W.R. Danbolt

TM 55-1520-211-10

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR'S MANUAL
ARMY MODELS UH-1A AND UH-1B
HELICOPTERS

HEADQUARTERS, DEPARTMENT OF THE ARMY

1965

HEADQUARTERS
DEPARTMENT OF THE ARMY
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TM 55-1520-211-10 is published for the use of all concerned.

By Order of the Secretary of the Army:

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Distribution

To be distributed in accordance with DA Form 12-31 requirements for operator's instructions for UH-1 aircraft.

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***This manual supersedes TM 55-1520-211-10, 13 July 1965, including C 1, 15 August 1965 and C 2, 7 September 1965.**

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

Section I — Scope

IMPORTANT

In order to obtain complete information and derive maximum benefits from this manual it is necessary to read this chapter carefully and thoroughly.

1-1. Purpose. TM 55-1520-211-10, issued expressly for operators, is an official document for Army Models UH-1A and UH-1B helicopters. Serial numbers of applicable helicopters tre as follows:

ARMY MODEL	SERIAL NO.
UH-1A	50-2078 thru 58-2093
	58-3017 thru 58-3047
	59-1607 thru 59-1716
	60-3530 thru 60-3545
UH-1B	60-3546 thru 60-3619
	61-686 thru 61-803
	62-1872 thru 62-2105
	62-4566 thru 62-4605
	62-12515 thru 62-12555
	63-8500 thru 63-8738
	63-12903 thru 63-12952
	64-13902 thru 64-14100
	64-14101 thru 64-14191
	65-9416 thru 65-9564

1-2. The purpose of this manual is to supply you with the latest information and performance data derived from flight test programs and operational experience. The study and use of this manual will enable you to peform the assigned duties and mission with maximum efficiency and safety.

1-3. Your ability and experience are recognized. Therefore, it is not the function of this manual to teach a pilot how to fly. Basic flight principles and elementary instructions are not included, the contents of this manual will provide you with a general knowledge of Army Models UH-1A and UH-1B helicopters, their flight characteristics and specific normal and emergency operating procedures.

1-4. Reports necessary to comply with the Army Aviation Safety Program are described in detail in AR 385-40.

1-5. Appendix I. This appendix contains a listing of all references that are applicable and available to the operator. The list includes official publications directly applicable to the Operator's Manual. All references called out in the text are reflected in this appendix.

1-6. Appendix II. This appendix consists of a page titled Appendix II, Maintenance Allocation Chart, and references the Maintenance Allocation Chart contained in TM 55-1520-211-20.

1-7. Appendix III. This appendix consists of a page titled Appendix III, Aircraft Inventory Master Guide, and references Appendix III, TM 55-1520-211-20.

1-8. Appendix IV. This appendix consists of a page titled Appendix IV, Operator's and Crewmember's Checklist. The checklist contains normal and emergency procedures to be performed by the pilot (and/or crewmember). The applicable checklist is not presented in this manual but is printed as a separate publication.

1-9. Index. The index lists, in alphabetical order, every important subject under the topic which may be of significance to the operator. This listing is not a repetition of paragraph titles, but an extensive listing of subjects which will aid the operator in his use of the manual.

Note

Do not destroy any page in this manual unless the data contained thereon has been replaced, superseded or included in the manual by change or revision.

Section II — General

1-10. Scope. The contents of this manual are arranged under Chapters and Sections as indicated in the Table of Contents. A brief description of each chapter is provided in Section I of the applicable chapters.

1-11. Where differences exist between a model or version, a code system has been used and is as follows:
No Code Letter—Applicable to UH-1A and UH-1B helicopters.

A	UH-1A helicopters
B	UH-1B helicopters (All)
B 5	UH-1B helicopters equipped with T53-L-5 engine.
B 9	UH-1B helicopters equipped with T-53-L-9 or T-53-L-9A engines.
B 11	UH-1B helicopters equipped with T53-L-11 or T53-L-11A engines.
5 4 0	UH-1B helicopters equipped with extended fuel and 540 rotor system.

1-12. Distribution and Revision System. a. Distribution, revision, and mandatory requirements are accomplished in accordance with AR 310-1.

b. Authorization for issue is accomplished in accordance with AR 310-3.

c. Notes, cautions, and warnings shall be used to emphasize important and critical instructions, and shall be used for the following conditions:

Note

On operating procedure, condition, etc., which is essential to highlight.

Caution

An operating procedure, practice, etc., which, if not strictly observed, will result in damage to or destruction of equipment.

Warning

An operating procedure, practice, etc., which, if not correctly followed, will result in personnel injury or loss of life.

1-13. Definitions. Refer to AR 310-3.

1-14. Reporting of Recommendations and Comments. The direct reporting of errors, omissions, and recommendations for improving this Equipment Manual by the individual user, is authorized and encouraged. DA Form 2028 will be used for reporting these improvements. This form may be completed using pencil, pen or typewriter. DA Form 2028 will be completed by the individual user and forwarded directly to: Commanding General, USAAVCOM, P.O. Box 209, Main Office, St. Louis, Mo. 63166.

1-15. Revisions to this manual shall be published when necessary to add, delete, revise or change. Frequency of revisions will be based on factual data accumulated as a result of maintenance experience. Data will be gathered by field studies, from equipment improvement recommendations, and from any other communications pertaining to the manual and its requirements.

Figure 1-1. ¾ View and three view UH-1B (typical)

CHAPTER 2
DESCRIPTION

Section I — Scope

2-1. Scope. The function of chapter 2 is to describe the helicopter and all its systems and controls which contribute to the physical act of flying the helicopter.

2-2. Included in this chapter is all the emergency equipment that is not part of the auxiliary system. This chapter contains description only. The procedures are covered elsewhere in this manual.

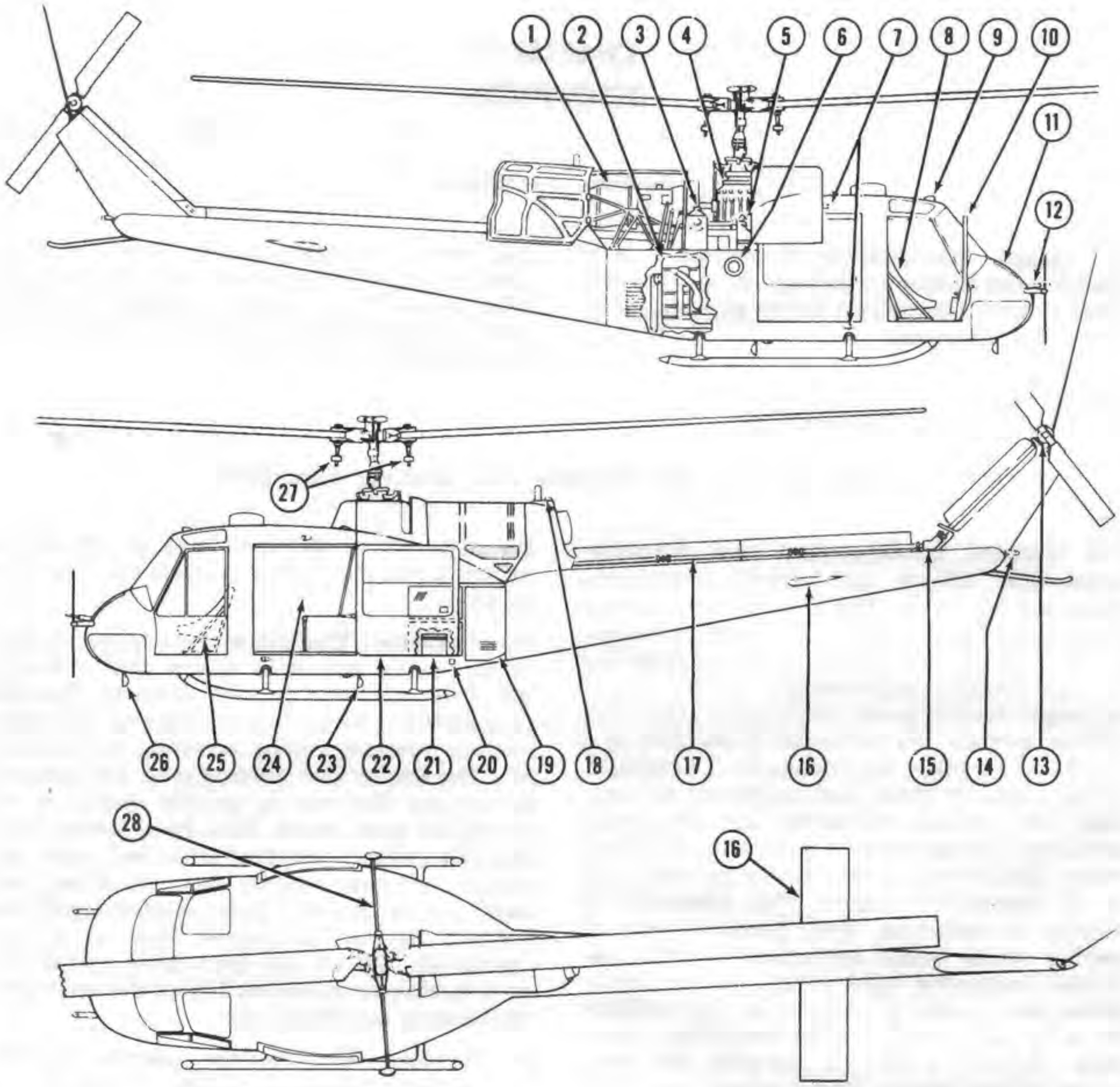
Section II — Aircraft Systems and Controls Description

2-3. General Configuration and Arrangement. The UH-1A and UH-1B helicopters, manufactured by the Bell Helicopter Company, are military type aircraft of a compact design, featuring a low silhouette and low vulnerability to meet combat requirements. A wide cargo-passenger compartment, with large cubic foot volume, permits the helicopter to be used in a variety of services: for transport of personnel, special teams or crews, and equipment and supplies; for medical evacuation and emergency ambulance service between medical installations where fixed-wing aircraft cannot be used; and as an instrument trainer. This helicopter is capable of operating from prepared take-off landing areas, under instrument (IFR) conditions (including light icing), day or night. It can also be used to navigate by dead reckoning or by use of radio aids to navigation. Maximum visibility is afforded the pilot and crew by use of transparent plastic panels at the top, front, bottom, and sides of the cabin.

2-4. *Access*. Entrance is accomplished by means of four doors. Crew entrance is through the two swing-hinged doors located in the forward cabin next to the pilot's and copilot's stations. Entrance to the cargo-passenger area aft of the pilot's and copilot's stations is accomplished by means of two large sliding doors, one on each side of the aft cabin area. The cargo-passenger area provides seating for passengers or troops. Removing the passenger seats and the copilot's seat provides an unrestricted loading space for cargo or equipment transportation. For medical evacuation and ambulance service, the area aft of the crew may be utilized to accommodate three litter patients and a medical attendant.

2-5. *Propulsion*. The propulsion system consists of the engine and drive system and is located aft of the cabin and mounted above the fuselage on a platform which provides footing for maintenance personnel while servicing the helicopter. The engine and drive system are enclosed by cowling that can be quickly opened or removed for easy access. This drive system with its independently mounted units and quick disconnect couplings, allows rapid servicing, and repair or replacement under combat conditions without the use of special tools or ground equipment. Use of this type drive system results in maximum availability of the helicopter for mission accomplishment.

2-6. *Airframe*. The fuselage consists of two main sections, the forward (cabin) section, and the aft (tail boom) section. The forward fuselage section consists primarily of two longitudinal beams with transverse bulkheads and metal covering. The beams provide the supporting structure for the cabin sections, landing gear, fuel tanks, transmission, engine, and tail boom and are attaching points for the external cargo suspension unit. The aft (tail boom) section is a semimonocoque structure with metal covering and attaches to the forward fuselage section with bolts to allow easy removal for repair or replacement. The rear of the tail boom supports the tail rotor, vertical fin, and synchronized elevator. The landing gear is of the skid type, attached to the fuselage



1. Engine
2. Heating Unit
3. Oil Reservoir
4. Transmission
5. Hydraulic Oil Reservoir
6. Fuel Tank Filler
7. Navigation Lights
8. Pilots Station
9. Cabin Ventilator
10. Pilots Door
11. Electronic Equipment Compartment
12. Pilot Tube
13. Tail Rotor (90°) Gear Box
14. Aft Navigation Light
15. Tail Rotor Intermediate (42°) Gear Box
16. Synchronized Elevator
17. Tail Rotor Drive Shaft
18. Anti Collision Light
19. Electrical Equipment Compartment
20. External Power Receptacle
21. Battery
22. Passenger - Cargo Door
23. Landing Light
24. Passenger - Cargo Compartment
25. Copilots Station
26. Search Light
27. Collective Counterweights
28. Stabilizer Bar

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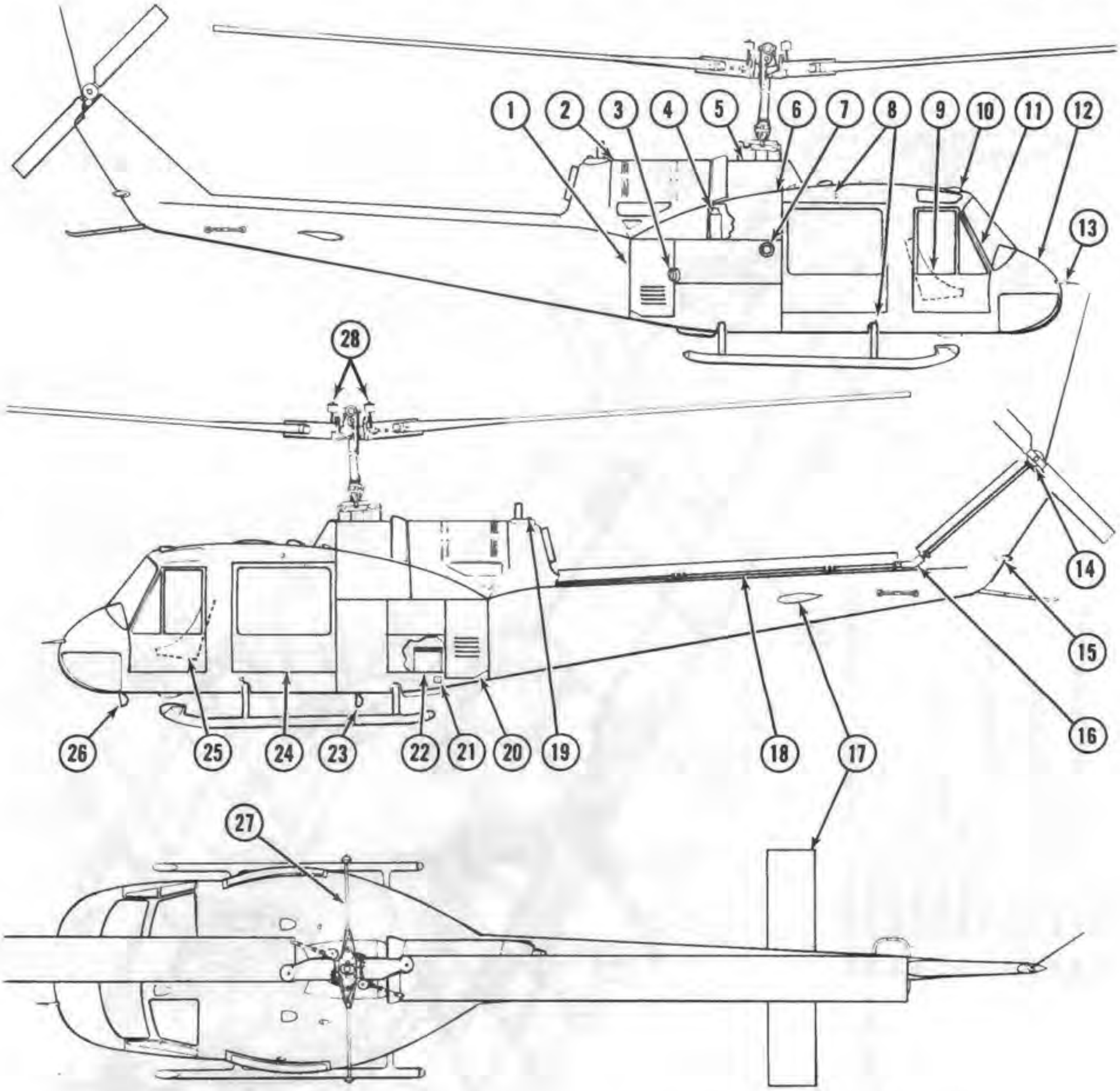
Figure 2–1. General arrangement (UH-1A) (Sheet 1 of 3)



1. Aft Cargo
2. Engine Compartment
3. Heating Burner & Blower Unit
4. Oil Reservoir
5. Transmission
6. Hydraulic Oil Reservoir
7. Fuel Tank Filler
8. Navigation Light (4)
9. Pilot's Station
10. Cabin Ventilator (4)
11. Pilot's Entrance Door
12. Electronic Equipment Compartment
13. Pitot Tube
14. Tail Rotor (90°) Gear Box
15. Aft Navigation Light
16. Tail Rotor Intermediate (42°) Gear Box
17. Synchronized Elevator
18. Tail Rotor Drive Shaft
19. Anti-Collision Light
20. Elextrical Equipment Compartment
21. External Power Receptacle
22. Battery
23. Landing Light
24. Cargo-Passenger Compartment
25. Copilot's Station
26. Search Light
27. Stabilizer Bar
28. Collective Counterweights

204900-31A

Figure 2-1. General arrangement (UH-1B) (Sheet 2 of 3)

1. Pilot's Station
2. Pitot Static Tube
3. Cabin Ventilators
4. Hydraulic Reservoirs
5. Oil Reservoir
6. Transmission
7. Stabilizer Bar
8. Anti Collision Light
9. Tail Rotor Drive Shaft
10. Synchronized Elevator
11. Tail Rotor Intermediate (42°) Gear Box
12. Tail Rotor (90°) Gear Box
13. Aft Navigation Lights
14. Engine
15. Electrical Equipment Compartment
16. Fuel Tank Filler
17. External Power Receptacle
18. Battery
19. Cargo Passenger Compartment
20. Landing Light
21. Forward Navigation Lights
22. Copilot's Station
23. Search Light
24. Cargo Mirror
25. Electronic Equipment Compartment

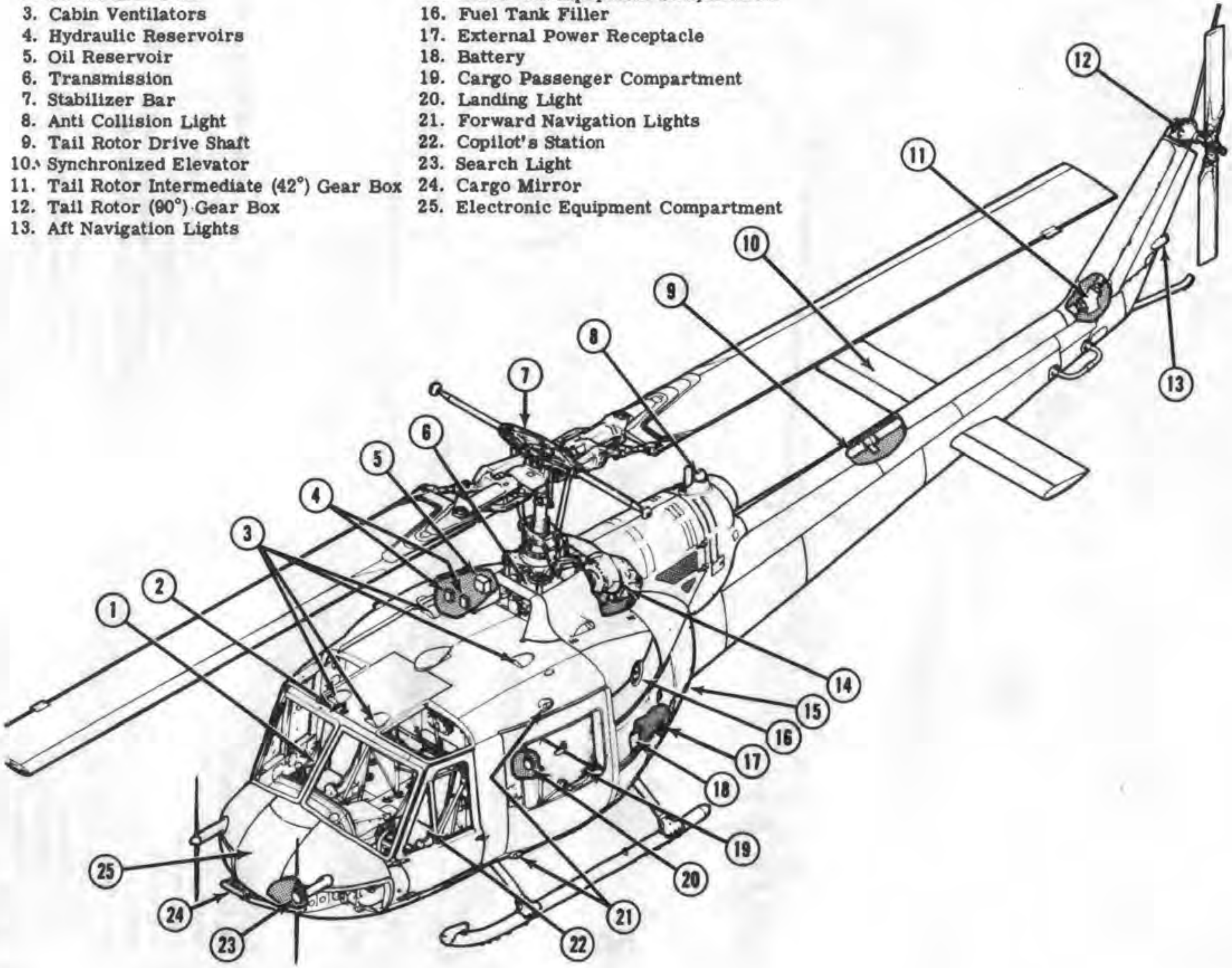


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Figure 2-1. General arrangement (UH-1B 540) (Sheet 3 of 3) at four points. Ground handling wheels are provided in the loose equipment and are quickly installed for moving the helicopter on the ground or removed to present a clean configuration for flight. The helicopter can be flown with cargo doors full open at 120 knots. The main differences are shown in table 2-2.

2-7. Crew Configuration. The crew required for operation of the helicopter consists of the pilot alone, pilot and medical attendant, or pilot and copilot, depending on the mission assigned.

2-8. Principal Dimensions — Maximum. Maximum dimensions of the helicopter are as specified in table 2-1.

2-9. Weights. The helicopter weight empty and gross operating weight will change according to the configuration or equipment installed for the type of mission to be performed. Refer to chapter 12, Weight and Balance Computation.

2-10. Engine. The UH-1A helicopter is equipped with the T53-L-1 or 1A engine and the UH-1B helicopter is equipped with either the T53-L-5, -9, -9A, or -11 engine and **B** **C** **D** T53-L-11 engine. The engines are similar in design and, except for stated differences (see table 2-3, will be treated as one engine in the description. The turbine engine and its accessories are located aft of the cabin and mounted on a platform deck to provide maximum accessibility for servicing and maintenance (figure 2-2). The complete engine and power transfer system is enclosed in an easily opened or quickly removable lightweight cowling. This engine is a free turbine type designed for low fuel consumption, minimum size and weight, and maximum performance.

2-11. Principles of Operation. The engine consists of a reduction gear section, an axial-centrifugal compressor, a diffuser, a combustion chamber, a first stage turbine, a second stage (free power) turbine, a power shaft, and an exhaust diffuser. The compressor consists of five axial stages and one centrifugal impeller, which produces a six to one compression ratio. The first stage turbine drives the compressor and the second stage turbine drives the power shaft. An acceleration airbleed assembly mounted on the axial compressor section improves engine performance during starts and acceleration. The power shaft extends coaxially through the compressor rotor, and drives the reduction gearing at the forward end of the engine. Power is extracted through an internally-splined output gear shaft driven by the reduction gearing. The through shaft arrangement permits mounting the accessory drives and power take-offs on the inlet housing, at the cool end of the engine, thus avoiding the problems of a hot end drive.

2-12. The free-power part of the engine eliminates the need for a clutch and provides free, smooth, and trouble-free engagement of the helicopter's rotor.

A The T53-L-1 and -1A engines are rated at 770 hp at 6200 to 6400 rpm for maximum continuous power minus installation losses.

B The T53-L-5 engine is rated at 825 hp at 6400 to 600 rpm for maximum continuous power minus installation losses.

B The T53-L-9, -9A, and -11 engines are rated at 900 hp at 6600 rpm for maximum continuous power minus installation losses.

2-13. The T53-L-9A engine is the same as the T53-L-9, except for relocation of the bleed air take-off point. On the T53-L-9 engine, the bleed air is taken from the inlet side of the impeller and delivered through a port on the top of the compressor housing. On the T53-L-9A and -11 engines, bleed air for driving the oil cooling fan and for heating purposes is taken from the outlet side of the impeller.

2-14. Engine Fuel Control System. The engine fuel system consists of the engine fuel regulator and engine overspeed governor, solenoid valve, starting-and main fuel manifolds, igniter nozzles, fuel vaporizers, and igniter plugs. The electrical cable assembly is connected to the fuel system at two points, at the solenoid valve and at the main fuel control assembly. The coil and lead assembly connect to the igniter plugs. From the helicopter fuel tanks, fuel enters and passes through the fuel regulator assembly to the starting and main discharge ports. The starting fuel flows to a solenoid valve which is wired in with the ignition system. Energizing the ignition system actuates the solenoid valve, which allows starting fuel to enter the starting fuel manifold and combustion chamber through five (T53-L-1, -1A, -5, -9 and -9A unmodified engines) or two (T53-L-9A and -11 modified engines) igniter nozzle assemblies. Two igniter plugs initiate the flame. After combustion occurs and the ignition system is de-energized, the solenoid valve shuts off the starting fuel flow. Main fuel is delivered to the main fuel system when the engine rpm is great enough to deliver minimum fuel pressure. Main

LENGTH	A	B	540
Overall (Main Rotor Fore and Aft and Tail Rotor Horizontal)	52 ft. 10.24 in.	52 ft. 8.84 in.	52 ft. 8.84 in.
Overall (Main Rotor Fore and Aft and Tail Rotor Vertical) to end of tail skid	49 ft. 8.84 in.	49 ft. 9.34 in.	49 ft. 9.34 in.
Nose of Cabin to Tail Skid	36 ft. 6.35 in.	36 ft. 6.35 in.	36 ft. 6.35 in.
Nose of Cabin to Tail Rotor Horizontal	42 ft. 7.25 in.	42 ft. 7.85 in.	42 ft. 7.85 in.
Skid Gear	10 ft. 9.9 in.	10 ft. 9.9 in.	10 ft. 9.9 in.
WIDTH			
Skid Gear	8 ft. 4.44 in.	8 ft. 4.44 in.	8 ft. 9.9 in.
Synchronized Elevator	9 ft. 4.0 in.	9 ft. 4.0 in.	9 ft. 4.0 in.
Stabilizer Bar	9 ft. 0.5 in.	9 ft. 0.5 in.	9 ft. 0.5 in.
HEIGHT (To Static Ground Line)		Serial No. 60-3546 thru 60-3619 and 61-686 thru 61-752	Serial No. 64-14101 thru 64-14191
Tip of Main Rotor Forward Blade to Ground	7 ft. 7.0 in.	8 ft. 4.62 in. Serial No. 61-753 thru 63-13089 7 ft. 3.0 in. Serial No. 64-13902 thru 64-14100 8 ft. 4.62 in.	5 ft. 10.5 in.
Top of Stabilizer Bar Weight to Ground	11 ft. 5.07	Serial No. 60-354 thru 60-3619 and 61-686 thru 61-752 13 ft. 0.0 in. Serial No. 61-753 thru 63-13089 12 ft. 11.0 in. Serial No. 64-13902 thru 64-14100 12 ft. 5.28 in.	Serial No. 64-14101 thru 64-14191 12 ft. 8.0 in.
Tip of Main Rotor Blade Static Position	11 ft. 4.57 in.	Serial No. 60-3546 thru 60-3619 and 61-686 thru 61-752 13 ft. 2.02 in. Serial No. 61-753 thru 63-13089 11 ft. 10.0 in. Serial No. 64-13902 thru 64-14100 13 ft. 2.02 in.	Serial No. 64-14101 thru 64-14191 11 ft. 10.5 in.

Table 2-1. Principal dimensions maximum (Sheet 1 of 2)

HEIGHT (Cont)	A	B	540
Tip of Forward Main Rotor Blade, Tied Down Position	15 ft. 2.04 in.	Serial No. 60-3546 thru 60-3619 and 61-686 thru 61-752 18 ft. 9.54 in. Serial No. 61-753 thru 63-13089 16 ft. 4.0 in. Serial No. 64-13902 thru 64-14100 18 ft. 9.54 in.	Serial No. 64-14101 thru 64-14191 16 ft. 5.0 in.
Tip of Tail Rotor Blade, Vertical Position	13 ft. 10.2 in.	Serial No. 60-3546 thru 60-3619 and 61-686 thru 61-752 14 ft. 7.0 in. Serial No. 61-753 thru 63-13089 15 ft. 8.0 in. Serial No. 64-13902 thru 64-14100 14 ft. 7.0 in.	Serial No. 64-14101 thru 64-14191 14 ft. 9.0 in.
Tail Skid to Ground	3 ft. 10.8 in.	Serial No. 60-3546 thru 60-3619 and 61-686 thru 61-752 3 ft. 10.8 in. Serial No. 61-753 thru 63-13089 5 ft. 3.0 in. Serial No. 64-13902 thru 64-14100 3 ft. 10.8 in.	Serial No. 64-14101 thru 64-14191 4 ft. 9.0 in.
Top of Chinese Weight to Ground		Serial No. 60-3546 thru 60-3619 and 61-686 thru 61-752 Serial No. 61-753 thru 63-13089 13 ft. 2.5 in. Serial No. 64-13902 thru 64-14100 12 ft. 7.28 in.	
Cabin Base to Ground	1 ft. 2.5 in.	1 ft. 0.0 in.	1 ft. 2.0 in.
DIAMETERS			
Main Rotor	43 ft. 9.0 in.	44 ft. 0.0 in.	44 ft. 0.0 in.
Tail Rotor	8 ft. 4.8 in.	8 ft. 6.0 in.	8 ft. 6.0 in.
Stabilizer Bar	9 ft. 0.5 in.	9 ft. 0.5 in.	9 ft. 0.5 in.

Table 2–1. Principal dimensions maximum (Sheet 2 of 2)

Table 2–2. Main differences

ITEM	UH-1A	UH-1B	UH-1B Serial No. 64-14101 & Subsequent
Main Rotor	15 Inch Blade Chord	21 Inch Blade Chord and Longer Mast	27 Inch Blade Chord with 540 Rotor System
Power Plant	Lycoming T53-L-1A	Lycoming T53-L-5, L-9, L-9A or L-11	Lycoming T53-L-11
Radio Equipment	AN/ARN-30A Omni Receiver AN/ARN-32 Marker Beacon	AN/ARN-30D Omni Receiver R-1041/ARN Marker Beacon	AN/ARN-30E Omni Receiver R-1041(A)/ARN Marker Beacon
Cabin Interior	12 Tie-Down Fittings on Floor. First Aid Kit on Aft Bulkhead.	27 Tie-Down Fittings on Floor. Three First Aid Kits on Door Posts.	32 Tie-Down Fittings on Floor. Three First Aid Kits on Door Posts.
Fuel Capacity	155 Gallons	165 Gallons	242 Gallons

fuel flow is maintained as the engine flame is propagated. After an engine shutdown, a pressure-actuated valve automatically drains any remaining unburned fuel from the combustion chamber. Engine fuel control is accomplished by a hydro-mechanical type fuel control system consisting of a fuel regulator assembly and overspeed governor assembly. An emergency fuel metering system is also provided as an integral part of the fuel control system. The fuel control regulator assembly supplies metered fuel to the solenoid valve and to the engine starting and main fuel manifolds by means of a fuel metering pump. A main governor, incorporated in the regulator assembly, determines the rate at which metered fuel is supplied to the engine in relation to the gas producer turbine speed (nI), altitude, compressor inlet temperature, and manual throttle selection. The regulator assembly limits engine fuel flow to the maximum permissible rate under all operating conditions. The overspeed governor assembly is mounted on the fuel control regulator assembly and functions to reduce the fuel flow when power turbine speed (nII) exceeds the selected rpm.

2-15. *Fuel Control System Operation.* Fuel flow control is accomplished by operation of

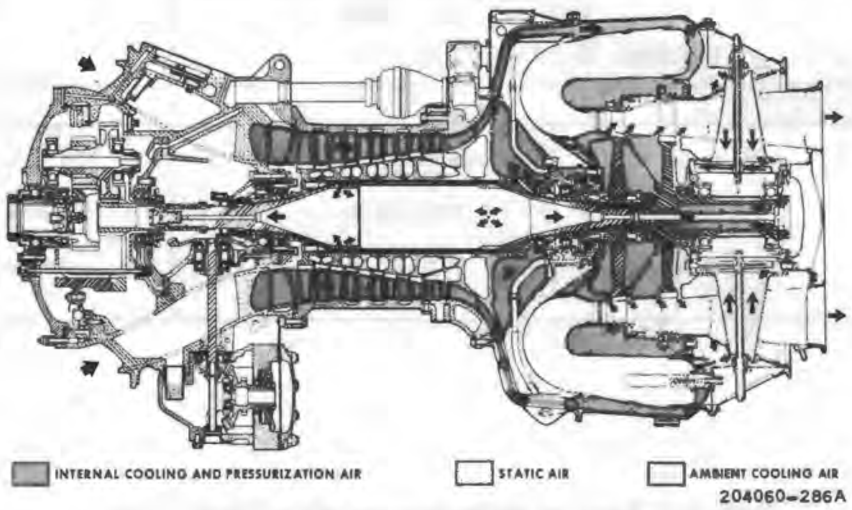


Figure 2–2. Engine airflow - typical

Table 2-3. Engine differences

MILITARY DESIGNATION	T53-L-1A	T53-L-5	T53-L-9	T53-L-9A	T53-L-11
Bell Application	UH-1A	UH-1B	UH-1B	UH-1B	UH-1B
SHP, T/O (Min)		960	1100	1100	1100
SHP, Military (Min)	860	900	1000	1000	1000
SHP, Normal Rated (Min)	770	825	900	900	900
Dry Weight	484	487	485	490	505
Acceleration, 60% to 90% nI	5 Sec (Max)	5 Sec (Max)	5 Sec (Max)	5 Sec (Max)	4 Sec (Max)
Combustor	Scoops Uncoated	Scoops Uncoated	Scoops Coated	Scoops Coated	Scoopless Uncoated
Customer Air Extraction	Compressor	Compressor	Compressor	Diffuser	Diffuser

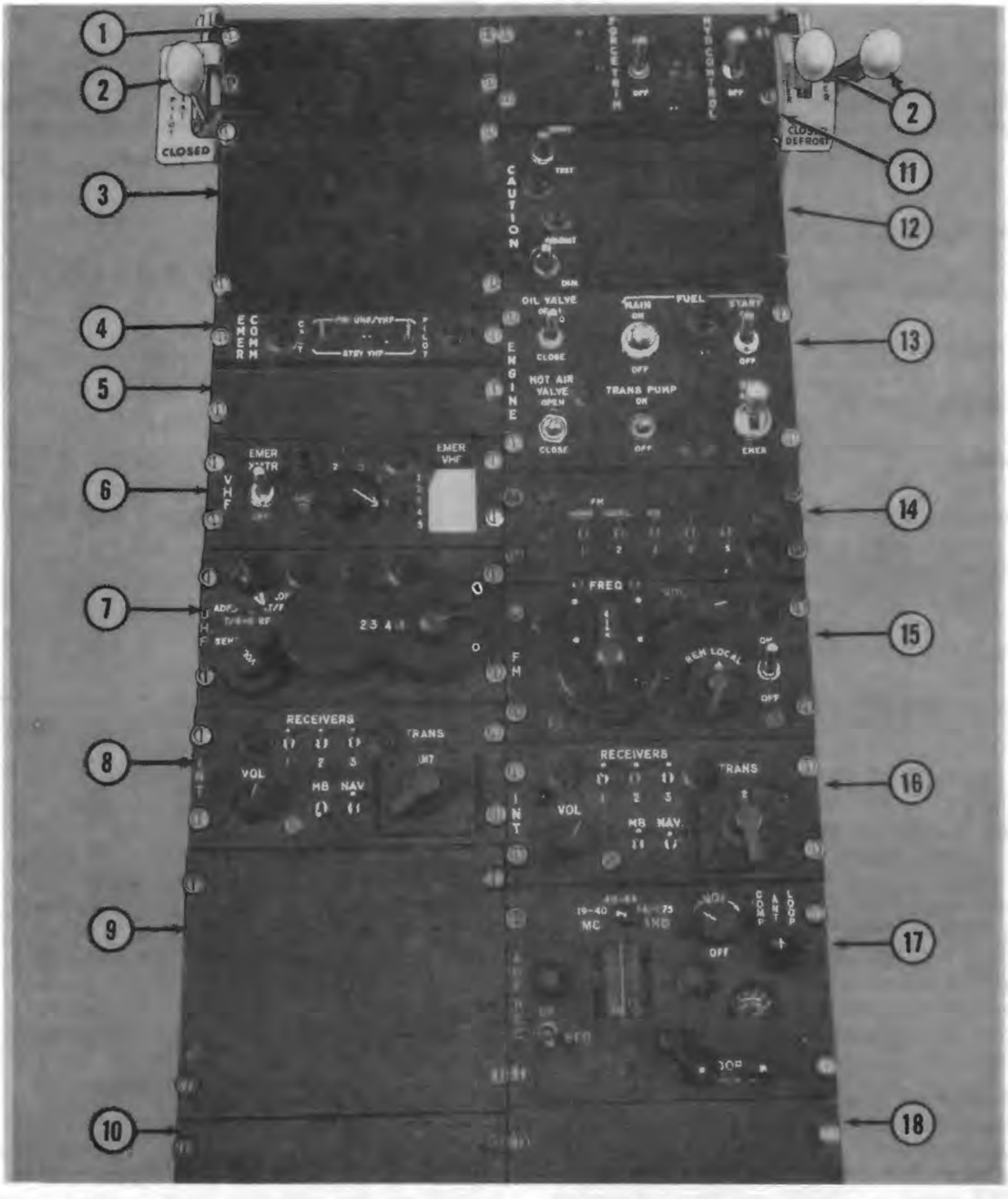
switches located on the pedestal-mounted ENGINE control panel (See figure 2-3). The panel contains two FUEL switches (MAIN ON/OFF and START ON/OFF), two INT FUEL TRANS PUMP switches (LEFT/OFF and RIGHT/OFF), and a GOV AUTO/EMER switch. The engine fuel and power control system permits the pilot to obtain maximum performance from the engine with a minimum of attention.

2-16. *Emergency Fuel Flow.* The switchover to emergency fuel flow is accomplished by retarding the power control (throttle) to flight idle, moving the GOV AUTO/EMER switch on the ENGINE panel to EMER, and then advancing the power control to operational rpm. The emergency control manually meters fuel to the engine without the incorporation of any automatic features. It is possible to fly the helicopter by utilizing smooth, coordinated use of the rotating power control. When operating on emergency control, it is possible to overspeed the gas producer turbine and the power turbine, and to exceed redline tailpipe temperature.

Note

Retarding the power control to 60 percent gas producer rpm or flight idle detent position before switching to emergency control will effect a satistory changeover at any altitude. At lower altitudes (below 10,000 feet) satisfactory emergency switchover may be made by retarding the power control under a reduction of (nII) rpm is noted and then switching to emergency.

2-17. *Power Control (Throttle).* The rotating griptype power controls (See figure 2-4) are located on the collective pitch control levers (pilot and copilot). The power control is a simple single throttle grip which is used for starting engine, adjusting to flight idle, autorotational landings, and in full decrease serves as idle cutoff. The throttle grip is rotated to the left to increase or to the right to decrease power. Friction can be induced into the throttle grip by rotating the ring at the upper end of the throttle grip. Rotating the ring to the left increases friction in the system and prevents



1. Cover Plate
2. Manual Heater Control
3. Cover Plate
4. Emergency Communication Panel
5. Cover Plate VHF Navigation Control Panel
6. VHF Control Panel (Emergency)
7. UHF Transceiver Panel
8. Signal Distribution Panel
9. Cover Plate
10. Cover Plate
11. Hydraulic Control Panel
12. Caution Panel
13. Engine Control Panel
14. Switch Panel Assembly - AN/ARC-44
15. FM AN/ARC-44 Control Panel
16. Signal Distribution Panel
17. ADF Receiver Panel
18. Cover Plate

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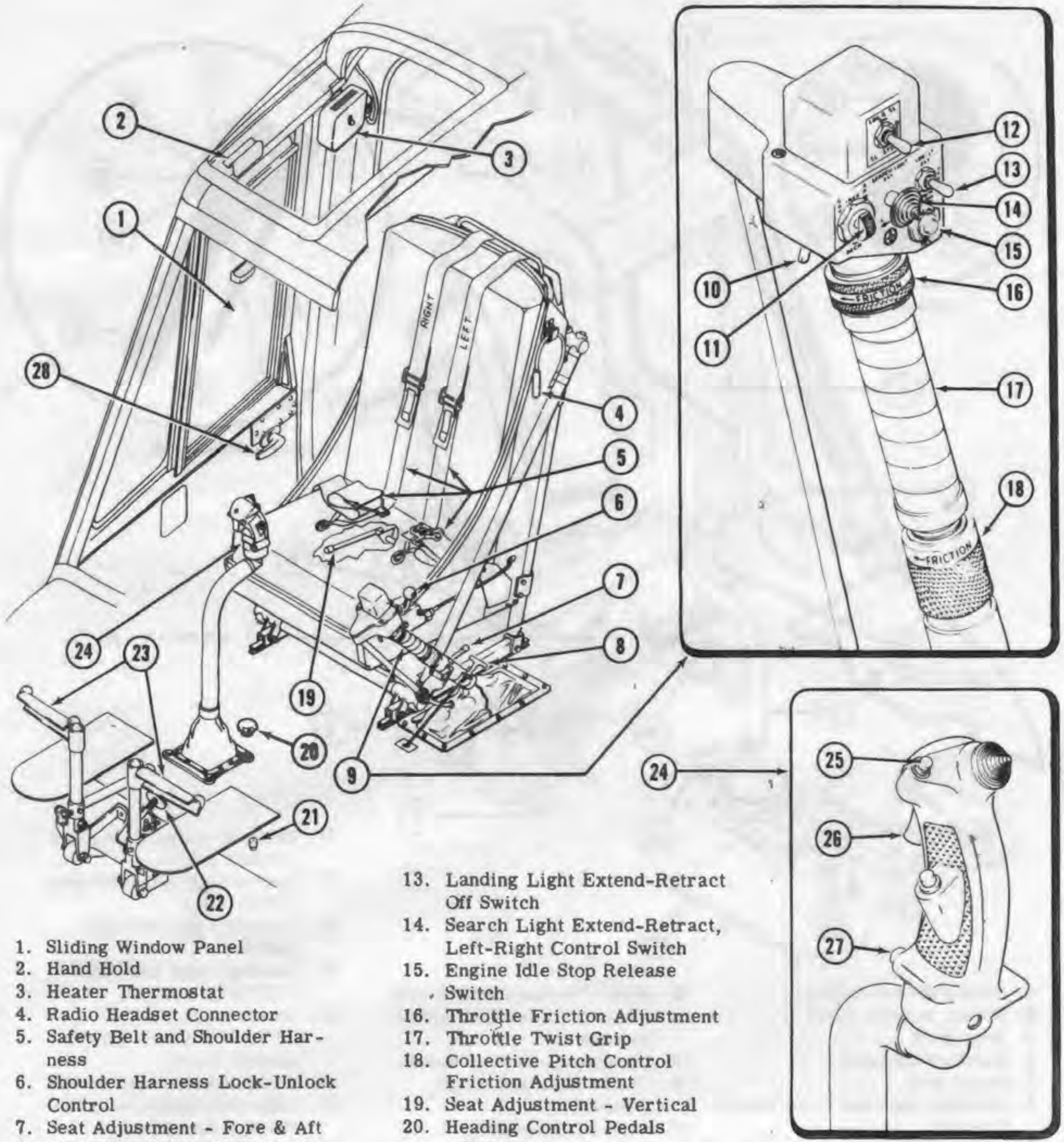
Figure 2–3. Pedestal panels installation – Typical



1. Sliding Window Panel
2. Hand Hold
3. Heater Thermostat
4. Radio Headset Connector
5. Safety Belt and Shoulder Harness
6. Shoulder Harness Lock-Unlock Control
7. Seat Adjustment - Fore & Aft
8. Collective Pitch, Down Lock
9. Collective Pitch, Control Lever
10. Starter-Ignition Trigger Switch
11. Governor RPM Increase-Decrease Switch
12. Landing & Search Lights ON-Off & Search Light Stow Switch
13. Landing Light Extend-Retract Off Switch
14. Search Light Extend-Retract, Left-Right Control Switch
15. Engine Idle Stop Release Switch
16. Throttle Friction Adjustment
17. Throttle Twist Grip
18. Collective Pitch Control Friction Adjustment
19. Seat Adjustment - Vertical
20. Heading Control Pedals Adjuster
21. Microphone Intercom-Transmit Foot Switch
22. External Cargo Manual Release
23. Heading Control Pedals
24. Cyclic Control Stick
25. Force Trim Switch
26. Microphone Intercom-Transmit Trigger Switch
27. External Cargo Electric Release Switch
28. Door Handle

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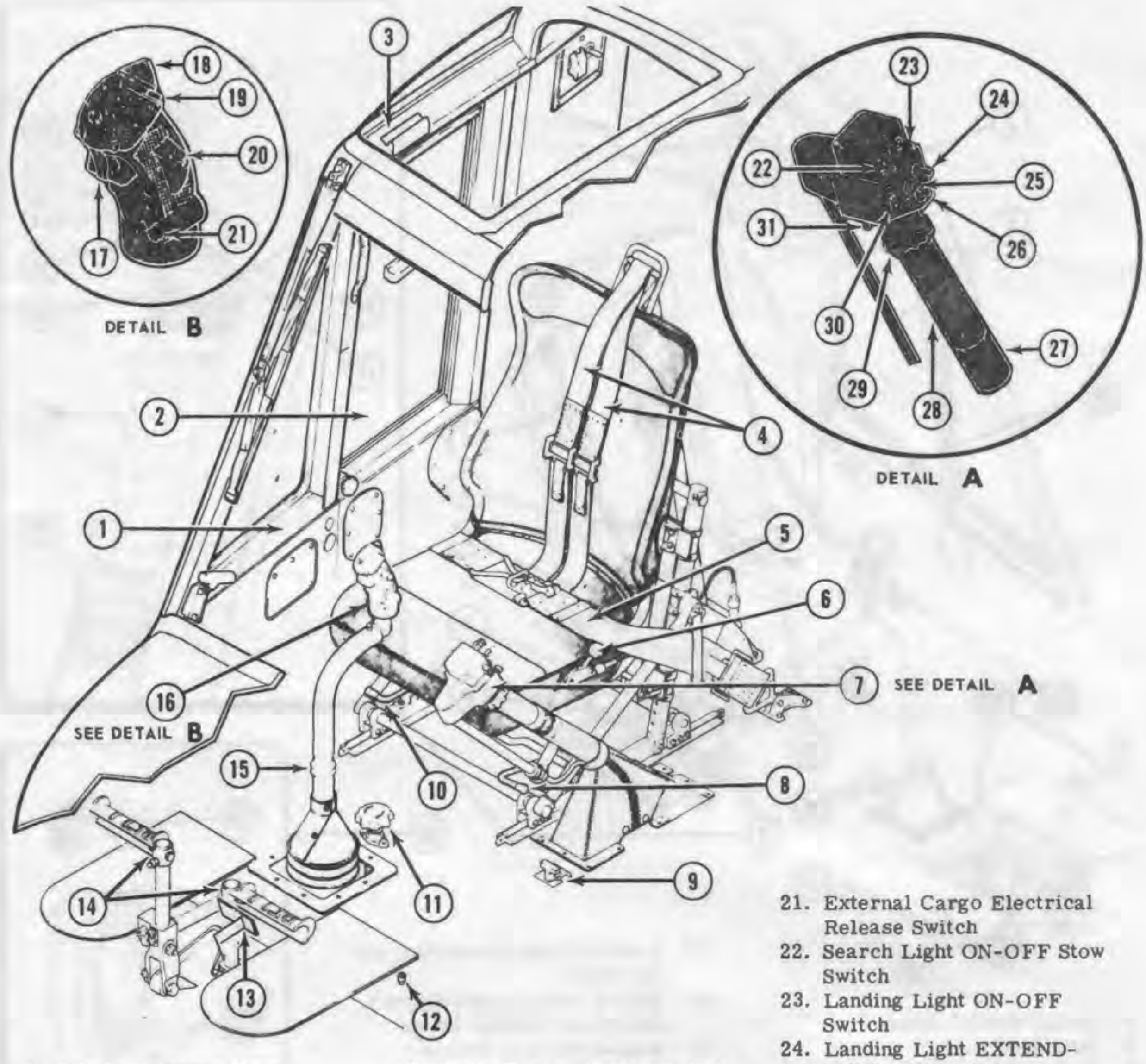
Figure 2–4. Pilot's station (UH-1A) (Sheet 1 of 2)



1. Pilot's Entrance Door
2. Sliding Window Panel
3. Hand Hold
4. Shoulder Harness
5. Safety Belt
6. Shoulder Harness Lock-Unlock Control
7. Collective Pitch Control Lever
8. Seat Adjustment Fore and Aft
9. Collective Pitch Down Lock
10. Seat Adjustment Vertical
11. Directional control Pedal Adjuster
12. Radio Transmit Foot Switch
13. External Cargo Mechanical Release
14. Directional Control Pedals
15. Cyclic Control Friction Adjuster
16. Cyclic Control Stick
17. Radio Transmit, ICS Trigger Switch
18. ASW-12 Directional Switch
19. Force Trim Switch
20. Armament Fire Control Switch
21. External Cargo Electrical Release Switch
22. Search Light ON-OFF Stow Switch
23. Landing Light ON-OFF Switch
24. Landing Light EXTEND-RETRACT Switch
25. Search Light EXTEND-RETRACT LEFT-RIGHT Control Switch
26. Engine Idle Release Switch
27. Collective Pitch Control Friction Adjuster
28. Throttle Twist Grip
29. Throttle Friction Adjuster
30. Governor RPM INCREASE-DECREASE Switch
31. Starter Ignition Trigger Switch

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Figure 2–4. Pilot's station (UH-1B) (Sheet 2 of 2) grip creepage during long flights. A 28-volt DC powered solenoid-operated idle detent is incorporated in the throttle to prevent inadvertent closing of the throttle during flight or ground run. To bypass the idle detent, depress and hold the engine idle release switch until gas producer speed of 40 to 44 percent rpm is obtained, then release switch and close throttle. The idle detent limits only the decrease rotation of the rotating grip. Under normal flight conditions the power plant free power turbine rpm speed is controlled by the power turbine speed governor. The gas producer speed governor safeguards the engine against overloading: and on acceleration and deceleration, the control prevents engine damage or combustion blowout due to sudden changes in power selection made at any rate and in any sequence.

2-18. *Starter-Ignition System.* Combination starter-ignition trigger-actuated snap switches (figure 2-4) (pilot and copilot) are mounted on the undersides of the collective pitch control lever switch boxes. Both the starter and ignition unit circuits are wired to these trigger switches, as the engine ignition will only be required while accomplishing engine starts.

2-19. *Power Supply.* The circuits are supplied power from the 28-volt DC essential bus. The starter circuit is actuated when the STARTER/GEN switch is in START position and the trigger switch (figure 2-4) is pulled. The ignition circuit is actuated when the FUEL MAIN ON/OFF switch on the ENGINE control panel is ON and the trigger switch is pulled.

2-20. *Governor RPM Switch.* The GOV RPM INCR/DECR switch is mounted in a switch box attached to the end of the collective pitch control lever (figure 2-4). The switch is a three-position momentary type and is held up in INCR position to increase the power turbine (nII) speed or down to DECR position to decrease the power turbine (nII) speed. Regulated power turbine speed may be adjusted in flight, through the operating range of 6000 to 6700 rpm, by movement of the switch as required. Electrical power for circuit operation is supplied by the 28-volt DC essential bus.

2-21. *Droop Compensator.* A droop compensator is installed on the governor control to maintain nII speed, as power is increased, to the rpm value selected by the pilot. (Refer to Chapter 9.) Governor droop should not be confused with rpm variations due to the acceleration-deceleration limiters (transient droop), or exceeding maximum power limits. Rapid movements of the collective control stick may require power changes at a rate in excess of the capabilities of the engine.

2-22. *Engine Idle Release Switch.* The ENGINE IDLE REL switch (figure 2-4) is pushbutton momentary-on type switch mounted in a switch box attached to the end of the collective pitch control lever. The pushbutton switch operates on electrical solenoid with a retractable plunger. The solenoid is mounted so that the plunger acts as a stop in the power control system linkage. The stop prevents the pilot from accidentally retarding the power control beyond the flight idle position. This acts as a safety feature by preventing inadvertent engine shutdown. The switch need not be depressed when performing an engine start or runup; however, the switch must be depressed when accomplishing an engine shutdown or when it is desired to retard the power control below the flight idle position. Electrical power for circuit operation is supplied by the 28-volt DC essential bus. Circuit protection is provided by IDLE STOP REL circuit breaker on the DC circuit breaker panel (See figure 2-12.)

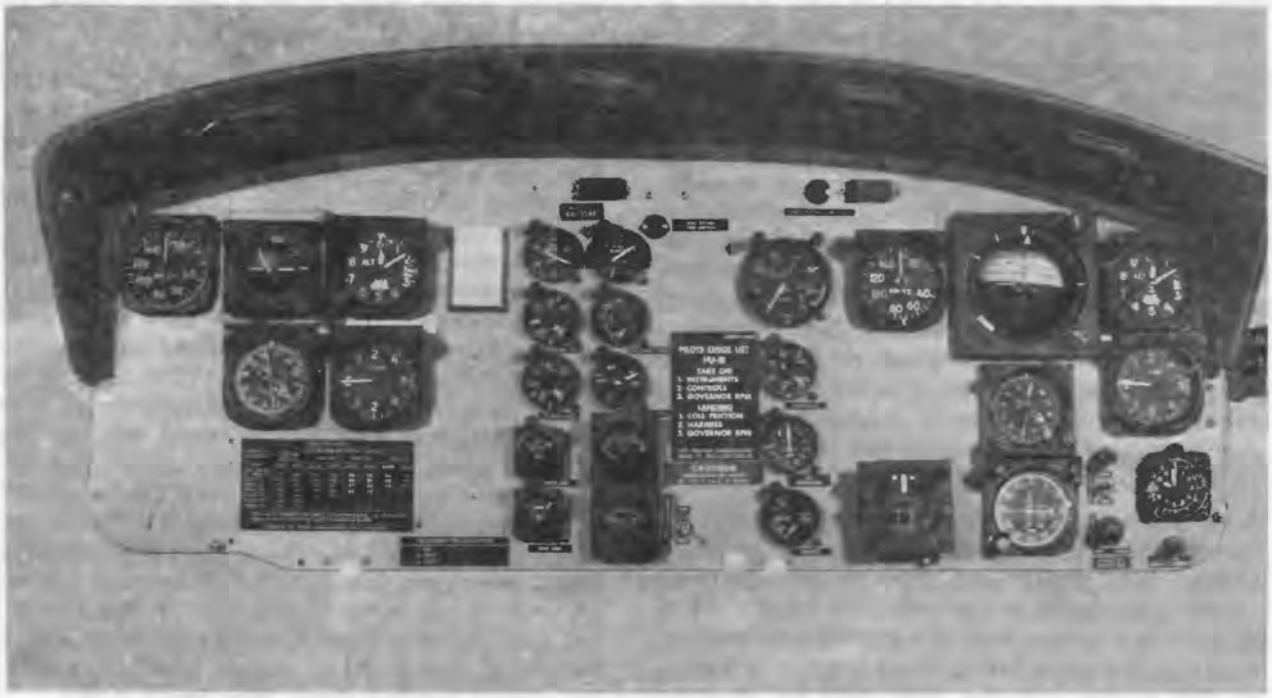
2-23. *Engine Instruments and Indicators.* All engine instruments and indicators are mounted in the instrument panel (see figure 2-5). The engine instruments and indicators consist of the following: torquemeter, exhaust gas temperature indicator, dual tachometer, gas producer tachometer indicator, engine oil pressure indicator, engine oil pressure low caution light, engine oil temperature indicator, fuel quantity indicator, fuel gage test switch, fuel quantity caution light, fuel pressure indicator, and engine fuel pump caution light.

2-24. *Torquemeter.* A low pressure torquemeter indicator is located on the instrument panel (see figure 2-5) and is connected to a transmitter which is part of the engine oil system. The torquemeter indicates torque pressure in psi readings of the torque imposed upon the engine output shaft. The torquemeter circuit is powered by 28 volts ac and is protected by a circuit breaker located on the ac circuit breaker panel mounted on the right side of the pedestal. (See figure 2-13.)

Note

> To convert torque pressure to horsepower multiply Torque X nII rpm X 0.00352.

2-25. *Exhaust Temperature Gage.* An exhaust temperature gage (see figure 2-5) is located



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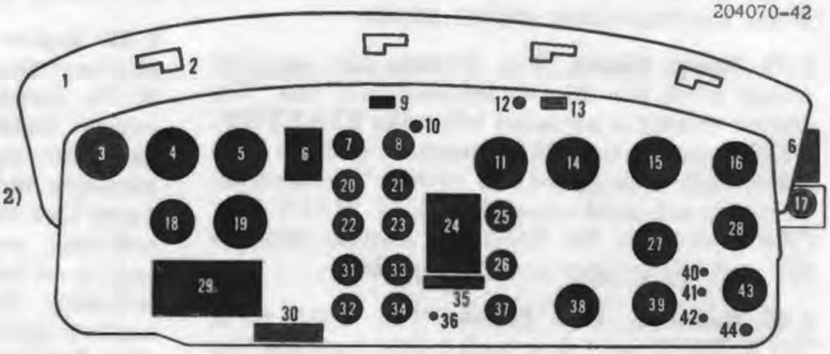


1. Glare Shield
2. Secondary Lights (4)
3. Airspeed Indicator
4. Attitude Indicator
5. Altimeter
6. Compass Correction Card Holder (2)
7. Fuel Pressure Indicator
8. Fuel Quantity Indicator
9. Master Caution Light
10. Fuel Gage Test Switch
11. Dual Tachometer
12. Fire Detector Test Switch
13. Fire Warning Indicator Light
14. Airspeed Indicator
15. Attitude Indicator
16. Altimeter
17. Standby Compass
18. Radio Magnetic Compass Indicator
19. Vertical Velocity Indicator
20. Engine Oil Pressure Indicator
21. Engine Oil Temperature Indicator
22. Transmission Oil Pressure Indicator
23. Transmission Oil Temperature Indicator
24. Pilot's Check List
25. Torque Meter
26. Gas Producer Tachometer
27. Radio Magnetic Compass Indicator
28. Vertical Velocity Indicator
29. Operating Limits Decal
30. Transmitter Selector Decal
31. Loadmeter - Main Generator
32. Loadmeter - Standby Generator
33. DC Voltmeter
34. AC Voltmeter
35. Engine Caution Panel
36. Compass Slaving Switch
37. Exhaust Temperature Indicator
38. Turn and Slip Indicator
39. Omni Indicator
40. Marker Beacon Light
41. Sensing Switch - Marker Beacon
42. Volume Control - Marker Beacon
43. Clock
44. Cargo Release Armed Light

Figure 2–5. Instrument panel – typical (UH-1B) on the instrument panel. The gage receives temperature indications from the bayonet type thermocouples mounted in the engine exhaust diffuser section. The gage temperature indications are in degrees centigrade and electrical power is not required as the system is self-generating.

2-26. *Dual Tachometer.* The dual tachometer located on the instrument panel (see figure 2-5) indicates both the engine and main rotor rpm. The outer scale of the indicator is for power turbine rpm, and the smaller inner scale is for the main rotor rpm. Power for operation of the indicators is provided by two tachometer generators mounted one on the engine and one on the transmission. These systems are self-generating, therefore a connection to the electrical system is not required. Normal operation of the helicopter is evident when the power turbine (engine) and rotor rpm indicator needles are in synchronization.

2-27. *Gas Producer Tachometer.* The gas producer tachometer (see figure 2-5), located on the instrument panel, registers the rpm of the gas producer turbine. The indicator is powered by a tachometer generator geared to the engine rotor shaft and therefore does not depend on the helicopter's electrical system. The indicator readings are in percent rpm of gas producer turbine speed. The instrument when used in conjunction with the exhaust temperature gage, permits engine power to be accurately set without exceeding engine limitations.

2-28. *Oil Pressure Gage.* The engine oil pressure gage, located on the center area of the instrument panel (see figure 2-5) receives pressure indications from the pressure transmitter and provides readings in psi. The oil pressure indicator and transmitter are electrically powered by 28 volt ac.

2-29. *Low Pressure-Caution.* An ENGINE OIL PRESSure caution light is located on the pedestal mounted CAUTION panel. (See figure 2-14). The light is connected to a low pressure switch which makes contact upon a pressure drop below safe limits, and illuminates the caution light. The circuit is powered by 28 volt dc and is connected to the essential bus.

2-30. *Oil Temperature Gage.* The engine oil temperature gage is located on the central area of the instrument panel (see figure 2-5). The gage is connected to an electrical resistance type thermocouple and indicates the temperature of the engine oil at the oil inlet. The oil temperature indicator is powered by 28 volt dc and is connected to the essential bus.

2-31. *Fuel Quantity Indicator.* The fuel quantity indicator is located on the instrument panel (see figure 2-5). This instrument is a transistorized electrical receiver which continuously indicates the Quantity of fuel in pounds and is powered by the 115 volt ac system and circuit protection is provided by a circuit breaker on the ac circuit breaker panel (see figure 2-13). The fuel quantity indicator is connected to a capacitor-type fuel quantity transmitter in the left fuel cell of UH-1A helicopters. Two capacitor-type fuel quantity transmitters, one in each cell, are installed in UH-1B helicopters thru serial No. 64-14100, serial No. 64-14101 and subsequent have a single capacitor-type fuel transmitter in the left fuel cell. The advantage of this type indicator system is that quantity volumes are more correctly indicated and not materially affected by varying temperatures. The indicator readings shall be multiplied by 100 to obtain fuel quantity in pounds.

2-32. *Fuel Gage Test Switch.* A push button momentary-on switch (see figure 2-5) is located directly above the fuel quantity indicator on the instrument panel and functions to provide a means of testing the indicator and circuit for operation. When the switch button is DEPRESSED and HELD IN, the fuel quantity indicator pointer moves from the actual quantity reading toward a lesser quantity reading. Upon release of the test button the indicator needle will return to the actual fuel reading.

2-33. *Fuel Quantity Caution Light.* The 20 MINUTE FUEL caution light is located on the pedestal mounted CAUTION panel (see figure 2-14). The light switch assembly is the UH-1A is located in the left fuel cell. UH-1B helicopters have two switch assemblies, one in each fuel cell. The switches function to close the circuit and illuminate the CAUTION light when there is approximately enough fuel remaining for 20 minutes flight time at cruise power. Electrical power for circuit operation is derived from the 28 volt dc essential bus.

2-34. *Fuel Pressure Indicator.* The fuel pressure indicator is located in the top center area of the instrument panel (see figure 2-5). This indicator provides psi pressure readings of the fuel as delivered from the tank mounted fuel boost pump(s) to the engine driven pump. The indicator is connected to a pressure transmitter, powered by 28 volt ac, which electrically transmits the actual psi fuel pressure reading to the fuel pressure indicator.

2-35. Engine Fuel Pump Caution Light. The engine fuel pump caution light is located on the pedestal mounted caution panel (see figure 2-14). The light is connected to a fuel differential pressure switch at the engine driven dual element fuel pump. A failure of either engine pump element will cause a differential fuel pressure, which is at once sensed by the pressure switch, thus closing the electrical circuit and illuminating the caution light. The caution light and pressure switch are powered by 28 volt dc from the essential bus. Sufficient fuel for engine operation is delivered by either element.

2-36. Rotor System. The rotor system consists of the main rotor, anti-torque tail rotor and rotor indicator.

2-37. Main Rotor. The main rotor is a two-bladed, semi-rigid see-saw type employing preconing and underslinging to insure smooth operation. The assembly consists of two all metal, bonded blades with corrosion and scuff resistant leading edges, blade grips, yoke, mast, stabilizer bar and rotating controls. Each blade is connected to the common yoke by means of a blade grip and pitch change bearings with tension straps to carry centifugal forces. The rotor assembly is attached to the mast with a cardan type universal joint and secured to the mast with a cap fitting which incorporates provisions for attaching a cable to hoist the helicopter. A stabilizer bar (see figure 2-1) is mounted above, in same plane, and 90° to the main rotor and provides the helicopter with a salient degree of inherent stability. The stabilizer bar is partially restrained in its movement by hydraulic type dampers. Blade pitch change is accomplished by movement of the collective pitch control lever (see figure 2-4) and a series of mixing levers terminating at the grip. Movement of the collective control lever UP increases the angle of attack of the rotor blades and causes the helicopter to ascend, and movement of the control lever DOWN decreases the angle of attack of the rotor blades allowing the helicopter to descend. Tilting of the rotor is accomplished by movement of the cyclic control stick (see figure 2-4) which, when moved, results in a corresponding change in the plane of rotation of the rotor. Power to drive the rotor is derived from the two-stage planetary transmission into which the main rotor mast is mounted.

2-38. 5 4 0 Rotor System. The 540 "door hinge" main rotor assembly is a two bladed semi-rigid, underslung feathering axis type rotor. The assembly consists basically of two all metal blades, blade trips, yoke extension, yoke, trunnion, stabilizer bar and rotating controls. The yoke is of flat steel plate design, which provides necessary inplane stiffness. This design greatly reduces 2/rev. vibrations. The control horns for cyclic and collective control input are mounted on the trailing edge of the blade grip. Blade centrifugal loads are transferred from the blade grips to the extensions by wire wrapped type tension-torsion straps. The main rotor is mounted on the first set of splines from the top of the mast by the trunnion. The trunnion is supported underneath by a split cone set and retained on the mast by a nut threaded to the top of the mast. The trunnion to pillow block bearings permit rotor flapping. A dynamic flap restraint is provided to limit thc flapping action of the main rotor at low rotor rpm. The blade grip to yoke extension bearings permit cyclic and collective pitch action. A collective friction device is provided to reduce the transient relative oscillation between the mast and collective sleeve.

2-39. Rotor System Indicator. The rotor rpm indicator is part of the dual tachometer (see figure 2-5) and is located on the instrument panel in front of the pilot's station. The rotor rpm reading is indicated on the inner scale and the pointer needle is marked with an R. The indicator is powered by a tachometer generator mounted on and driven by the transmission. The indicator and generator operate independent of the helicopter's electrical system. The tachometer generator is a variable output type, and as rpm changes, the current output of the generator varies. The variable output power from the generator operates the motor in the indicator thus providing a direct reading of the rotor rpm.

2-40. Tail Rotor. The tail rotor is a two bladed, semi-rigid, delta hinged type employing a preconing and underslinging. Each blade is connected to a common yoke by means of a grip and pitch change bearings. The blade and yoke assembly is mounted on the tail rotor shaft by means of a Delta-hinge trunnion to minimize rotor flapping. Blade pitch is altered by movement of the tail rotor control pedals to control or maintain heading. This blade pitch change provides control of torque and change of direction heading. Power to drive the tail rotor is

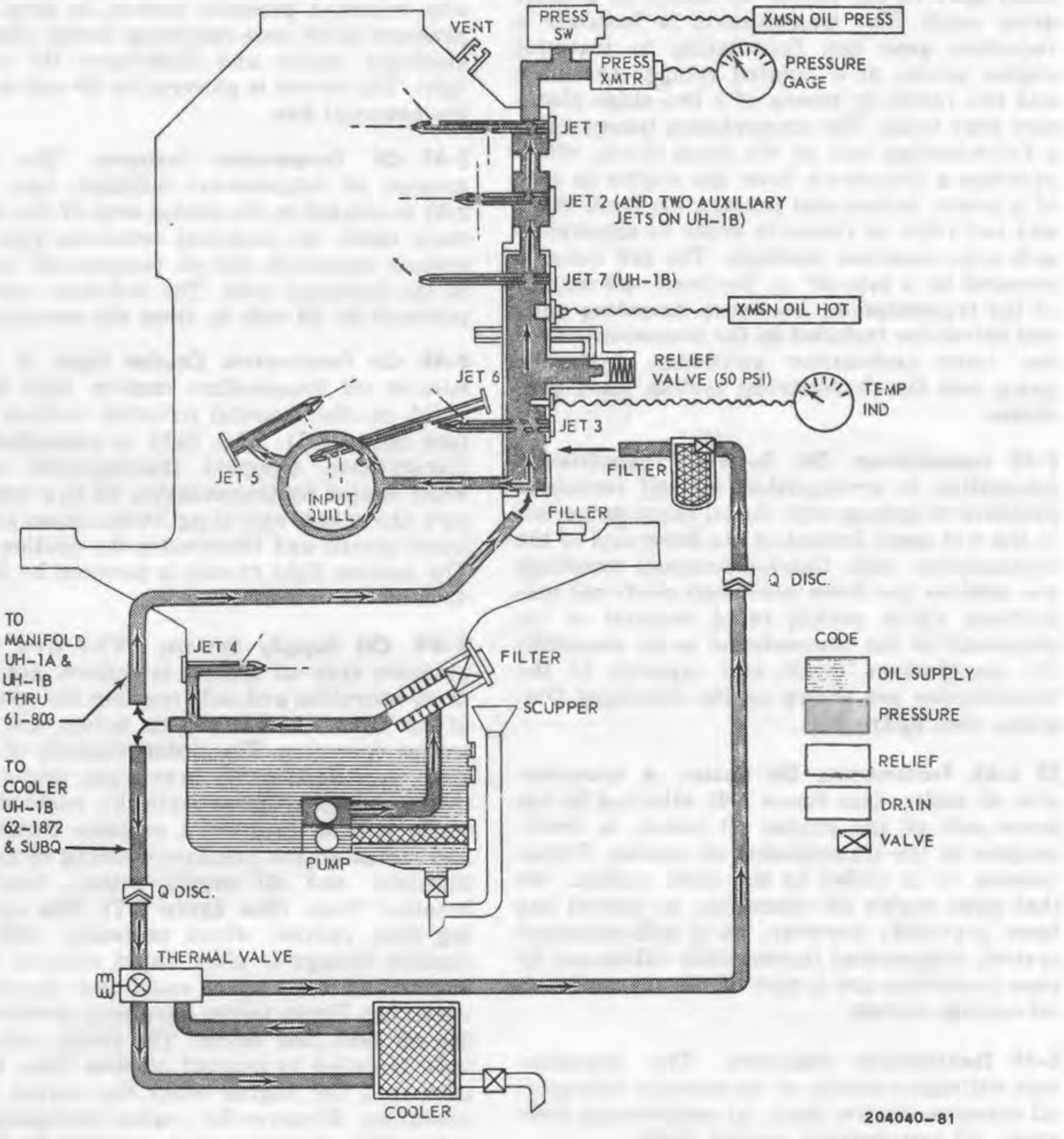


Figure 2–6. Transmission oil system schematic (UH-1B)

supplied from a take-off on the lower end of the main rotor transmission.

2-41. Transmission System. The transmission (see figure 2-1) is mounted forward of the engine and coupled to the power turbine (cool end) of the engine by means of a short drive shaft. The transmission is basically a reduction gear box functioning to transmit engine power, at a reduced rpm, to the main and tail rotors by means of a two-stage planetary gear train. The transmission incorporates a freewheeling unit at the input drive, which provides a disconnect from the engine in case of a power failure and permits the main rotor and tail rotor to rotate in order to accomplish safe autorotational landings. The tail rotor is powered by a take-off on the lower aft section of the transmission. Accessory mounting pads and drives are included on the transmission for the rotor tachometer generator, hydraulic pump and the dc electrical system main generator.

2-42. Transmission Oil System. Transmission lubrication is accomplished by self contained pressure oil system with the oil pump immersed in the wet sump located at the lower end of the transmission unit. Quick-disconnect couplings are used on the drive shaft and electrical connections which permit rapid removal or replacement of the transmission as an assembly. Oil specification, grade and capacity of the transmission are shown on the Servicing Diagram, (see figure 2-9).

B ***2-43. Transmission Oil Cooler.*** A transmission oil cooler, (see figure 2-6) attached to the lower end of the engine oil cooler, is incorporated in the transmission oil system. Transmission oil is cooled by the same turbine fan that cools engine oil; therefore, no control has been provided; however, as a self-contained system, independent thermostatic valves and by pass provisions are a part of the transmission oil cooling system.

2-44. Transmission Indicators. The transmission indicators consist of oil pressure indicator, oil pressure caution light, oil temperature indicator, oil temperature caution light.

2-45. Oil Pressure Indicator. The transmission oil pressure indicator (see figure 2-5), located in the center area of the instrument panel, receives pressure indications from the transmission oil pressure transmitter and indicates pressure readings in psi. The oil pressure indicator and transmitter are electrically powered by the helicopter's 28 volt ac circuit.

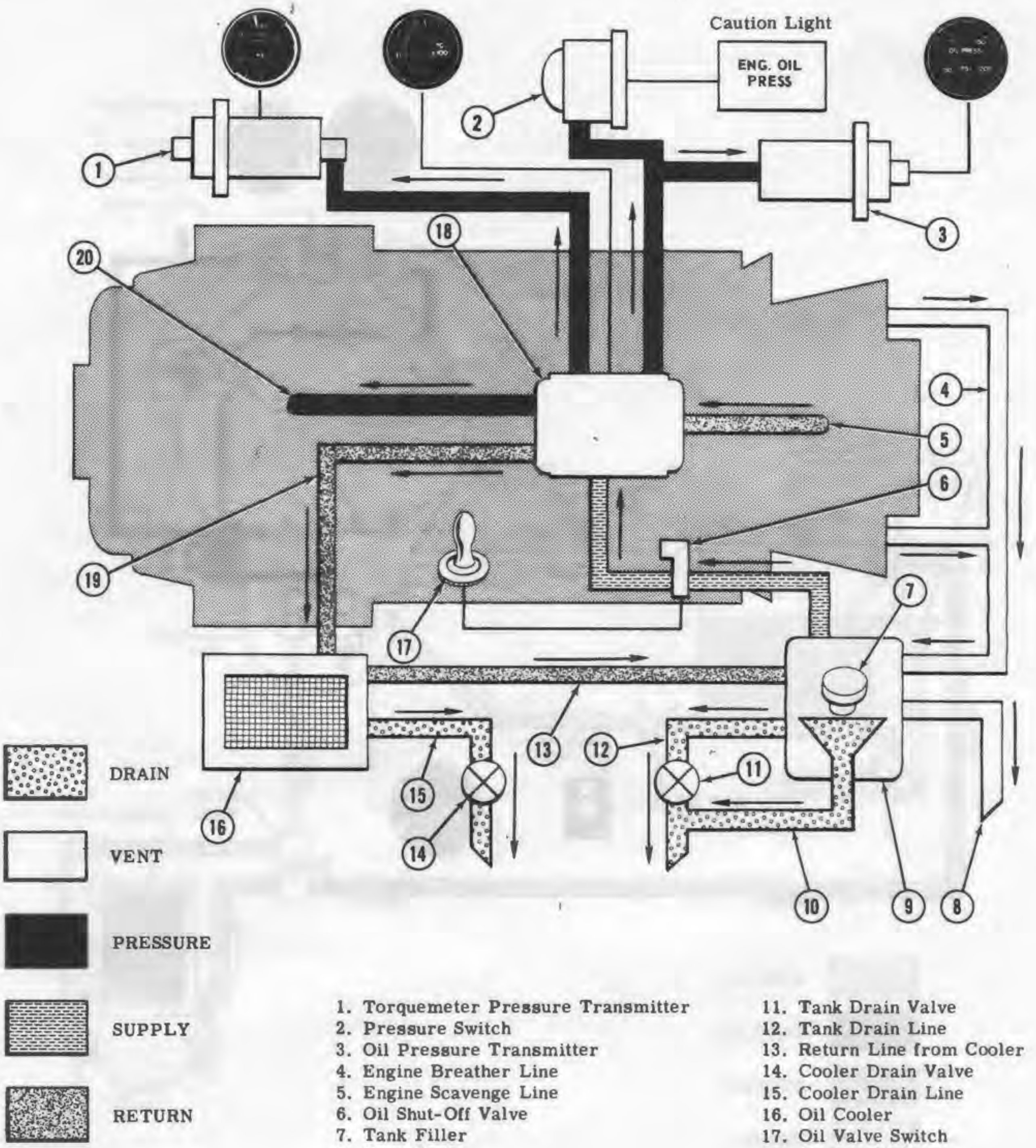
2-46. Oil Pressure Caution Light. A caution light marked XMSN OIL PRESS is located on the pedestal mounted caution panel (see figure 2-14). This light is connected to a transmission mounted pressure switch. A drop in oil pressure below safe operating limits, closes the electrical circuit and illuminates the caution light. The circuit is powered by 28 volt dc from the essential bus.

2-47. Oil Temperature Indicator. The transmission oil temperature indicator (see figure 2-5) is located in the center area of the instrument panel. An electrical resistance type thermobulb transmits the oil temperature reading to the indicator unit. The indicator circuit is powered by 28 volt dc from the essential bus.

2-48. Oil Temperature Caution Light. A transmission oil temperature caution light is provided on the pedestal mounted caution panel (see figure 2-5). This light is connected to a transmission mounted thermoswitch which, when heated by transmission oil to a temperature above safe operating limits, closes an electrical circuit and illuminates the caution light. The caution light circuit is powered by 28 volt dc from the essential bus.

2-49. Oil Supply System. The dry sump pressure type oil system is entirely automatic in its operation and only requires the operation of an OIL VALVE switch before and after engine operation. The system consists of an oil tank with de-aeration provisions, and electric motor valve, a thermostatically controlled oil cooler with by-pass valve, pressure transmitter and indicator, low pressure warning switch and indicator and oil supply return, vent and breather lines. (See figure 2-7). The connecting lines include, where necessary, quick-disconnect fittings to allow rapid removal of the engine and items which could need checking or removing. Drain valves have been provided for the oil tank and cooler. The motor valve has been installed to prevent oil flow from the oil tank into the engine when the engine is not operating. Pressure for engine lubrication and scavenging of return oil is provided by the engine mounted and driven oil pump. The tank capacity, oil specification and grade are shown on the Servicing Diagram (see figure 2-9).

2-50. Oil Cooling. Engine oil cooling is accomplished by an oil cooler with thermostatic valves and by-pass provisions. The cooler is housed



1. Torquemeter Pressure Transmitter
2. Pressure Switch
3. Oil Pressure Transmitter
4. Engine Breather Line
5. Engine Scavenge Line
6. Oil Shut-Off Valve
7. Tank Filler
8. Tank Vent
9. Oil Tank
10. Scupper
11. Tank Drain Valve
12. Tank Drain Line
13. Return Line from Cooler
14. Cooler Drain Valve
15. Cooler Drain Line
16. Oil Cooler
17. Oil Valve Switch
18. Engine Oil Pump
19. Pump Outlet Line
20. Engine Supply Lines

Figure 2–7. Oil system schematic (UH-1A) (Sheet 1 of 2)

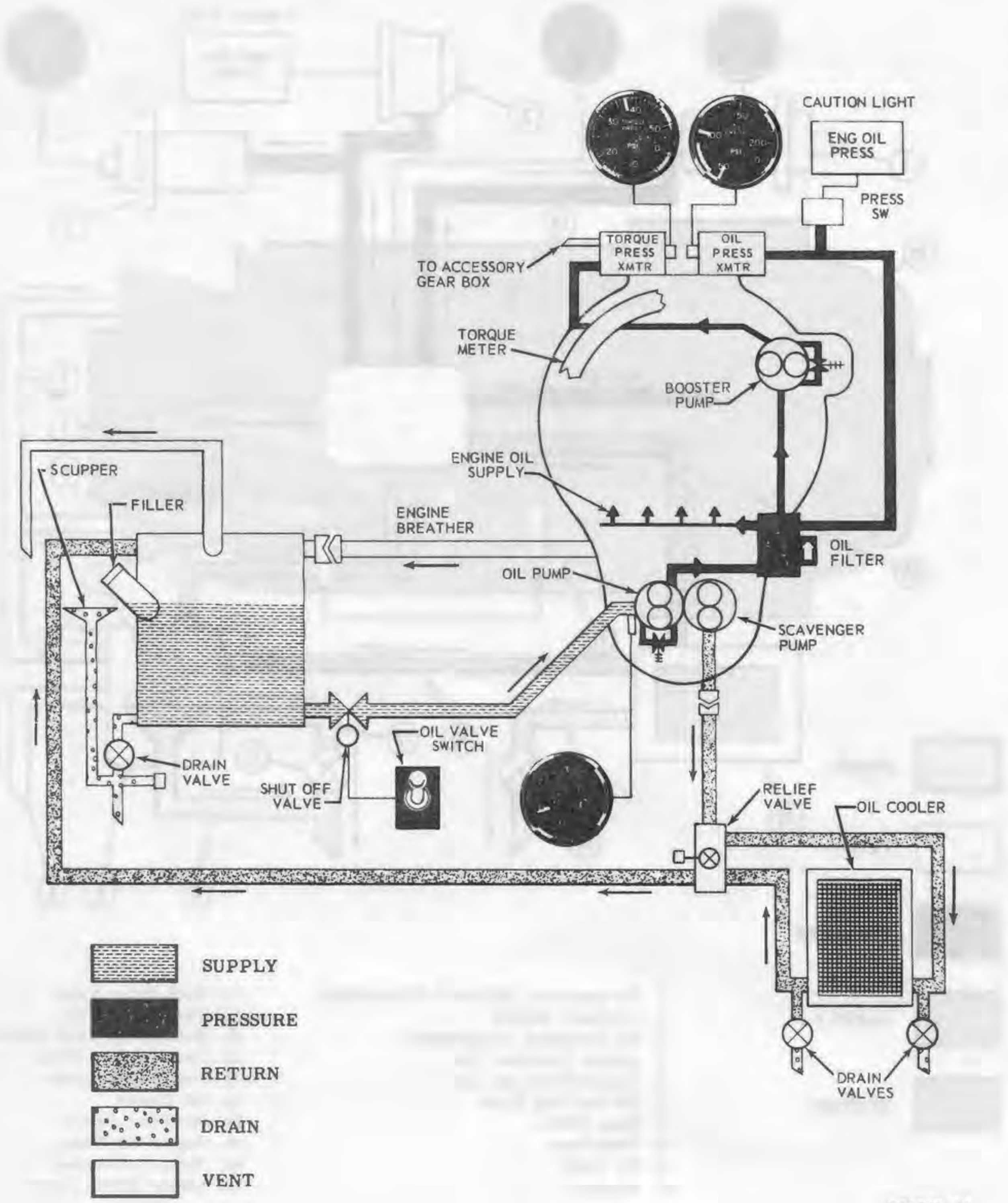


Figure 2-7. Oil system schematic (UH-1B) (Sheet 2 of 2)

Table 2-4. Oil quantity table

U.S. GALLONS				
MODEL	NO. OF TANKS	CAPACITY	EXPANSION SPACE	USEFUL CAPACITY
UH-1A	1	3.0	1.4	1.6
UH-1B	1	4.05	.80	3.25

within the fuselage area under the deck. Air for oil cooling is supplied, on UH-1A helicopters, by a fan, driven by a shaft connected to a power take-off on the engine accessory case. Air for oil cooling is supplied, on UH-1B helicopters, by a turbine fan which operates from compressor bleed air. The fans are powered at all times when the engine is in operation and no control is required or provided.

2-51. ***Oil System Control.*** The OIL VALVE OPEN-CLOSE toggle switch is located on the pedestal mounted ENGINE panel (see figure 2-3) and controls the operation of the engine oil motor valve. Movement of the switch to OPEN shall be accomplished before an engine start to allow oil flow from the oil tank to the engine. Movement of the switch to CLOSE shuts off the flow and prevents the oil from flowing into the engine when the engine is not running. Power for valve operation is derived from the 28 volt dc essential bus.

Note

> In the event the oil switch is inadvertently moved to CLOSE when engine is operating, a built-in fail-safe feature provides that oil flow to engine will be maintained so long as the fuel valve switch is in OPEN position.

A **2-52. Fuel Supply System.** The helicopter fuel system (see figure 2-8) consists of two interconnected rubber fuel cells, fuel boost pump in left cell, filter, motor valve, fuel pressure transmitter, fuel quantity gage, fuel low level warning switch, caution lights for FUEL PRESSure and 20 MINute FUEL, drain and defuel valves.

B The helicopter fuel system (see figure 2-8) consists of two interconnected rubber fuel cells, each with a sump and a submerged fuel boost pump, a fuel pressure switch, a capacitor-type fuel quantity gage system and a fuel-low level warning switch; also included in the system are a fuel filter, a motor shut-off valve, a fuel pressure transmitter and gage caution lights for ENGine FUEL PUMP, 20 MINUTE FUEL, LEFT FUEL BOOST and RIGHT FUEL BOOST, FUEL FILTER, drain valves and defuel valves.

Warning

> The 20 MINUTE FUEL caution light is not valid if either boost pump is inoperative. The reason being that the left fuel cell is mounted lower in the airframe than the right. If the left-hand pump fails, there will be approximately 55 pounds of unusable fuel remaining. If the right-hand pump fails, there will be approximately 35 pounds of unusable fuel. For purposes of standardization: If a boost pump caution light is on and the 20 MINUTE FUEL caution light illuminates, there will be enough fuel for approximately 5 minutes of flight at cruise power.

A B Provisions for an auxiliary fuel tank installation include permanently installed fuel, vent and drain lines and electrical wiring and connections which terminate under the cabin deck and are accessible through a removable panel. A check valve, incorporated in the auxiliary fuel tank flow-line, prevents fuel flow from the main cells to the auxiliary tank over-filling the main fuel cells when transfer pump switch is in the OFF position. Fuel specification, grade and capacity are shown on the Service Diagram, (See figure 2-9).

2-53. ***Fuel System Controls.*** The fuel system controls consist of fuel valve switch, fuel boost pump switch, main fuel switch, full start switch and fuel transfer pump switch.

A **2-54.** ***Fuel Valve Switch.*** The FUEL VALVE OPEN-CLOSE toggle switch is located on the pedestal mounted, ENGINE PANEL

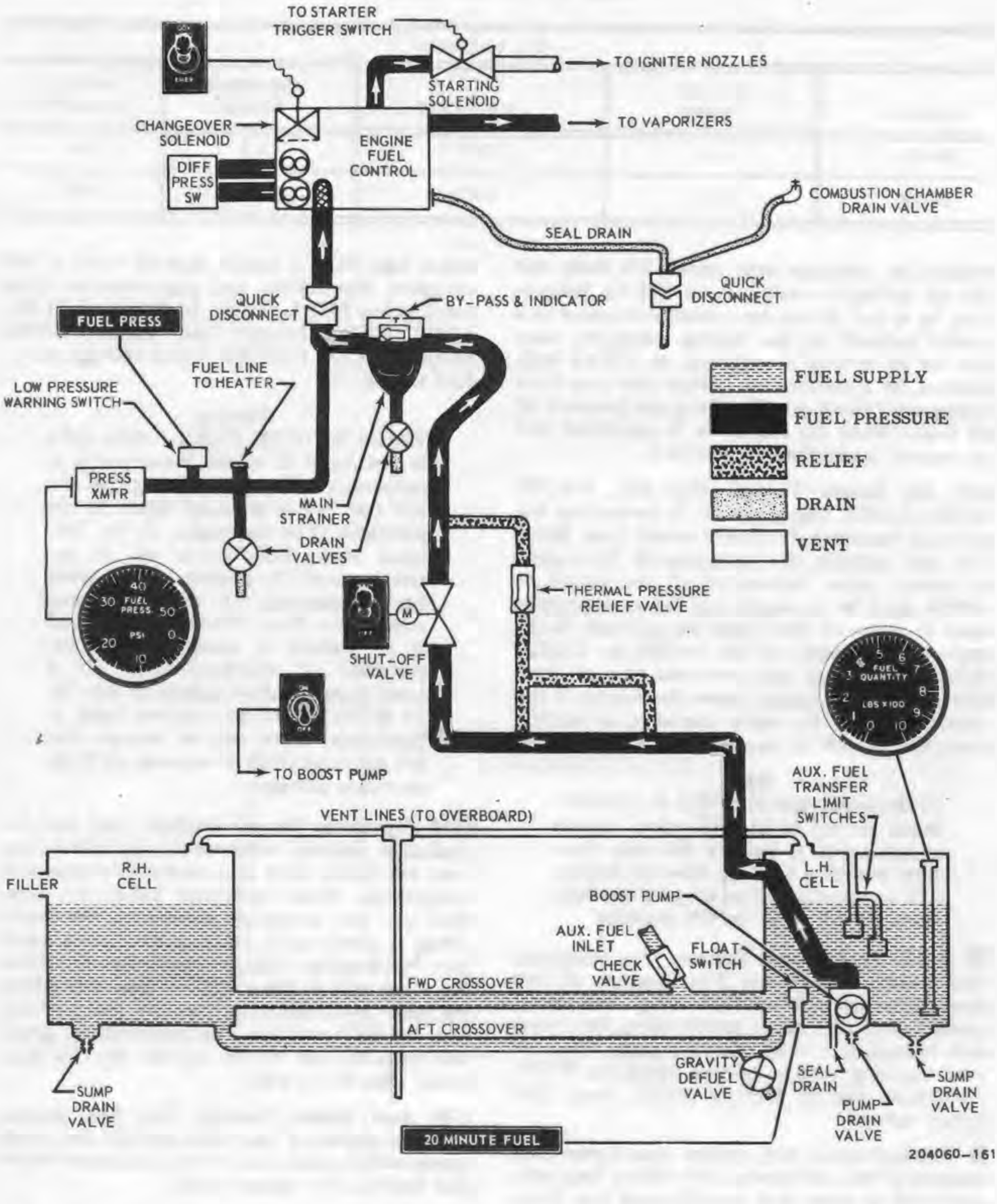


Figure 2–8. Fuel system schematic (UH-1A) (Sheet 1 of 3)

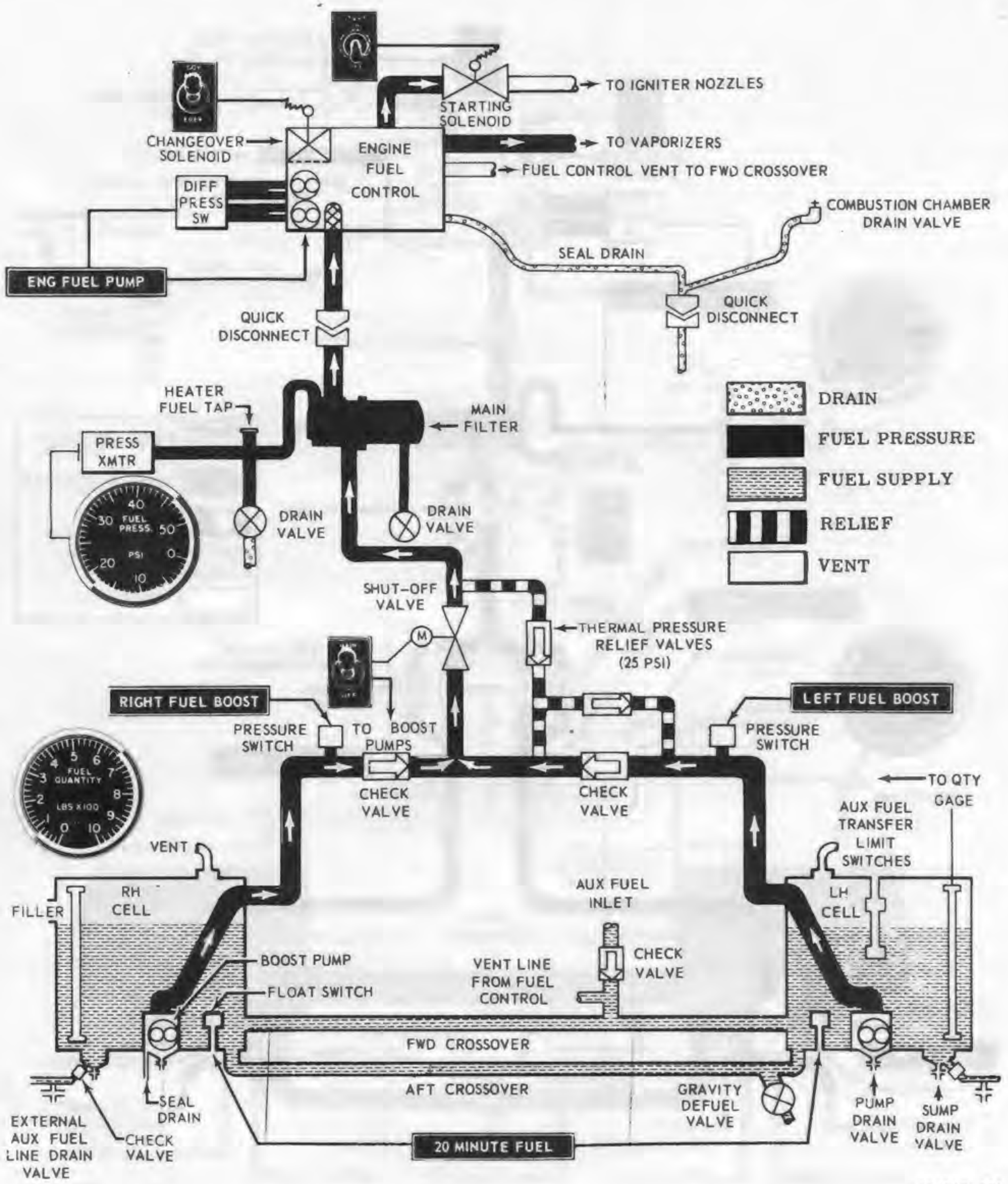


Figure 2–8. Fuel system schematic (UH-1B) (Sheet 2 of 3)

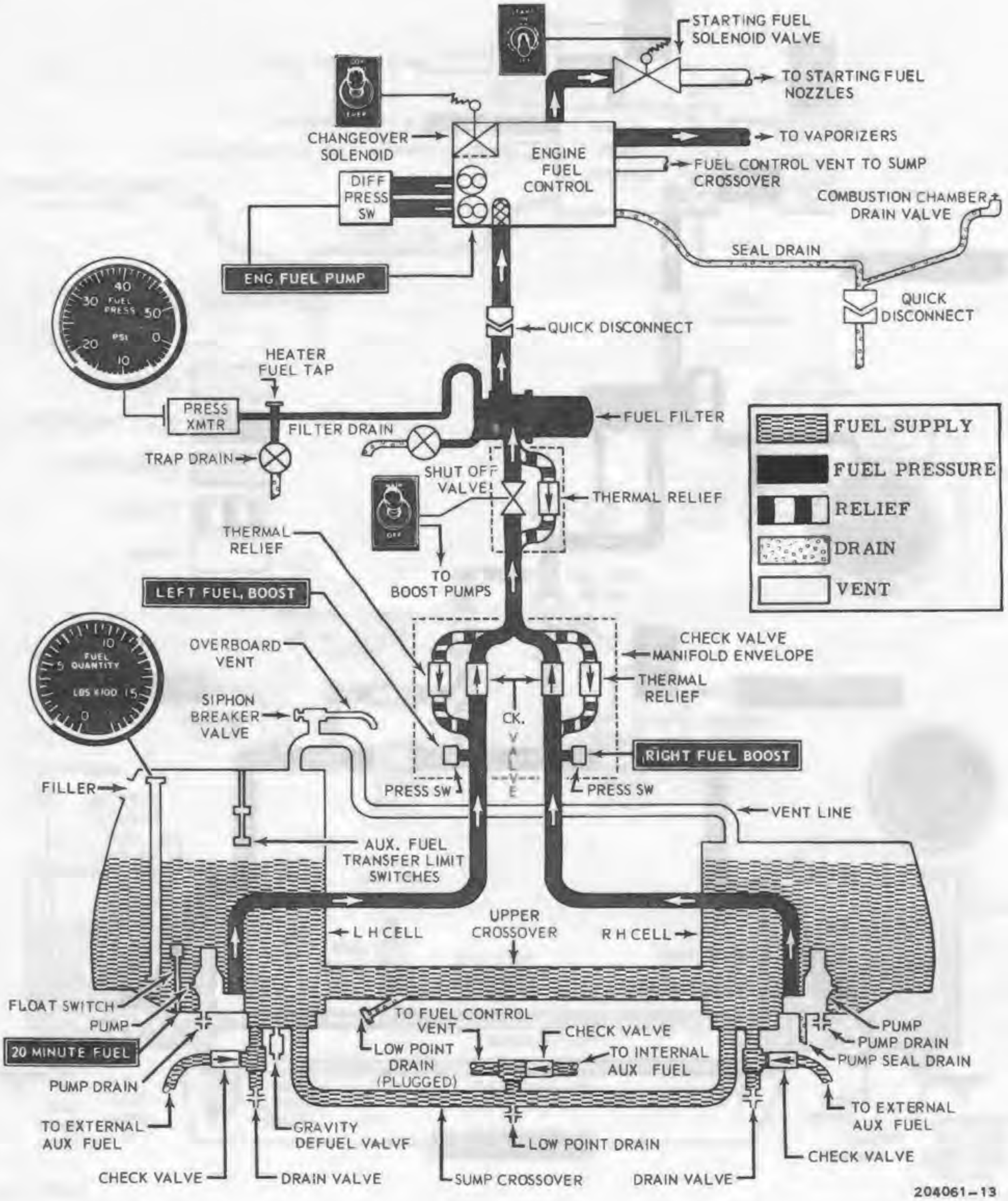


Figure 2-8. Fuel system schematic (UH-1B 540) (Sheet 3 of 3)

Table 2–5. Fuel quantity table

U. S. GALLONS AND POUNDS			
MODEL	NO. OF TANKS	NORMAL SERVICING	MAXIMUM CAPACITY AND/OR SPILL OVER LEVEL
UH-1A	2	125 Gallons 812.5 Pounds	138 Gallons 897.0 Pounds
	2	Serial No. 59-1607 and Subsequent 125 Gallons 812.5 Pounds	155 Gallons 1007.5 Pounds
UH-1B	2	165 Gallons 1072.5 Pounds	168.2 Gallons 1093.3 Pounds
UH-1B 64-14101 and Subsequent	2	242 Gallons 1574.0 Pounds	245 Gallons 1592.5 Pounds

Note

1. To convert gallons of fuel to pounds, multiply gallons by 6.5.
2. JP-4 fuel density 6.5 pounds/one gallon based on Standard Day conditions: 59°F (15°C), 29.92 inches Hg, Dry Air.

(see figure 2-3) and operates the fuel motor valve. The switch is protected against accidental operation by a spring locked toggle lever which must be pulled UP before switch movement can be accomplished. Movement of the switch to OPEN allows the fuel to flow from the tank to the engine pump. When the toggle is lifted and the switch is moved to CLOSE the fuel is terminated. Power for circuit operation is supplied by the 28 volt dc electrical system and is connected to the essential bus.

Note

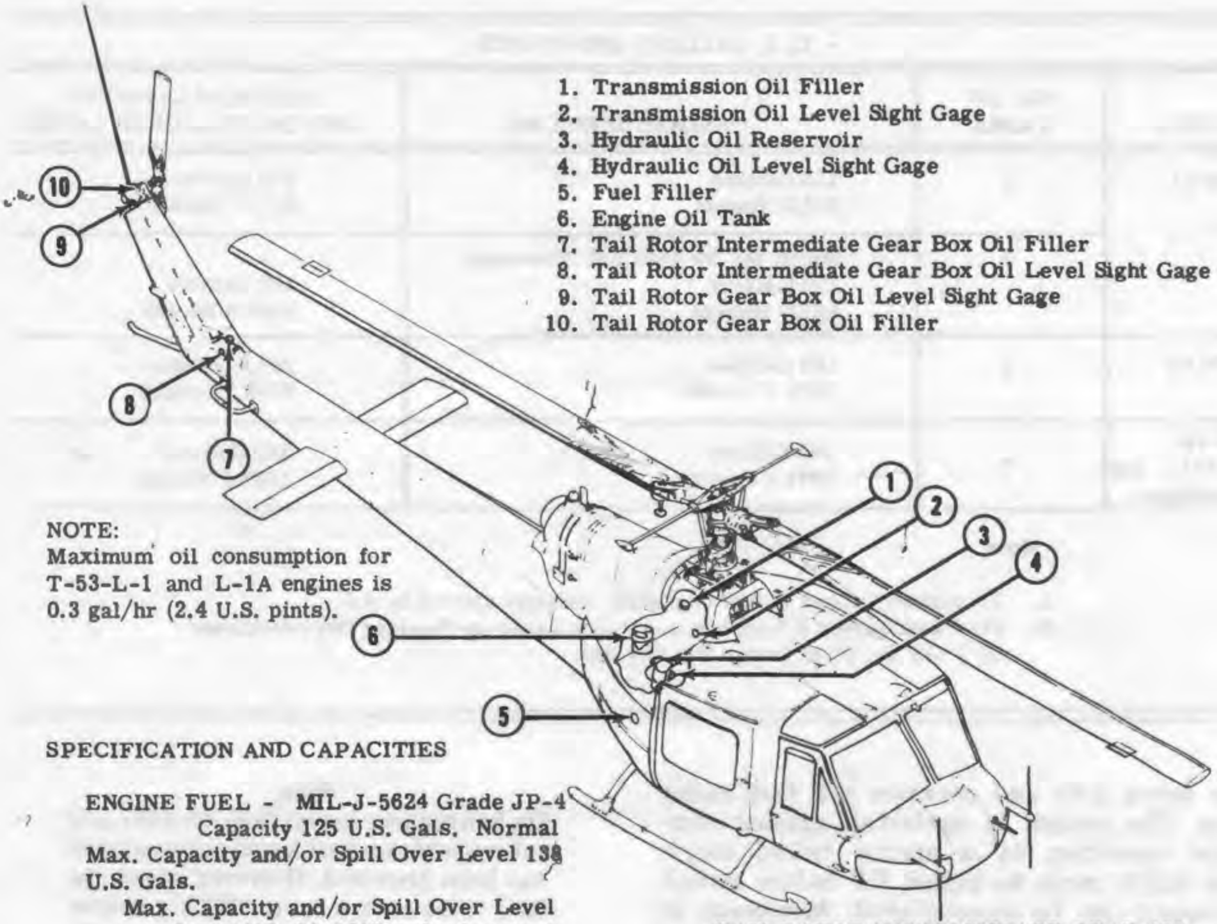
In the event the oil valve switch is inadvertently moved to CLOSE when operating helicopter engine, a built-in-fail-safe feature provides that oil flow to engine will be maintained so long as the fuel valve switch is in OPEN position.

A **2-55.** ***Fuel Boost Pump Switch.*** The toggle-type fuel BOOST PUMP ON-OFF switch is located on the pedestal mounted, ENGINE panel (see figure 2-3) and controls operation of the fuel boost pump. The switch shall be moved to ON for starting and all flight operations. The circuit is connected to the essential bus and is powered by 28 volt dc.

Note

On helicopters Serial Nos. 59-1607 and subsequent, no fuel boost pump switch has been provided. However, when the fuel valve switch is in OPEN position the fuel boost pump is automatically put into operation.

B **2-56.** ***Main Fuel Switch.*** The FUEL MAIN ON-OFF switch is located on the pedestal mounted ENGINE panel (see figure 2-3). This switch is a two-position toggle type marked ON in up position and OFF in down position. The switch is protected against accidental operation by a spring loaded toggle lever which must be pulled up before switch movement can be accomplished. Movement of the switch to ON position allows fuel to flow from the tank to the engine pump and also activates the circuit to the LH and RH fuel boost pumps. When the toggle head is lifted and the switch is moved to OFF position, the fuel flow is terminated and the LH and RH fuel boost pumps cease operation. The electrical power for circuit operation is supplied for the 28 volt dc essential bus. Circuit protection is provided by circuit breakers on the dc circuit breaker panel, (see figure 2-12).



1. Transmission Oil Filler
2. Transmission Oil Level Sight Gage
3. Hydraulic Oil Reservoir
4. Hydraulic Oil Level Sight Gage
5. Fuel Filler
6. Engine Oil Tank
7. Tail Rotor Intermediate Gear Box Oil Filler
8. Tail Rotor Intermediate Gear Box Oil Level Sight Gage
9. Tail Rotor Gear Box Oil Level Sight Gage
10. Tail Rotor Gear Box Oil Filler

NOTE:
Maximum oil consumption for T-53-L-1 and L-1A engines is 0.3 gal/hr (2.4 U.S. pints).

SPECIFICATION AND CAPACITIES

ENGINE FUEL - MIL-J-5624 Grade JP-4
Capacity 125 U.S. Gals. Normal
Max. Capacity and/or Spill Over Level 138 U.S. Gals.
Max. Capacity and/or Spill Over Level
Serial NO. 59-1607 and subsequent
155 U.S. Gals.

ENGINE OIL - MIL-L-7808
Capacity 1.6 U.S. Gals. Normal
2.25 U.S. Gals. Ferry

TRANSMISSION OIL - MIL-L-7808
Capacity 1.75 U.S. Gals.

TAIL ROTOR INTERMEDIATE GEAR OIL
MIL-L-7808 Capacity 0.375 U.S. Pints

TAIL ROTOR GEAR BOX OIL - MIL-L-7808
Capacity 0.50 U.S. Pints

HYDRAULIC FLUID - MIL-H-5606
Capacity 4.0 U.S. Pints - Reservoir
3.0 U.S. Pints - Refill Level

The following EMERGENCY fuels may be used in accordance with Technical Bulletin TB AVN 2:

(a) Unleaded gasoline (white gasoline)

(b) MIL-G-5572, Aviation Gasoline
(Use lowest grade available)

(c) MIL-G-3056, Automotive Gasoline
(Use lowest grade available)

(d) MIL-J-5624, Grade JP-5

An entry shall be made in DA Form 2408A after the use of EMERGENCY fuels.

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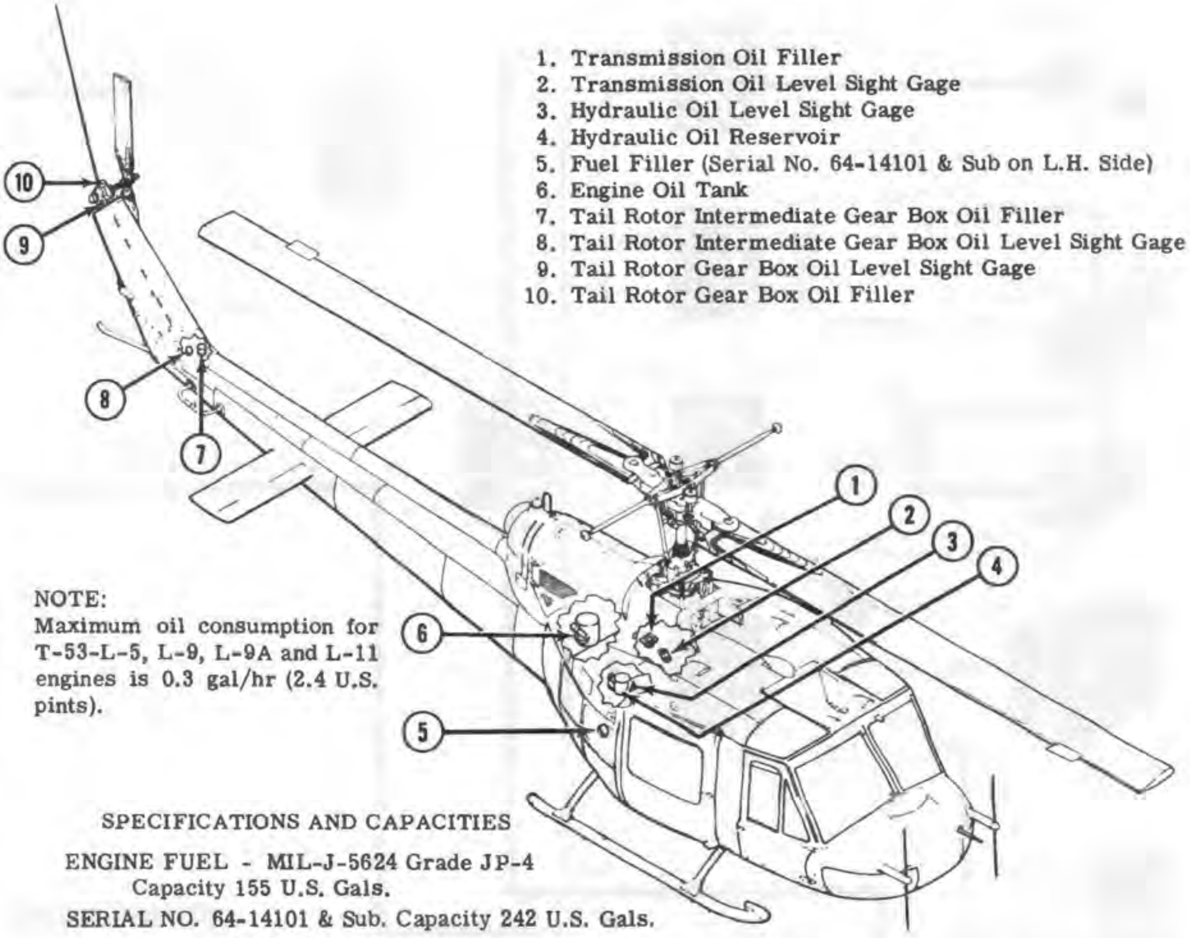
Figure 2-9. Servicing diagram (UH-1A) (Sheet 1 of 2)



1. Transmission Oil Filler
2. Transmission Oil Level Sight Gage
3. Hydraulic Oil Level Sight Gage
4. Hydraulic Oil Reservoir
5. Fuel Filler (Serial No. 64-14101 & Sub on L.H. Side)
6. Engine Oil Tank
7. Tail Rotor Intermediate Gear Box Oil Filler
8. Tail Rotor Intermediate Gear Box Oil Level Sight Gage
9. Tail Rotor Gear Box Oil Level Sight Gage
10. Tail Rotor Gear Box Oil Filler

NOTE:
Maximum oil consumption for T-53-L-5, L-9, L-9A and L-11 engines is 0.3 gal/hr (2.4 U.S. pints).

SPECIFICATIONS AND CAPACITIES

ENGINE FUEL - MIL-J-5624 Grade JP-4
Capacity 155 U.S. Gals.
SERIAL NO. 64-14101 & Sub. Capacity 242 U.S. Gals.

ENGINE OIL - MIL-L-7808
Capacity 3.25 U.S. Gals. Normal
3.25 U.S. Gals. Ferry

TRANSMISSION OIL - MIL-L-7808
Capacity 2.25 U.S. Gals.

TAIL ROTOR INTERMEDIATE GEAR OIL
MIL-L-7808 Capacity 0.375 U.S. Pints

TAIL ROTOR GEAR BOX OIL - MIL-L-7808
Capacity 0.50 U.S. Pints

HYDRAULIC FLUID - MIL-H-5606
Capacity 4.0 U.S. Pints - Reservoir
3.0 U.S. Pints - Refill Level
SERIAL NO. 64-14101 & Sub. Dual Hydraulic System Capacity 3.2 U.S. Pints - Reservoir (2)

The following EMERGENCY fuels may be used in accordance with Technical Bulletin TB AVN 2:

(a) Unleaded gasoline (white gasoline)

(b) MIL-G-5572, Aviation Gasoline
(Use lowest grade available)

(c) MIL-G-3056, Automotive Gasoline
(Use lowest grade available)

(d) MIL-J-5624, Grade JP-5

An entry shall be made in DA Form 2408A after the use of EMERGENCY fuels.

204470-42A

Figure 2–9. Servicing diagram (UH-1B) (Sheet 2 of 2)

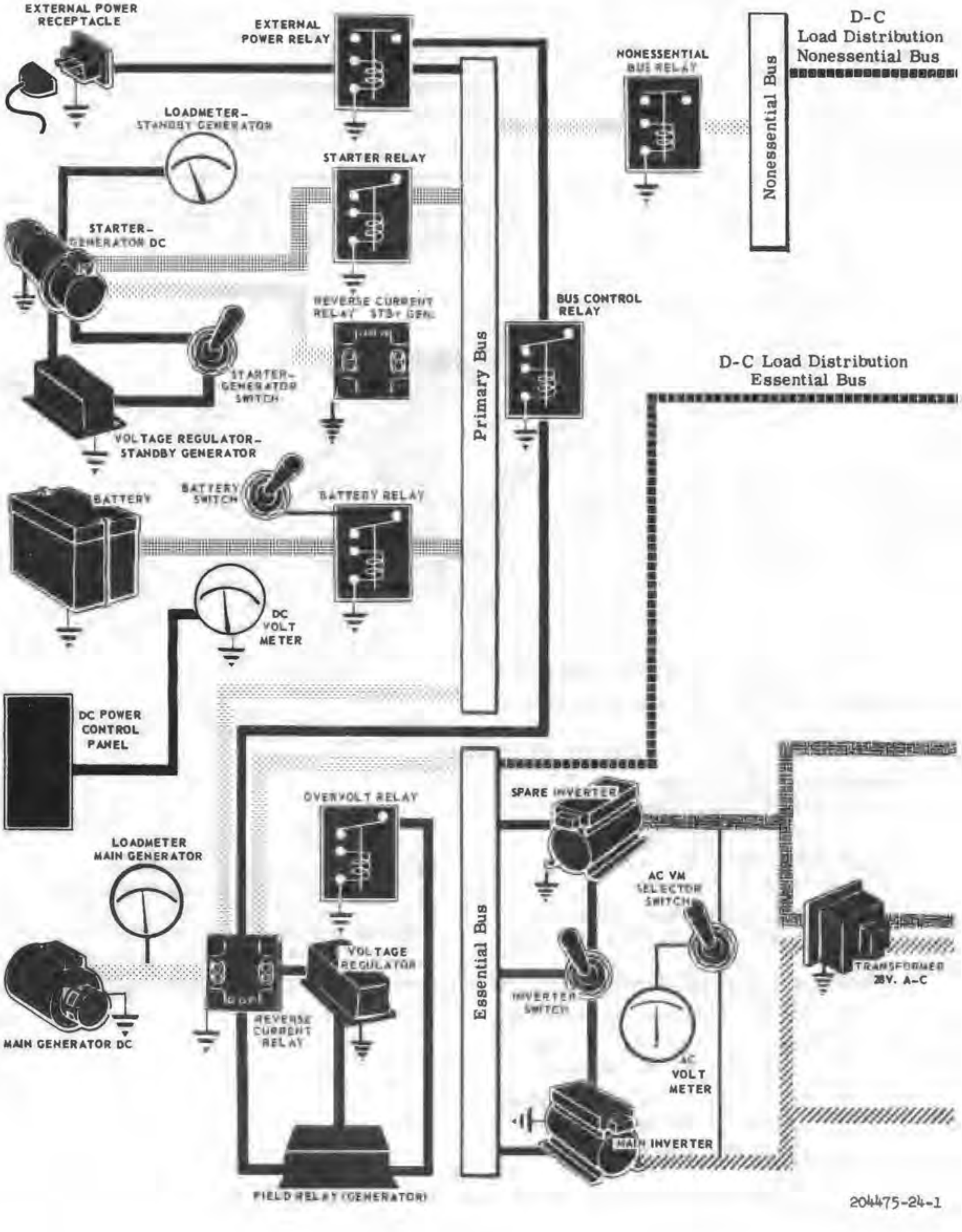


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Figure 2–10. Electrical system schematic – typical (UH-1B) (Sheet 1 of 2)

Figure 2–10. Electrical system schematic – typical (UH-1B) (Sheet 2 of 2)

> ***Note***
>
> In the event the oil valve switch is inadvertently moved to CLOSE when operating helicopter engine, a built-in fail-safe feature provides that oil flow to engine will be maintained so long as the MAIN FUEL switch is in the ON position.

B **2-57. *Fuel Start Switch.*** The fuel START ON-OFF switch is located on the pedestal mounted ENGINE panel (see figure 2-3). When this switch is in the ON position the starting fuel solenoid valve circuit is energized to receive electrical power when the starter-ignition trigger switch is pulled. When switch is in OFF position the circuit is de-energized. The electrical power for the circuit operation is supplied from the dc essential bus. Circuit protection is provided by a circuit breaker on the dc circuit breaker panel, (see figure 2-12).

2-58. *Fuel Transfer Pump Switch.* The FUEL TRANSfer PUMP ON-OFF switch is located on the pedestal mounted ENGINE panel (see figure 2-3). This switch is used only when the complete auxiliary fuel equipment has been securely installed in the helicopter and all mechanical and electrical connections have been made. The auxiliary fuel equipment kit, description and operating procedure is covered in Chapter 6, Auxiliary Equipment.

2-59. *Fuel System Indicators.* The fuel system indicators consist of fuel pressure caution light, caution lights-right and left-hand fuel boost pump and fuel filter caution light.

A **2-60. *Fuel Pressure Caution Light.*** The FUEL PRESSure caution light located on the pedestal mounted CAUTION panel monitors the operation of both the helicopter fuel boost pump and the engine driven fuel pump. To isolate the reason for light illumination, first check the fuel pressure gage to determine if the fuel boost pump is operating, a zero reading when switch is ON is evidence that the trouble is in the boost pump. If there is a pressure reading and the light is illuminated, one element of the dual engine driven fuel pump is faulty. The caution light and pressure switches are powered by 28 volt dc from the essential bus.

> ***Caution***
>
> The FUEL PRESS caution light will not serve as a warning light for the fuel boost pump being inoperative during flight at altitudes between SL to 4000 to 5000 feet. The engine driven pump is capable of supplying necessary fuel in this altitude range.

B **2-61. *Caution Lights — Right and Left-Hand Fuel Boost Pump.*** The LEFT FUEL BOOST AND RIGHT FUEL BOOST pumps caution lights are located on the pedestal mounted caution panel, (see figure 2-14). These caution lights monitor the operation of their respective pump as the worded segment of the caution panel will indicate when illuminated. A failure of a fuel boost pump is sensed by a pressure switch which then illuminates the caution light for the particular boost pump (LH and RH) that failed. The caution lights and pressure switches are powered by 28 volt dc derived from the essential bus.

B **2-62. *Fuel Filter Caution Light.*** The FUEL FILTER caution light is located on the pedestal mounted CAUTION panel. A differential pressure switch is mounted in the fuel line across the filter. When the filter becomes clogged, the pressure switch senses this and closes contacts, to energize the circuit. The FUEL FILTER caution light illuminates, alerting the pilot to a clogged fuel filter condition. If clogging continues, the fuel by-pass lines opens to permit fuel to flow around the filter.

> ***Caution***
>
> Within 30 minutes after the FUEL FILTER caution light illuminates, the pilot shall land the helicopter. The helicopter shall not be flown until the reason for illumination has been determined and corrected.

2-63. Electrical Power Supply Systems. The electrical power supply systems consist of a dc system and an ac system.

2-64. DC Power Supply System. The 28 volt direct current supply system is a single conductor system with the negative lead of the generators grounded to the helicopter structure. Direct current power is supplied by one of the following: main generator, standby generator (starter-generator), battery or external power. The power supply incorporates a primary bus, essential bus, non-essential bus, main generator voltage regulator, stand-by generator voltage regulator, main generator over voltage relay, main generator field relay, main generator reverse current relay, standby generator reverse current relay, bus control relay, battery relay, non-essential bus relay, starter relay, external power relay, control panel and circuit breakers to furnish protection for the system and equipment operating from the system. In the event of a main generator failure, the non-essential bus is automatically dropped when circuit is opened by means of the bus control relay and the non-essential bus relay actions; however, a switch has been provided, on the DC POWER control panel to override the automatic action, if the pilot so desires. The 28 volt main generator is rated at 300 ampere output and is mounted on and driven by the transmission, therefore, generator power is provided and battery drain prevented when autorotational landings are being performed. Also provided is a standby generator (starter-generator), rated at 200 ampere output and mounted on the helicopter's engine accessory drive section, to furnish 28 volt dc power in the event of a main generator failure. Direct current power control is accomplished from the DC POWER panel (see figure 2-11) located on the overhead console.

2-65. *DC Power Control.* The dc power is controlled by control panel, main generator switch, battery switch, starter generator switch, non-essential bus control switch, dc voltmeter selector switch and dc circuit breakers.

2-66. *Control Panel.* This panel is labeled DC POWER and contains the MAIN GENerator switch, BATtery ON-OFF switch, STARTER-GENerator START-STBY GEN switch, DC VM (volt-meter) selector switch and a NON-ESSential BUS MANUAL ON-NORMAL ON switch. Panel illumination is provided by three panel lights controllable from the instrument lights control, (see figure 2-11).

2-67. *Main Generator Switch.* The main generator switch is a three-position type, equipped with a guard and is located on the left area of the DC POWER panel (see figure 2-11). This switch is labeled MAIN GEN. RESET in the aft position, OFF in the center position and ON in the forward position. The RESET position is spring loaded to return to OFF position when released, therefore, to reset generator the switch must be held in the RESET position momentarily and then moved to ON position.

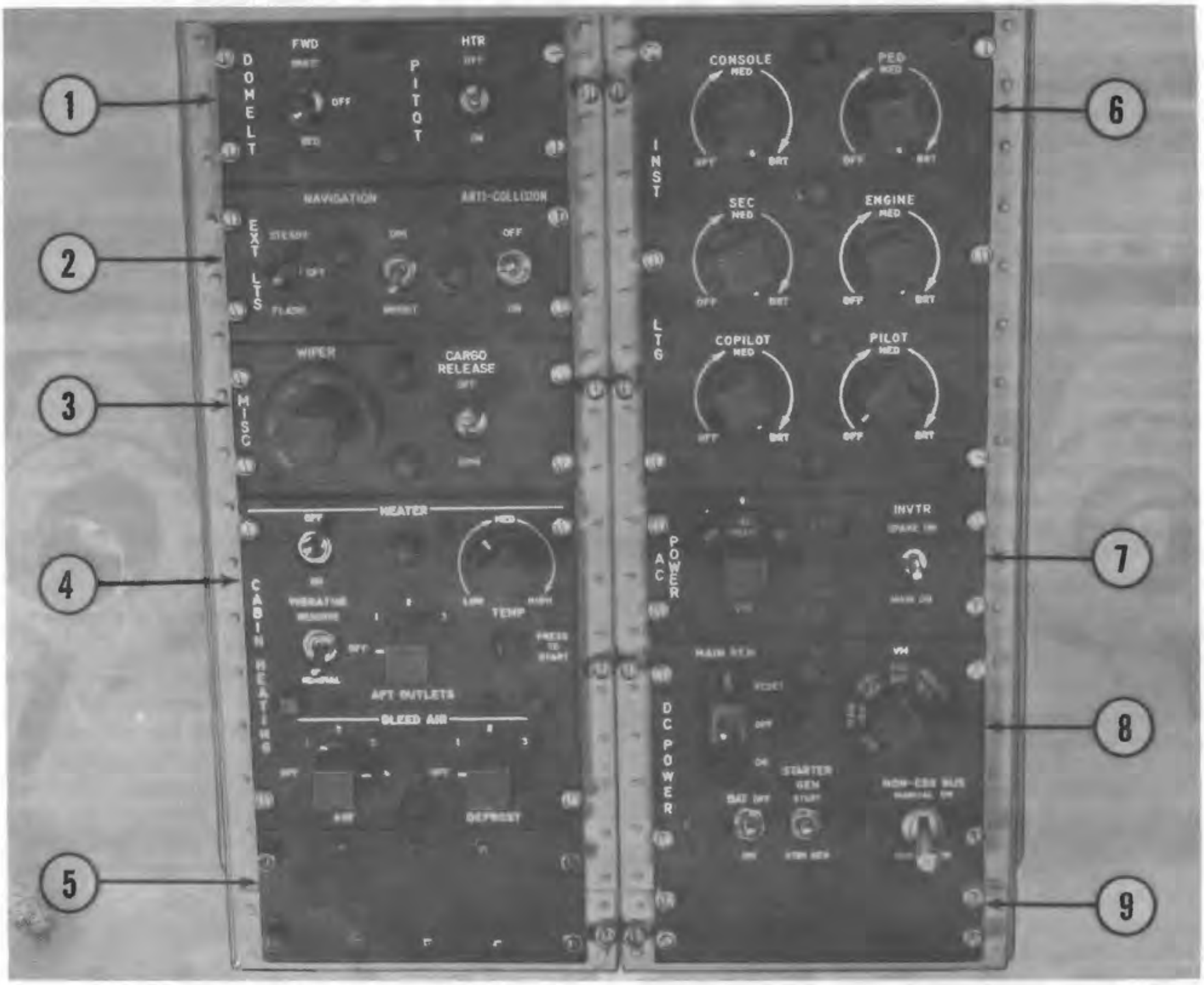
2-68. *Battery Switch.* The battery switch is located on the left area of the DC POWER control panel (see figure 2-11) below the main generator switch. This switch is a two-position toggle, labeled BAT OFF in the aft position and ON in the forward position. When the switch is placed in the ON position, it closes the circuit to the actuating coil of the battery relay and 28 volt dc is then being delivered from the battery to the primary bus. When switch is placed in OFF position it opens circuit to actuating coil of battery relay and no current is delivered from the battery.

2-69. *Starter Generator Switch.* The starter-generator switch is located in the lower center area of the DC POWER control panel (see figure 2-11). This switch has two positions labeled STARTER GEN START in aft position and STBY GEN in forward position. The START position of the switch activates the electrical circuits for starter functions of the starter-generator. The STBY GEN position activates the generator unit of the starter-generator and permits 28 volt dc to be supplied to the primary bus of the helicopter's electrical system in the event of a main generator failure.

2-70. *Non-Essential Bus Control Switch.* The non-essential bus control switch is located on the lower right area of the DC POWER control panel (see figure 2-11). This is a two-position switch labeled NON-ESS BUS MANUAL ON in the aft position and NORMAL ON in the forward position. The function of the switch is to permit the pilot, at his option, in the event of a generator failure, to switch to manual on, to override the automatic action when the non-essential bus is dropped by the electrical system's bus control relay and non-essential bus relay, thus restoring electrical current to the non-essential bus. NORMAL ON is the position for automatic action of the non-essential bus.

2-71. *DC Volt Selector Switch.* The direct current voltmeter selector switch located in the upper right area of the DC POWER control panel (see figure 2-11) is a rotatable type, identified by the VM label on the panel face. The switch is actuated by a knob and functions to monitor the voltage delivered from any of the following: BAT(battery) MAIN GEN (main generator), STBY GEN (standby generator), ESS BUS (essential bus) and NON-ESS BUS (non-essential bus). Voltage will be indicated on the instrument panel mounted DC VOLTMETER (see figure 2-5).

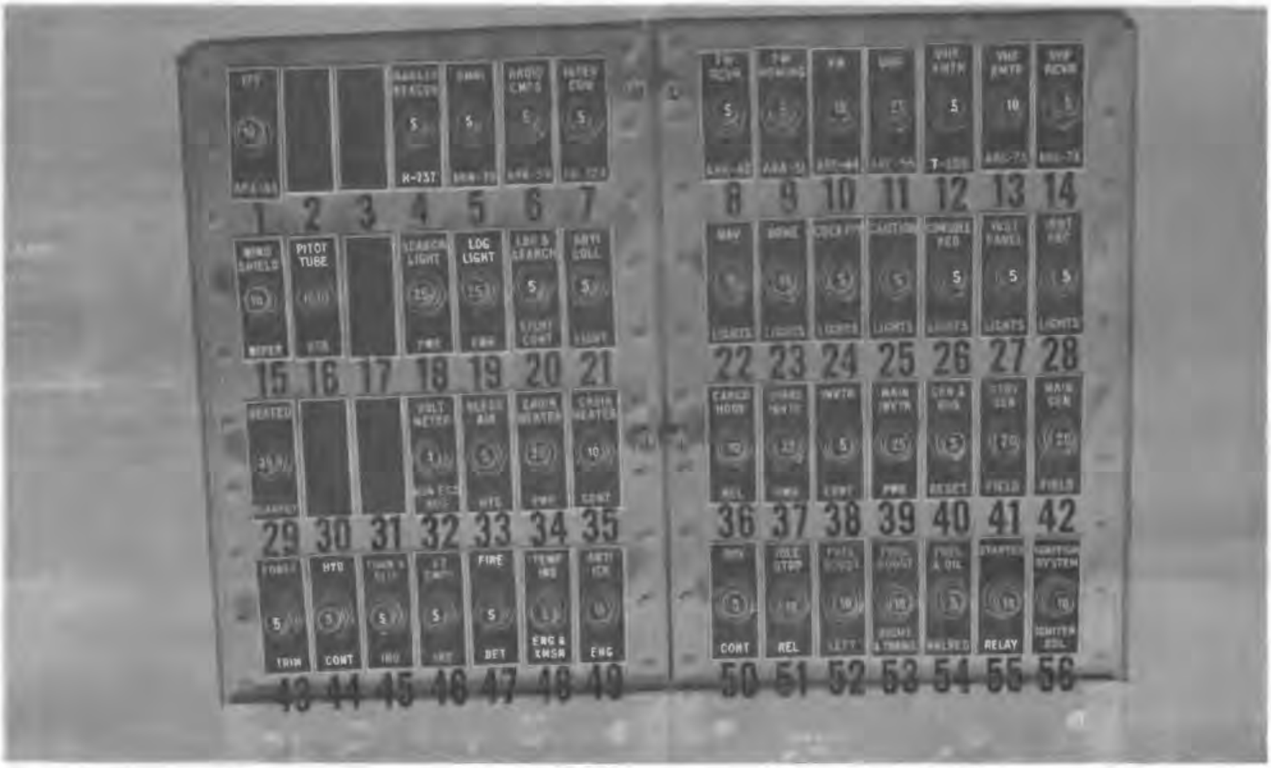
2-72. DC *Circuit Breaker Panel.* The direct current circuit breaker panel is located on the overhead console within easy reach of the pilot's and copilot's positions. Each individual breaker is clearly labeled for the particular electrical circuit protected. In the event a circuit is overloaded the circuit breaker protecting that particular circuit will pop out.



204075-22

1. Dome Lights Control Panel
2. External Lights Control Panel
3. Miscellaneous Control Panel
4. Cabin Heating Control Panel
5. Cover Plate
6. Instrument Lights Control Panel
7. AC Power Control Panel
8. DC Power Control Panel
9. Cover Plate

Figure 2–11. Overhead console – typical (UH-1B)



204075-21

1. IFF APX-44
2. Spare
3. Spare
4. Marker Beacon R-737
5. Omni ARN-30
6. Radio CMPS ARN-59
7. Intercom SB-329
8. FM RCVR ARR-46
9. FM Homing ARA-31
10. FM ARC-44
11. UHF ARC-55
12. VHF XMTR T-366
13. VHF XMTR ARC-73
14. VHF RCVR ARC-73
15. Windshield Wiper
16. Pitot Tube HTR
17. Spare
18. Search Light PWR
19. LDG Light PWR
20. LDG & Search Light Cont.
21. Anti-Collision Light
22. NAV Lights
23. Dome Lights
24. Cockpit Lights
25. Caution Lights
26. Console PED Lights
27. Instrument Panel Lights
28. Instrument SEC Lights
29. Heated Blanket
30. Spare
31. Spare
32. Voltmeter NON ESS BUS
33. Bleed Air HTG
34. Cabin Heater PWR
35. Cabin Heater CONT
36. Cargo Hook REL
37. Spare INVTR PWR
38 INVTR CONT
39. Main INVTR PWR
40. GEN & BUS RESET
41. STBY GEN Field
42. Main GEN Field
43. Force Trim
44. HYD CONT
45. Turn & Slip IND
46. J2 CMPS IND
47. Fire DET
48. TEMP IND ENG & XMSN
49. Anti-Ice ENG
50. GOV CONT
51. Idle Stop REL
52. Fuel Boost Left
53. Fuel Boost Right & TRANS
54. Fuel & Oil Valves
55. Starter Relay
56. Ignition System Igniter SOL

Figure 2–12. DC Circuit breaker panel – typical (UH-1B)

204475-35

1 & 2. Pilot Attitude Indicator System
3 & 4. Copilot Attitude Indicator System
5 & 6. Spare
7 & 8. J-2 Compass System
9. Fuel Quantity System
10. 28 Volt Quantity System
11. AC Failure Relay
12. Spare
13. Fuel Pressure System
14. Torque Pressure System
15. Transmission Oil Pressure System
16. Engine Oil Pressure System
17. Course Indicator System
18. Spare

Figure 2-13. AC circuit breaker panel – typical (UH-1B)

The circuit is reactivated by pushing the circuit breaker button in.

2-73. DC System Indicators. The dc indicators consist of dc voltmeter and dc loadmeters.

2-74. DC Voltmeter. The direct current voltmeter (see figure 2-5) is mounted in the center area of the instrument panel and is labeled DC VOLT. Generator voltage output is indicated by this instrument. Voltage indications will not be shown when the generator is not furnishing electrical power, for, the direct current voltmeter is connected to the generator side of the reverse current relay.

2-75. DC Loadmeters — Main and Standby. Two direct current loadmeters are mounted in the lower center area of the instrument panel. One is labeled MAIN GEN and indicates the percentage of total electrical system amperage being used by the helicopter's electrical system when the main generator is operating. The other loadmeter is labeled STBY GEN and indicates the percentage of total electrical system amperage being used by the helicopter's electrical system when the standby generator is operating. Loadmeters will not indicate this percentage when the generators are inoperative.

2-76. AC Power Supply System. The alternating current is supplied by two 250 volt ampere, three-phase inverters (main and spare) that convert the 28 volt dc to 115 volt ac. The main and spare inverters are interchangeable in power output, and controlled by the INVTR SPARE ON MAIN ON switch on the AC POWER control panel (see figure 2-11). Either inverter (at pilot's option) will supply 115 volt ac to the attitude indicator system, ac failure relay; fuel quantity indicator and tank unit, gyro-magnetic compass system and the 28 volt ac transformer. The 28 volt ac transformer in turn supplies ac to the following: course indicator, torque pressure transmitter and torquemeter, oil pressure transmitter and indicator, engine oil pressure transmitter and indicator, fuel pressure transmitter and indicator.

2-77. AC Power Control. The ac power is controlled by control panel, inverter switch and ac voltmeter selector switch and ac circuit breakers.

2-78. Control Panel. The AC POWER control panel (see figure 2-11) located on the overhead console contains the INVTR SPARE ON-MAIN ON switch and the AC PHASE VM (voltmeter) selector switch and two panel lights.

2-79. Inverter Switch — Main and Spare. The INVTR switch located in the right area of the AC POWER control panel is three-position, aft position SPARE ON, center OFF, forward position MAIN ON. For normal flight the inverter switch is kept in the MAIN ON position. The SPARE ON position is used to put the spare inverter into operation in the event of main inverter failure. Inverter switch circuit is powered from the 28 volt dc essential bus, the circuit is protected by the inverter control circuit breaker on the DC circuit breaker panel.

2-80. AC Voltmeter Selector Switch. The AC voltmeter selector switch located in the left area of the AC POWER control panel (see figure 2-11) is a rotatable type, identified by the VM on the switch dial. The switch is used to monitor or check voltage between any of the three-phases of the 115 volt ac electrical system. Switch is actuated by means of a knob which has three PHASE (monitor) positions, labeled: AB, AC and BC. To monitor voltage between phases A and B of the 115 volt ac system position selector switch on AB, then read AC VOLTMETER on instrument panel. To monitor voltage between phases A and C, position selector switch on AC, then read AC VOLTMETER. To monitor voltage between phases B and C, position selector switch on BC and read AC VOLTMETER.

2-81. ***AC Circuit Breaker Panel.*** The alternating current circuit breaker panel is located on the right-hand side of the pedestal base, visible and within easy reach of the pilot. The upper and center panel plates, labeled AC 115V contain the circuit breakers which provide circuit protection for the 115 volt alternating current electrical circuits. The lower panel plate labeled AC 28V, contains the circuit breakers which provide circuit protection for the 28 volt alternating current electrical circuits. In the event of a circuit overload, the circuit breaker protecting that particular circuit will pop out. The circuit is reset or activated by pushing the circuit breaker button in.

2-82. ***AC System Indicator.*** The ac indicator is the ac voltmeter.

2-83. ***AC Voltmeter.*** The alternating current voltmeter (see figure 2-5) is mounted in the center area of the instrument panel directly under the direct current voltmeter. The AC voltage output, from the inverter (main or spare) is indicated on this instrument, however, the voltage indicated is between phases A and C.

Note

> With the ac voltmeter selector switch on the AC POWER control panel in AB position, the voltage indicated on voltmeter is voltage between phases A and B. With the selector switch in AC position, the voltage indicated is voltage between phases A and C. The switch in BC position will produce an indication of voltage between phases B and C.

2-84. ***External Power Receptacle.*** The external power receptacle (see figure 2-1) is located on the left side of the helicopter's fuselage, aft of the cabin bulkhead, under the battery compartment. When a 28 volt dc auxiliary power unit plug is securely inserted in the receptacle, the external power relay in the helicopter's electrical system is energized and 28 volt dc electrical power is supplied to the primary bus for distribution. When external power is connected on UH-1A helicopters the EXTERNAL POWER caution light on the caution panel will be illuminated. When external power door is opened on UH-1B helicopters, the EXTERNAL POWER control light will be illuminated.

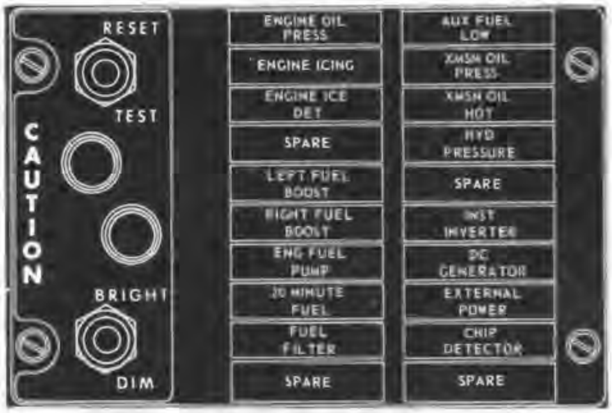


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Figure 2–14. Caution panel – typical

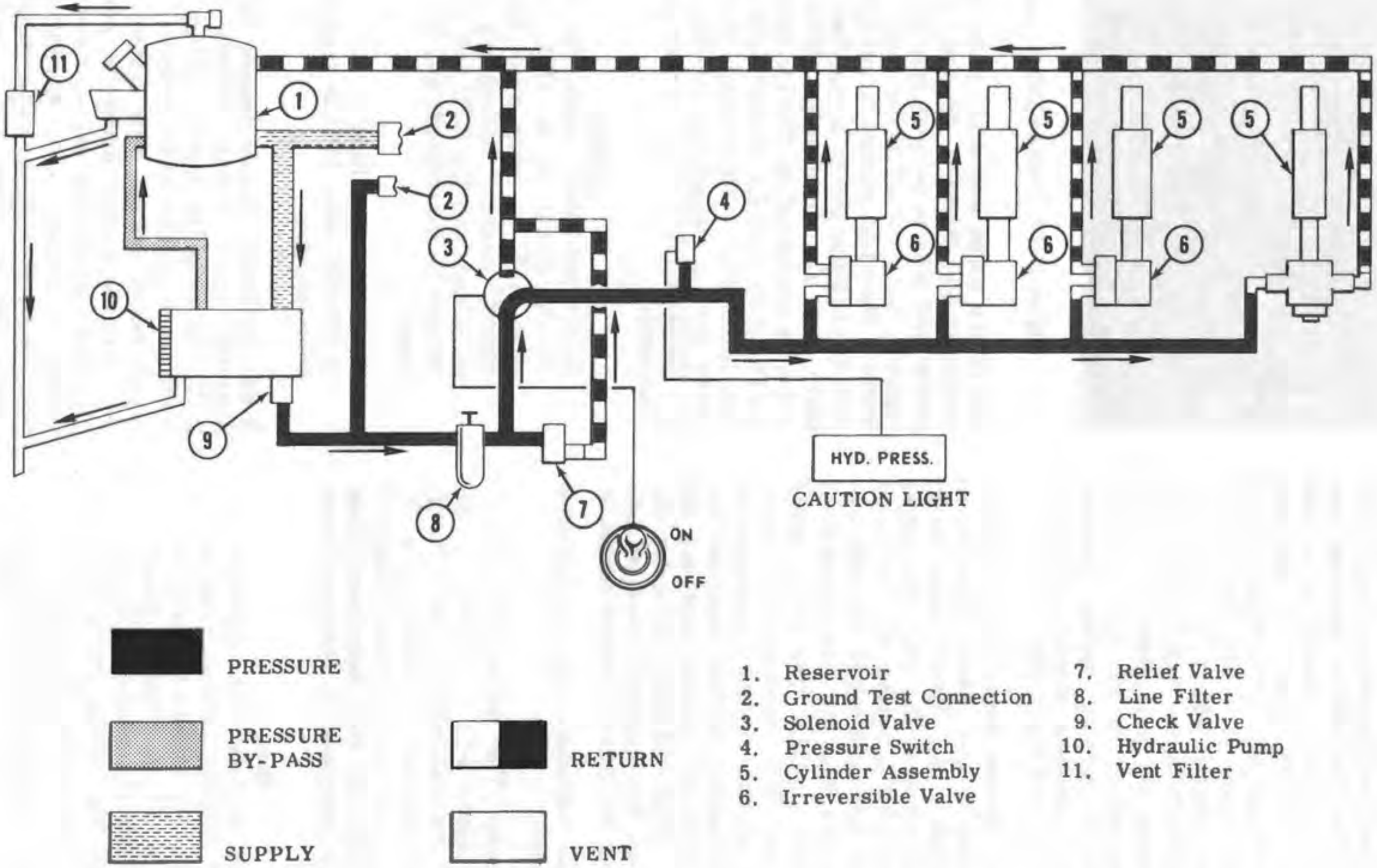
Caution

> To prevent battery drain, the battery switch should be in OFF position when APU is being used. Reversed polarity between helicopter's electrical system and the APU will result in damage to the aircraft and its equipment.

Note

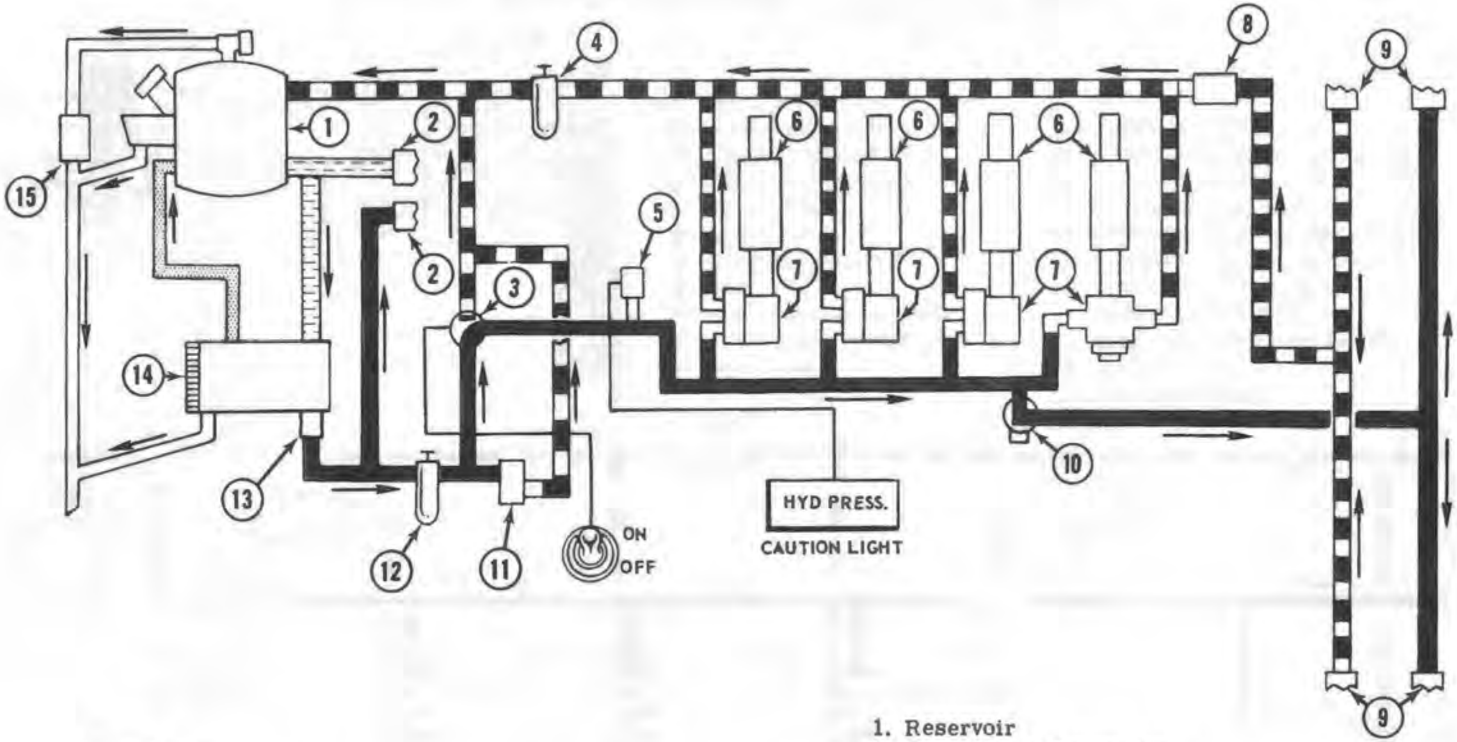
> A 650-800 amp APU is required for external start.

2-85. Hydraulic Power Supply System. The hydraulic power supply system (see figure 2-15) has been provided to reduce the operational loads of the cyclic, collective and directional control system. This system consists of the variable output hydraulic pump, power cylinders, irreversible valves, relief and check valves, a solenoid valve, system filter, vent filter, reservoir, bleed air valve, pressure switch, ground test couplings and connecting hardware. The hydraulic pump is mounted on and driven by the transmission and supplies pressure to the power cylinders. The power cylinders in turn are connected into the mechanical



1. Reservoir
2. Ground Test Connection
3. Solenoid Valve
4. Pressure Switch
5. Cylinder Assembly
6. Irreversible Valve
7. Relief Valve
8. Line Filter
9. Check Valve
10. Hydraulic Pump
11. Vent Filter

Figure 2–15 .Hydraulic system schematic (UH-1B) (Sheet 1 of 3)



■ PRESSURE

▨ PRESSURE BY-PASS

▤ SUPPLY

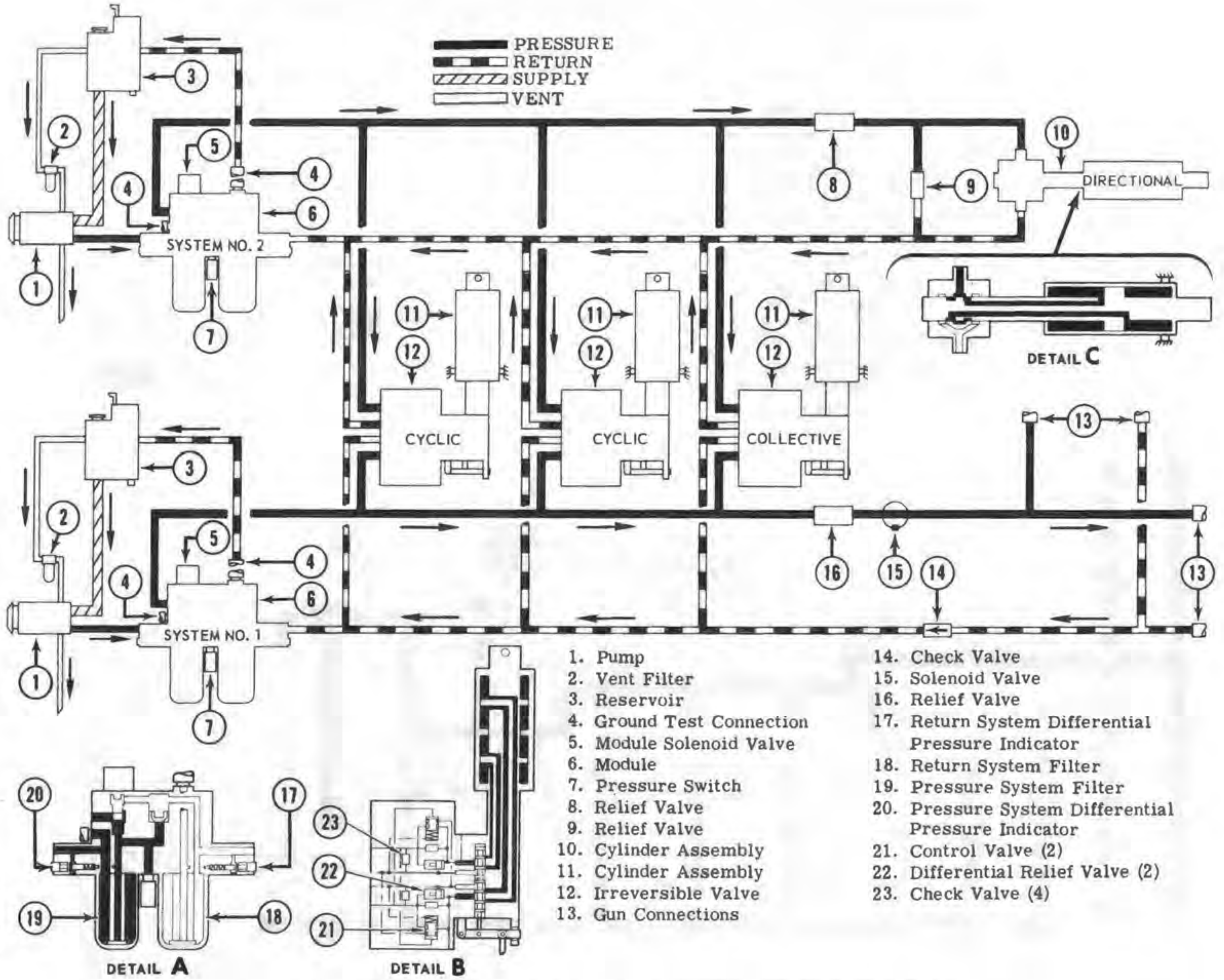
◧ RETURN

☐ VENT

1. Reservoir
2. Ground Test Connection
3. System Solenoid Valve
4. Return Line Filter
5. Pressure Switch
6. Cylinder Assembly
7. Irreversible Valve
8. Check Valve
9. Armament Connections
10. Armament Solenoid Valve
11. Relief Valve
12. Pressure Line Filter
13. Check Valve
14. Hydraulic Pump
15. Vent Filter

204476-3

Figure 2-15. Hydraulic system schematic (UH-1B with armament) (Sheet 2 of 3)



1. Pump
2. Vent Filter
3. Reservoir
4. Ground Test Connection
5. Module Solenoid Valve
6. Module
7. Pressure Switch
8. Relief Valve
9. Relief Valve
10. Cylinder Assembly
11. Cylinder Assembly
12. Irreversible Valve
13. Gun Connections
14. Check Valve
15. Solenoid Valve
16. Relief Valve
17. Return System Differential Pressure Indicator
18. Return System Filter
19. Pressure System Filter
20. Pressure System Differential Pressure Indicator
21. Control Valve (2)
22. Differential Relief Valve (2)
23. Check Valve (4)

Figure 2-15. Hydraulic system schematic (UH-1B 540) (Sheet 3 of 3) linkage of the helicopter's flight control system. The irreversible valves are installed on the cyclic and collective power cylinders to prevent main rotor feedback in the event of a hydraulic system malfunction. The pressure required for system operation is preset to supply the demand. This system for all practical purposes is considered to be a closed type, therefore a pressure gage is not provided or required. In the event of a hydraulic system malfunction, it will be indicated by the illumination of a caution light on the caution panel. The hydraulic servo system (see figure 2-15) reduces the operational loads of the helicopter's cycle, collective and directional control systems. Movement of the controls in any direction causes a power cylinder valve, in appropriate system, to open and admit hydraulic pressure to actuate the cylinder, thereby reducing the force load required for control movement.

2-86. *Hydraulic System Control.* The hydraulic system is controlled by an hydraulic control switch.

2-87. *Control Switch.* The hydraulic control switch is located on a pedestal mounted panel (see figure 2-3). The switch is a two-position toggle type labeled HYD CONTROL ON-OFF. When the switch is in the ON position, the solenoid valve bypass port closes and pressure is supplied to the servo system. When the switch is in OFF position the solenoid valve bypass port opens and hydraulic fluid bypasses from pump to reservoir, thus no pressure is supplied to the servo system. Electrical power for hydraulic system control is supplied from the 28 volt dc essential bus and circuit is protected by a circuit breaker on the dc circuit breaker panel (see figure 2-12).

2-88. *Hydraulic System Indicators.* The hydraulic indicators consist of fluid level gage and low pressure caution light.

2-89. *Fluid Level Gage.* The hydraulic reservoir is mounted on the cabin bulkhead and has a capacity of four pints. **A** A sight gage, which can be seen from inside the cabin, indicates "Full and Refill" requirements. UH-1B helicopters have sight glass mounted on top aft side of reservoir and it is necessary to open the right side of transmission cowl to read quantity of fluid in reservoir.

2-90. *Low Pressure Caution Light.* The low hydraulic pressure caution light is located in the pedestal mounted caution panel (see figure 2-14). When illuminated, the segment wording or light reads HYD PRESSURE to provide the pilot with visual indication of a low hydraulic pressure condition. The light is wired in conjunction with the master caution light located at the upper center of the instrument panel. The master caution indicator light is extinguished, by momentarily placing the reset-test switch in the RESET position. Electrical power for the low hydraulic pressure caution indicator light is supplied from the 28 volt dc essential bus and circuit protection is provided by circuit breaker on the dc circuit breaker panel.

B C D 2-91. Dual Hydraulic System. A dual hydraulic control system is provided for the cyclic and collective controls with the directional controls powered by a single servo cylinder. The hydraulic system consists of two variable delivery hydraulic pumps, two reservoirs, relief valves, shut-off valves, pressure warning lights, lines, filters, fittings, and manual dual tandem servo actuators incorporating irreversible valves. A tandem power cylinder incorporating closed center four-way manual servo valves and irreversible valves are provided in the lateral and fore-and-aft cyclic and collective control systems. A single power cylinder incorporating a closed center four-way manual servo valve is provided in the directional control system. The cylinders contain a straight-through mechanical linkage. The fluid level indicators of the two reservoirs are visible through the fire access door opening on right side of fuselage. Each hydraulic system contains a modular component assembly consisting of pressure line filter, return line filter, relief valve, pressure switch, differential pressure indicators and an electrically operated shut-off valve.

2-92. Flight Control System. The flight control system is a positive mechanical type, actuated by conventional helicopter controls which when moved, direct the helicopter in various modes of flight. The system includes: the cyclic control stick, used for fore and aft and lateral control; the collective pitch (main rotor) control lever, used for vertical control; tail rotor (directional) control pedals, used for heading control; and a synchronized elevator, to increase controllability and lengthen CG range. The control forces of the flight control system are reduced to a near zero pounds force, to lessen pilot fatigue, by hydraulic servo cylinders connected to the control system mechanical linkage and powered by the transmission driven pump. Force trims, (force gradient) connected to the cyclic and directional controls are electrically operated mechanical units used to induce artificial control feeling into the cyclic and directional controls and to prevent the cyclic stick from moving of its own accord.

Note

> Provisions are made for a full dual installation of flight controls for training missions.

2-93. *Force Trims (Force Gradient).* Force centering devices are incorporated in the cyclic control and directional pedals controls. These devices are installed between the cyclic stick and the hydraulic power cylinders, and between the directional pedals and the hydraulic power cylinder. The devices act to furnish a force gradient or "feel" to the cyclic control stick and directional control pedals, however, these forces can be reduced to zero by depressing and releasing a button on top of the cyclic control stick (see figure 2-4). The gradient is accomplished by means of springs and magnetic brake release assemblies which enable the pilot to trim the controls, as desired, for any condition of flight. A force trim ON-OFF switch is installed in the HYD CONTROL panel to activate the force trim.

2-94. *Stabilizer Bar.* The stabilizer bar (see figure 2-1) is attached to the main rotor mast above, in the same plane, and 90° to the main rotor blades. The bar is connected into the main rotor system in such a manner that the inherent inertia and gyroscopic action of the bar is induced into the rotor system and produces a measure of stability for all flight conditions. If, while hovering in a level attitude, the helicopter attitude is disturbed, the bar due to its gyroscopic action tends to remain in its present plane. The relative movement between the bar and the mast causes the hub and blade assembly to feather and return the rotor to its original plane of rotation. Due to a restraining and dampening action, the bar possesses a mast following characteristic. The following time is regulated by two hydraulic dampers connected to the bar in such a manner that a movement of the mast is transmitted to the bar through the dampers at a rate determined by the adjustment of the dampers. A compromise is met in which the bar provides the desired amount of stability and still allows the pilot complete responsive control of the helicopter. The dampers are cam actuated to increase dampening as the stabilizer bar becomes displaced.

2-95. *Collective Counterweights.* A collective counterweight (see figure 2-1), commonly termed "Chinese Weights" is installed on each main rotor grip. These weights act to balance the collective forces in the main rotor. In cruise flight, at approximately 70 knots, and with hydraulic servo turned off, an equivalent force to move the collective pitch control lever either up or down indicates proper installation and weight of the counterweights.

2-96. *Cyclic Pitch Control Stick.* The cyclic control stick (see figure 2-4) is similar in appearance to the control stick of fixed wing aircraft. Movements of the stick control fore and aft and lateral control systems, therefore, when moved in any direction a corresponding directional movement of the helicopter is produced which is the result of a change in the plane of rotation of the main rotor. Cyclic stick fore and aft movement change the synchronized elevator attitude, by means of mechanical linkage and connecting control tubes. The pilot's cyclic stick grip contains the cargo release switch, trigger type three-position radio transmitter switch, the force-trim release switch, the ASW-12 directional control switch and the armament fire control switch. Desired operating friction can be induced into the control stick by hand tightening the friction adjuster.

2-97. *Collective Pitch Control Lever.* The collective pitch control lever (see figure 2-4) is located to the left of the pilot's position and controls the vertical mode of flight. When the lever is in full up position, the main rotor is in maximum pitch. The amount of lever movement determines the angle of attack and lift developed by the main rotor blades and results in ascent or descent of the helicopter. Desired operating friction can be induced into control lever by hand tightening the friction adjuster. A rotating grip-type throttle and a switch box assembly are located in the upper end of the collective pitch lever. The switch box assembly contains the starter, governor, engine idle release, landing light and search light switches. A spring loaded pitch lever down lock is located on the floor at the approximate center of the lever. The copilot's collective pitch control lever, when installed, contains only the rotating grip-type throttle and governor rpm INCrease DECrease switch, and starter.

Note

> The collective pitch control system has a built-in friction of 8 to 10

pounds with MANUAL friction control in full decrease position. This friction is adjusted with shims at the base of the collective stick and its proper value is important to the operation of the helicopter.

2-98. ***Tail Rotor Pitch Control Pedals.*** The directional control pedals are similar to and react in the same manner as fixed wind aircraft rudder pedals. Movement of these pedals results in altering the pitch of the tail rotor blades and thereby provides the means of directional control. This literally allows the helicopter to be pivoted about its own vertical axis at slow or zero airspeeds. Pedal adjusters are located below the floor, aft of the cyclic pitch control sticks and forward of the pilot and copilot positions. Adjusters knobs (figure 2-4) extend above the floor to enable adjustment of pedal distance for individual comfort. The force trim system is connected to the directional controls and is operated by the force trim switch on the cyclic control stick grip. The copilot's directional control pedals, when installed, are identical to the pilot's pedals.

2-99. ***Synchronized Elevator.*** The synchronized elevator (figure 2-1) is located near the aft end of the tail boom and is connected by control tubes and mechanical linkage to the fore and aft cyclic control system. Fore and aft movements of the cyclic control stick produces a change in the synchronized elevator attitude, thus increasing controlability and lengthening CG range. If the elevator were removed, the helicopter would exhibit a tuck-under tendency above 50 knots.

2-100. Landing Gear System. The landing gear system is a skid type, consisting of two lateral mounted arched cross-tubes attached to two formed longitudinal skid tubes. The landing gear structural members are made from formed aluminum alloy tubing with full length steel skid shoes to minimize skid wear. The gear assembly is attached with clamps at four points of the fuselage structure; therefore, gear removal for maintenance can easily be accomplished. The manually retractable and quickly removable wheel assemblies have been provided to facilitate helicopter ground handling operations.

2-101. ***Tail Skid.*** A tubular steel tail skid is attached to the lower aft section of the tail boom assembly and acts as a warning to the pilot upon an inadvertent tail low landing.

2-102. Flight Instruments. The flight instruments consist of airspeed indicator, turn and slip indicator, vertical velocity indicator, altimeter, and attitude indicators.

2-103. ***Airspeed Indicator.*** The single scale indicator is calibrated in knots and provides an indicated airspeed of the helicopter at any time during flight, by measuring the difference between impact air pressure from the pitot tube and static air pressure from the static vents. The pitot tube is mounted on the metal nose section, and the static vents are located in the side cabin skins near the forward edges of the crew doors. UH-1A helicopters have one airspeed indicator located on the instrument panel. UH-1B helicopters are equipped with two indicators, one on the pilot's side of the instrument panel and one on the copilot's side.

5 **4** **0** **2-104.** ***Pitot Static Tube.*** (Serial Nos. 64-14101 and subsequent). A standard pitot static tube mounted on the forward cabin roof panel replaces the pitot tube and static vents.

2-105. ***Turn and Slip Indicator.*** The turn and slip indicator (4 MIN TURN) (see figure 2-5) is controlled by an electrically activated gyro which is dc powered from the essential bus. The instrument has a needle (turn indicator) and a ball (slip indicator). Although the needle and ball are combined in the one instrument and are normally read and interpreted together, each has its own specific function and operates independently of the other. The ball indicates when the helicopter is in directional balance, either in a turn or in straight and level flight. In the event of helicopter yawing or slipping the ball will be off center. The needle indicates in which direction and at what rate the helicopter is turning. The electrical circuit is protected by a circuit breaker on the dc circuit breaker panel.

2-106. ***Vertical Velocity Indicator.*** The vertical velocity indicator (CLIMB) registers ascent and descent of the helicopter in feet per minute. The instrument is actuated by the rate of atmospheric pressure change and vented to the static air system. One indicator is mounted on the instrument panel of UH-1A helicopters and two indicators are mounted on the UH-1B helicopter instrument panels.

2-107. ***Altimeter.*** The altimeter (ALT) furnishes direct readings of height above sea level and is actuated by the pitot static system. UH-1A helicopters are equipped with a single altimeter and UH-1B helicopters are equipped with two altimeters, one for the pilot and one for the copilot.

A 2-108. ***B1-A Gyro Indicator.*** The B-1A gyro attitude indicator (see figure 2-5) located at the top center of the instrument panel, indicates the flight attitude of the helicopter relative to the earth's surface. The gyro is electrically driven and is powered by 115 volt ac and 28 volt dc simultaneously. A power OFF warning flag is incorporated in this indicator which is exposed at any time when either the ac or the dc power malfunctions. However, the OFF flag does not indicate internal system failures which may occur in the control or indicator. The flag disappears approximately two minutes after power is supplied to control. A pitch trim knob is located in the lower right corner of the indicator case. The knob is adjusted to center the horizon bar with respect to the miniature airplane after the helicopter level flight pitch attitude has been established.

Note

> The OFF flag is not an all-inclusive warning of instrument malfunction, because the flag will not indicate internal system failures which may occur in the control or indicator.

B 2-109. ***Pilot's Attitude Indicator.*** The pilot's attitude indicator (see figure 2-5) is located on the pilot's section of the instrument panel and provides the pilot with a visual indication of the pitch and roll flight attitude of the helicopter in relation to the earth's horizontal plane. The attitude indicator system is operated by three-phase ac power, supplied by the inverter, and is protected by circuit breakers on the ac circuit breaker panel (see figure 2-13). Integral lighting, operated by 28 volt dc from the essential bus, is incorporated in the indicator. An OFF warning flag in the indicator is exposed when electrical power is removed from the system; however, the OFF flag does not indicate internal system failure which may occur in the control or indicator. The flag disappears approximately two minutes after electrical power is supplied in the control. The indicator has been specifically tailored for the flight characteristics of helicopters by incorporating an electrical trim in the roll axis in addition to the standard pitch trim. Degrees of pitch and roll are indicated by a universally mounted sphere. The horizon is represented as a white line on the sphere, horizontal markings indicate the degree of dive or climb while bank (roll) angles are read from the semicircular scale located on the upper half of the indicator face. The pitch trim knob located on the lower right corner of the indicator is adjusted to center the horizon on the indicator sphere with the miniature airplane with regard to the normal flight attitude of the helicopter. The roll trim knob, on the indicator case, is adjusted to align the vertical axis of the sphere with the center mark on the roll (bank) indicator in regard to normal flight attitude of the helicopter.

B 2-110. ***Copilot's Attitude Indicator.*** The copilot's attitude indicator (see figure 2-5) is located on the copilot's section of the instrument panel and is operated by three-phase ac power supplied by the inverter. The gyro is enclosed in a sphere, a portion of which is visible through the opening in the face of the instrument. This indicator provides the copilot with a visual indication of the pitch and roll flight attitude of the helicopter in relation to the earth's horizontal plane. Relative motion of the helicopter is indicated on the face of the instrument by movement of horizon bar with relation to the adjustable miniature airplane in the center of the dial. In a climb (or dive) exceeding 27 degrees of pitch, the horizon bar stops at the top (or bottom) of the case and the sphere then becomes the reference. The copilot's attitude indicator may be caged manually by means of the PULL TO CAGE knob being drawn smoothly away from the face of the instrument to the limit of its travel and then release quickly.

Caution

> Caging of the copilot's (J-8) gyro attitude indicator should be kept to a minimum, and never accomplished in flight, except when helicopter is in straight and level flight by visual reference to a true horizon. The caging knob should never be pulled violently.

2-111. Navigation Instruments. The navigation instrument is the standby compass.

2-112. ***Standby Compass.*** A standard magnetic type compass (see figure 2-5) is mounted on the upper right edge of the instrument panel. This compass is used in conjunction with a compass correction card on the instrument panel.

2-113. Miscellaneous Instruments and Indicators. Instruments and indicators that are independent or are linked with more than one system are free air temperature indicator, master caution system and rpm high-low limit warning system.

2-114. ***Free Air Temperature Indicator.*** The bimetal free-air temperature indicator is located above the instrument panel and in the approximate center of the windshield. The indicator provides a direct reading of the outside air temperature.

2-115. ***Master Caution System.*** The master caution system is a segment wording type, consisting of a segmented word warning CAUTION panel and a remote master caution indicator light.

2-116. ***Master Caution Indicator.*** The master caution indicator light (see figure 2-5) is located at the top center of the instrument panel. When this light illuminates it will be aviation yellow and the pilot is alerted to check the caution panel (see figure 2-14) for the fault condition or conditions that occurred.

2-117. ***Caution Panel.*** The caution panel is located on the instrument pedestal. When illuminated the worded segment lettering in panel will be aviation yellow, however, when they are not illuminated the lettering will not be readable. Illumination of any of the worded segments on the caution panel alerts the pilot to a fault condition or conditions. The panel is equipped with a RESET-TEST switch, a BRIGHT-DIM switch and two edge lights for illuminating the switches. Electrical power to the caution panel is supplied from the 28 volt dc essential bus. Circuit protection is provided by the CAUTION LIGHTS circuit breaker (see figure 2-12) on the dc circuit breaker panel. This panel functions to provide the pilot visual indications (day or night) of fault conditions:

Fault Conditions	***Caution Panel Segment Wording***
Low Engine Oil Pressure	A ENG OIL PRESS B ENGINE OIL PRESS
Engine Icing	ENGINE ICING
Engine Ice Detector Disarmed	A ENG ICE DET B ENGINE ICE DET
Low Fuel Quantity	A 20 MIN FUEL B 20 MINUTE FUEL
Auxiliary Fuel Tank Empty	AUX FUEL LOW
Low Transmission Oil Pressure	XMSN OIL PRESS
High Transmission Oil Temperature	XMSN OIL HOT
Low Hydraulic Pressure	A HYD PRESS B HYD PRESSURE 5 4 0 HYD PRESS NO. 1 5 4 0 HYD PRESS NO. 2
AC Bus Failure (inverter Failure)	A INST INVTR B INST INVERTER
DC Generator Failure	A DC GEN B DC GEIERATOR
Foreign Metal Particles in Transmission or Tail Rotor Gear Boxes	B CHIP DETECTOR
Governor in Emergency Position	B GOV-EMER
External Power Plugged In	A EXT PWR B EXTERNAL POWER
Fuel Pressure Low	A FUEL PRESS
Left Fuel Boost Pump "OFF"	B LEFT FUEL BOOST
Right Fuel Boost Pump "OFF"	B RIGHT FUEL BOOST
Engine Fuel Pump "Inoperative"	B ENG FUEL PUMP
Fuel Filter Inoperative	B-11 FUEL FILTER BYPASS

2-118. ***Bright - Dim Switch.*** The bright - dim switch on the caution panel permits the pilot to manually select a bright or dimmed condition for all the individual worded segments and the master caution indicator light on the instrument panel. After each initial application of power, the lamps will come on in the bright condition, momentarily placing the switch in up position selects the BRIGHT condition, down position selects the DIM condition.

Note

> Segments will dim only when pilot's instrument lights are on.

2-119. ***Reset-Test Switch.*** The caution panel is provided with a reset-test switch enabling the pilot to manually reset and test the master caution system. This switch is labeled RESET in an up position and TEST in the down position. Momentarily placing the reset-test switch in the RESET position extinguishes and resets the master caution indicator light on the instrument panel so it will again illuminate should another fault condition occur. Momentarily placing reset-test switch in TEST position will cause the illumination of all the individually worded segments and also the master caution indicator. Testing of the system will not change any particular combination of fault indications which might exist prior to testing.

Note

> The worded segments will remain illuminated so long as fault condition or conditions exist.

B **2-120.** ***RPM High-Low Limit Warning System.*** The rpm high-low warning system provides the pilot with an immediate warning of high and low rotor and/or engine rpm limits. Main components of the system consist of the chassis black box unit, ON-OFF audio switch, warning light, electrical wiring and connectors. The light warning and audio warning function when the following rpm conditions exist:

Warning

> When high/low limit warning light illuminates and audio signal buzzes, execute ENGINE FAILURE emergency procedure (refer to Chapter 4); then cross reference engine instruments. If engine instruments show normal indications, a malfunction other than engine failure is apparent.

Light Warning and Audio Warning in Combination	For rotor rpm of 295 plus or minus 10 below or engine rpm of 6000 plus or minus 200 or below or both. (Low Warning.)
Caution Light Only	For rotor rpm of 339 plus or minus 10 or above. (High Warning.)

Note

> The audio warning will be heard in the pilot's headset. The audio is a varying oscillating frequency starting low and building up to a high pitch, on for 0.85 second interval, then off for 1.25 second, then on.

2-121. Electrical power for system operation is supplied from the 28 volt dc essential bus and circuit protection is provided by a circuit breaker on the auxiliary circuit breaker panel.

2-122. ***Light - High - Low RPM Warning.*** The high-low warning light is located on the upper left-hand area of the instrument panel. This light illuminates to provide a visual warning of low rotor rpm, low engine rpm or high rotor rpm.

Note

> For low rpm warning the audio warning functions in conjunction with the warning light.

2-123. ***Switch-Low RPM Audio On-Off.*** The ON-OFF audio switch is located at the left of the main fuel switch on the engine panel. The audio switch in OFF position prevents audio warning from functioning for engine starting when the audio might be very objectionable. This prevents the use of the circuit breaker as a switch thereby increasing safety by having warning light working at all times.

2-124. Emergency Equipment. The emergency equipment consists of fire extinguisher and first aid kit.

2-125. ***Fire Extinguisher.*** A portable fire extinguisher is carried in a bracket located on the left side and forward on the pedestal on UH-1A helicopters and to the right of the pilot's seat on the deck on UH-1B helicopters.

2-126. ***First Aid Kit.*** An aeronautical type first aid kit is located at the upper center of the aft cabin bulkhead on UH-1A helicopters. UH-1B helicopters have three aeronautical type first aid kits, located, one on the right hand door post and two on the left hand door post.

2-127. Doors. Entrance is accomplished through pilot's and copilot's doors and/or cargo-passenger doors.

2-128. ***Pilot's and Copilot's Doors.*** The pilot's and copilot's doors (see figure 2-1) are formed aluminum frames with transparent plastic windows in the upper section. Ventilation is supplied by sliding panels in the windows. Cam type door latches are used and doors are equipped with jettisonable door releases to allow release for emergency exit.

2-129. ***Cargo Doors.*** The two cargo doors (see figure 2-1) are formed aluminum frames with transparent plastic windows in upper section. These doors are on rollers and slide aft to the open position allowing unrestricted access to the cargo area. The helicopters can be flown with the cargo doors fully open at maximum airspeed. The windows in the cargo doors can be kicked out to permit emergency exit in the even of doors being jammed shut.

2-130. Pilot's and Copilot's Seats. The pilot's and copilot's seats (see figure 2-4) are the adjustable non-reclining type and each seat is mounted on two fixed tracks. The lever for vertical height adjustment is on the right side of the seats and the fore and aft lock is on the left side of the seats. Each seat is equipped with a lap safety belt and inertia-reel shoulder harness. Design of the seats permits the use of a backpack parachute or a standard cushion on the back of the seat. Also a seat pack parachute, pararaft kit or a standard cushion in the seat can be used.

2-131. ***Shoulder Harness.*** An inertia-reel shoulder harness is incorporated in the pilot's and shoulder harness is incorporated in the pilot's and copilot's seats with manual lock-unlock handle (see figure 2-4) on the handle, the latch is released and the control handle may be moved freely from one position to the other. With the control in the unlocked position, the reel cable will extend to allow the pilot to lean forward; however, the reel will automatically lock when helicopter encounters an impact force of 2 or 3 "G" deceleration. Locking of the reel can be accomplished from any position and the reel will automatically take up the slack in the harness. To release the lock it is necessary to lean back slightly to release tension on the lock and move the control handle to the lock and then unlock position. It is possible to have pressure against the seat back whereby no additional movement can be accomplished and the lock cannot be released; if this condition occurs, it will be necessary to loosen shoulder harness. Manual locking of the reel should be accomplished for emergency landings.

1-132. Auxiliary Equipment. The following auxiliary equipment is described in Chapter 6:

Ventilating System
Heating and Defrosting Systems
Engine Anti-Icing
Pitot Heater
Lighting Equipment
Armament Systems
Windshield Wiper
Instrument Trainer Equipment
Casualty Carrying Equipment
Fire Detector Warning System
Heated Blanket Receptacles
Data Case
Pilot's Check List
Mooring Fittings
Tow Rings
Ground Handling Wheels
Blackout Curtains
Blood Bottle Hangers
Rotor Tie Down
Cargo Tie Down Fittings
Cargo Tie Down Net
External Cargo Hook-Up Mirror
Tailpipe Cover
Pitot Tube Cover
Auxiliary Fuel Equipment
Paratroop Static Line
Mechanical External Stores Jettison
Engine Vibration Check Equipment

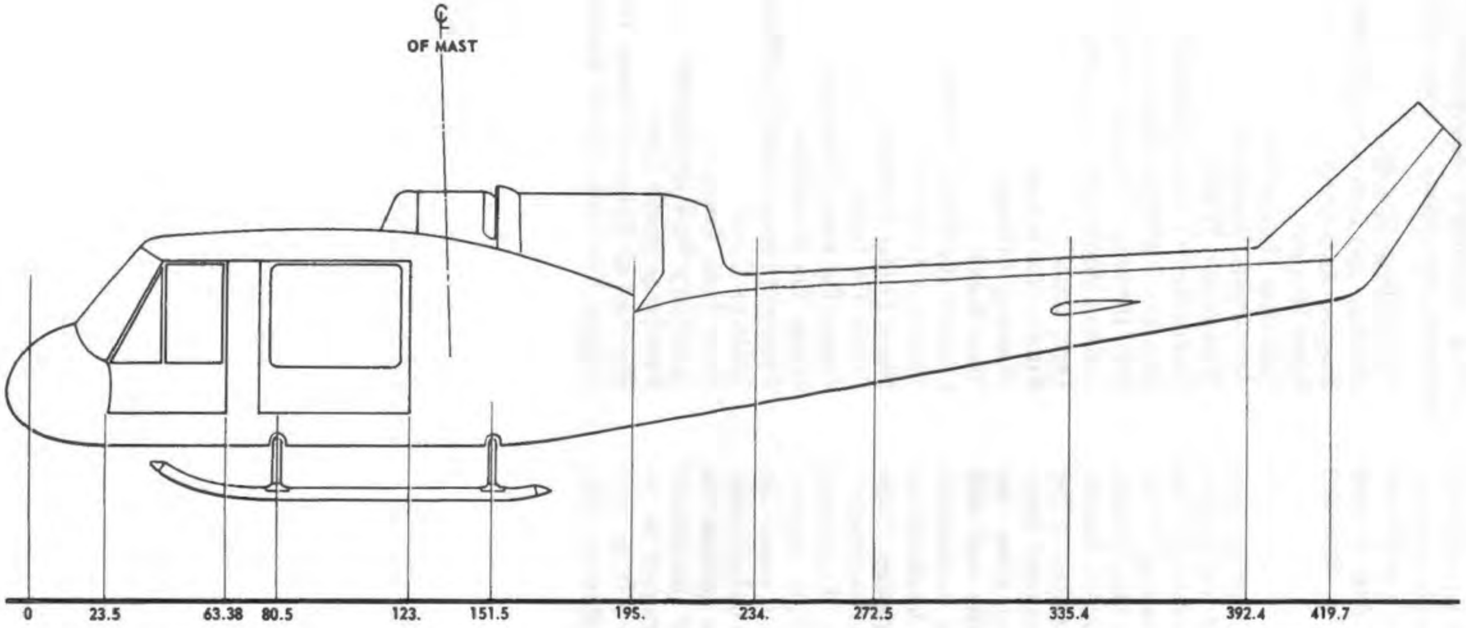


Figure 2–16. Station diagrams

CHAPTER 3

NORMAL PROCEDURES

Section I — Scope

3-1. Purpose. Chapter 3 contains instructions and procedures covering flight of the helicopter from the planning stage through actual flight considerations to securing the helicopter after landing. Normal and standard conditions are assumed in these procedures. Pertinent data in other chapters is referenced when applicable.

3-2. Normal procedures are given in checklist from which applicable. A condensed version of these procedures is contained in the condensed checklist Technical Manual TM 55-1520-211-10CL.

Section II — Flight Procedures

3-3. Preparation For Flight. This period should be devoted to matters of general mission planning and a study of special problems involved in operating the aircraft for mission completion.

3-4. Flight Restrictions. Refer to chapter 7 of this Technical Manual for flight restrictions due to helicopter operating limitations.

3-5. Flight Planning. The safe and efficient planning of the mission to be accomplished will provide the pilot with the data to be used during flight. The information to be used can be compiled from the following sources.

a. Check type of mission to be performed, and destination.

b. Select performance charts to be used from Chapter 14.

c. Record for in-flight use, the information concerning fuel quantity required, airspeed, power settings, take-off, climb, cruise or hovering condition, landing and fuel consumption for operating gross weight and climatic condition.

3-6. Take-Off and Landing Data Cards. Take-off and landing data cards in format for local reproduction are contained in TM 55-1520-211-10CL. Consult chapter 14, Performance Data, for detail operating information when planning various types of missions that require use of the data cards.

3-7. Weight And Balance. Ascertain proper weight and balance of the helicopter as follows:

a. Consult applicable weight and balance instructions given in Chapter 12, and ascertain that DD Form 365F has been completed properly.

b. Compute take-off and anticipated landing gross weight, checking helicopter CG and location and ascertaining weight of fuel, oil, payload, etc.

c. Check that loading limitations, described in Chapter 7, have not been exceeded.

3-8. Pre-Flight Check. The amplified preflight check includes the exterior and interior checks as outlined.

3-9. Before Exterior Check. Check fuel and oil servicing data requirements as given in Chapter 2.

a. Check DA Form 2408A.

b. Check battery switch - OFF.

3-10. Exterior Check. The designated exterior check areas are shown in figure 3-1. The following checks reference these areas.

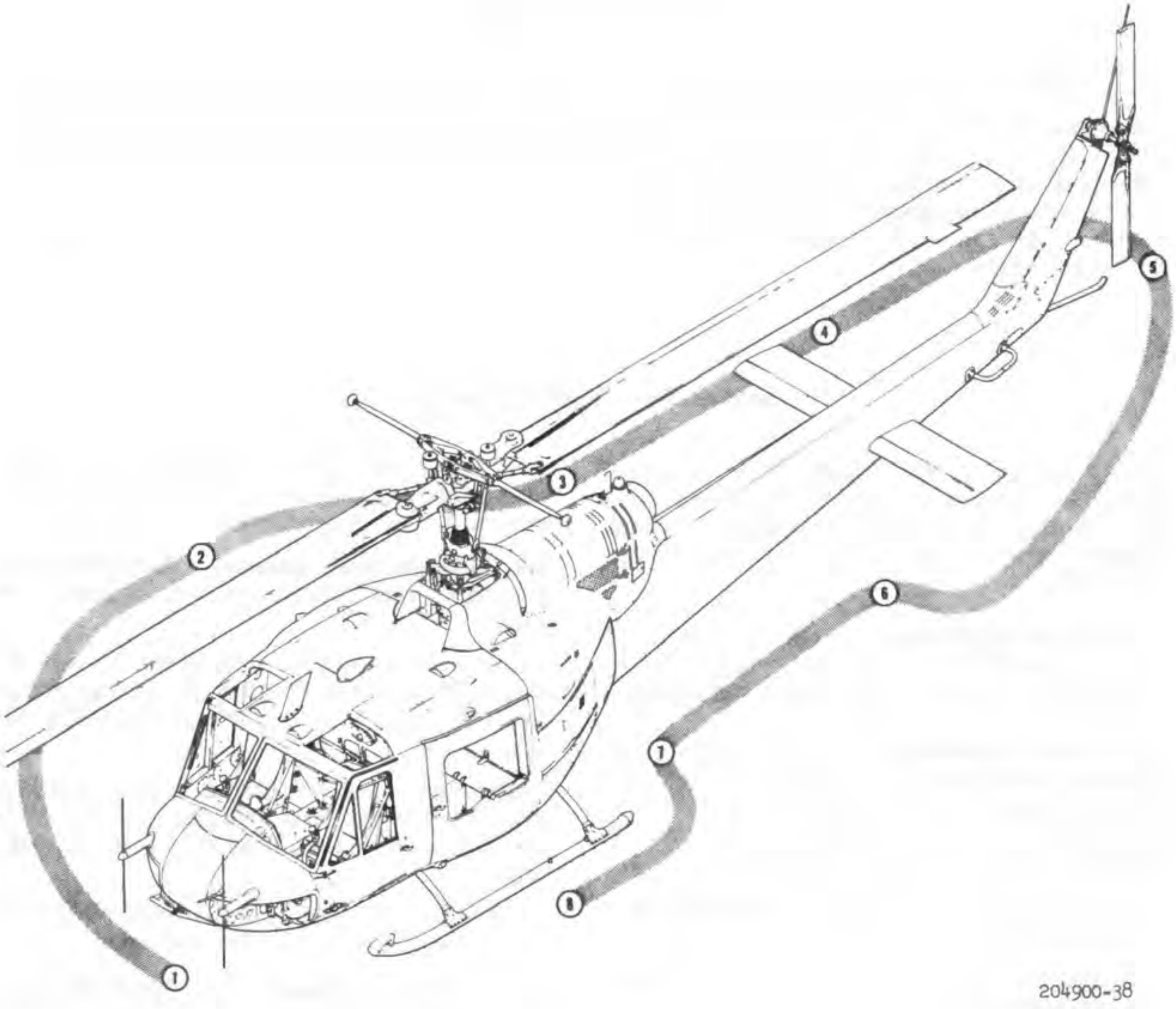


Figure 3–1. Exterior check diagram

Note

Be certain that helicopter is clear of all obstructions, including other aircraft.

3-11. *Fuselage Front Area 1.* a. Visually check condition and cleanliness of front rotor blade.
b. Visually inspect static ports.

5 **4** **0** Visually inspect pitot static tube to be uncovered and clean.

c. Check security of radio door.

d. Check security and condition of antennas.

e. Inspect pitot tube to be uncovered and clean.

f. Inspect cabin area for defects and glass cleanliness.

g. Check that searchlight is stowed.

3-12. *Fuselage — Cabin Right Side and Top Area 2.* a. Check condition and cleanliness of glass and operation of entrance doors.

b. Check condition of landing gear and remove handling wheels.

c. Check security of cargo suspension unit.

d. Check that cabin top ventilators are unobstructed.

e Check condition and security of antennas.

f. Check cleanliness of engine intake.

h. **A** Drain right sump.

B Drain right sump and right pump.

i. Check condition of navigation lights.

3-13. *Fuselage — Aft of Cabin Right Side Area 3.* a. Visually check oil level of rotor head reservoirs.

b. Check hydraulic fluid level.

c. Check security of engine and transmission cowling.

d. Visually check fuel level, secure filler cap.

e. Visually check engine oil level and secure filler cap.

f. Visually check transmission oil level.

g. Secure access doors.

h. Visually check external surfaces and ground beneath engine compartment for oil leaks.

3-14. *Aft Fuselage—Right Side Area 4.* a. Check cleanliness and general condition of aft fuselage.

b. Secure fairing.

c. Check condition of synchronized elevator.

d. Check security and condition of omni antenna.

e. Visually check oil level 42° tail rotor gear box.

f. Check condition of navigation light(s).

g. Visually check aft rotor blade for condition and cleanliness.

3-15. *Fuselage — Full Aft Area 5.* a. Secure aft fuselage extension covers.

b. Check tail skid condition.

c. Check security and condition of aft antenna.

d. Check tail rotor for condition and free movement on flapping axis.

e. Visually check oil level in 90° tail rotor gear box.

3-16. *Aft Fuselage — Left Side Area 6.* a. Check security of tail rotor drive shaft covers.

b. Check condition of synchronized elevator.

c. Check security and condition of omni antenna.

d. Check aft fuselage for cleanliness and general condition.

e. Secure fairing.

3-17. *Fuselage — Aft of Cabin Left Side Area 7.* a. Check security of engine and transmission cowling.

b. Check that battery is connected and circuit breakers in.

c. Check vent lines to be clean and unobstructed.

d. Secure access doors.

e. **A** Drain fuel pump and sump.

B Drain fuel sump, pump and fuel filters.

3-18. *Fuselage — Cabin Left Side Area 8.* a. Check condition of landing gear, remove handling wheels.

b. Check that landing light is stowed.

c. Check condition of navigation lights.

d. Secure access doors.

e. Check entrance doors for condition, cleanliness and operation.

Warning

> Inspect quick-disconnect fitting on main fuel line at fuel filter for security by insuring that a positive lock has been accomplished. Inspect security by noting lock-pin indicators, disconnect flange flush with coupling, and no fuel leak under pressure.

3-19. Interior Check. After exterior check, accomplish interior check.

• a. Entrance doors—SECURED for flight.

b. Main rotor tie down, pitot cover, intake cover and tail pipe cover—STOWED.

c. Seat and pedals—ADJUSTED.

d. Safety belts and shoulder harness—FASTEN.

e. Operation of shoulder harness lock—CHECK.

f. Cyclic, collective pitch, and pedals-actuate through full travel and center. (Boost needed to check **5** **4** **D**.)

g. All ac circuit breakers—IN.

h. All radios and transponder, if installed—OFF.

i. LOW RPM switch—OFF.

j. FUEL TRANSfer PUMP—OFF.

k. GOVernon—AUTO.

l. START FUEL— ON.

A Fuel Valve—OPEN.

m. MAIN FUEL—ON.

n. OIL VALVE—OPEN.

o. DE-ICE-OFF.

p. FORCE TRIM—ON.

q. HYDraulic CONTrol—ON.

r. COMPASS SLAVING—IN.

s. Instruments—Check static indications, slippage marks and operating range limits.

t. Altimeters—SET.

u. Clock—WIND and SET.

v. MARKER BEACON—OFF.

w. Magnetic compass—SET.

x. CABIN HEATING control panel—HEATER and BLEED AIR—OFF.

y. Windshield WIPERS—OFF.

z. CARGO RELease switch—OFF.

aa. POSITION LIGHTS—OFF (except for night operations).

bb. ANTI-COLLision light—OFF.

cc. DOME lights—OFF.

dd. DC circuit breakers—IN (except armament and special equipment if not to be used.)

ee. INSTrument lights—OFF (except for night operations).

ff. AC power voltmeter—AC phase.

gg. INVerter—OFF.

Note

> Operation of the inverter imposes a considerable drain on the battery. If the battery is weak, operation of the inverter during the start attempt may produce a hot start or even prevent the start altogether in extreme cases. The engine and transmission oil pressure warning lights in the caution panel are dc powered and they are available to monitor the presence of oil pressure until the start is completed and the inverter is turned on to provide ac current to the oil pressure transmitters.

hh. MAIN GENerator—ON.

ii. DC voltmeter—BATtery (24 volts is normal).

Caution

> A minimum of 24 volts is needed for battery start.

jj. NON-ESSential BUS-NORMAL ON.

kk. STARTER—GENerator—START.

ii. BATtery—ON (OFF for APU starts).

mm. FIRE DETECTOR light—TEST (15 seconds MAXIMUM).

nn. MARKER BEACON light—TEST.

oo. CARGO RELEASE ARMED warning light—TEST.

pp. CAUTION panel and MASTER CAUTION—TEST.

qq. GOVernor RPM INCRease—DECRease switch—Decrease 8 to 10 seconds.

rr. Search light switch—STOW.

ss. Landing light switches—OFF and RETRact.

tt. Throttle—Position the throttle just below the ENGINE IDLE stop release (for abort start purposes).

3-20. Starting Engine. Ascertain that rotor paths are clear and fire guard is posted.

a. Energize starter and start clock. (Start fuel flow and ignition occur simultaneously.)

Caution

> If a hot start is imminent—EGT 400°C and rising rapidly, nI less than 19% - proceed as follows:
>
> (1) Throttle—FREEZE.
>
> (2) GOVernor switch—EMERgency position (CONTINUE TO ENERGIZE STARTER.)
>
> I. If EGT rise is not checked below 620°C, abort start as follows:
>
> (a) Throttle—CLOSE.
>
> (b) MAIN FUEL—OFF.
>
> (c) Motor starter for approximately 20 seconds.
>
> II. If EGT stabilizes in the green, proceed as follows:
>
> (a) Slowly advance throttle to increase GAS PRODUCER RPM to 60% nI without exceeding 620°C EGT.
>
> **Caution**
>
> DO NOT "jockey" governor switch between AUTO and EMER positions.
>
> (b) Retard throttle to the ENGINE IDLE stop and simultaneously reposition GOVernor switch to AUTOmatic position.
>
> **Note**
>
> When the GOVernor switch is moved to the EMERgency position, the fingers of the right-hand should not be removed from the switch until it has been repositioned in the AUTOmatic position unless the throttle is closed first.

b. START FUEL switch—OFF at 400°C.

c. Release starter switch at 40% nI speed.

Caution

> Limit starter energize time to 40 seconds. If engine does not start, a three minute cooling period is recommended, after which, a second starting cycle may be attempted. Only three forty-second starting attempts are permissible in any one hour period.

Caution

> Monitor EGT to avoid a hot start. If uneven or intermittent acceleration is accompanied by rapid rise in EGT, shut down engine and immediately investigate. During starting or acceleration, the MAXIMUM allowable EGT is 760°C. If this limit is exceeded, perform a hot end inspection. If, during the start operation of T53-L-5, T53-L-9 or T53-L-9A engines, EGT exceeds 620°C for more than five secons, record a hot start on DA Form 2408A, and three such hot starts shall require a hot end inspection. If, during the start operation of the T53-L-11 or T53-L-11A engines, EGT exceeds 650° for more than five seconds, perform a hot end inspection.

d. Slowly advance the throttle over the ENGINE IDLE stop.

e. INVerter—SPARE ON.

f. Engine and transmission oil pressures—CHECK.

Caution

> If no oil pressure is evident at this time, shut down engine immediately and investigate the cause.

g. START FUEL switch—ON.

h. Radios and headsets—ON.

3-21. Engine Run-Up. Retard the throttle to the ENGINE IDLE stop and check the following:

a. GAS PRODUCER, 56% to 58% RPM.

b. ENGINE and TRANSmission OIL PRESSure—in the green.

c. FUEL PRESSURE—in the green.

d. CAUTION panel and MASTER CAUTION—all lights OFF.

e. LOW RPM switch—AUDIO then OFF.

f. Copilot's attitude indicator—CAGE.

g. FUEL (QUANITY) GAGE TEST switch—TEST.

h. PITOT HEATER—ON-note LOAD meter increase then OFF.

i. AC power voltmeter—CHECK all Phases for 115 (plus or minus three) volts (on SPARE INVerter).

j. INVerter—MAIN ON.

k. AC power voltmeter—CHECK all Phases for 115 (plus or minus three) volts.

l. DC power voltmeter—CHECK all positions and leave in NON-ESSential BUS position.

m. STARTER GENerator—STand BY GENerator.

n. MAIN GENerator—OFF note that MAIN GENerator LOADmeter zeros and STand BY GENerator LOAD meter registers.

o. DC power voltmeter—CHECK voltage zero (with NON-ESSential BUS power OFF).

p. NON-ESSential BUS-NORMAL ON.

q. DC power voltmeter—MAIN GENerator.

r. MAIN GENerator—ON-note that MAIN GENerator LOAD meter registers and STand BY GENerator LOADmeter zeros.

s. STand BY GENerator—START.

t. Pilot's attitude indicator—SET. Increase throttle to 70% gas producer rpm and perform. Emergency Power Control Test as follows:

(1) GOVernor swtch—EMERgency.

(2) GAS PRODUCER RPM—note decrease to 65% rpm.

(3) GOVernor switch—AUTOmatic—note increase to 70% GAS PRODUCER RPM. This constitutes an adequate test of ability to switch from AUTOmatic to EMERgency and then back to AUTOmatic only.

u. Increase throttle slowly to FULL OPEN noting that the engine rpm stabilizes at 6000 plus or minus 50 rpm. Then accomplish the following:

v. All engine and transmission instruments normal or in the green.

w. DE-ICE switch—ON. Note EGT rise.

x. DE-ICE switch—OFF. Note EGT decrease.

y. LOW RPM switch—AUDIO.

z. GOVernor RPM INCRease—DECRease switch. Actuate through full range:

A 5800 to 6700 rpm plus or minus 50 rpm set at 6400 rpm.

B 6000 to 6700 rpm plus or minus 50 rpm set at 6600 rpm.

Note

> Check that audio LOW RPM warning ceases and visual LOW RPM warning light goes off.

aa. FORCE TRIM — OFF — Check control freedom then ON.

bb. HYDRaulic CONTROL — OFF — CAREFULLY check for control freedom then — ON.

5 **4** **0** Check System number 1 and system number 2 then BOTH.

Caution

> Extreme care must be exercised if the collective pitch is raised, as an upward force is present which could cause the helicopter to rise from the ground unexpectedly if the hydraulic off forces are not properly adjusted.

cc. ANTI-COLLision light—ON.

3-22. Before Take-Off. Just prior to take-off check:

Note

> Taxiing as literally interpreted is not applicable for reason of the skid type landing gear. Movement of the helicopter from one ground position to another can be accomplished by the pilot flying from spot to spot at any altitude in close proximity to ground surface.

a. Collective pitch control—Minimum pitch and friction adjusted as desired.

b. Cyclic control—Neutral or slightly into wind.

B Friction as desired.

c. Flight instruments—Check operation and settings.

d. Pitot heater switch—ON if required.

e. Cabin heater—As required (OFF for take-off and landing.)

f. Throttle—FULL OPEN.

g. Dual tachometer—Check synchronization of needles.

h. Engine oil pressure, 60 to 80 psi.

i. Engine oil temperature.

A 88°C (190°F) maximum.

B 90°C (200°F) maximum.

j. Transmission oil pressure.

A 40 to 60 psi.

B 45 to 55 psi.

k. Transmission oil temperature, 100°C (230°F) maximum.

l. Fuel pressure.

A 5 to 20 psi.

B **5** Approximately 12 psi.

B **9** **11** Approximately 13 to 15 psi.

Warning

> Suspend operations immediately if engine or transmission oil pressure and temperature are not within operating limits.

3-23. Take-Off and Climb Procedures. Take-off and climb procedures are accomplished as follows:

3-24. Normal Take-Off to Hover. The normal vertical take-off is the most common type of take-off, and should be used whenever possible. Normal vertical take-off can be accomplished at moderate altitude and with normal gross weights as shown in the Take-Off Distance Chart, Chapter 14. In this type take-off, the safety factor is high as the helicopter is lifted from ground vertically to a height of approximately five feet where the flight controls and engine may be checked for normal operation before continuing to climb. A normal vertical take-off is made in the following manner. Increase throttle to full open with the collective pitch full down. Select desired rpm with INCRease—DECRease switch. Place cyclic control in the neutral position. Increase collective pitch control slowly and smoothly until hovering altitude of five feet is reached. Apply tail rotor pedal to maintain heading as collective is increased. As the helicopter breaks ground make minor corrections with cyclic control to insure vertical ascent, and apply tail rotor pedals to maintain heading.

3-25. Normal Take-Off from Hover. Hover briefly to determine if engine and flight controls are operating properly. From a normal hover at five feet altitude, apply forward cyclic pressure to accelerate smoothly into effective translational lift; maintain hovering altitude with collective pitch and maintain heading with tail rotor control pedals, until effective translational lift has been obtained and the ascent has begun. Then smoothly lower nose of helicopter to an attitude that will result in an increase of airspeed to 60 knots. Adjust power as required to establish the desired rate of climb. Stabilize airspeed and torque pressure as soon as a smooth rate of acceleration will permit.

3-26. Maximum Power Take-Off. Place cyclic control in neutral position. With throttle full open, increase collective pitch smoothly. As the helicopter leaves the ground, continue increasing power to maximum available torque pressure (not to exceed red line) and assume a 40 knot airspeed attitude. As power is increased, maintain heading by smoothly coordinating tail rotor pedals. When sufficient altitude for obstacle clearance is obtained, smoothly increase airspeed and reduce power to establish a normal climb.

3-27. Crosswind Take-Off. In the event a crosswind take-off is required, normal take-off procedures are used. As the helicopter leaves the ground, there will be a definite tendency to drift downwind. This tendency can be corrected by holding the cyclic stick into the wind a sufficient amount to prevent downwind drift. When a crosswind take-off is accomplished, it is advisable to turn the helicopter into the wind for climb as soon as obstacles are cleared and terrain permits.

3-28. After Take-Off. As the helicopter accelerates from hovering flight to flight in any direction, it passes through a transitional period. If engine power, rpm, and collective pitch are held constant in calm air, a momentary setting will be noted when the cyclic control stick is moved forward to obtain forward speed. This momentary settling condition is a result of the helicopter moving from the ground cushion and the tilting of the tip-path plane of rotation of the main rotor blades to obtain forward airspeed. Wind velocity at the time of take-off will partially eliminate this settling due to the increased airflow over the main rotor blades. As wind velocity increases this settling will be less pronounced. After the helicopter accelerates forward to 10 to 15 knots airspeed, less power is required to sustain flight due to increase in aerodynamic efficiency as airspeed is increased to best climbing speed. Take-off power should be maintain until a safe autorotative airspeed is attained, then power may be adjusted to establish the desired rate of climb.

3-29. Climb. During climbs at low altitude a safe autorotative speed should be maintained so that in the event of engine failure, sufficient but not excessive speed is available to accomplish a safe autorotative landing. Airspeed to avoid at low altitudes are shown on figure 7-3. If necessary to clear ground obstructions after take-off, vertical climbs can be accomplished; however, operation within the shaded area on figure 7-3, should be held to a minimum. Accelerating the helicopter to the optimum climbing airspeed in a shallow climb eliminates critical settling and the possibility of the helicopter striking the ground on take-off.

3-30. Cruise Checks. These checks consist of constantly monitoring instruments, to be cognizant of any change in performance or condition.

3-31. Flight Characteristics. The helicopter is capable of delivering a maximum thrust commensurate with rotor-engine limitations and the density altitude in which it is operating. Maximum thrust can be utilized to obtain maximum airspeed, optimum rate of climb or, at some reduced airspeed, the maximum maneuver potentially. The capabilities of the helicopter may be employed within maximim limitations and in accordance with the environment under which operated. The capabilities of the helicopter in stabilized flight conditions are clearly and accurately defined in Chapter 7, and Chapter 14.

3-32. Before Landing Check. a. Crew—ALERTED.

b. Collective friction—ADJUST.

c. Governor—AUTO.

d. Engine.

A 6000 to 6400 rpm.

B 6400 to 6600 rpm.

e. Instruments—Check within operating limits.

f. Shoulder harness—LOCK.

3-33. Approach And Landing Procedures. Before approach and landing are accomplished, the pilot should evaluate the landing site for suitability of usable area by making a low speed pass into the wind over the intended landing site. Evaluate terrain, check wind direction, velocity and consistency. The gross weight of the helicopter must be considered; and the final step in evaluation of a landing, is the anticipated helicopter performance during landing and subsequent take-off.

3-34. *Normal Approach.* The objective of a normal approach and landing is to bring the helicopter to a hover over the spot of intended landing. The airspeed is decreased gradually and a constant approach angle of 8 to 10 degrees established at an engine speed of maximum rpm. In case of undershooting or overshooting, the approach angle is corrected by increasing or decreasing the power and the collective pitch level. As the landing spot is approached the airspeed and the rate of descent are decreased in order to attain a hovering attitude at approximately five feet.

3-35. *Steep Approach*. The steep approach procedure is a precision, power-controlled approach used to clear obstacle and to accomplish a landing in confined areas. The rate of descent in a steep approach should not exceed approximately 400 fpm with a constant approach angle of 12 to 15 degrees and some forward airspeed should be maintained at all times. Since a reasonable amount of power will be required to control the rate of descent (power required is governed by the gross weight and atmospheric conditions) a minimum amount of additional power will remain to accomplish a hover. The airspeed is decreased by holding the cyclic stick aft. The rate of descent is controlled by proper application of power and collective pitch lever. In the final stages of approach, the collective pitch lever is increased gradually and the cyclic stick is adjusted to maintain the originally established glide angle in a way which will reduce the rate of descent to zero the moment the hovering altitude is reached.

1. Accomplish prelanding check and start approach. Airspeed – 43 knots minimum.
   A. Engine 6000 to 6400 RPM.
   B. Engine 6400 to 6600 RPM.
2. Start approach and prelanding descent. Adjust collective pitch control friction – as desired.
3. Maintain approach speed.
   A. Engine – 6000 to 6400 RPM.
   B. Engine – 6400 to 6600 RPM.
4. Gradually apply rearward cyclic control stick until ground speed is approximately zero at an altitude of from 3 to 6 feet.
5. Increase collective pitch sufficiently to establish hovering flight above ground.

   Gently descend by slowly reducing collective pitch while holding helicopter motionless over landing area.

204099–16

Figure 3–2. Normal approach and landing – power on

Caution

Never reduce forward airspeed to zero before reaching hovering altitude. If the landing spot has been overshot, execute a go-around immediately.

Warning

Due to lag in acceleration which is inherent in turbine engines, acceleration from flight idle position to normal operating RPM requires approximately 8 to 10 seconds of the 8 to 10 second, 4 to 5 seconds are allowed to compensate for pilot reaction time and effects due to altitude and temperature, with the remaining 4 to 5 seconds to compensate for the inherent turbine engine lag. The total lag could possibly be in excess of 10 seconds depending on how far the pilot has allowed nI and nII speed to drop.

3-36. Normal Landing. With an engine rpm at: 6000 to 6400 **A** 6400 to 6600 **B**, decrease collective pitch to effect a constant, smooth rate of descent until touchdown, making necessary corrections with pedals and cyclic control to maintain level attitude and constant heading, and to prevent movement over the ground. Upon contact with the ground, continue to decrease collective pitch smoothly and steadily until the entire weight of the helicopter is resting on the ground.

3-37. Slope Landing. (Slope landing should be made cross-slope with skid type gear.) Make the slope landing by heading the helicopter generally cross-slope. Descend slowly, placing the upslope skid on the ground first. Coordinate reduction of collective pitch with lateral cyclic (into the slope) until the downslope skid touches the ground. Continue coordinating reductiton of collective pitch and application of cyclic into the slope until all the weight of the aircraft is resting firmly on the slope. If the cyclic control contacts the stop before the downslope skid is resting firmly on the ground, return to hover, and select a position where the degree of slope is not so great. After completion of a slope landing, and after determining that the aircraft will maintain its position on the slope, place the cyclic stick in neutral position.

3-38. Crosswind Landing. Crosswind landings can generally be avoided in helicopter operations. Occasionally, plowed, furrowed or eroded fields, and narrow mountain ridges may require that cross wind landings be made. The crosswind landing, in such instances where terrain features dictate, is utilized to prevent landing at a high tipping angle or dangerous tail low attitude. Cross wind landing may also be accomplished on smooth terrain when deemed advisable by pilot. The following procedures should be observed in accomplishing cross wind landing:

A a. Engine rpm 6400

B Engine rpm 6600.

b. Hover helicopter crosswind.

c. Hold the cyclic control stick into the wind to prevent side drift throughout the landing.

d. Proceed as in normal landing.

3-39. After Landing Check. The engine post-flight check shall be performed after the last flight of the day or after any flight if engine mal-function occurs during flight. Enter complete information of engine and helicopter descrepancy, if circumstances require, on DA Form 2408A.

A & **B** **5** a. Gas Producer rpm 58% to 62%.

B **9** **11** Gas Producer rpm 56% to 58%.

b. Exhaust Gas Temperature—Check within allowable range.

c. Engine Oil Pressure:

A 60 to 80 psi.

B 25 psi minimum.

d. Engine Oil Temperature:

A 88°C (190°F) maximum.

B 93°C (199°F) maximum.

e. Transmission Oil Temperature, 110°C (230°F) maximum.

f. Transmission Oil Pressure:

A & **B** **5** 40 to 60 psi.

B **9** **11** 30 psi minimum.

3-40 Engine Shut-Down. Proceed as follows for engine shut down:

A a. Stabilize exhaust gas temperature by allowing engine to operate at flight idle from one to two minutes.

b. Throttle — PUSH and HOLD engine idle stop release switch, retard throttle to full off position.

Note

The main fuel valve must be closed as soon as the engine has been stopped, to insure that fuel does not drain from the engine fuel control and allow air to enter the fuel system. Fuel valve should remain in CLOSED position at all times when engine is not running, except when fuel boost pump is operating.

B a. Throttle — CLOSED.

b. Fuel MAIN ON-OFF Switch — OFF.

Note

After stopping the engine a fuel pressure indication in excess of 30 psi may be observed, due to the expansion of fuel trapped between the fuel control and fuel shut-off valve. This expansion is caused by radiation from the engine resulting in fuel pressure indication. Check valves located in the fuel system relieve pressure exceeding 40 to 45 psi and permit fuel to bleed into the fuel cells.

Caution

If a rapid rise is exhaust temperature is noted, with throttle closed and starter fuel off, motor the engine to allow temperature to stabilize within limits. Do not exceed 40 seconds continuous starter application.

Note

The main fuel valve must be closed as soon as engine has been stopped, to ensure that fuel does not drain from the engine fuel control and allow air to enter the fuel system. Fuel valve should remain in CLOSED position at all times when engine is not running.

3-41. Before Leaving The Helicopter: Check the following:

a. All electrical switches — OFF.

b. Circuit breakers — OUT.

c. Radio switches — OFF.

d. Collective pitch control — FULL DOWN and engage DOWN lock.

e. Moor aft main rotor blade with mooring block by drawing blade down lightly against static stop and tieing web strap to the tail boom. Tie lower tail rotor blade to the vertical fin with web strap.

f. Install exhaust cover and engine inlet cover.

Caution

In addition to the established requirements for reporting any system defects, unusual and excessive operations, the pilot will also make entries in DA Form 2408 A to indicate when any limits in the Flight Manual have been exceeded.

Note

MINIMUM GROUND CLEARANCES

Main Rotor Blades Stationary	12 FT 8 IN.
Tail Skid	4 FT 9 IN.
Tail Rotor Blades Stationary	6 FT 3.5 IN.
Bottom of Fuselage	1 FT

*Check antennas that may protrude lower

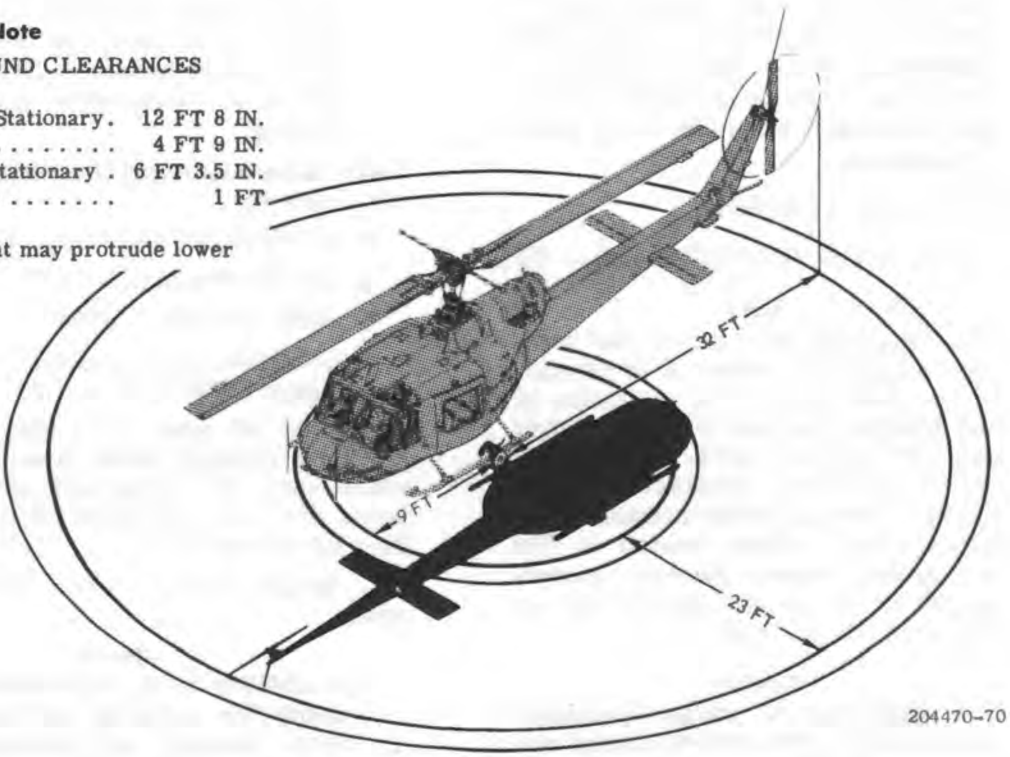


Figure 3–3. Turning radius and ground clearance

CHAPTER 4

EMERGENCY PROCEDURES

Section I — Scope

4-1. Scope. This Chapter clearly and concisely describes the procedure to be followed in meeting any emergency except in connection with auxiliary equipment.

4-2. *Scope of Emergency Procedures.* Procedures in this Chapter describe action to be followed in emergencies, that can within reason be expected. In some cases emergency situations can be avoided by maintaining operation within the limitations described in Chapter 7.

4-3. Emergency operation of auxiliary equipment is contained in the Chapter insofar as its utility affects safety of flight. Detail descriptions of this equipment are given in Chapter 6.

4-4. Emergency procedures are given in checklist form when applicable. A condensed version of these procedures is contained in the condensed checklist Technical Manual TM55-1520-211-10CL.

Section II — Engine

4-5. Engine. This section sets forth the emergency procedures to be taken in the event of engine failure under various conditions.

4-6. Flight Characteristics. The handling characteristics of the helicopter without power is similar to those of a normal power descent. Full control is maintained by autorotative action of the main rotor, and ground contact force is reduced by increasing main rotor pitch prior to landing.

4-7. Autorotation. Autorotation is the result of aerodynamic forces exerted on the main blades, causing the rotor to continue to rotate without engine power. The rotation of the rotor, caused by the aerodynamic characteristics of the system, allows operating rotor rpm to be maintained, thereby, creating energy which is stored in the rotor system. This energy is utilized by the pilot to make a controlled descent and by application of the collective pitch, just prior to ground contact, a safe landing can be accomplished with average skill and a near normal touchdown will be the result.

4-8. Directional control during autorotation is obtained through use of the cyclic stick and heading control is provided by the tail rotor which is powered by the main rotor though the transmission. Partial power and simulated autorotational descents shall be accomplished at approach speed not less than shown on power-off landing charts in Chapter 14.

Note

> When making a forward speed autorotation landing with skid gear, carefully increasing collective pitch just prior to ground contact will result in a slower rate of descent. Deceleration is obtained by reducing main rotor pitch after ground contact.

4-9. Engine Failure During Take-Off/and While Hovering Below 10 Feet. The energy stored within the rotor system at normal operating rpm is sufficient to prevent a hard landing and can be utilized by use of the following procedure:

a. Instantly FREEZE collective pitch control lever and allow helicopter to settle.

b. Maintain heading with tail rotor pedals.

c. Utilize rotor rpm.

d. Just prior to ground contact INCREASE collective pitch to cushion landing.

e. A Fuel boost pump switch — OFF.

B Fuel main ON-OFF switch — OFF.

f. A Fuel valve switch — CLOSE.

g. Oil valve switch — CLOSE.

h. Battery switch — OFF.

Caution

Do not attempt to restart engine until cause of engine failure has been determined and corrected.

4-10. Engine Failure Between 10 and 400 Feet. If engine failure occurs between 10 and 400 feet, accomplish the following procedure.

Caution

To reduce the possibility of a hard landing in the event of a power failure, vertical climb should only be used for obtaining obstacle clearance.

a. Reduce collective pitch sufficiently to maintain rpm which will provide energy to cushion the landing.

b. Maintain heading with tail rotor pedals.

c. Obtain forward speed, to reduce rate of descent if altitude permits.

d. Just prior to ground contact INCREASE collective pitch a sufficient amount to cushion the landing.

e. **A** Fuel boost pump — OFF.

B Fuel main ON-OFF switch — OFF.

f. **A** Fuel valve switch — CLOSE.

g. Oil valve switch — CLOSE.

h. Battery switch — OFF.

Caution

Do not restart engine until cause of failure has been determined and corrected.

4-11. Engine Failure During Flight. If engine failure occurs in flight proceed as follows:

Note

Rotor rpm will tend to overspeed in autorotation at high gross weights, high density altitude or when maneuvering. High rotor rpm may be kept within limits by judicial use of collective control.

a. Collective pitch — Adjust to maintain rotor rpm.

b. Reduce forward speed to desired autorotative airspeed for existing conditions, refer tot Chapter 14.

c. **A** Fuel boost pump switch — OFF.

B Fuel main ON-OFF switch — OFF.

d. **A** Fuel valve switch — CLOSE.

e. Oil valve switch — CLOSE.

f. Battery switch — OFF.

g. Shoulder harness — LOCK.

h. At low altitude, flare to lose excessive speed.

i. Execute an autorotative landing.

Caution

After landing do not attempt to restart engine until cause of failure has been determined and corrected.

4-12. Engine Restart During Flight. The condition which would warrant an attempt to restart the engine would probably be an engine flameout caused by a malfunction of the fuel control unit or failure of the boost pump(s). The decision to attempt an engine restart during flight is the pilot's responsibility and is dependent upon pilot's experience and the operating altitude. If an engine restart is to be attempted, proceed as follows:

Caution

When cause of engine failure is obviously mechanical DO NOT attempt an engine restart.

a. Establish an autorotative glide.

b. Throttle — CLOSED.

c. Governor switch — EMERGENCY.

d. **A** Fuel boost pump switch — ON.

A Fuel valve switch — ON.

B Fuel START ON-OFF switch — START ON.

B Fuel main ON-OFF switch — ON.

e. Battery switch — ON.

f. Starter-ignition switch—PULL and HOLD and simultaneously open throttle slowly to supply sufficient fuel for start.

Caution

Monitor EGT to avoid a hot start.

g. Gas producer tachometer — Observe for engine start indication.

h. **B** Fuel START ON-OFF switch — OFF at 400°C EGT.

i. Starter switch — RELEASE at 35 to 42 percent rpm nI speed.

j. Fuel pressure — CHECK within operating limits.

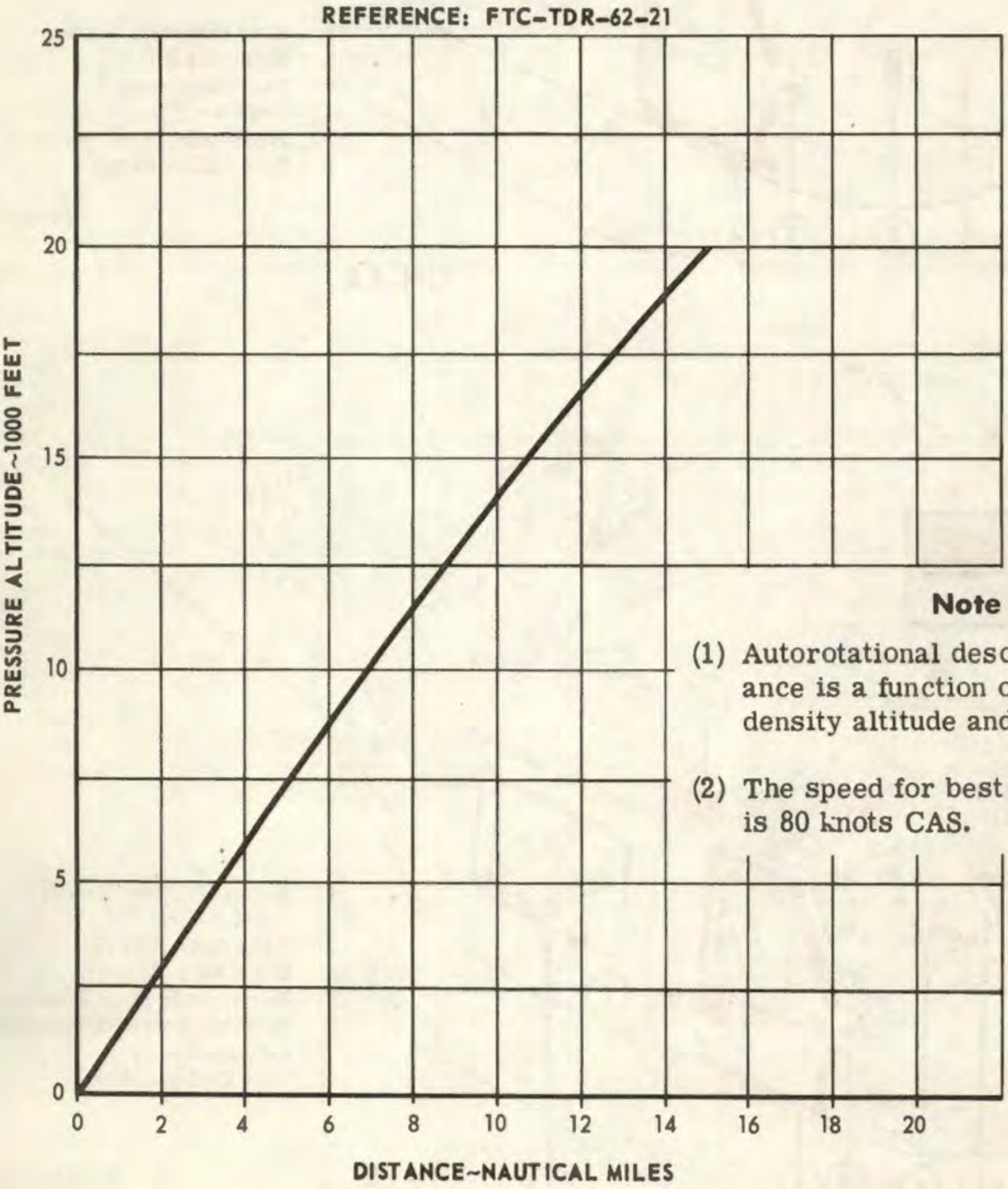
k. Starter-generator switch — STANDBY position.

4-13. Minimum Rate of Descent. The power-off minimum rate of descent is obtainable by maintaining a forward speed of approximately 45 to 60 knots depending on gross weight and attitude.

4-14. Maximum Glide. A forward glide speed of approximately 80 knots will result in obtaining maximum gliding distance.

MAXIMUM GLIDE DISTANCE, POWER OFF

AVERAGE G.W.=6400LBS
ROTOR RPM 310

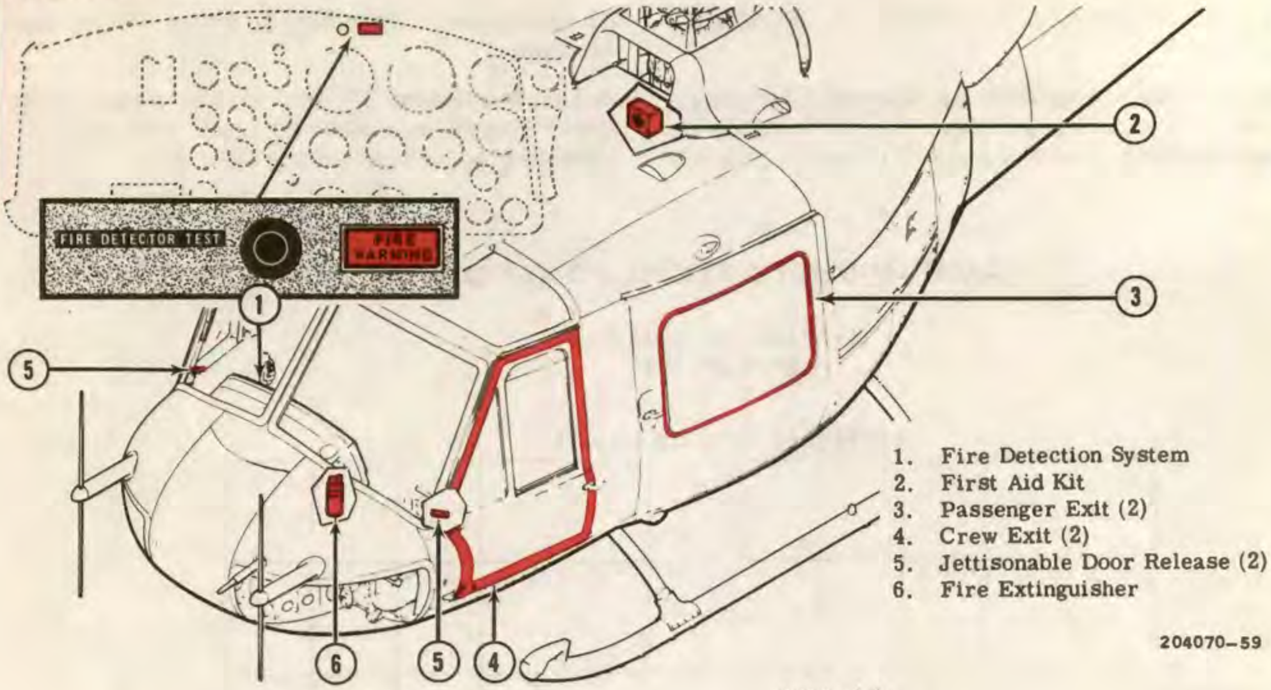


Note

(1) Autorotational descent performance is a function of airspeed by density altitude and grossweight.

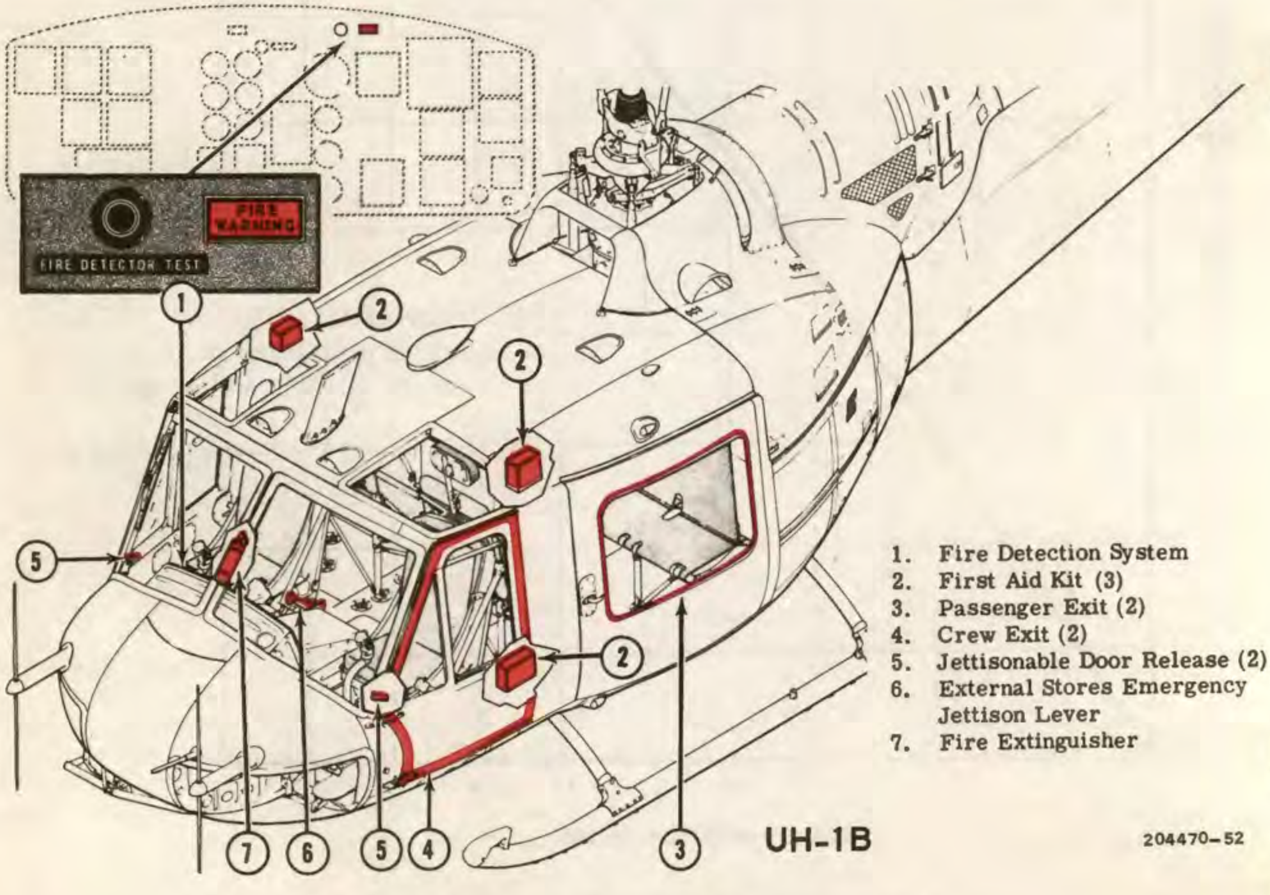
(2) The speed for best glide distance is 80 knots CAS.

Figure 4–1. Maximum glide distance – power off



1. Fire Detection System
2. First Aid Kit
3. Passenger Exit (2)
4. Crew Exit (2)
5. Jettisonable Door Release (2)
6. Fire Extinguisher

UH-1A



1. Fire Detection System
2. First Aid Kit (3)
3. Passenger Exit (2)
4. Crew Exit (2)
5. Jettisonable Door Release (2)
6. External Stores Emergency Jettison Lever
7. Fire Extinguisher

UH-1B

Figure 4–2. Emergency exits and equipment – typical

Section III — Tail Rotor

4-15. Tail Rotor Failure During Take-Off. Close throttle immediately and accomplish an autorotational landing.

4-16. Tail Rotor Failure While Hovering Below 10 Feet. Close throttle immediately and accomplish an autorotational landing.

4-17. Tail Rotor Failure During Flight. Loss of anti-torque control will be evident by a loss of directional control. Maintain sufficient forward airspeed of at least 50 knots to insure a streamlined effect and maintain rotor RPM in the green. If altitude and terrain are adverse for immediate landing, the pilot should consider further powered flight to an area affording a safe autorotation running landing.

4-18. Tail Rotor Failure During Landing. Close throttle immediately and accomplish an autorotational landing.

Section IV — Fire

4-19. Engine Fire During Starting. An engine fire during starting will be caused by an overloading of fuel in the combustion chamber and a delayed ignition of the fuel resulting in flame emitting from the tailpipe. To extinguish fire proceed as follows:

a. Throttle — CLOSE and continue to crank engine.

b. A Fuel boost pump switch — OFF.

A Fuel valve switch — CLOSE.
B Fuel main ON-OFF switch — OFF.

c. Battery switch — OFF after fire extinguished.

Note

If hot start is evident, the following technique may be utilized to relieve this situation: FREEZE the power control, switch governor to EMERgency. This should check EGT rise If rise is not checked below 620°C ABORT start.

4-20. Engine Fire During Flight. Immediately enter autorotation and prepare for power-off landing and accomplish the following.

a. Throttle — CLOSE.

b. A Fuel valve switch — CLOSE.

A Fuel boost pump switch — OFF.

B Fuel main ON-OFF switch — OFF.

c. Battery switch — OFF.

d. Generator switch — OFF, except when power is required to operate lights or avionic equipment.

e. Shoulder harness — LOCK.

f. Execute an autorotative descent and landing.

Caution

After landing do not attempt to restart engine until cause of fire has been determined and corrected.

4-21. Fuselage Fire. In the event of a fuselage fire, proceed as follows:

a. Airspeed — REDUCE TO MINIMUM to lessen possibility of spreading fire.

b. If smoke enters cabin, open pilot's sliding windows, cabin ventilators and cargo doors.

c. Battery switch — OFF.

d. Generator switch — OFF (ON if lighting or avionic equipment are to be used).

e. Accomplish landing and use fire extinguisher if fire is not severe.

Warning

Fire extinguisher fluid vapors are toxic and use should be limited to well ventilated areas.

4-22. Electrical Fire. The electrical circuits are individually protected by circuit breakers that automatically interrupt power to aid in the prevention of fire when a short circuit or malfunction occurs. To further identify and isolate the defective system, if necessary, proceed as follows:

a. Instrument — CHECK for correct reading.

b. Battery and generator switches — OFF.

c. Circuit breakers — OUT.

d. Generator switch — ON, if generator circuit is shorted, return generator switch to OFF, and turn battery switch ON.

e. Circuit breakers — IN one at a time, and allow a short period of time to identify defective circuit.

Note

> Flight operation can be maintained without battery and generators; however, most instruments will not function, as they are electrically powered.

4-23. Smoke and Fume Elimination. Smoke or toxic fumes entering the cabin can be exhausted by the following procedure:

a. Pilot's and copilot's windows — Slide OPEN.

b. Cabin ventilators — OPEN.

c. Cargo doors — OPEN.

Note

> If smoke or fumes are caused by an electrical fire, isolate the defective circuit as outlined under ELECTRICAL FIRE.

Section V — Fuel System

4-24. A Helicopter Fuel Boost Pump Failure. Malfunction of the fuel boost pump will be evident by the illumination of the master caution light and the FUEL PRESSure light located on the CAUTION panel and the procedure is as follows:

a. If altitude permits, descend to pressure altitude of 4600 feet or less.

b. Fuel boost pump switch — ON.

c. Fuel valve switch — ON.

d. Fuel, oil valve and fuel pump circuit breakers IN.

e. Attempt, if necessary, ENGINE RESTART DURING FLIGHT.

f. If trouble is not corrected, follow ENGINE FAILURE DURING FLIGHT procedures.

Note

> UH-1B helicopters are equipped with two separate fuel boost, either one is capable of sustaining normal flight. Upon landing, however, both pumps should be put in working condition before new flight.

4-25. Engine Fuel Control Malfunction. Malfunction or failure of the engine fuel control unit will be evident by a loss of power due to lack of fuel or feeding too much fuel into the engine, which will cause a repeated number of loud noises to emit from the tailpipe and will sound like backfiring. This is called compressor stall. In the event of a control unit malfunction or failure, proceed as follows:

a. Collective pitch control lever — Down to maintain rotor rpm.

b. Throttle — RETARD TO FLIGHT IDLE.

c. Governor switch — EMERGENCY position.

d. Throttle — ADVANCE slowly and firmly to obtain engine operating rpm.

Warning

> When operating on the emergency fuel system, the throttle must be manually adjusted to maintain engine rpm. Throttle movement shall be performed at a slower rate to minimize the possibility of flameout or compressor stall.

4-26. The engine fuel system is as near failsafe as possible, because the fuel pump is a dual element unit, either element is capable of supplying engine fuel requirements. Failure of one pump element will illuminate the master caution light and the caution panel. A FUEL PRESS B ENGINE FUEL PUMP warning light. Then extinguish the master caution light, move the caution panel switch to RESET: however, the warning light will remain illuminated.

Section VI — Electrical System

4-27. Electrical Power System Failure. Complete failure of the electrical system is improbable because the primary dc power normally supplied by the main generator will be furnished by the standby generator and battery in the event of a main generator failure. Evidence of generator failure will be provided by illumination of the DC GENerator fault light and the MASTER CAUTION light. If the generators have not failed and the circuit has opened, reset as follows: MAIN GENerator and STBY GEN FIELD circuit breakers on dc circuit breaker panel, push to check, move main panel switch to extinguish caution panel light.

Note

> The battery switch should be placed in the OFF position in the event the main generator has failed and standby generator is supplying power to the essential bus. This will conserve battery power for use as a secondary emergency power source.

Note

> Turn off all non-essential electrical equipment to prevent overload of the standby generator.

4-28. AC Inverter Failure. Failure of the main inverter will be evident by illumination of the master caution light and the INST INVTR fault light on the caution panel. In the event of a main inverter failure, check the MAIN INVerter POWER and INVerter CONTrol circuit breakers by pushing IN. If main inverter power is not restored, position INVTR switch to SPARE ON.

Note

> The main and spare inverters afford the same power output.

Section VII — Hydraulic System

4-29. Hydraulic Power System Failure. Hydraulic power failure will hardly be detected in the control system until control movements are executed. When the controls are moved it will be evident that the source required for control movement is increased and moderate feedback forces will be felt. Control motions will result in normal flight reactions in all respects except for the increased force required for control movement. In the event of a hydraulic power failure, proceed as follows:

a. HYDraulic CONtrol circuit breaker — Check IN.

b. HYDraulic CONTROL switch — ON, OFF if power is not restored.

c. Airspeed — Adjust as desired to obtain most comfortable control movement level.

d. Landing — Accomplished as soon as practical.

5 4 .0 **4-30. Emergency Operation Dual Hydraulics.** With either system OFF, the helicopter is controllable at speeds from zero to maximum operating speed. The guns are operative when system 1 is ON and inoperative with system 1 OFF. With system 2 OFF, there will be no hydraulic pressure supplied to the directional servo cylinder; however, the control is operative.

Section VIII — Landing and Ditching

4-31. Emergency Descent. The power off minimum rate of descent is obtained by maintaining a forward speed glide of approximately 45 to 60 knots, dependent on gross weight and altitude.

4-32. Emergency Landing. Emergency landings can be accomplished without undue difficulty. They are executed in near the same manner as a power-on landing. The portion of the procedure which is different, is the final touchdown which will be easier to perform with a slight forward speed at time of contact. It should be remembered that landing distance (ground roll) is limited by the skid type landing gear and ground surface condition. Refer to ENGINE FAILURE DURING FLIGHT procedure contained in this Chapter.

Note

When anticipating a crash landing or ditching — and time permitting — locking of the shoulder harness provides an added safety precaution over that of the automatic lock. However, depending on pilot's seat adjustment and cockpit configuration, certain controls and switches may become impossible with the harness locked. Each pilot should determine for himself to what extent, in each type aircraft he flies, a locked shoulder harness would interfere with aircraft and systems control.

4-33. Landing In Trees. A power-off landing into heavily wooded area can be accomplished by executing a normal autorotative approach and full flare. The flare should be executed so as to reach zero rate of descent and zero ground speed as close to the top of the trees as possible. As the helicopter settles, increase collective pitch to maximum.

4-34. Emergency Entrance and Exit. To gain entrance to the cabin in the event of an emergency, slide or break the pilot's or copilot's movable windows, reach forward and PULL the jettisonable door release, if door will not jettison, or cargo door will not open, break door windows or windshield to gain entrance.

4-35. Ditching With Engine On. When ditching with power is required, a normal descent and pre-landing technique is employed. Radio helicopter position to aid in search and rescue and warn passengers of intent. Jettison the copilot's door while hovering a few feet above the water, and have passengers leave the helicopter, then fly a safe distance to avoid possible passenger injury. Secure right-hand window and right-hand doors. Turn battey switch OFF. Effect a normal right landing as gear settles in water apply FULL RIGHT lateral CYCLIC control to roll helicopter onto RIGHT SIDE, release shoulder harness and safety belt and clear the helicopter immediately.

Note

Full lateral cyclic stick will cause the helicopter to slip sideways into the the water, using water resistance to stop the main rotor blade. Rolling the helicopter on the right side with right-hand doors and window closed will provide the maximum flotation and escape period. It should be remembered however, that the helicopter is not watertight and will sink rapidly.

4-36. Ditching With Engine Off. Immediately perform an autorotative glide into the wind, by a coordinated movement of the controls, and an airspeed of approximately 45 to 60 knots. Warn passengers and radio position. Close pilot's window, secure right-hand doors, jettison copilot's door and slide left cargo door full open. LOCK shoulder harness, turn fuel boost pump OFF, and CLOSE fuel and oil valve switches. As surface is approached, execute an abrupt flare and approach with a moderately tail low attitude. As the tail contacts the water, apply FULL RIGHT CYCLIC control to roll the helicopter on its right side, release safety belt and shoulder harness and immediately clear the helicopter.

Section IX — Flight Controls

4-37. Flight Control Failure. The flight control system is a mechanical type with hydraulic servo cylinders connected into the fore and aft lateral cyclic controls, the collective control and the directional control system.

4-38. The servo cylinders are installed solely to reduce control forces and lessen pilot fatique. The design of the control system mechanical linkage is sturdy, control movements are positive and the possibility of failure is remote; therefore, an emergency system has not been provided.

Section X — Bail Out

4-39. Bail Out. Helicopter design, flight characteristics and autorotation qualities virtually eliminate the necessity for bail out. however, if a decision is made to bail out, accomplish as follows:

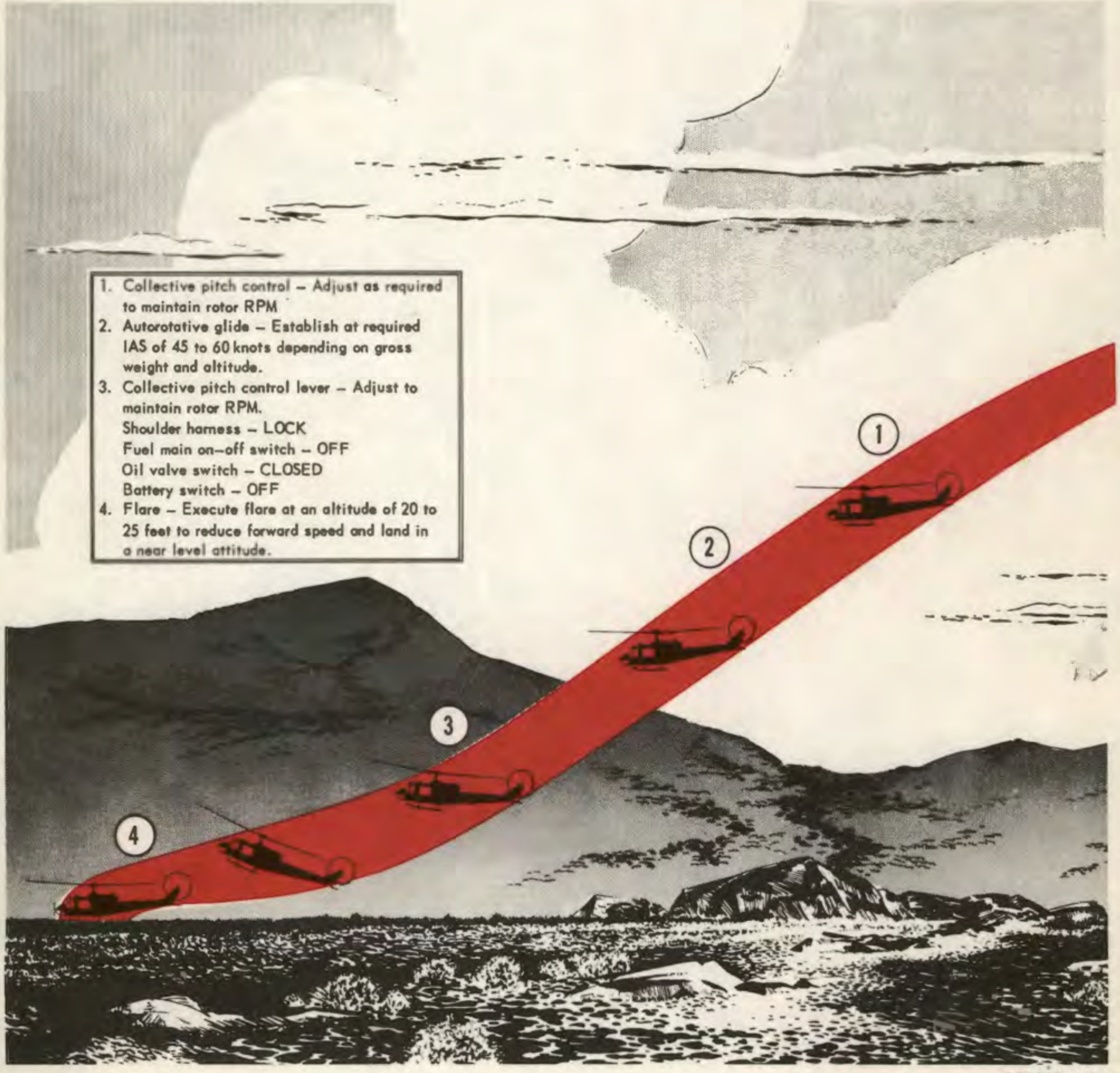
a. Warn passengers of intent and radio position.

b. Reduce airspeed to approximately 20 knots, if doors are to be jettisoned.

c. Release jettisonable doors and slide cargo doors open as required.

d. Set controls to establish CRUISE forward speed, nose slightly down flight attitude.

e. Bail out when ready through nearest exit.



1. Collective pitch control – Adjust as required to maintain rotor RPM
2. Autorotative glide – Establish at required IAS of 45 to 60 knots depending on gross weight and altitude.
3. Collective pitch control lever – Adjust to maintain rotor RPM.
   Shoulder harness – LOCK
   Fuel main on–off switch – OFF
   Oil valve switch – CLOSED
   Battery switch – OFF
4. Flare – Execute flare at an altitude of 20 to 25 feet to reduce forward speed and land in a near level attitude.

Figure 4–3. Approach and landing – power off

CHAPTER 5
AVIONICS

Section I — General

5-1. Scope. This chapter covers the electronic equipment configuration in Army Models UH-1A and UH-1B helicopters. It includes a brief description of the electronic equipments, their technical characteristics, capabilities, and location. The chapter also contains complete operating instructions for all signal equipment installed in the helicopter.

5-2. Nomenclature and Common Names. A list of the avionic equipment installed in the helicopter, with a common name assignment for each piece of equipment, is presented in Table 5-1.

Section II — Description and Data

5-3. Purpose and Use. The purpose and use of the communication and navigation equipment installed in the helicopters is described in the following paragraphs:

5-4. FM Liaison Set AN/ARC-44. The FM Liaison Radio Set provides the pilot and copilot with two-way communication between their aircraft and ground stations and between other aircraft. Communication with armored, artillery, and infantry units in the field is also provided within the frequency range of 24 to 51.9 megacycles (mc) on 280 preset channels, The distance range is limited to line of sight up to distances of approximately 50 miles.

5-5. When used with Antenna Group AN/ARA-31, Radio Set ARC-44 provides a homing facility which allows the pilot to home on any keyed unmodulated signal transmitted within the frequency range of 24 to 49 mc.

5-6. Signal Distribution Panel SB-329/AR. The SB-329/AR signal distribution panel amplifies and controls the distribution of audio signals applied to or from each headset-microphone, to or from communication receivers and transmitters and from navigation receivers. The SB-329/AR Panel is used for intercommunication between the pilot, copilot, and medical attendant and is also used for monitoring the communication and navigation receivers singly or in combination.

5-7. Signal Distribution Panel C-1611A/AIC. Signal Distribution Panel C-1611A/AIC is a transistorized unit which provides the same functions that are provided by the SB-329/AR Panel. In addition the C-1611A/AIC panel permits the operator to control four receiver-transmitters. A private interphone line is also provided. When the selector switch is in the PVT position it provides a hot private line (no external switch is used) to any station in the helicopter. A HOT MIC switch is also provided on the C-1611A/AIC control panel at the medical attendant's station.

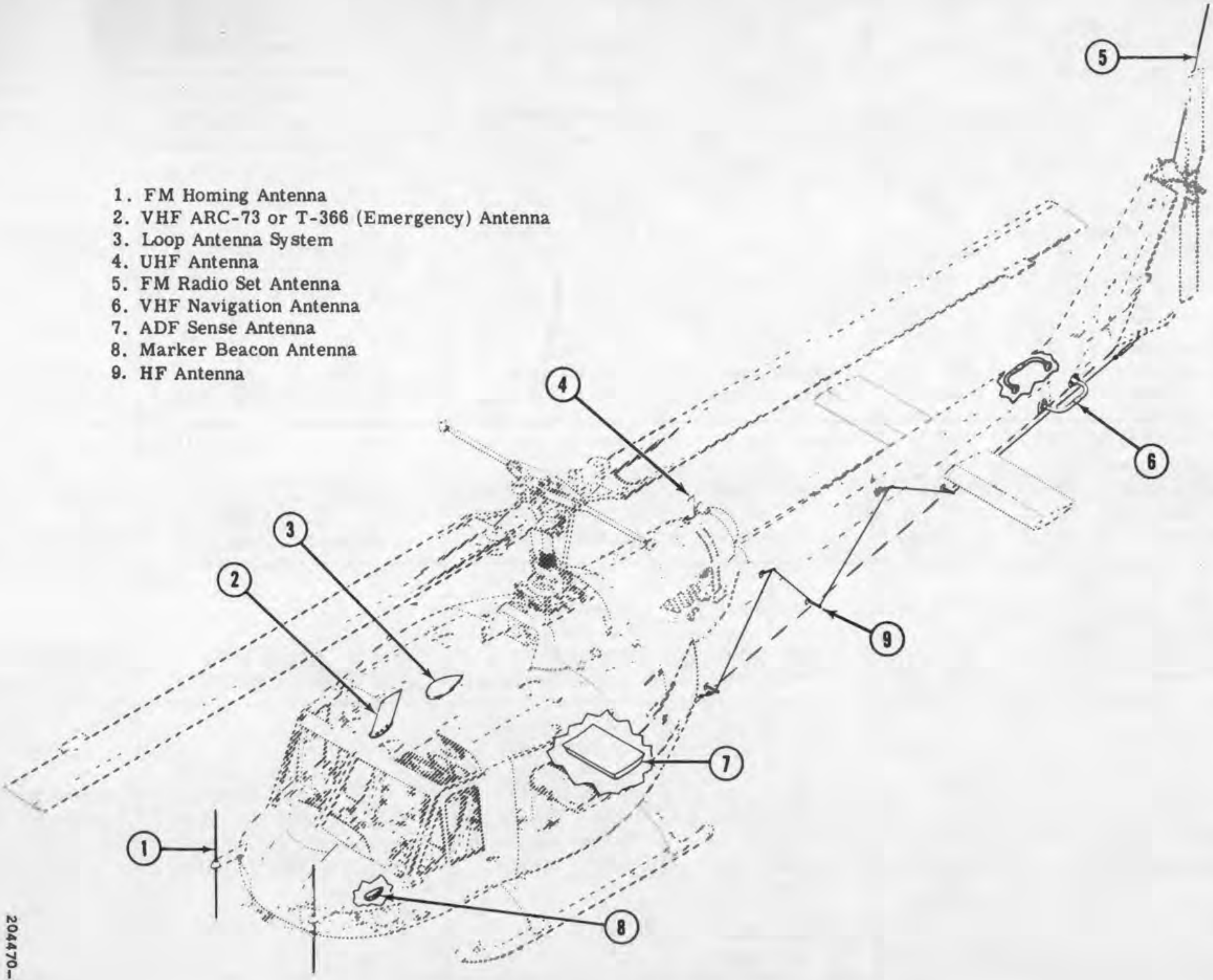
5-8. UHF Command Set AN/ARC-55B. The ARC-55B Command Set provides two-way amplitude-modulated voice radio communication between aircraft in flight, aircraft and ship, and aircraft and ground stations. Transmission and reception is provided on any one of 1750 channels, in the band of 225.0 to 399.9 megacycles. Channel selection is manual and the guard frequency may be monitored.

5-9. UHF Command Set AN/ARC-51 ( ) X. Radio Sets AN/ARC-51X and AN/ARC-51BX both serve the same purpose and both operate within the ultrahigh frequency (UHF) band of 225.0 to 399.9 megacycles (mc). The ARC-51X provides 1750 channels and tunes in 0.1-mc increments. The ARC-51BX tunes in 0.05-mc increments and provides 3500 channels. The ARC-51BX also permits selection of 20 preset

Table 5–1. Nomenclature and common names table

NOMENCLATURE	COMMON NAME
*Radio Set AN/ARC-44	FM Liaison set
Receiver-Transmitter RT-294/ARC-44	FM receiver-transmitter
Control Panel SB-327/ARC-44	FM control panel
Signal Distribution Panel SB-329/AR	Signal distribution panel
Antenna AT-454/ARC	FM antenna
Antenna Group AN/ARA-31	Antenna group
*Radio Set AN/ARC-54	Radio set
Receiver-Transmitter RT-348/ARC-54	Receiver-transmitter
Control Panel C-3835/ARC-54	Control panel
Antenna and coupler AT-7650/ARC-54	FM antenna and coupler
Antenna Group AN/ARA-56	Antenna Group
Indicator ID-453/ARN-30	Course Indicator
*Radio Set AN/ARC-55	UHF command set
Receiver-transmitter RT-349/ARC-55	UHF receiver-transmitter
Control panel C-1827/ARC-55	UHF control panel
Antenna AT-1108()/ARC	UHF/VHF antenna
*Radio Set AN/ARC-51X	UHF radio set
Receiver - Transmitter RT-702/ARC-51X	Receiver-Transmitter
Control Panel C-4677/ARC-51X	Control Panel
*Radio Set AN/ARC-51BX	UHF radio set
Receiver-Transmitter RT-742/ARC-51BX	Receiver - Transmitter
Control Panel C-6287/ARC-51BX	Control panel
Radio Set AN/ARC-73	VHF command set
Receiver 51X-2B	VHF receiver
Transmitter 17L-7A	VHF transmitter
Control panel 614U-6	VHF control panel
Transmitter T-366 ( )/ARC	Emergency VHF transmitter
Control panel C-80B	Emergency VHF control panel
Receiving Set AN/ARN-30E	VHF navigation set
Receiver R-1021/ARN-30D	VHF receiver
Signal Data Converter CV-265A/ARN-30A	Converter
DMN4-4 Antenna	Omni antenna
Control panel C-3634A/ARN-30D	VHF navigation control panel
Indicator ID-453/ARN-30	Course indicator
Radio Receiver AN/ARN-59	Direction finder set
Receiver R-836/A	ADF receiver
Control panel C-2275/ARN-59	ADF control panel
Indicator ID-998/ASN	Bearing-heading indicator
Antenna AT-780/ARN	Loop antenna
Antenna 205-075-325	Sense antenna
Transponder Set AN/APX-44	Transponder set
Receiver-transmitter, radar RT-494/APX-44	Receiver-transmitter
Transponder Set Control C-2714/APX-44	Control panel
Antenna AT-884/APX-44	Control panel
Radio Receiver R-1041 ( )/ARN	Marker Beacon Receiver
Radio Receiver AN/ARN-32	Marker Beacon Receiver

*Only one FM and one UHF radio set will be installed in each helicopter.



1. FM Homing Antenna
2. VHF ARC-73 or T-366 (Emergency) Antenna
3. Loop Antenna System
4. UHF Antenna
5. FM Radio Set Antenna
6. VHF Navigation Antenna
7. ADF Sense Antenna
8. Marker Beacon Antenna
9. HF Antenna

Figure 5-1. Antenna installation — typical

Table 5–2. Communications and associated electronic equipment (Sheet 1 of 2)

FACILITY	NOMENCLATURE	USE	RANGE DISTANCE AT SPECIFIC ALTITUDE	LOCATION OF CONTROLS	REMARKS
UHF command communications	Radio Set AN/ARC-55B AN/ARC-51X or AN/ARC-51BX	Two-way voice communications in the frequency range of 225 to 399.9 MC	Line of sight	Pedestal	
FM liaison communications	Radio Set AN/ARC-44 or AN/ARC-54	Two-way voice communications in the frequency range of 24.0 to 51.9 MC	Line of sight or 50 mile average conditions	Pedestal	AN/ARC-44 dynamotor supplies power for operation of signal distribution panel SB-329-AR
Intercommunication	Radio Set SB-329/AR or C-1611A/AIC	Intercommunication between crew members	Stations within helicopter	Pedestal and cabin overhead	Press-to-talk switches located, on cyclic stocks foot switch on floor in cockpit area and crew members control panel
VHF command communications	Radio Set AN/ARC-73	Two-way voice communications in the frequency range of 116.00 to 149.95 MC	Line of sight or 50 miles average Conditions	Pedestal	The AN/ARC-73 is used as an alternate for the UHF Command Set
HFSSB/AM communications	Radio Set AN/ARC-102	Two-way voice communications in the frequency range of 2.0 to 29.999 MC		Pedestal	Minimum pilot weight is 260 pounds with AN/ARC-102 installed
Marker Beacon Reception	MB Receiver R-1041/ARN	Navigational Aid	Vertical to 50,000 feet	Instrument Panel	
Marker Beacon Reception	MB Receiver AN/ARN-32	Navigational Aid	Vertical to 50,000 feet	Pedestal	

Table 5–2. Communications and associated electronic equipment (Sheet 2 of 2)

FACILITY	NOMENCLATURE	USE	RANGE DISTANCE AT SPECIFIC ALTITUDE	LOCATION OF CONTROLS	REMARKS
VHF emergency transmitter	Transmitter T-366/ARC	VHF emergency transmitter	Line of sight	Pedestal	The VHF navigation receiver used in conjunction with T-366/ARC standby transmitter
FM homing	Antenna group AN/ARA-31 used with AN/ARC-44 or AN/ARA-56 used with AN/ARC-54	Homing on FM transmission within frequency range of 24 to 49 MC	Line of sight or 50 miles average conditions	Pedestal	The FM liaison set must be operated while homing
VHF navigation (VOR, VAR, LOCALIZER)	Radio receiver AN/ARN-30E	VHF navigational aid and VHF audio reception in the frequency range of 108 to 126 MC	Line of sight	Pedestal	Information is presented aurally in headset, and visually on course indicator and bearing-heading indicators
Automatic direction finding	Direction finder set AN/ARN-59	Radio range and broadcast reception; automatic direction finding and homing in the frequency range of 190 to 1750 KC	50 to 100 miles range signals 100 to 150 miles broadcast	Pedestal	
Magnetic heading indications	J-2 Gyro Magnetic Compass	Navigational Aid		Instrument Panel	
Identification	Transponder Set AN/ARX-44	Transmits a specially coded reply to a ground-based IFF radar interrogator system	Line of sight	Pedestal	

channels. Both radio sets permit monitoring of the guard channel and provide two-way radio communications between aircraft in flight, aircraft and ground, or aircraft and surface ships when such installations are equipped with similar UHF equipment. Transmission and reception are conducted on the same frequency with the use of a common antenna.

5-10. FM Radio AN/ARC-54. Radio Set AN/ARC-54 is an FM radio that provides the aircraft crew with two-way voice communications between aircraft and ground stations within the frequency range of 30 to 69.95 megacycles. In addition to voice communication the ARC-54 permits selective calling (TONE) operation and when used with the homing antenna group and course indicator the pilot is provided with a homing facility.

5-11. VHF Command Set. The VHF Command Set AN/ARC-73 is an alternate set for the UHF radio. The set provides air-to-air and air-to-ground transmission and reception of AM radio signals in the VHF range. The receiver may be tuned within its frequency range of 116.00 to 151.95 mc in 50 kc increments to any one of the 720 available channels. The transmitter may be tuned within its frequency range of 116.00 to 149.95 mc in 50 kc increments to any one of its 680 available channels. The distance range is limited to line of sight or a distance of approximately 50 miles.

5-12. Emergency VHF Transmitter. The emergency VHF transmitter provides emergency VHF transmission on five crystal controlled channels. The equipment can also provide emergency two-way voice communication when used in conjunction with the VHF navigation receiver.

5-13. HF AM/SSB Radio Set. The AN/ARC-102 is a High Frequency (HF) Single Side Band (SSB) transceiver which transmits and receives in the 20 to 30 megacycle frequency range. The set tunes in 1 kc steps to any one of 28,000 manually selected frequencies. The set provides long range communications to airborne, portable mobile or fixed stations. The primary mode of operation is SSB, however the ARC-102 can also transmit and receive a compatible AM signal.

5-14. VHF Navigation Receiver. The VHF navigation receiver provides for reception of 190 VHF channels whose frequencies are all the 0.1 mc steps between 108.00 mc and 126.90 mc. This permits reception and interpretation of VHF omnidirectional radio range (VOR) signals and of localizer signals broadcasted by ground station. The line-of-sight distance range for the navigation set varies from 12 nautical miles at 100 feet altitude to 160 nautical miles at 20,000 feet altitude. This navigational data permits the operator to perform the following:

a. Fly a desired course to or from a VOR station.

b. Fly to an objective other than a VOR station.

c. Make approximate ground speed checks.

d. Fly to the intersection of a localizer and VOR signal.

e. Approach a runway associated with either a VOR or a localizer station.

f. Determine the bearing of the aircraft with respect to a VOR station.

5-15. Direction Finder Set. The direction finder set is a radio compass system designed to provide automatically, a visual indication of the direction from which an incoming radio-frequency (RF) signal is received. It provides for aural reception of AM signals in the 190 to 1,750 kc frequency range. It may also be used for homing and position fixing or as a manually operated direction finder.

5-16. Gyro Magnetic Compass. The gyro magnetic compass is a direction sensing system which provides a visual indication of the magnetic heading of an aircraft with respect to the magnetic meridian and/or horizontal component of the earth's magnetic field. The information which the system supplies may be used for navigation and to control the flight path of the aircraft. The system may also be used as a free gyro in areas where the magnetic reference is unreliable.

5-17. Marker Beacon Receiver. The marker beacon receiver is a radio navigational aid for receiving marker beacon signals from a ground transmitter. The pilot is provided with aural and visual presentations of the received marker beacon signals. This aids in determining the exact location of the aircraft for navigational and instrument landing purposes.

A 5-18. Marker Beacon Receiver AN/ARN-32. The ARN-32 marker beacon receiver is a navigational aid for receiving marker beacon signals from a ground transmitter. The pilot is provided with aural and visual presentations of the received marker beacon signals. This aids in determining the exact location of the aircraft for navigational and instrument landing purposes.

5-19. Transponder Set. Transponder Set AN/APX-44 receives, decodes and responds to interrogations of the Mark X Identification Friend or Foe (IFF) System, to the interrogations of Mark X IFF system supplemented by Selected Identification Features (SIF) and to the interrogation of civil secondary ground radar systems. The transponder set can also be used to transmit specially coded emergency signals or position-identifying signals, even though the set is not being interrogated by a ground based IFF system.

5-20. Interrogating signals, consisting of pairs of pulses spaced to form a code, are transmitted to the AN/APX-44, which decodes the interrogation and transmits a coded reply to the question source. The form of coded reply, which can be preset by the transponder set controls, presents positive identification of the nationality and position of the helicopter.

5-21. The operational facilities of the transponder set are divided into five categories, each of which may be selected by the pilot. These categories are as follows:

Normal Operation
Modified (SIF) Operation
Civil Operation
Position Identification
Emergency Operation

5-22. Three independent coding modes, or combinations of three, are available to the pilot. Mode 1 provides 32 possible code combinations, any one of which may be selected while in flight. Mode 2 provides one code combination which is preset prior to flight and may consist of any one of 4,096 possible code combinations. Mode 3 provides 64 additional code combinations, any one of which may be selected by the pilot while in flight.

5-23. AN/APX-68 Transponder. (Information not available at this time.)

5-24. Technical Characteristics. The technical characteristics are given in paragraphs 5-25 through 5-36.

5-25. Technical Characteristics of FM Liaison Set AN/ARC-44.

Frequency range	24.0 to 51.9 mc.
Number of channels and spacing	280 channels, spaces 100 kc.
Modes of operation	FM voice, or homing.
Type of Modulation	Frequency
Distance range	50 miles (average conditions).

5-26. Technical Characteristics of FM Liaison Set AN/ARC-54.

Frequency range	30.00 to 69.95 mc.
Number of channels and spacing	800 channels, spaces 50 kc.
Modes of operation	FM voice, or homing.
Type of modulation	Frequency.
Distance range	80 miles (average conditions).

5-27. Technical Characteristics of UHF Command Set AN/ARC-55B.

Freqeuncy range	225.0 to 399.9 mc.
Number of channels and spacing	1750 channels, spaces 100 kc.
Modes of operation	AM voice.
Type of modulation	Amplitude.

5-28. Technical Characteristics of UHF Command Set AN/ARC-51X.

Frequency range	225.0 mc to 399.9 mc.
Number of channels and spacing	1750 channels, spaces 100 kc.
Modes of operation	AM voice.
Type of modulation	Amplitude.

5-29. *Technical Characteristics of UHF Command Set AN/ARC-51BX.*

Frequency range.................225.0 to 399.9 mc.

Number of channels and spacing....3500 channels, spaces 50 kc.

Modes of operation.............................AM voice

Type of modulation...........................Amplitude

5-30. *Technical Characteristics of VHF Radio Set AN/ARC-73. Receiver 51X-2B.*

Frequency range.......116.00 mc to 151.95 mc.

Number of channels and spacing.......720 channels, spaces 50 kc.

Transmitter 17L-7A
Frequency range..............116.00 to 149.95 mc.

Number of channels and spacing.......680 channels, spaces 50 kc.

Receiver and Transmitter
Modes of operation............................AM voice.

Type of modulation...........................Amplitude

Distance range....Line of sight or approximately 50 miles.

Altitude range............Sea level to 30,000 feet.

5-31. *Technical Characteristics of HF Radio Set.*

Frequency range.............2.0 mc. to 29.999 mc.

Number of channels and spacing....28,000 channels, spaces 1 kc.

Modes of operation....Single Side Band (SSB) AM and Continuous Wave (CW).

Channel changing time.......8 seconds average (independent of external antenna tuner).

5-32. *Technical Characteristics of VHF Navigation Receiver.*

Frequency range.......108.00 mc to 126.90 mc.

Number of channels and spacing....190 channels, spaces 100 kc.

Types of signals received....VOR, localizer and communication.

Channeling time..............4 seconds maximum.

Type of modulation...........................Amplitude.

5-33. *Technical Characteristics of Direction Finder Set.*

Frequency range:

Band 1.................................190 kc to 400 kc.

Band 2.................................400 kc to 840 kc.

Band 3..........................840 kc to 1,750 kc.

Modes of operation....Automatic direction finding and aircraft homing.

Type of modulation...........................Amplitude.

Distance range...............................Long range.

5-34. *Technical Characterirstics of Transponder Set AN/APX-44.*

Freqency range:
Receiver...........1,010 to 1,030 mc (one preset frequency).

Transmitter.........1,090 to 1,110 mc (one preset frequency).

Type of signals received and transmitted.......................Pulsated radio frequency.

Interrogation rates..........15 to 500 per second (normal).

Range...Line of sight.

5-35. *Technical Characteristics of Marker Beacon Receiver R-1041/ARN.*

Operating frequency....Fixed at 75 megacycles.

Type of modulation...........................Amplitude.

Range.........................Vertical to 50,000 feet.

Caution

> With AN/ARC-102 Radio Set install, minimum cockpit weight is 260 pounds.

5-36. Technical Characteristics of Marker Beacon Receiver AN/ARN-32.

Operating frequency	Fixed at 75 megacycles.
Type of modulation	Amplitude.
Range	Vertical to 50,000 feet.

5-37. Description of Configuration. The avionic configration consists of the following installed communications equipment: An FM radio set including the FM homing facility, a signal distribution and interphone system, a UHF command set, with complete provisions for installing a VHF radio set as an alternate. Complete provisions are made for installing an HF radio set and a VHF emergency transmitter. Complete provisions are also provided for installing an IFF transponder set.

5-38. The installed navigation equipment consists of a direction finder set, a marker beacon receiver, a VHF navigation receiver, and a gyro magnetic compass system.

5-39. The avionic equipment installed may vary with respect to model of equipment installed. Also equipment for which provisions are made may or may not be installed. Therefore no attempt is made to specify the exact combinations of equipment installed in any particular helicopter. All equipment installed or equipment for which provisions are made for installing, has been described and operating procedures are outlined.

5-40. Description of Components. The components of the radio sets and electronic equipment installed in the helicopter are described in the following paragraphs:

5-41. FM Liaison Set AN/ARC-44. The FM liaison set includes an FM receiver-transmitter and mounting, three INT signal distribution panels, an FM control panel, a dynamotor and mounting, a switch panel, an antenna system and interconnecting cabling.

a. The FM receiver-transmitter is mounted in the nose radio rack and is controlled from the pedestal mounted remote control panel.

b. The dynamotor is mounted in the nose radio rack adjacent to the receiver-transmitter. Primary power from the helicopter power supply is applied to the dynamotor, which transforms the primary power into operating voltages for operation of the FM liaison set.

c. The FM antenna consists of a whip, a base and coupler. The whip and base are mounted on the aft tail boom section and are connected to the coupler by coaxial cable.

d. The headset-microphone provides for hand free low-noise communication. The microphone is mounted on a swivel so that it may be placed directly in front of the lips when transmitting and moved aside when not in use. The position of the microphone with respect to the lips is adjusted with the swivel bracket adjusting screw. The telephone type plug on the headset-microphone plugs into a connector and cordage suspended from the roof. Headset connectors and cordage assemblies are installed for the pilot, copilot, and medical attendant.

e. The following are provided for the homing operation of the FM liaison set: Four antenna elements and two impedance matching networks, installed forward of the nose section, a keyer installed in the nose radio compartment, and a switch panel installed in the pedestal. (See figure 5-4.)

5-42. FM Liaison Set AN/ARC-54. The ARC-54 Radio Set Includes an FM receiver-transmitter, FM control panel, FM communications antenna, a homing antenna system and a homing indicator.

a. The FM receiver-transmitter is installed in the nose radio compartment and is controlled from the pedestal mounted remote control panel. Primary power to the receiver-transmitter is supplied from the helicopter 28-volt power supply system. A transistorized power supply is contained within the receiver-transmitter.

b. The communications antenna consists of a whip, mounting base, and 40-position antenna coupler, which are mounted on the aft tail boom section. The antenna coupler is positioned automatically from the control panel when the frequency channel is selected.

c. The homing antenna consists of four antenna elements and two impedance matching networks installed forward of the nose section of the helicopter. Data provided by the homing facility is displayed visually on the course indicator, which is mounted on the instrument panel.

5-43. UHF Command Set AN/ARC-55B. UHF Command Set ARC-55B consists of a receiver-transmitter and mount, a pedestal mounted remote control unit, and a UHF antenna mounted on the cabin roof.

a. The receiver-transmitter consists of ten separate sub assemblies and a dynamotor mounted on a main chassis. The complete unit is installed in the nose radio compartment. Primary power is supplied from the helicopter 28-volt power supply system. The receiver-transmitter is controlled from the UHF control panel mounted on the pedestal (see figure 5-6.)

b. The UHF antenna (see figure 5-1) is an airfoil shaped antenna. It is used for both reception and transmission. The antenna has a VHF connector and element which permits it to be used for both UHF and VHF radio sets.

5-44. Radio Set AN/ARC-51X. The ARC-51X Radio Set includes a receiver-transmitter and mount installed in the nose, a remote control panel installed on the pedestal and the UHF antenna installed on the cabin roof.

a. The receiver-transmitter is a pressurized unit. The internal air is cooled by heat exchangers and an externally mounted blower. The blower operates only when the internal temperature of the receiver-transmitter exceeds 95°F. Primary power to operate the ARC-51X equipment is supplied from the helicopter 28 volt power supply. The receiver-transmitter is controlled from the UHF remote control panel installed in the pedestal. (See figure 5-8.)

b. The UHF antenna used with the ARC-51X for reception and transmission is installed on the cabin roof.

5-45. Radio Set AN/ARC-51BX. The ARC-51BX is similar to the ARC-51X in purpose, operation and appearance. The receiver-transmitters differ in internal electrical circuitry only. The control panels differ as follows:

a. Control Panel C-4677/ARC-51X tunes in 0.1 mc increments has a four-numbered frequency indicator, and contains a SENS control.

b. Control Panel C-6287/ARC-51BX tunes in 0.05 mc increments, has a five numbered frequency indicator, and does not have a sens control. The C-6287/ARC-51BX permits selection of 20 preset channels, and has a mode selector which permits preset channel selection, manual channel selection, and automatic switching of RT-742/ARC-51BX to the guard channel frequency. (See figures 5-8 and 5-9.)

5-46. Radio Set AN/ARC-73. The VHF Radio Set AN/ARC-73 consists of a receiver, transmitter, dual mount, remote control panel, VHF antenna, and inter-connecting cable assemblies. The receiver and transmitter are contained in separate metal cases and mounted on a dual shock mount. The ARC-73 is an alternate for the UHF command set and when installed is mounted in the nose radio compartment where the UHF command set is normally installed. The receiver and transmitter are controlled from a single control panel mounted in the pedestal. (See figure 5-10.) The VHF antenna and UHF antenna are contained in the same housing.

5-47. Radio Set AN/ARC-102. The AN/ARC-102 Radio Set consists of a receiver-transmitter installed in the aft radio compartment; an antenna coupler and impedance matching network installed in the forward section of the tail boom; a long wire type antenna installed on each side of the tail boom; remote control panel installed in the pedestal; and interconnecting cable assemblies. Complete provisions are provided for installation of the ARC-102.

a. The receiver-transmitter is composed of eleven plug-in modules, which includes an interchangeable internal power supply. The complete unit is contained in a metal case and weighs 50 pounds. The receiver-transmitter is controlled from the control panel installed in the pedestal. (See figure 5-13.) Primary power to operate the receiver-transmitter is supplied from the helicopter 28 volt power supply.

b. The ARC-102 antenna coupler is mounted in the forward section of the tail boom. The coupler automatically matches the impedance of the long wire antenna (see figure 5-1) to the channel frequency selected on the remote control unit. Power to operate the antenna coupler is supplied from the receiver-transmitter.

5-48. VHF Navigation Receiver. The VHF navigation set consists of: a receiver and converter, which are contained in separate metal housings and installed on a dual mount in the aft radio compartment; a power supply unit is mounted externally on the receiver housing. Other equipment includes: an omni antenna with one element mounted on each side of the aft section of the tail boom; (see figure 5-1) a remote control panel mounted in the pedestal, (see figure 5-14) and a course indicator mounted on the instrument panel (see figure 5-15).

5-49. Direction Finder Set. The direction finder set consists of a receiver, a control unit, a power unit, a loop antenna and two indicators.

a. The receiver is a three-band unit mounted in the nose radio compartment. Frequency band selection is accomplished from the remote control panel, by a band switching dc motor and a 4000-to-1 speed reduction gear train. Tuning of the receiver is accomplished through a flexible mechanical linkage that connects the receiver and remote control unit. (See figure 5-16).

b. The power unit consists of a dynamotor and alternator. Primary power from the helicopter 28 volt dc system is supplied to the power unit. The power unit then supplies the operating voltages for the direction finder equipment. The power unit is mounted in the nose radio compartment.

c. The loop antenna (see figure 5-1) is enclosed in a streamlined housing and is installed on top of the cabin roof. The sense antenna (see figure 5-1) is also part of the direction finder equipment. It is installed beneath the cargo area.

d. Information received via the direction finder set is presented on the pilot's bearing-heading-indicator (see figure 5-17) and the copilot's bearing-heading-indicator.

5-50. Transponder Set AN/APX-44. Transponder Set AN/APX-44 consists of a receiver-transmitter and mounting, a remote control panel, antenna and interconnecting cable assemblies.

a. The receiver-transmitter when installed is located on a mounting in the aft radio compartment. The equipment is controlled from the pedestal mounted control panel. (See figure 5-18.) Power to operate the transponder set is supplied from the helicopter 28 volt power supply system.

b. The antenna used with the transponder set is a lightweight blade type. It is installed beneath the nose section of the helicopter.

5-51. Marker Beacon Receiver. The marker beacon equipment consists of a receiver and mount, indicator lamp, remote volume control, sensitivity switch and antenna.

a. The marker beacon receiver is contained in a metal case and mounted on a bracket in the nose radio compartment. Power to operate the receiver is supplied from the helicopter 28-volt power supply.

b. The indicator light, sensitivity switch, and combination on off switch and volume control are mounted on the lower right corner of the instrument panel. The volume-control-on-off switch applies power to the receiver and adjusts the audio level. The sensitivity switch controls internal circuits in the receiver to increase the gain for weak signals. The indicator light illuminates when the aircraft is over a marker beacon transmitter.

c. The marker beacon antenna (see figure 5-1) is installed on the fuselage below the cabin area. The antenna is a 50-ohm impedance antenna, which is used to receive the 75-megacycle signal transmitted by ground transmitter.

A **5-52. Marker Beacon Receiver AN/ARN-32.** The ARN-32 marker beacon equipment consists of a receiver and mount, indicator lamp, remote control panel and antenna.

a. The marker beacon receiver is contained in a metal case and mounted in the nose radio compartment. The receiver has two output circuits, a visual indicator circuit for operation of the indicator light on the instrument panel and an aural output circuit which supplies an aural signal through the signal distribution panel and the headset. Operating power for the receiver is supplied through the 28-volt dc non-essential bus.

b. The marker beacon light is located in the center area of the instrument panel. When the marker beacon receiver is operating the light will illuminate when the aircraft is passing over a marker beacon transmitter. The light will illuminate steady or flash on and off, depending upon the type of signal received.

c. The marker beacon antenna is installed on the lower aft fuselage section. The antenna has a 52-ohm input impedance, and receives the 75 MC signal from the ground transmitter.

5-53. Gyro Magnetic Compass. The J-2 Gyro Magnetic Compass System consists of a remote compass transmitter, directional gyro control, slaved gyro magnetic compass amplifier, two heading indicators and interconnecting cable assemblies.

a. The compass transmitter is installed in the tail boom. It is the direction sensing unit of the gyro magnetic compass system. The compass transmitter consists of a hemispherical bowl, which houses the functioning assemblies, and is attached to a mounting flange and comepnsator.

b. The directional gyro control is installed in the aft radio compartment. The gyro is slaved to the earth's magnetic meridian by the compass transmitter (in the free mode of operation the gyro operates as a free gyro.) The heading of the aircraft in relation to the position of the gyro, and the earth's magnetic meridian is indicated on the pilot's and copilot's heading indicators, when the system is operating in the slaved mode. (See figure 5-17.)

c. The compass amplifier is installed in the aft radio compartment near the directional gyro. The amplifier controls and amplifies voltages from the transmitter to the directional gyro. Operating voltages for the gyro magnetic compass system are supplied from the 28 volt dc bus, the 26 volt ac bus and the 115 volt ac bus. An ac-dc Interlock Relay insures that ac and dc operating voltages are applied simultaneously to prevent damage to the system.

5-54. Emergency VHF Transmitter. The T-366 Emergency Transmitter is installed on a mount in the nose radio compartment. The transmitter is controlled from a control panel mounted in the pedestal, (see figure 5-11.) Power to operate the transmitter is supplied from the helicopter 28-volt dc system.

5-55. Communication Junction Box. The communications junction box is mounted on the aft end of the pedestal. It consists of two terminal blocks, a connector, distributing and impedance matching junction point for communication and navigation circuits.

5-56. Radio Transmit, ICS Trigger Switch. The pilot and copilot are each provided with a trigger switch for keying intercom and transmitting circuits. The switch is located on the forward section of the cyclic stick grip, (see figure 2-4). The switches are two position switches, depressing the switch to the first detent keys the intercom circuit; depressing the switch to the second detent keys the transmitting circuit.

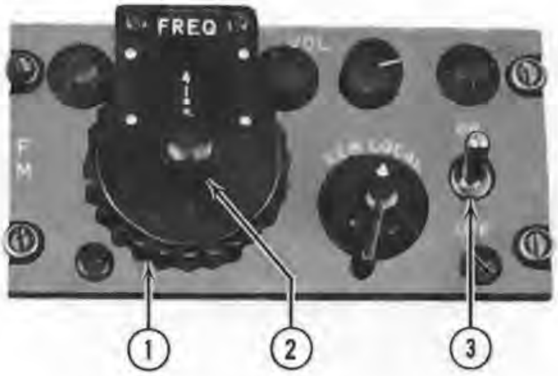
5-57. A foot operated switch (see figure 2-4) is also provided for the pilot and copilot. The switches are located on the floor just forward of the pilot's and copilot's station. The switches have only one position when pressed they key the transmitter or (INT) interphone which ever is selected with the transmit-interphone selector switch on the signal distribution panel.

Section III — Operating Controls

5-58. FM Control Panel SB/327-ARC-44. Control Panel SB-327-ARC-44 (see figure 5-2) is marked FM. The panel is mounted on the pedestal and is used to control the FM receiver-transmitter. The controls located on the panel and their function are as follows.

CONTROL	FUNCTION
Power ON-OFF switch	In the ON position applies power to the FM receiver-transmitter. In the OFF position removes power from the receiver-transmitter.
REM Local Switch	Must always be in the LOCAL position. REmote used only when two or more panels are used.

CONTROL	FUNCTION
One tenth and whole megacycle selector switch	Selects the receiving and transmitting frequency of the FM receiver-transmitter as indicated in the FREQ window. Outside knurled knob selects the first two numbers of whole number. Inside knob selects the third number or one tenth megacycle number of the desired frequency.
Receiver VOL Control	Adjusts FM receiver audio volume.



1. Whole Megacycle Selector
2. 1/10 Megacycle Selector
3. Power Switch

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Figure 5–2. FM Control panel SB-327/ARC-44

5-59. Signal Distribution Panel SB-329/AR.

The SB-329/AR Signal Distribution Panel (see figure 5-3) is marked INT. Two of the panels are installed in the pedestal for pilot and copilot and one is installed in the cabin roof, aft of the overhead console, for the medical attendant. The signal distribution panel provides interphone circuits and microphone and headset amplifiers for the radio equipment. Switching circuits enables the pilot, copilot and medical attendant to monitor as many as five receivers. The pilot and copilot may supply audio to any one of three transmitters that may be installed in the aircraft. Power to operate he signal disribution panels is supplied through a switch marked ICS on the ARC-44 switch panel (see figure 5-4). The controls located on the signal distribution panel and their functions are as follows:

CONTROL	FUNCTION
Receiver Switches	The switches marked 1, 2, 3, MB and NAV are for connecting or disconnecting receiver audio signals to the associated headset. The up position is on and connects the receiver. The down position is off and disconnects the receiver. The number 1 switch is for the FM receiver, number 2 switch is for the UHF receiver and switch number 3 is for the VHF receiver when installed. The switch marked MB connects audio from the marker beacon receiver, and the switch marked NAV connects audio from the ADF or VHF navigation receivers.

CONTROL	FUNCTION
Receiver Switches (cont.)	
TRANS selector switch	This is a rotary type switch with indicator window at the top. The switch has four positions INT, 1, 2, and 3. Positions 1, 2, and 3 selects the receiver-transmitter to be used to receive or transmit regardless of the position of the RECEIVERS 1, 2, 3 switches. The INT position connects the INT signal distribution panels for interphone operation. The operator will hear side tone when transmitting. The other crew-member will hear the interphone message regardless of the position of his TRANS selector switch.
VOL control	Adjusts the volume level of the audio applied to the headset associated with the INT signal distribution panel.

Figure 5-3. Signal distribution panel SB-329/AR

5-60. FM Switch Panel AN/ARC-44. The switch panel assembly (see figure 5-4) is mounted in the pedestal and contains five toggle switches. The switches are numbered 1, 2, 3, 4, and 5 and their functions are as follows:

CONTROL	FUNCTION
No. 1 HOME Switch	In the UP position the No. 1 HOME switch energizes the homing circuits, disconnects the communication antenna, connects the homing antenna through keyer to the receiver-transmitter unit receiver input, and disables FM transmitter. When the switch is in the down position, the homing operation is disabled, allowing radio set to return to normal operation.
No. 2 SQUEL switch	In the UP position, the FM receiver output is squelched. In the DOWN position the receiver is unsquelched allowing background noises to be heard.
No. 3 ICS switch	In the UP position the ICS circuit is energized. In the DOWN position, ICS circuit is disabled. This switch turns on the ARC-44 dynamotor which provides high voltage for the SB-329/AR Signal distribution panel.
No. 4 Switch	The No. 4 switch is used for auxiliary FM receiver squelch when auxiliary FM receiver is installed.
No. 5 Switch	The No. 5 switch is not connected and does not apply to this installation.

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Figure 5–4. Switch panel assembly AN/ARC-44

5-61. Signal Distribution Panel C-1611/AIC. Signal Distribution Panel C-1611/AIC (see figure 5-5) is marked INT. Two of the panels are installed in the pedestal, one each for the pilot and copilot. Another panel is installed in the cabin roof aft of the overhead console for the medical attendant. The C-1611/AIC panels are used as an intercommunication and radio control system. The panels may be used in any one of three different modes as determined by the setting of the switches and controls on the panel. The three modes of operation are two-way (air-to-air or air-to-ground) radio communication, radio receiver monitoring and intercommunication between the crew members, The switches and controls located on the C-1611/AIC panel and their function are as follows:

CONTROL	FUNCTION
RECEIVER Switches 1, 2, 3 and 4	Up position applies output of connected radio receiver to the earphones of the associated headset. Down position disconnects the receiver from the headset. Each of the switches are marked FM, UHF, etc. to indicate the receiver they connect.
RECEIVERS INT switch	Up position connects earphones of the headset to the interphone system. Down disconnects the headset from the interphone system.
RECEIVERS NAV switch	Up position connects audio from the VHF navigation receiver, the ADF, and marker beacon to the earphones of the associated headset. Down position disconnects the audio from the headset.
VOL control	Adjusts the earphone volume of all radio receivers except NAV receivers. Maximum obtainable volume on all receivers depends on the setting of the volume control on each receiver.
Transmit-Interphone Selector Switch	Positions 1, 2, 3, and 4 connects the receiver-transmitter to the associated headset for air-to-air or air-to-ground voice communication; cyclic stick trigger switch or foot switch

CONTROL	FUNCTION
Transmit-Interphone Selector Switch (cont.)	must be depressed to transmit. Position INT connects the headset microphone to the interphone system; INT switch must be depressed to talk. Position PVT energizes the interphone system for hot mic operation; no external key is needed.

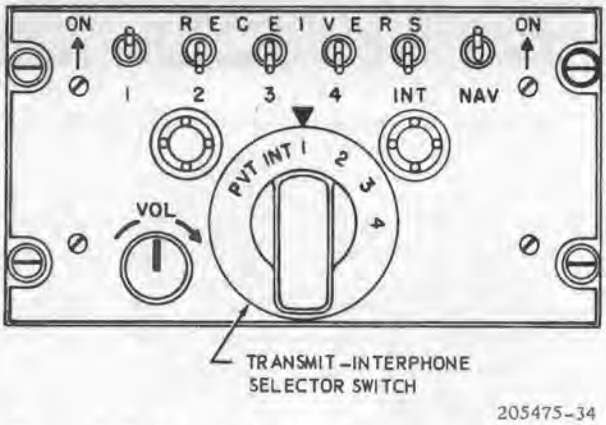
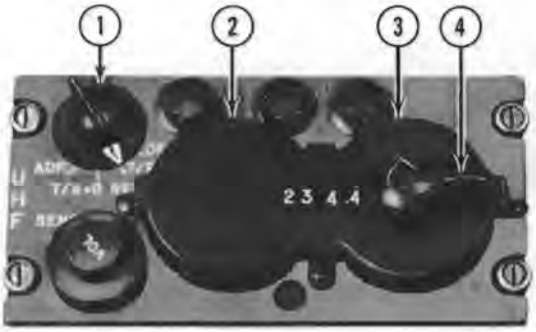


Figure 5-5. Signal distribution panel C-1611/AIC

5-62. UHF Control Panel C-1827/ARC-55B. UHF Control Panel C-1827/ARC-55B (see figure 5-6) is marked UHF. The panel is mounted in the pedestal and is used to control the ARC-55B receiver-transmitter. The controls located on the panel and their functions are as follows:

CONTROL	FUNCTION
Selector Switch	Applies power to the radio set and selects the mode of operation. OFF position — turns off primary power. TIR position — transmitter and main receiver are on, guard receiver is off. T/R+G REC position—transmitter, main receiver and guard receiver are on. ADF position — Not used on this installation.
Volume Sensitivity Control	This is a dual purpose rotary control. The larger or outer knob is marked SENS, receiver sensitivity is increased by rotating the knob clockwise and decreased by rotating counterclockwise. The smaller or inner knob is marked VOL, rotating clockwise decreases volume.
Tuning Controls	The tuning controls consists of two large control knobs, an inner control knob, and an indicator window. The large knob on the left side is used to select the first two digits (or ten megacycle number) of the desired frequency. The large knob on the right side is used to select the third digit (or one megacycle number) of the desired frequency. The inner knob is used to select the fractional (or tenth megacycle number) of the desired frequency.



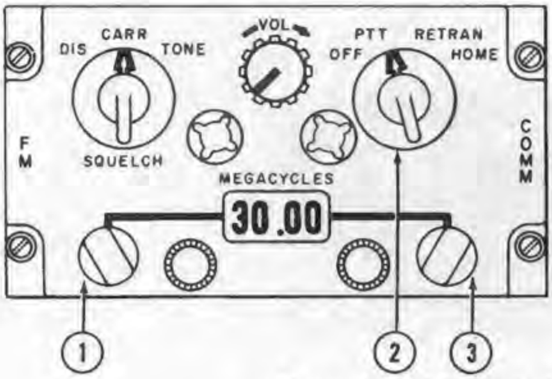
1. Function Selector Switch
2. Frequency Selector (First Two Digits)
3. Frequency Selector (Third Digit)
4. Frequency Selector (Fourth Digit)

205475-32

Figure 5–6. UHF Control panel C-1827/ARC-55B

5-63. Control Panel C-3835/ARC-54. Control Panel C-3835 (see figure 5-7) is marked FM COMM and is mounted in the pedestal. The control panel is used to control the AN/ARC-54 Radio Set. The controls located on the panel and their functions are as follows:

CONTROL	FUNCTION
Mode Control (four position rotary switch)	Applies power to the set and selects the mode of operation. OFF position — Turns off primary power PTT (push-to-talk) applies power. Radio set operates in normal communication mode. (Radio cyclic stick switch or foot switch must be pressed to transmit.) RETRAN (retransmit) — applies power. Radio set operates as a two-way relay station. (Two radio sets are required) HOME position — Applies power and radio set operates with AN/ARA-56 Homing Antenna and Course Indicator as a homing facility.
VOL control	Adjusts the audio output level of the radio set.
SQUELCH control (three position switch)	Selects one of three squelch modes as follows: DIS (disable) position — squelch circuits are disabled. CARR (carrier) position — squelch circuits operate normally. TONE position — squelch opens (unsquelches) only on signals containing a 150-CPS tone modulation.
Frequency control, Whole-megacycle digit	Selects the whole-megacycle digits of the operating frequency.
Frequency control decimal-megacycle digit.	Selects the decimal-megacycle digits of the operating frequency.
MEGACYCLES Display Window	Displays the selected operating frequency of the radio set.



1. Frequency Control Whole - Megacycle
2. Mode Selector Switch
3. Frequency Control Decimal - Megacycle

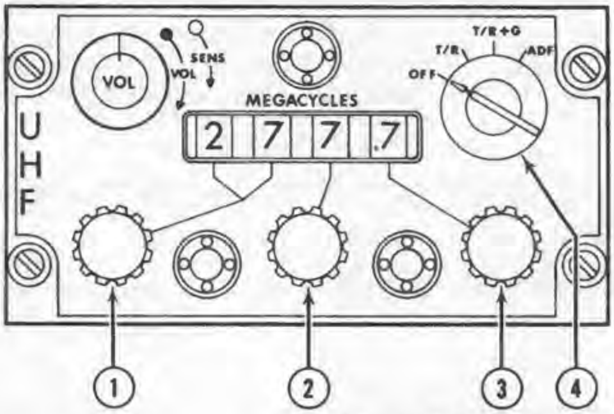
205475-33

Figure 5-7. FM Control panel C-3835/ARC-54

5-64. Control Panel C-4677/ARC-51X.

Control Panel C-4677 (see figure 5-8) is marked UHF and is mounted in the instrument panel. The control panel is used to control the AN/ARC-51X Radio Set. The controls located on the panel and their functions are as follows:

CONTROL	FUNCTION
Function sheet switch (four-position rotary switch)	Applies power to the radio and selects type of operation as follows: OFF position — removes operating power from radio set. T/R position — applies power to the set and permits transmission and reception; guard receiver is not operative. T/R+G position — Permits transmission and reception; guard receiver is operative. ADF position — Not applicable on this installation.
VOL control SENS control	Controls level of audio applied to headset. Adjusts main receiver sensitivity. When rotated fully clockwise the control disables the squelch.
Ten-megacycle control	Selects the first two digits (or ten-megacycle number) of the operating frequency.
One-megacycle control	Selects the third digit (or one-megacycle number) of the operating frequency.
One-tenth megacycle control	Selects the fourth digit (or tenth-megacycle number) of the operating frequency.



1. Frequency Selector (First Two Digits)
2. Frequency Selector (Third Digit)
3. Frequency Selector (Fourth Digit)
4. Function Selector Switch

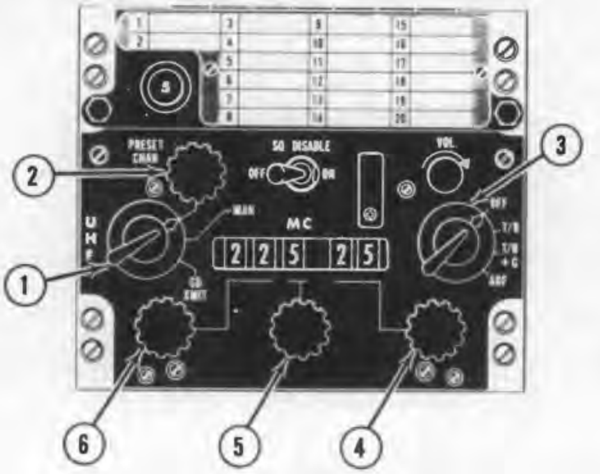
205475-13A

Figure 5-8. UHF Control panel C-4677/ARC-51X

5-65. Control Panel C-6287/ARC-51BX.

Control Panel C-6287 (see figure 5-9) is marked UHF and is mounted in the pedestal. The control panel is used to control the AN/ARC-51BX Radio Set. The controls located on the panel and their functions are as follows:

CONTROL	FUNCTION
Function Select Switch (four position rotary switch)	Applies power to radio set and selects type of Operation as follows: OFF position — Removes operating power from the set. T/R position — Applies power to radio set and permits transmission and reception; guard receiver is not operative. T/R+G position — Permits transmission and reception; guard receiver is operative. ADF position — Not applicable on this installation.
VOL control SQ DISABLE switch	Controls level of audio applied to headset. In the OFF position squelch is disabled. In the ON position, the squelch is operative.
Mode selector (three position rotary switch)	Determines the manner in which the frequencies are selected as follows: PRESET CHAN position — permits selection of one of 20 preset channels by means of preset channel control. MAN position — Permits frequency selection by means of megacycle controls. GD XMIT position — Receiver-transmitter automatically tunes to guard channel frequency.
PRESET CHANnel control 20-position notary switch	Permits selection of any one of 20 preset channels.
Preset channel indicator	Indicates the preset channel selected by the preset channel control.
Ten megacycle control	Selects the first two digits (or ten-megacycle number) of the operating frequency.
One megacycle control	Selects the third digit (or 1 megacycle number) of the operating frequency.
Five-hundredths megacycle control	Selects the fourth and fifth digits (or 0.05 megacycle number) of the operating frequency.



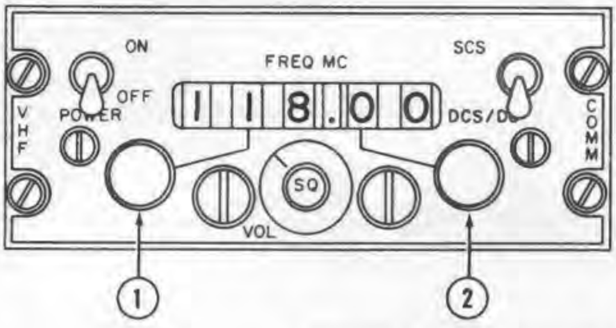
1. Mode Selector
2. Preset Channel Control
3. Function Select Switch
4. 0.05 Megacycle Control
5. 1 Megacycle Control
6. 10 Megacycle Control

205475-30

Figure 5-9. UHF Control panel C-6287/ARC-51BX

5-66. Control Panel 614U-6. Control Panel 614U-6 (see figure 5-10) is marked VHF COMM. The panel is installed in the pedestal and is used to control the AN/ARC 73 Radio Set. The controls located on the panel and their functions are as follows:

CONTROL	FUNCTION
POWER switch VOL control knob SQ Control knob	Turns primary power to the radio set ON or OFF. Controls the receiver audio volume level. Adjusts the squelch threshold level of the receiver output.
Megacycle Control knob	Selects receiver and transmitter frequency in 1-mc steps.
Kilocycle Control knob	Selects receiver and transmitter frequency in 50-kc steps.
FREQ NC Indicator window	Indicates receiver and transmitter frequency selected.
SCS-DCS/DCD switch	Not used.



1. Megacycle Control Knob
2. Kilocycle Control Knob

205475-29

Figure 5-10. VHF Control panel 614U-6/ARC-73

5-67. VHF Emergency Transmitter Control Panel. The Emergency Transmitter Control Panel (see figure 5-11) is marked VHF and is installed in the pedestal. The controls located on the panel and their functions are as follows:

CONTROL	FUNCTION
Power Switch	Turns power on and off. OFF position — turns power off. EMER XMTR position turns transmitter on.
Selector Switch	Selects the desired crystal controlled operating frequency. The first position selects the ARC-73 Radio Set. The frequencies selected at positions 2, 3, 4 and 5 are listed on the placard on the panel.

1. Power Switch
2. Channel Selector

205475-28

Figure 5–11. VHF Emergency transmitter control panel

5-68. Emergency Communications Switch Panel. A switch panel (see figure 5-12) is provided for emergency operation. The panel is installed in the pedestal. The switch panel permits operation of all remaining equipment should the AN/ARC-44 system fail. The panel contains two switches, their functions are as follows:

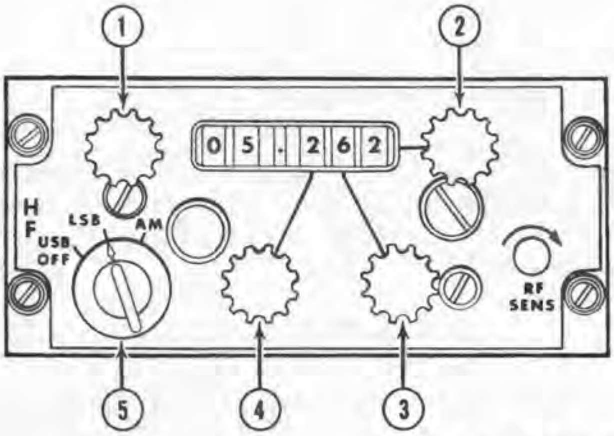
CONTROL	FUNCTION
Pilot Switch	Up position permits normal operation of UHF, VHF and interphone equipment. Down position permits operation of the standby transmitter. (The VHF Navigation receiver may be used with the standby transmitter. The interphone system is inoperative.)
Copilot Switch	This switch permits the same functions listed for the pilot's switch.

205475–27

Figure 5–12. Emergency communications switch panel

5-69. HF Control Panel. The HF Control panel (see figure 5-13) is marked HF and is installed in the pedestal. It provides remote control of the AN/ARC-102 Radio Set. The operating controls and their functions are as follows:

CONTROL	FUNCTION
Function Selector switch (4-position rotary switch)	OFF position — Turns off primary power to the radio set. USB position — Energizes radio set for upper sideband mode of operation. LSB position — Energizes radio set for lower sideband mode of operation. AM position — Energizes radio set for amplitude modulation mode of operation.
Megacycle select knobs	Four knobs used to select the desired frequency as follows: Upper left knob selects the first two digits of the desired frequency. Left center knob selects the third digit. Right center knob selects the fourth digit. Upper right knob selects the last digit of the operating frequency.
RF SENS knob.	Permits adjustment of the audio level in headphones.



1. Frequency Selector (First Two Digits)
2. Frequency Selector (Fifth Digit)
3. Frequency Selector (Fourth Digit)
4. Frequency Selector (Third Digit)
5. Function Selector Switch

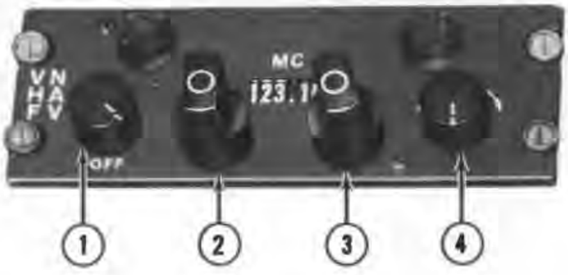
205475–26

Figure 5–13. HF Radio control panel

5-70. VHF Navigation Control Panel. The VHF navigation control panel (see figure 5-14) is marked VOR ILS and is installed in the pedestal. It provides remote control of the AN/ARN-30E Navigation (omni) receiver. The controls located on the panel and their functions are as follows:

CONTROL	FUNCTION
VOL-OFF Switch	Clockwise rotation applies power to the VHF receiver, further clockwise rotation increases the audio output of the receiver. Extreme counterclockwise position turns off power to VHF receiver.
SQUELCH Control	Controls receiver squelch circuit. Clockwise rotation decrease receiver noise.

CONTROL	FUNCTION
Whole Megacycle Channel Selector switch	This is the control on the left side. It permits selection of the desired frequency in 1-mc steps between 108 mc and 126 mc. The selected frequency is displayed on the left side of the dial.
Fractional Megacycle Channel Selector switch	This is the control on the right side. It permits selection of the desired frequency in 0.1-mc steps, between 0.0 mc and 0.9 mc. Frequency selection is displayed on the right side of the dial.



1. Volume-off Control
2. Megacycle Control (First Three Digits)
3. Fractional Megacycle Control (Fourth and Fifth Digits)
4. Squelch Control

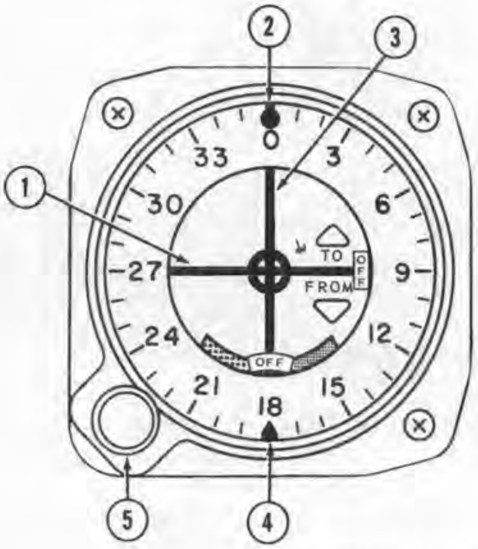
205475-25

Figure 5-14. VHF Navigation receiver control panel

5-71. Course Indicator. The course indicator (see figure 5-15) is installed in the instrument panel. The purpose of the indicator is to present a visual indication of the position of the helicopter relative to the station being received. Information presented on the course indicator is received via the VHF navigation receiver and converter, and from the AN/ARC-54 when it is operating in the homing mode. The indicator consists of six indicating elements and one control knob. The function of the indicators and control are as follows:

INDICATOR OR CONTROL	FUNCTION
Course Selector Knob	Selects desired magnetic bearing of heilcopter, relative to VOR station being received. Its setting is indicated by position of course pointer on selector dial. Helicopter is at bearing selected when vertical pointer is centered.
Course Pointer	Indicates magnetic bearing selected by operation of course selector knob. When vertical pointer is centered, helicopter is flying magnetic bearing indicated by course pointer.
Reciprocal Pointer	Indicates the magnetic bearing which is 180° out of phase with the bearing selected with the course pointer.
OFF Vertical Flag	Indicates that VHF navigation receiver is tuned to VOR or localizer station frequency of usable signal strength by moving out of view. The OFF vertical flag also indicates the sufficiency of AN/ARC-54 signal being received in the homing mode.

INDICATOR OR CONTROL	FUNCTION
OFF Horizontal Flag	Indicates sufficiency of signal being received via AN/ARC-54 in homing mode.
TO - FROM Meter	Indicates TO when helicopter is flying towards VOR station being received; indicate FROM when helicopter is flying away from VOR station being received.
Vertical Pointer	Indicates whether or not helicopter is flying on selected course. Vertical pointer is centered on VOR operation when helicopter is flying magnetic bearing indicated by position of course pointer. Vertical pointer is centered in localizer operation when the helicopter is flying on the runway centerline. The vertical pointer also indicates whether or not the helicopter is on course when using the homing facility of the AN/ARC-54.
Horizontal Pointer	Indicates when helicopter is over station when using the homing facility of the AN/ARC-54.



1. Horizontal Pointer
2. Reciprocal Pointer
3. Vertical Pointer
4. Course Pointer
5. Course Selector Knob

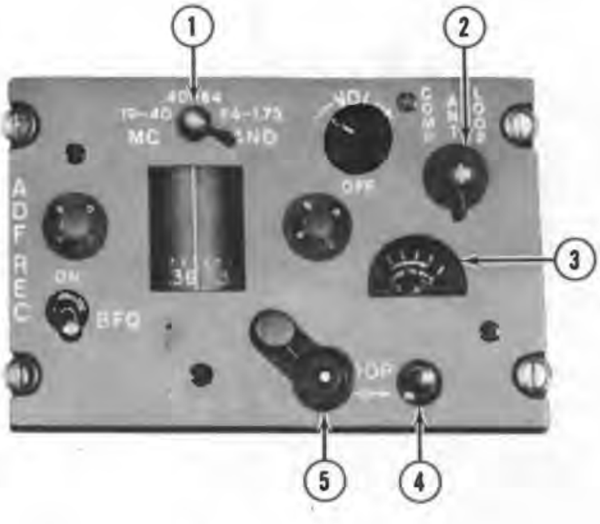
205475-24

Figure 5–15. Course indicator

5-72. Direction Finder Control Panel. The direction finder control panel (see figure 5-16) is marked ARF REC. The control panel is located in the pedestal and is used to control the AN/ARN-59 receiver. The controls and indicators located on the panel and their functions are as follows:

CONTROL	FUNCTION
MC BAND switch	Selects the desired frequency band.
VOL-OFF Control	Turns direction finder set on or off. Adjusts receiver audio level when function switch is in COMP position. Adjusts receiver RF sensitivity when function switch is in ANT or LOOP position.
Function Switch	COMP position — Receiver operates on combined loop and sense antennas as a radio compass. ANT position — receiver operates with sense antenna. Loop position — receiver operates with loop antenna.

CONTROL	FUNCTION
LOOP switch	Positions the loop antenna when the function switch is in either COMP or LOOP position.
Tuning Crank	Tunes the receiver to the frequency of the received signal.
Tuning Meter	Facilitates accurate tuning of the receiver.
BFO switch	Turns BFO ON or OFF.



1. Band Switch
2. Function Switch
3. Tuning Meter
4. Loop Switch
5. Tuning Crank

205475-23

Figure 5–16. ADF Control panel

5-73. Bearing Heading Indicator. Two bearing-heading-indicators are installed in the instrument panel (see figure 5-17 for illustration of the pilot's bearing-heading-indicator). The copilot's indicator (not shown) is a repeater type instrument similar to pilots indicator except that it does no have a heading knob or a heading synchronization knob. The moving type dials on both indicators display the gyro magnetic compass heading. The No. 1 (single bar) pointers display the radio magnetic bearing from the direction finder set. The No. 2 (double bar) pointers display the bearing of the station being received on the VHF navigation receiver. The controls located on the bearing-heading-indicators and their functions are as follows:

CONTROL	FUNCTION
Heading Synchronization Knob	This is the knob in the lower right corner of the indicator, it is used to synchronize the dials when two indicators are used.
SET HDG knob	This knob is marked SET HDG and is in the lower left corner of the indicator. Turning the knob drives a selector pointer around the heading dial. The circuit is not connected, but the SET HDG pointer can be used as a heading reminder.

CONTROL	FUNCTION
VOR - ADF Knob	This switch is to be used when two VOR and one ADF units are installed. This installation has one VOR and one ADF unit and the VOR - ADF switch shall be set to ADF at all times. Setting switch to VOR will result in no display on pointer No. 1.

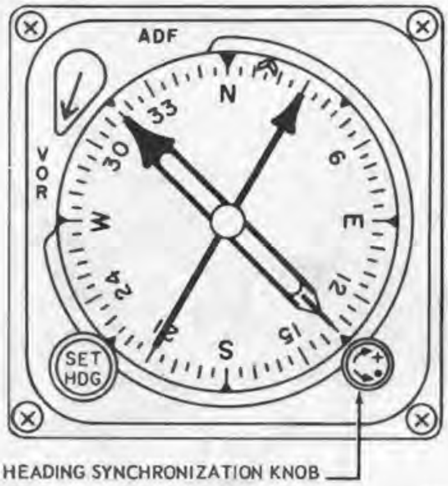


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Figure 5-17. Bearing — heading indicator

5-74. Marker Beacon Controls. The marker beacon receiver controls (see figure 2-5) are located on the lower right section of the instrument panel. The control and indicators and their function are as follows:

INDICATOR OR CONTROL	FUNCTION
VOLUME OFF - INCR Control	Clockwise rotation turns the marker beacon receiver on. Further clockwise rotation increases the level of the aural signal in the headset. Full counterclockwise rotation turns the marker beacon receiver off.
SENSING Switch	HIGH position — Increases sensitivity of the receiver. LOW position — Decreases sensitivity of the receiver.
Marker Beacon Indicator or Light	Flashes on and off when marker beacon receiver is operating and aircraft is passing over the ground transmitter.

A Marker Beacon (see figure 5-18) Control Panel. The marker beacon control panel is marked M. B. RCVR and is used to turn on the ARN-32 marker beacon receiver and regulate the audio level. The control panel is located on the instrument panel. The controls on the control panel and their functions are as follows:

CONTROL	FUNCTION
Two position toggle switch	ON position — Connects power to start marker beacon receiver operating. OFF position — Turns marker beacon receiver off.

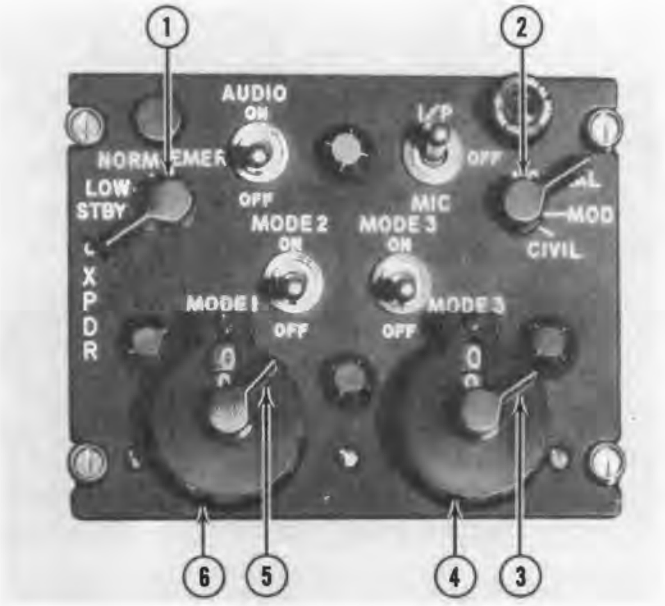
CONTROL	FUNCTION
VOL control	Regulates the audio level of the receiver marker beacon signal in the headset. Clockwise rotation increases volume and counterclockwise rotation decreases volume.

Figure 5–18. Marker beacon ARN-32 control panel

5-75. Transponder control panel — AN/APX-44. The control panel (see figure 5-19) is installed on the pedestal and provides remote control of the AN/APX-44 transponder set. The controls and indicators on the panel and their function are as follows:

CONTROL OR INDICATOR	FUNCTION
Master Control	OFF position — Removes power from the equipment.
	STBY position — Places the set in standby or warmup condition.
	LOW position — Selects low receiver sensitivity.
	NORM position — Selects normal receiver sensitivity.
	EMER position — places transmitter in condition for emergency automatic operation.
Function Control	Selects operational mode as follows:
	NORMAL position — Permits transponder set to reply with normal pulse codes, representing modes 1, 2, and 3.
	MOD position — Permits transponder set to reply with set pulse codes, representing modes 1, 2, and 3.
	CIVIL position — Permits transponder set to reply with civil pulse codes, representing modes 1, 2, and 3.
1/P switch	Enables 1/P reply operation as follows:
	MIC position — Connects 1/P energizing circuits to aircraft microphone key circuits and permits aural 1/P for 30 seconds when speaking into the microphone.
	OFF position — Disconnects microphone keying and 1/P initiating circuits. 1/P position — when momentarily actuated initiates 1/P operation for 30 seconds.

CONTROL OR INDICATOR	FUNCTION
AUDIO switch	ON position — Permits monitoring transmitted reply pulses.
MODE 2 switch	Permits transponder set to provide mode 2 replies for Mode 2 interrogations.
MODE 3 switch	Permits transponder set to provide mode 3 replies for mode 3 interrogations.
MODE 1 Code Control	Selects and indicates the two-digit, mode 1 code number. First digit selector selects first digit of mode 1 code number. Second digit selector selects second digit of mode 1 code number.
MODE 3 Code Control	Selects and indicates the two-digit, mode 3, code number. First digit selector selects the first digit of the mode 3 code number. Second digit selector selects second digit of mode 3 code number.
Emergency Barrier	Prevents accidental placement of the master control to the EMER position.
Pilot Light	Lights when power is applied to transponder.
Lens Shutter	Controls brilliance of pilot light.
Test Button	Permits test of pilot light.
Emergency Barrier	Prevents accidental placement of master control switch to EMER position.



1. Master Control
2. Function Control
3. Second Digit Selector
4. First Digit Selector
5. Second Digit Selector
6. First Digit Selector

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Figure 5–19. Transponder control panel AN/APX-44

Section IV — Types of Operating Facilities

(Not Applicable)

Section V — Preliminary Starting Procedure

(Not Applicable)

Section VI — Operating Procedures

5-76. AN/ARC-44 Operation. The ARC-44 may be operated in the following modes of operation: interphone system, FM liaison set, and FM homing. The different modes of operation and the starting and stopping procedures are presented in the following paragraphs.

5-77. Preliminary Check. Set the controls and switches on the SB/329-AR Signal Distribution Panel, FM Control Panel and FM Switch Panel as follows:

a. Place ON-OFF power switch on FM control panel to OFF position.

b. Place all switches on the FM switch panel to OFF position.

c. Place RECEIVERS, MB, and NAV switches to OFF position.

d. Rotate receiver VOL control, on FM control panel and headset VOL control on INT panel to their full counterclockwise positions.

Note

> All instructions for the INT signal distribution panel apply to pilot's, copilot's and medical attendant's distribution panels. However, the medical attendant's panel cannot be used for radio transmission.

e. Rotate the TRANS selector switch on the INT panel to the INT position.

f. REM-LOCAL should always be in LOCAL position.

g. Rotate the one-tenth and whole megacycle FREQ switches to select the desired frequency.

5-78. Starting Procedure. With controls set as outlined in the preliminary check, perform the starting procedure as follows:

a. Ascertain that the helicopter master power switch is in the ON position.

b. Ascertain that the INT and FM circuit breakers are in.

c. Set the ICS switch on the FM switch panel to the ON position. Allow approximately three minutes for the signal distribution panel to warm up.

d. Follow the procedures outlined in paragraphs 5-78, 5-79 and 5-80 for the desired type of operation.

5-79. Interphone Operation. Perform the following steps for interphone operation.

a. Press the microphone switch at any one of the interphone stations.

b. Speak into the microphone; side-tone will be heard in the headset.

c. Adjust the INT signal distribution panel headset VOL controls for comfortable audio in the headsets.

Note

> The volume control has no effect on the microphone amplifier output but should be kept at a normal level to prevent feedback conditions.

5-80. FM Receiver — Transmitter Operation. Refer to paragraph 5-77 for starting procedure and perform the following steps:

a. On the operator's INT signal distribution panel place RECEIVERS No. 1 switch to UP position.

b. Turn the VOL control on the INT signal distribution panel fully clockwise for maximum volume.

c. On the FM control panel place the ON-OFF power switch to ON. Allow approximately two minutes for warmup. Cycling may take place in the receiver-transmitter. This will be indicated by a 400-cycle-per-second signal heard in the headsets.

d. Select the required freqency by rotating frequency selector switches.

e. Turn the VOL control on the FM panel for maximum volume, and reduce the volume to a suitable listening level, if necessary with the headset VOL control on the INT signal distribution panel.

f. To transmit rotate TRANS selector switch to select No. 1 position.

g. Press trigger switch on cyclic stick to second detent (or depress foot switch) and speak into microphone. Observe normal traffic precautions to avoid breaking in on a transmission or reception.

5-81. *FM Homing Operation*. To operate the AN/ARC-44 for FM homing perform the following steps.

a. Set up the equipment panels for FM reception as outlined in steps a. through e. in paragraph 5-79.

b. Set the HOME switch on the FM Switch Panel to the ON position.

5-82. *Shut-down Procedure*. To turn off the AN/ARC-44 equipment proceed as follows:

a. To turn off homing equipment position HOME switch on FM switch panel down to OFF position.

b. To turn off FM receiver-transmitter position ON-OFF power switch on FM control panel to OFF position.

c. To turn off interphone system position ICS switch on FM switch panel down to OFF position.

Note

> The operation of the electronic equipment in this helicopter is dependent on the operation of the interphone system. Do not turn the interphone system off until the end of the flight day.

5-83. C-1611A/AIC Operation. The procedure for operating the C-1611A/AIC Signal Distribution Panel is presented in the following steps:

a. Check that helicopter master power switch is on.

b. Check that C-1611A circuit breaker is in.

c. Position transmitter selector switch as desired.

d. Position receiver switches as desired.

e. Position microphone switches as desired.

f. Adjust Volume control on C-1611A as desired.

5-84. AN/ARC-54 Operation. The operating procedures for voice transmission and reception, the homing operation and stopping procedure for the AN/ARC-54 FM Liaison Set are presented in the following steps:

a. Check that helicopter master power is on.

b. Check that ARC-54 and C-1611A circuit breakers are in.

c. Set the mode selector switch to PTT.

d. Adjust frequency control knobs to select the desired operating frequency.

Note

> A channel changing tone should be heard in the headset while radio set is tuning. When the tone stops the radio set is tuned.

e. Set the VOL control on the FM panel to mid-position.

f. Set the SQUELCH control to CARR or as required.

g. To monitor the FM receiver set No. 1 RECEIVERS switches on the INT panel to UP position.

h. Adjust VOL on INT panel to a comfortable level.

i. To transmit set the transmit-interphone selector switch on the INT panel to No. 1 position.

j. After a three minute warmup, depress the cyclic stick trigger switch to the second detent, or depress the foot switch, and speak into the microphone. Note that sidetone is heard in the headset.

5-85. Homing Operation. The procedure for operating the AN/ARC-54 Radio Set in the homing mode is presented in the following steps:

a. Perform steps a. and b. paragraph 5-83.

b. Set the mode selector switch to HOME.

c Adjust the frequency controls to the frequency of the homing station The sufficiency of the signal will be indicated by the disappearance of the flags in the homing indicator.

d. Set the SQUELCH control to CARR or as required.

e. Fly the course that keeps the vertical pointer of the course indicator in the center of the indicator scale. To insure that the aircraft is not heading away from the station, change the heading slightly and note that the heading indicator vertical pointer deflects in the direction of the turn.

f. Over-the-station position is indicated by the heading indicator horizontal pointer.

5-86. Stopping Procedure — AN/ARC-54. When the equipment is not needed set the mode control on the control panel to OFF.

5-87. AN/ARC-55B Operation. The operating procedure for operation of the ARC-55B UHF Command Set is outlined in the following steps:

a. Check that helicopter master power is on.

b. Check that the ARC-55B circuit breaker is in.

c. Position selector switch on UHF control panel to TR or TR+G REC as required.

d. Rotate frequency controls to select the desired frequency.

e. To monitor UHF receiver position RECEIVERS switch No. 2 to UP position.

f. Set VOL-SENS controls as desired.

Note

> No transmission will be made on emergency (distress frequency channels except for actual emergency purposes in order to prevent transmission of messages that could be construed as actual emergency call messages.

g. To transmit set transmit-interphone switch on signal distribution panel to position 2.

h. Depress trigger switch on cyclic stick, or depress foot switch and speak into the microphone.

5-88. Operation on Guard Frequency. A completely separate guard channel receiver is provided in the equipment to continuously monitor the guard frequency while operating on the main channel. To operate on the guard frequency proceed as follows:

a. To energize the guard receiver position the function switch to T/R+G REC position and operate the equipment as described in paragraph 5-85.

b. To transmit on the guard frequency perform steps a. and b. in paragraph 5-85.

c. Position function switch to T/R Position.

d. Rotate the channel selector to select the assigned guard frequency.

e. Depress cyclic stick trigger switch to second detent, or depress foot switch and speak into microphone.

5-89. Stopping Procedure — AN/ARC-55B. When the equipment is not needed set the selector switch to OFF position.

5-90. AN/ARC-51X Operation. The operating procedure for the ARC-51X UHF Command Set is outlined in the following steps: ⑩

a. Check that helicopter master power is on.

b. Check that ARC-51X and C-1611A circuit breakers are in.

c. Set the function select switch to T/R or T/R+G to select the desired type of operation.

d. Allow the radio set to warm up for five minutes.

e. Rotate megacycle controls to select the desired frequency.

f. Position No. 2 RECEIVERS switch on the signal distribution panel to UP position.

g. Adjust SENS and VOL controls for a comfortable level.

h. To transmit set the Transmit-interphone selector switch to position 2.

i. Depress the foot switch or cyclic stick trigger switch and speak into the microphone.

5-91. ***AN/ARC-51X Guard Frequency Operation.*** The operation of the ARC-51X on the guard frequency is the same as the procedure outlined in paragraph 5-85, except, the function select switch must be in the T/R+G position, and the megacycle controls must be tuned to the assigned guard frequency.

5-92. ***Stopping Procedure.*** To turn the ARC-51X off, rotate the function select switch to OFF position.

5-93. AN/ARC-51BX Operation.

The operating procedure for the ARC-51X UHF command set is outlined in the following steps:

a. Check that helicopter master power is on.

b. Check that the ARC-51BX and C-1611A circuit breakers are in.

c. Set the function select switch to T/R or T/R+G as required.

d. Set the mode selector switch to PRESET CHAN and allow set to warm up for five minutes.

e. To monitor the UHF receiver, position RECEIVERS switch No. 2 to UP position.

f. Rotate PRESET CHAN control to select desired preset frequency. Note 800-cps audio tone in headset during channel changing cycle.

g. Set SQ DISABLE switch to ON.

h. Adjust VOL control to a comfortable level.

i. To transmit set the transmit-interphone selector switch to position 2.

j. Depress foot switch or cyclic stick trigger switch and speak into the microphone.

5-94. ***AN/ARC-51BX Guard Frequency Operation.*** To transmit and receive on the guard frequency set up the equipment as outlined in paragraph 5-88, steps a, b, and c. Set the mode selector switch to GD, XMIT to tune automatically to the guard frequency. Complete steps g, h, i and j in paragraph 5-93.

5-95. ***Stopping Procedure.*** To turn the ARC-51BX off, rotate the function select switch to OFF position.

5-96. VHF Command Set Operation.

The operating procedure for the VHF Command Set is outlined in the following steps.

a. Check that helicopter master power is on.

b. Check that ARC-73 and C-1611A circuit breakers are in.

c. Set the POWER switch on the VHF control panel to ON position and allow set to warm up.

d. Rotate megacycle and kilocycle selector knobs to select the desired operating frequency.

e. To monitor the VHF receiver, position RECEIVERS switch No. 3 to UP position.

f. Adjust SQuelch and VOLume control knobs for a comfortable audio level.

g. To transmit set the transmit-interphone selector switch to position 3.

h. Depress foot switch or cyclic stick trigger switch, to second detent, and speak into the microphone.

i. To turn off the VHF command set, operate the POWER switch on the VHF control panel to OFF position.

5-97. Emergency Transmitter Operation. The operating procedure for the T-366/ARC Emergency Transmitter is outlined in the following steps:

a. Check that helicopter master power is on.

b. Check that VHF XMTR T-366 circuit breaker is in.

c. Rotate the transmit-interphone selector switch on the signal distribution panel to position 3.

d. Position the toggle switch or switches (pilot and copilot) on EMER COMM switch panel to down (STBY VHF) position.

Note

> The EMER COMM panel is only used when the AN/ARC-44 fails.

e. Position the toggle switch on the emergency transmitter control panel to on position.

f. Rotate the frequency selector switch on the emergency transmitter control panel to the desired frequency.

g. Depress the foot or cyclic stick trigger switch and speak into the microphone.

h. To turn the emergency transmitter off, position the toggle switch on the control panel to OFF position.

5-98. HF Radio Set Operation. The operating procedure for the AN/ARC-102 HF Radio Set is presented in the following steps:

Warning

> When ground testing ARC-102, equipment, be sure that personnel are clear of antenna. Serious burns can result if body contact is made with the antenna during ground testing.

a. Check that master helicopter power is on.

b. Check that ARC-102 circuit breakers are in.

c. Position the function selector switch to the desired mode of operation.

d. Rotate the frequency control knobs to select the desired frequency.

Note

> If the function selector is moved from the OFF position to an operating mode and the desired operating frequency is already set up on the control panel, rotate the 10-kilocycle knob one digit off frequency and then back to the operating frequency. This will allow the system to retune to the frequency.

e. To monitor the HF receiver position RECEIVERS switch marked HF to up position.

f. Adjust RF SENS control and volume controls on HF control panel and signal distribution panel to a comfortable level.

g. To transmit set the transmit-interphone selector switch on signal distribution panel to HF position (refer to transmitter selector decal).

h. Depress foot switch or cyclic stick trigger switch and speak into the microphone.

i. To turn the HF radio set off rotate the function selector switch to OFF position.

5-99. HF Radio Emergency Procedures. The HF radio has two built in protective devices that could cause the set to stop operating. The condition and corrective steps are as follows:

a. A protective circuit is designed to turn the receiver-transmitter off, when a short exists in the output circuit. To restore the receiver-transmitter to operation, move the function selector to OFF position and then back to the desired operating mode.

b. When the associated antenna coupler is required to complete several tuning cycles it may become overheated. In this event a thermal relay in the coupler unit is designed to turn off the receiver-transmitter. If the receiver-transmitter stops operating after a series of tuning cycles, position the function selector switch to OFF position, allow the thermal relay to cool for two minutes, and return the function selector to the desired operating mode.

c. If the above procedures do not return the HF radio set to normal operation, place the function selector in the OFF position and report the failure to the maintenance personnel.

5-100. VHF Navigation Receiver Operation. The different modes of operation for the AN/ARN-30E VHF navigation receiver are presented in the following paragraphs.

5-101. ***Visual Omni Range Instructions.*** To operate the VHF receiver as a Visual Omni range (VOR) receiver perform the following steps.

a. Rotate VOL-OFF control clockwise until a click is heard, indicating that the set is energized. Allow five minutes for set to warm up.

b. Rotate SQUELCH control knob full counterclockwise.

c. Turn selector knobs to select the desired frequency on the MC dials.

d. Ensure that the warning flag for the vertical pointer is out of sight.

Warning

> The warning flag for the vertical pointer is an indication of signal strength and reliability. Under no circumstances should navigation be attempted if the flag is visible or if the TO-FROM indicator remains blank.

e. Check to see that the TO-FROM indicator is operating properly.

f. Adjust SQUELCH control knob as desired.

5-102. ***VOR Operating Procedures.*** With the VHF navigation receiver tuned to a VOR station, information is provided to accomplish the following:

5-103. ***Determine Relative Bearing.*** To determine the relative bearing of the aircraft to the station being received accomplish the following:

a. Perform the starting procedure outlined in paragraph 5-100, identify the station.

b. Rotate the course selector knob on the course indicator until the vertical pointer is centered.

c. Read the heading to which the course pointer is pointing and note whether it is TO or FROM. This is the bearing of the aircraft relative to the station being received.

5-104. ***Intercept and Fly a Course to or From VOR Station.*** To intercept and fly a course to or from a VOR station accomplish the following:

a. Perform the starting procedure as outlined in paragraph 5-100.

b. Rotate the course selector knob on the course indicator until the course pointer points to the desired course to or from the station.

c. Check TO-FROM indicator for desired indications.

d. Turn the aircraft until its magnetic heading is flying toward the vertical pointer. Hold this heading until the vertical pointer starts to center. Adjust aircraft heading to keep vertical pointer centered.

Note

> If the aircraft heading and the desired course are about 180° apart, it indicates that the aircraft is heading in a direction opposite to the desired course. An attempt to fly toward the vertical pointer under this condition causes the vertical pointer to move still further left or right. To correct this situation, make a 180° turn and fly toward the vertical pointer.

5-105. ***Maintaining Course.*** If the course pointer is adjusted on course so that the TO-FROM indicator is reading TO going toward the station being received and FROM going away from the station being received, the steering rule to get back on course is as follows:

a. When the vertical pointer moves left then steer left.

b. When the vertical pointer moves right then steer right. These two steps are referred to as steering into the needle and is the same rule which should be followed on normal runway approaches on the localizers.

5-106. ***Passage Over VOR Stations.*** When the VHF navigation receiver is tuned to a VOR station passage over the station will be indicated by the following:

a. Increase in station identification.

b. Vertical pointer fluctuates from side to side.

c. Off flag may appear and disappear in rapid succession.

5-107. ***Runway Localizer Instructions.*** The procedure for making a runway localizer approach using the VHF navigation receiver is presented in the following steps.

a. Check that helicopter master power switch is on and ARN-30 circuit breaker is in.

b. Rotate VOL-OFF switch clockwise until a click is heard indicating receiver is energized, and allow receiver to warm up.

c. Rotate SQUELCH control knob full counterclockwise.

d. Turn megacycle channel selector knobs to select the desired frequency on the MC dials. The localizer function of the VHF navigation system is selected automatically whenever a localizer frequency appears in the MC dial, providing a full scale deflection for a lesser deviation from course line. Localizer frequencies are those ending in odd tenths of a megacycle from 108.1 to 111.9 megacycles inclusive.

e. Position NAV switch on the signal distribution panel up to on position.

f. Listen for the station call sign. Adjust audio and SQUELCH control. Note the identifying signal to make sure the proper station is tuned in. Be sure the course warning flag is out of sight on the course indicator.

g. Check position of the vertical pointer on the course indicator and begin flying toward the station.

h. Fly left if the vertical pointer on the course indicator is left of center, and a 150 cycle-per-second (cps) tone is heard in the interphone system (when used); fly right if the vertical pointer is right of center and a 90 cps tone is heard in the interphone (when used.)

Note

> When making a back course localizer approach, repeat the procedure used for the front approach except as follows. Fly left if the vertical pointer on the course indicator is right of center and a 90 cps tone is heard in the interphone (when used); fly right if the vertical pointer is left of center and a 150 cps tone is heard in the interphone (when used).

5-108. ***Operation as Communications Receiver.*** The procedure for operating the VHF navigation receiver as a communications receiver is outlined in the following steps:

a. Check that helicopter master power is on and ARN-30 circuit breaker is in.

b. Adjust the SQUELCH control to the full counterclockwise position.

c. Turn VOL-OFF switch clockwise until a click is heard, indicating set is energized. Allow five minutes for the receiver to warm up.

d. Rotate the channel selector controls to select the desired VHF communications frequency on the MC dials.

e. Position the NAV switch on the signal distribution panel up to on position.

f. Adjust VOL-OFF and SQUELCH controls for comfortable audio level.

g. To turn the VHF receiver off rotate the VOL-OFF control full counterclockwise to OFF position.

5-109. Direction Finder Set Operation. The operating procedure for the AN/ARN-59 Direction Finder Set is outlined in the following steps:

a. Check that helicopter master power is on.

b. Check that ARN-59 and INT circuit breakers are in.

c. Turn the VOL control on the ADF REC control panel full clockwise and allow equipment to warm up.

d. Position the NAV switch on the signal distribution panel up to ON position.

e. Set the function switch on the ADF REC panel to ANT position.

Caution

> Tuning the direction finder set with the function switch in COMP position will result in premature wear or possible damage to the gear teeth of the loop antenna assembly.

f. Set the MC BAND switch to the desired frequency band and turn tuning crank until the desired frequency is indicated in the indicator window. Tune for maximum tuning meter reading if a signal is present.

g. Check station identification to be certain the desired station is being received.

h. Set the function selector switch to COMP.

Note

> If the signal strength is too weak for easy identification in the COMP position, switch to ANT position temporarily for identification purposes. Signal-to-hoise ratio may be generally improved.

i. Ascertain that the bearing reading on the indicator is a reliable one as follows: Move the LOOP switch to the right and observe that the indicator pointer rotates clockwise. When the pointer has traveled 10 to 20 degrees, release LOOP switch and note action of indicator pointer. If operation is normal and a reliable signal is received, pointer will immediately return to original reading.

5-110. *Manual Operation of Direction Finder Set.* To operate the direction finder set manually, perform steps a. through d., in paragraph 5-108 and perform the following additional steps.

a. Set the function switch to LOOP.

b. Set the BAND switch to the desired operating band.

c. Turn the tuning crank to select the desired frequency.

d. Turn BFO switch ON.

e. Press the LOOP switch to the right or left and rotate loop until the tone drops to a minimum.

Note

> When using the loop antenna alone (LOOP position) for taking bearings, the pointer may be indicating the proper bearing or its reciprocal. Unless the aircraft position is known definitely, this ambiguity must be resolved to determine the bearing from the aircraft to the station.

5-111. *Operation of Direction Finder As A Low Frequency Range Receiver.* The operating procedure for operating the Direction Finder Set as a LF Range Receiver is outlined in the following steps:

a. Perform steps a. through f. paragraph 5-108.

b. Adjust VOL control for desired headset level.

Note

> When operating the direction finder as a range receiver, back off VOL control knob to obtain a comfortable audio level, because broadening may result at high audio levels.

c. To turn off the direction finder set rotate VOL control knob full counterclockwise to OFF position.

5-112. Marker Beacon Receiver Operation.

The marker beacon on-off volume control switch and high-low sensing switch are located on the lower right corner of the instrument panel. The operating procedure is outlined in the following steps:

a. Check that helicopter master power is on.

b. Check that MARKER BEACON and INT circuit breakers are in.

c. Rotate VOLUME ON/OFF control clockwise to ON.

d. Position the NAV switch on signal distribution panel (ME switch if SB/329-AR panel is used) up to on position.

e. Adjust VOLUME control for desired headset audio level.

f. Position HIGH/LOW SENSING switch as required.

g. When marker beacon receiver is not needed position VOLUME ON/OFF control to OFF position.

A 5-113. AN/ARN-32 Marker Beacon Operation. The operating procedure for the ARN-32 Marker Beacon Receiver is outlined in the following steps:

a. Check that ARC-44, SB-329, and ARN-32 circuit breakers are in.

b. Position marker beacon ON-OFF switch up to ON position.

c. Position MB toggle switch on signal distribution panel up to ON position.

d. Adjust VOL controls on marker beacon and signal distribution panel for desired audio level.

e. Position ON-OFF switch down to OFF position when marker beacon receiver is not needed.

5-114. Transponder Set Operation. The preliminary starting procedure and different modes of operation for the AN/APX-44 Transponder Set are given in the following paragraphs:

a. Preliminary Starting Procedure. Set the controls on the control panel as follows:

(1) Master control — OFF

(2) AUDIO switch — OFF

(3) I/P switch — OFF

(4) MODE 2 switch — OFF

(5) MODE 3 switch — OFF

(6) MODE 1 control — To read 00

(7) MODE 3 control — To read 00

(8) Function control — NORMAL

b. Starting Procedure

(1) Check that master helicopter power is on.

(2) Check that APX-44 circuit breaker is in.

(3) Place the master control in STBY position. The pilot light should light.

(4) If the pilot light does not light, press the test button. If the light does not light when the test button is pressed, either light is burned out or operating power is not reaching the transponder set.

(5) Adjust the pilot light to the desired brilliance by opening or closing the lens shutter.

(6) Allow three to five minutes for the transponder set to warm up.

5-115. *Normal Operation*. The normal operating procedure is outlined in the following steps:

a. For Mode 1 operation set the controls as follows:

(1) Function control — NORMAL.

(2) Master control — LOW or NORM as required.

(3) Mode 2 switch — OFF.

(4) Mode 3 switch — OFF.

(5) 1/P switch — Refer to paragraph 5-118.

(6) AUDIO switch — Refer to paragraph 5-119.

b. Combined modes 1 and 2. Set the controls as follows:

(1) Function control — NORMAL

(2) Master control — LOW or NORM as required.

(3) MODE 2 switch — ON.

(4) MODE 3 switch — OFF.

(5) 1/P switch — Refer to paragraph 5-118.

(6) AUDIO switch — Refer to paragraph 5-119.

c. Combined modes 1 and 3. Set the controls as follows:

(1) Function control — NORMAL

(2) Master control — LOW or NORM as required.

(3) MODE 3 switch — ON

(4) MODE 2 switch — OFF

(5) 1/P switch — Refer to paragraph 5-118.

(6) AUDIO switch — Refer to paragraph 5-119.

d. Combined modes 1, 2 and 3. Set the controls as follows:

(1) Function control — NORMAL

(2) MODE 2 switch — ON

(3) Mode 3 switch — ON

(4) Master control — LOW or NORM as required.

(5) 1/P switch — Refer to paragraph 5-118.

(6) AUDIO switch — Refer to paragraph 5-119.

5-116. *Modified Operation*. The procedure for operating with the function selector at MOD position is outlined in the following steps:

a. Mode 1. Set the controls as follows:

(1) Function control — MOD

(2) MODE 1 code control — Assigned two digit code number.

(3) MASTER control — LOW or NORM as required.

(4) MODE 2 switch — OFF

(5) MODE 3 switch — OFF

(6) 1/P switch — Refer to paragraph 5-118.

(7) AUDIO switch — Refer to paragraph 5-119.

b. Combined Modes 1 and 2. Set the controls as follows:

(1) Function control — MOD

(2) MODE 1 code control — Assigned two digit code number.

(3) MODE 2 switch — ON

(4) Master control — LOW or NORM as required.

(5) MODE 3 switch — OFF

(6) 1/P switch — Refer to paragraph 5-118.

(7) AUDIO switch — Refer to paragraph 5-119.

c. Combined Modes 1 and 3. Set the controls as follows:

(1) Function control — MOD

(2) MODE 2 switch — OFF

(3) MODE 3 switch — ON

(4) MODE 1 code control — Assigned two digit code number.

(5) MODE 3 code control — Assigned two digit code number.

(6) Master control — LOW or NORM as required.

(7) 1/P switch — Refer to paragraph 5-118.

(8) Audio Switch — Refer to paragraph 5-119.

d. Combined modes 1, 2 and 3. Set the controls as follows:

(1) Function control — MOD

(2) Mode 1 code control — Assigned two digit code number.

(3) MODE 2 switch — ON

(4) MODE 3 switch — ON

(5) MODE 3 code control — Assigned two digit code number.

(6) Master control — LOW or NORM as required.

(7) 1/P switch — Refer to paragraph 5-118.

(8) AUDIO switch — Refer to paragraph 5-119.

5-117. *Civil Operation*. The procedure for operating with the function selector at civil position is outlined in the following steps:

a. Combined Civil and Military Code 1. Set the controls as follows:

(1) Function control — CIVIL

(2) MODE 3 code control — Assigned two-digit code number.

(3) MODE 3 switch — ON

(4) MODE 2 switch — OFF

(5) MODE 1 code control — Assigned two-digit code number.

(6) Master control — LOW or NORM as required.

(7) 1/P switch — Refer to paragraph 5-118.

(8) AUDIO switch — Refer to paragraph 5-119.

b. Combined Civil and Military Mode 1 and 2. Set the controls as follows:

(1) Function control — CIVIL

(2) MODE 3 code control — Assigned two-digit code number.

(3) MODE 3 switch — ON

(4) MODE 2 switch — ON

(5) MODE 1 code control — Assigned two-digit number.

(6) Master control — LOW or NORM as required.

(7) 1/P switch — Refer to paragraph 5-118.

(8) AUDIO switch — Refer to paragraph 5-119.

5-118. *1/P (Position Identification) Operation*. The pilot may identify the position of his helicopter without being interrogated by a ground based IFF system. This type of operation is initiated by the pilot upon receipt of request via communications set, or upon arrival at pre-established check points. The transponder set will transmit position identifying signals when either of the following procedures are used:

a. Procedure No. 1. Perform the following steps:

(1) To transmit position-identifying signals, momentarily hold the 1/P switch in the 1/P position.

(2) On completion, release the 1/P switch.

b. Procedure No. 2. Perform the following steps:

(1) Place the 1/P switch in MIC position.

(2) Press the switch on the microphone; the transponder set is now transmitting position identifying signals.

(3) On completion of identification of position, release the microphone switchbutton.

(4) Place the 1/P switch in the OFF position.

Note

> The 1/P switch may remain in the MIC position for the duration of a flight. This permits position-identifying signals to be transmitted each time the radio-telephone equipment is operated.

5-119. *Monitoring*. Monitor the reply pulses transmitted by the transponder set as follows:

a. Place the AUDIO switch in the ON position. Transmitted reply pulses, following interrogation, will be audible in the pilot's headset.

b. Immediately following completion of the monitoring procedure, place the AUDIO switch in the OFF position.

5-120. ***Emergency Operation.*** In the event of an emergency or distress condition, the transponder set may be used to transmit specially coded emergency signals. These emergency signals are automatically set up and will be transmitted as long as the master control of the transponder set remains in the EMER position. Even after the transponder set is interrogated by a ground-based IFF system, these signals will continue to be transmitted automatically, regardless of any mode and function combination previously set up, and will provide indications to the ground-based IFF system that the helicopter is in an emergency or distress condition. For emergency operation, set the controls as follows:

a. Depress and hold in the emergency barrier button.

b. Turn the master control to the EMER position.

c. Release the barrier button.

d. Permit the master control to remain in the EMER position for the duration of the emergency.

e. When the emergency is over, return the master control to the NORM or LOW position.

5-121. ***Stopping Procedure.*** To turn off the transponder set, set the controls on the control panel as follows:

a. Master control — OFF

b. AUDIO switch — OFF

c. 1/P switch — OFF

d. MODE 2 switch — OFF

e. MODE 3 switch — OFF

f. MODE 1 code control — To read 00.

g. MODE 3 code control — To read 00.

h. Function control — NORMAL.

5-122. Gyro Magnetic Compass Operation.

The gyro magnetic compass may be operated in the slaved or free mode of operation, depending upon the reliability of the earth's magnetic reference.

Slaved gyro mode of operation. The procedure for the slaved gyro mode of operation is presented in the following steps:

a. Operate the slaving cutout switch, located on the instrument panel, to the IN position.

b. Check that AC and DC circuit breakers are in and allow for three minute warmup period.

c. Set dial index for desired flight heading, using the indicator set course knob.

d. In-flight operation. The moving dial, of the bearing-heading indicator is used in the same manner as a magnetic compass after the aircraft becomes airborne.

5-123. ***Free Gyro Mode of Operation.*** The procedure for the free mode of operation is presented in the following steps:

a. Operate the slaving cutout switch, located on the instrument panel, to the OUT position.

(1) When the compass system is initially placed in operation in the free mode, there will be no magnetic sensing, no slaving of the compass system, and consequently no reference for obtaining directional indications. In this mode of operation, the compass system is used chiefly as a turn indicator.

(2) During flight from an area where magnetic sensing is reliable into or through an area where magnetic sensing is unreliable, the compass system may be used in the free mode to determine heading information. The slaving cut-out switch must be operated from the IN position (Slaved Mode) to the OUT position (Free Mode) before flying into the unreliable area. The compass system does not automatically compensate for gyro drift in the free mode, nor can manual corrections be made. Periodic correction based on the gyro drift rate and the latitude of operation must be calculated algebraically and added to the indicated heading. Heading information determined in this manner should also be checked against two known references.

(3) If the aircraft lands in an area where magnetic sensing is unreliable, and the compass system is kept operating in the free mode until take off, the compass system may still be used as a turn indicator and also to supply directional information. If, however, the compass system is turned off after landing it should be used in the free mode and only as a turn indicator on subsequent flights within the area where magnetic sensing is unreliable.

b. Stopping procedure. The compass system stops operating when the helicopter's electrical power supply is turned off.

Section VII — Inspection

(Not Applicable)

Section VIII — Operation of Electronic Equipment In Conjunction With Other Items

(Not Applicable)

CHAPTER 6

AUXILIARY EQUIPMENT

Section I — Scope

6-1. Scope. This Chapter includes the description, normal operation and emergency operation of all equipment not directly contributing to flight, but which enables the helicopter to perform certain specialized functions.

6-2. Much of the equipment discussed in this Chapter is highly specialized or interchangeable (used in many aircraft). Coverage for specialized or interchangeable equipment of this type will be brief, since complete coverage is appropriately available in publications devoted entirely to that equipment.

Section II — Heating and Ventilation

6-3. Ventilating System. The ventilating system consists of four independently controlled air scoop type ventilators (see figure 2-1) located, two on the topside of the cockpit section and two on the topside of the cargo-passenger section of the cabin. The amount of outside air, entering cabin through ventilators, is regulated by knurled control rings located on the ventilator above pilot, copilot and passengers stations.

6-4. Operation. Rotate knurled control ring to desired position to provide fresh outside air for flight.

🄰 ***6-5. Forced Ventilation.*** a. External power, connected or battery switch to BAT.

b. VENT-HEAT switch — aft to VENT.

c. VENT-HEAT switch—OFF to stop forced ventilation.

🄰 **6-6. Heating and Defrosting System.** The helicopter's heating and defrosting system, see figure 6-1, consists of a combustion type burner, electrically-powered blower, plenum chamber, ducting and registers for transfer of heater air from the unit to the cabin area. Fuel for the combustion unit is supplied from the engine fuel system. The air is drawn in through an intake (inside or outside) and forced through heat exchange unit surrounding the combustion chamber. Heated air is then blown into plenum chamber and through ducts into cabin area. Also provided are ducts that supply heated air through ducts and nozzles for windshield defrosting. The heater fan may be operated separately from the system for ventilation. Electric power for heating and defrosting system operation is furnished from the 28 volt dc non-essential bus. Circuit protection is provided by two circuit breakers marked HEATER CONT CABIN and HEATER PWR CABIN on the dc circuit breaker panel.

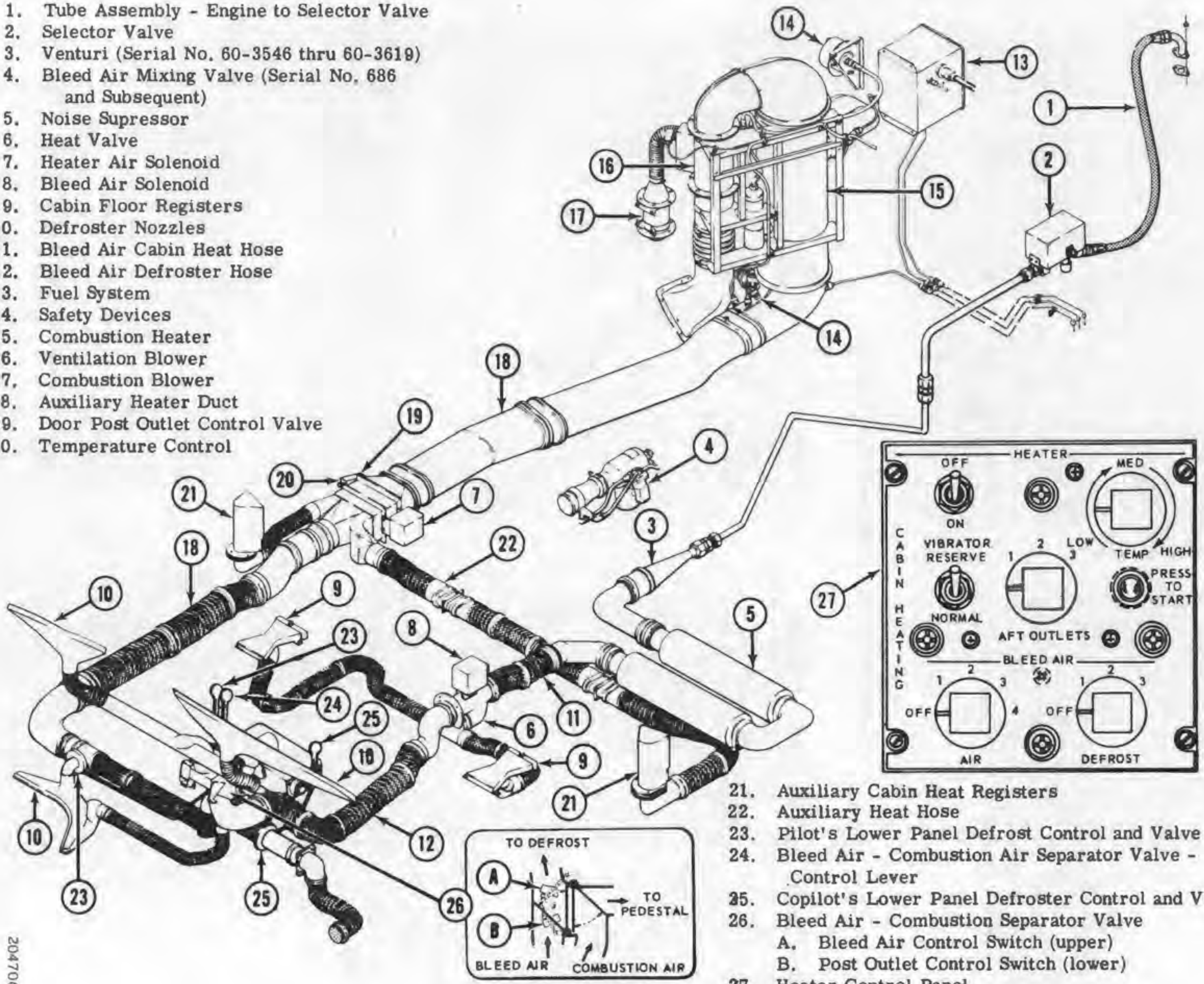
🄰 ***6-7. Cabin Heater Panel.*** The cabin heater panel is located on the overhead console. This panel contains three switches and three panel lights. The switch on the left side of the panel is a three-position toggle switch with aft position marked VENT, the center position marked OFF, and the forward position marked HEAT. The switch in the center of the panel is a momentary ON-OFF switch spring loaded to OFF position and marked MOM START in forward position. The pitot heater switch on the right side of the panel is a two-position toggle switch with the aft position marked PITOT HTR OFF and the forward position marked ON. Electrical power to this panel is supplied from the 28 volt dc non-essential bus.

Caution

> To prevent fire hazard to aircraft, due to possibility of cabin heater exhaust blast causing fire on landing surfaces, move the cabin heater switch to OFF position at least one minute prior to landing on clean surface and at least two minutes prior to landing on surface with combustible materials present.

🄰 ***6-8. Heater Air Control Panel.*** The heater air control panel is located on the top portion of the pedestal. Two knobs on this panel can be actuated in or out as desired to direct the flow

1. Tube Assembly - Engine to Selector Valve
2. Selector Valve
3. Venturi (Serial No. 60-3546 thru 60-3619)
4. Bleed Air Mixing Valve (Serial No. 686 and Subsequent)
5. Noise Supressor
6. Heat Valve
7. Heater Air Solenoid
8. Bleed Air Solenoid
9. Cabin Floor Registers
10. Defroster Nozzles
11. Bleed Air Cabin Heat Hose
12. Bleed Air Defroster Hose
13. Fuel System
14. Safety Devices
15. Combustion Heater
16. Ventilation Blower
17. Combustion Blower
18. Auxiliary Heater Duct
19. Door Post Outlet Control Valve
20. Temperature Control



21. Auxiliary Cabin Heat Registers
22. Auxiliary Heat Hose
23. Pilot's Lower Panel Defrost Control and Valve
24. Bleed Air - Combustion Air Separator Valve - Control Lever
25. Copilot's Lower Panel Defroster Control and Valve
26. Bleed Air - Combustion Separator Valve
    - A. Bleed Air Control Switch (upper)
    - B. Post Outlet Control Switch (lower)
27. Heater Control Panel

Figure 6-1. Heating and defrosting system of heated air in, heated air for windshield defrosting and fresh air in. The left knob is marked FRESH AIR IN and RECIRCULATE OUT. The right knob is marked HEAT IN DEFROST OUT. The knobs, by means of flexible cables, actuate valves in heating ducts.

A **6-9.** ***System Normal Operation.*** a. External power-connected or battery switch to BAT.

b. Non-essential bus and battery — ON for heater operation.

c. Fuel boost pump — ON and engine valve must be OPEN before attempting to light heater.

d. MOMentary START switch—HOLD down to MOM START position for three or four seconds, then release.

e. Heater air control knobs — regulate as desired.

f. VENT-HEAT switch — OFF to stop heater operation.

Note

> After the VENT-HEAT switch has been moved to OFF, the heater combustion motor will continue to operate until heater unit has cooled to a safe temperature.

A **6-10.** ***System Emergency Operation.*** There is no emergency operation of the heating and defrosting system.

B **6-11. Heating and Defrosting System.** The heating and defrosting system consists of tube assemblies, selector valve, noise suppressors, ducts, outlets, control panel and attaching hardware. Heat is supplied from the engine compressor bleed air. Electric power for heating and defrosting system operation is furnished from the 28 volt dc electrical system.

B **6-12.** ***Cabin Heater Panel.*** A dual purpose CABIN HEATING panel is located on the overhead console. The aft portion of this panel is inactive unless the combustion heater is installed. The forward section of this panel, marked BLEED AIR is active for use of the bleed air heating and defrosting. Electrical power to this panel is supplied from the 28 volt dc electrical system.

B **6-13.** ***Pedestal Mounted Heater Control.*** Manual controls are mounted to the forward outer edge of the pedestal installation. The outboard levers are installed as part of the winterization equipment and are used in conjunction with the combustion heater. The right inner lever is used to activate the bleed air circuit.

B **6-14.** ***System Normal Operation.*** a. Inner right-hand lever on forward edge of pedestal in aft position.

b. Rotating switch on control panel marked AIR, rotate as required for heat to floor vents.

c. Rotating switch on control panel marked DEFROST, rotate as required for heat to defrost nozzles.

d. Inboard pedestal lever forward to deactivate bleed air heating and defrosting system circuit.

Note

> For ambient temperature above 50°F, DO NOT operate bleed air heater with selector in position 2, 3 or 4.

B **6-15.** ***System Emergency Operation.*** There is no emergency operation of the bleed air heating and defrosting system.

6-16. Heating and Defrosting System — Combustion. The 100,000 BTU combustion type heating and defrosting system (see figure 6-1) equips the helicopter with sufficient heat supply to maintain a plus 40°F cabin temperature with an outside temperature to minus 65°F. With the combustion heater installed, a combination of bleed air heat and combustion heat is available for heating, or combustion heat for defrosting only, bleed air is off for the last condition. The combustion heater consists of fuel system safety devices, combustion heater, combustion blower, ventilation blower, cycling switch, temperature control and distribution system. The heater fuel system consists of a fuel pressure regulator, fuel filter, fuel pump and a fuel shut-off valve.

Note

> The helicopter's fuel pump must be operating before fuel is available for heater combustion.

The system safety devices are purge switch, overheat switch and air pressure switch. The purge switch prevents the blowers operating after shutdown, to prevent overheat of the system due to residual heat. The overheat switch automatically turns the heater off if a malfunction occurs and the starting cycle has to be repeated to start the heater. The combustion air blower and the ventilation blower are the airvane type operated by 28 volt dc. Both of these blowers operate when the heater switch is ON and continue operation until the switch is OFF. The cycling switch located on the heater plenum, operates in conjunction with the temperature control system and is set at 25°F, the switch turns the fuel on and off, cycling the heater at approximately this temperature. The temperature control systems are the automatic or the duct sensing control. The automatic system is a three temperature pickup system, outside temperature, cabin temperature and duct temperature controlled from the overhead console; while the simplified system controls only the duct temperature from a control located on the right-hand door post.

6-17. Cabin Heater Panel. The aft section of the dual purpose control panel, located on the overhead console, controls the combustion heater. Electrical power to this panel is supplied from the 28 volt dc electrical system.

6-18. Pedestal Mounted Heater Control. Manual controls are mounted to the forward outer edges of the pedestal installation. The outboard levers control valves to admit hot air to the pilot's and copilot's foot area ducts. The right inner lever is used to control the bleed air-combustion air separator valve.

6-19. System Normal Operation. a. External power connected or battery switch to BAT ON.

b. Fuel MAIN ON-OFF switch — ON.

c. PRESS TO START switch — DEPRESS and hold for three or four seconds, then release.

d. Heater air control knobs. Regulate as desired.

e. ON-OFF switch — OFF to stop heater operation.

6-20. System Emergency Operation. There is no emergency operation of the heating and defrost system.

6-21. Heating and Defrosting System — Muff Type. (Information to be supplied when available.)

6-22. Heating Controls. (Information to be supplied when available.)

6-23. Heating Controls. (Information to be supplied when available.)

6-24. System Normal Operation. (Information to be supplied when available.)

6-25. System Emergency Operation. (Information to be supplied when available.)

Section III — Anti-Icing, De-Icing and Defrosting Systems

> ***Note***
>
> The defrosting system is combined with the heating system. Refer to Heating and Defrosting Systems — Chapter 6, Section II.

6-26. Engine Anti-Icing. The anti-icing system for the engine functions to prevent icing of the air inlet areas when engine is operating at freezing temperatures. The system consists of an ice-detector, interpreter and hot air valve. The system is electrically operated and powered by the 28 volt dc system and is connected to the essential bus.

A ***6-27. Principles of Anti-Icing Operation.*** The ice detector senses a pressure differential caused by the icing-over of the upstream probe sensing holes and energizes the interpreter which, in turn, opens the hot air valve. Hot air (under pressure) from an annular manifold within the centrifugal compressor housing passes through the air flow regulator valve into the hollow-annulus located on top of the air inlet housing, where it is directed into the inlet guide vane area of the engine. Hot air also flows through a flexible tube to the temperature sensing element of the main fuel control unit. Small openings in the inlet guide vane allow the hot air to bleed back into the compressor area. The valve of the air flow regulator is "fail safe" loaded in the OPEN or ON position, therefore, in event of an electrical power failure, anti-icing becomes continuous.

6-28. Two indicator lights for the engine anti-icing system are located on the pedestal mounted CAUTION panel (figure 2-5) and provide information as to the system status. These lights are worded ENGINE ICING AND ENG ICE DET. The ENGINE ICING light is illuminated intermittently to denote engine icing conditions and the operation of the detector is roughly proportional to the ice accumulation. The ENGine ICE DETector light will be illuminated when the anti-ice circuit breaker (figure 2-15) is OUT (deactivated) or the probe is clogged or when there is an electrical malfunction in the system. The illumination of the ENG ICE DET light signifies that the detector and interpreter are inactive and the anti-icing operation is continuous.

B ***6-29. Principles of Anti-Icing Operation.*** The ice detector senses a pressure differential caused by the icing over of the upstream probe sensing holes and energizes the interpreter which in turn causes the illumination of the ENGINE ICE caution light and the MASTER CAUTION light, and activates the probe heater to clear probe of ice. Illumination of these lights alerts the pilot to activate the hot air valve by placing the switch on the pedestal mounted ENGINE panel in the OPEN position. For model T53-L-5 and T53-L-9 engines: Hot air, under pressure from the annular manifold within the centrifugal compressor housing, flows forward through the air flow shut-off regulator into the hollow annulus, located on top of the inlet housing. For model T53-L-9A and T53-L-11 engines: Hot air extracted from the annular manifold within the diffuser housing. This hot air is then directed through five of the six hollow inlet housing support struts to de-ice the air inlet area. Hot scavenge oil draining the lower strut into the accessory drive gear box, de-ices the bottom of the air inlet area. Hot air is also directed into the inlet guide vane area and through an annulus around the region of the temperature sensing element of the main fuel control to prevent ice formation in the area of the ambient temperature sensing bulb. Small openings in the bottom of the inlet guide vanes allow hot air to bleed back into the compressor area. The valve of the air flow shut-off regulator is "fail safe" loaded in the OPEN or ON position but must be manually operated by the HOT AIR VALVE switch, when electrical power is available to the system. In the event of electrical failure, anti-icing becomes continuous.

6-30. Two indicator lights for the engine anti-icing system are located on the pedestal mounted caution panel (figure 2-5) and provide information as to the detector system functional status. The ENGINE ICING indicator light illuminates to denote engine icing conditions and the operation of the detector is proportional to the engine ice accumulation. The ENGINE ICE DETector disarmed light will be illuminated when the anti-ice circuit breaker (figure 2-15) is out (deactivated) or the probe is clogged or when there is an electrical malfunction in the system.

6-31. Pitot Heater. The pitot heater is installed on the pitot head and functions to prevent ice forming in the pitot tube. Electric power for pitot heater operation is supplied from the 28 volt dc essential bus. Circuit protection is provided by a circuit breaker, marked PITOT TUBE HEATER, on dc circuit breaker panel.

6-32. ***Pitot Heater Switch.*** The pitot heater switch is located on the overhead console. UH-1A switch is located in the HEATING control panel. UH-1B switch is in the DOME LT control panel. The switch in both ships is two-position marked OFF IN AFT POSITION AND ON in forward position.

6-33. ***Operation Pitot Heater Switch.*** Forward to ON position to prevent ice forming in pitot tube. To shut off pitot heater, position PITOT HTR switch to OFF position.

Section IV — Lighting Equipment

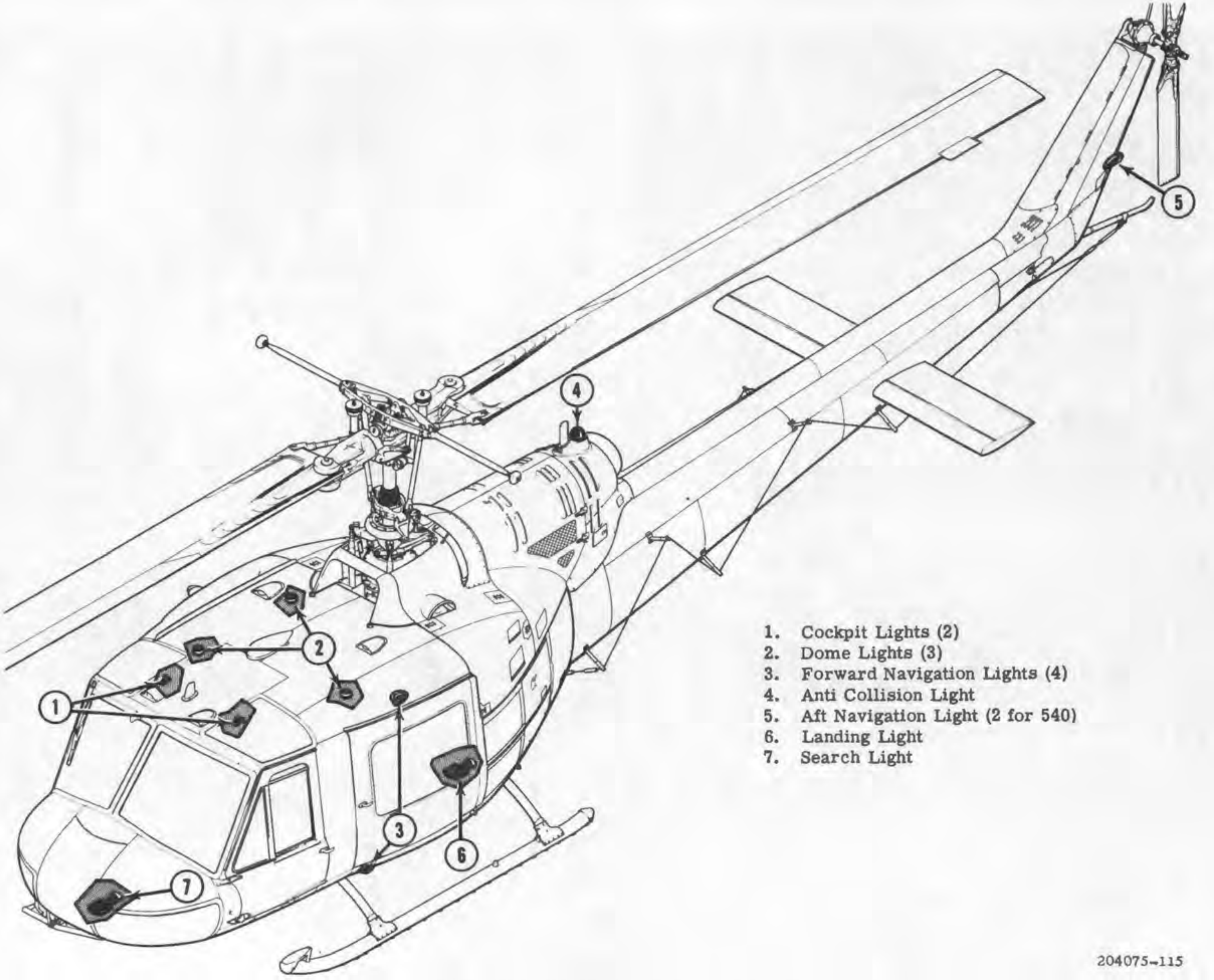
6-34. Navigation Lights. The navigation lights consist of eight lights (see figure 6-2). **5 4 0** Nine lights. On the right side of the fuselage two green lights are mounted, one above and one below the cabin door. On the left side of the fuselage two red lights are mounted, one above and one below the cabin door. Two white lights are mounted on top of the fuselage and one white light is mounted on the bottom of the fuselage. One yellow light is mounted on the tail boom fin. **5 4 0** Two yellow lights are mounted on the tail boom fin. Electric power to operate these lights is supplied from the 28 volt dc electrical system. Circuit protection is provided by a circuit breaker on the dc circuit breaker panel.

6-35. These lights are controlled from the EXT LTS control panel on the overhead console. A three-position switch permits the lights to be STEADY, OFF or FLASH. Another two-position switch on this panel controls brilliance and is marked DIM and BRIGHT. When the three-position switch is in STEADY position, all eight navigation lights are illuminated. In FLASH position, the colored lights illuminate alternately with the white lights.

Note

> When ANTI-COLLISION light is ON, NAV lights on STEADY.

6-36. Anti-Collision Light. One anti-collision light (see figure 6-2) is mounted on the top of the fuselage aft of the cabin. Rotation of the light creates a flashing action that is visible for a considerable distance. Electric power to operate this light is supplied from the 28



1. Cockpit Lights (2)
2. Dome Lights (3)
3. Forward Navigation Lights (4)
4. Anti Collision Light
5. Aft Navigation Light (2 for 540)
6. Landing Light
7. Search Light

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Figure 6–2. Lighting equipment diagram

volt dc electrical system. Circuit protection is provided by a circuit breaker on the dc circuit breaker panel. Control of this light is accomplished from the EXT LTS panel on the overhead console by a two-position switch marked ON and OFF.

Caution

> Under instrument conditions, particularly at night, through conditions of reduced visibility, unnecessary operation of the anti-collision light should be avoided. Uncommon reflections on the helicopter's windows caused by rotating light being reflected back from the clouds through the whirling blades may cause extreme vertigo. In addition, the light would be ineffective as an anti-collision light during these conditions since it could not be observed by pilots or other aircraft in the area.

Note

> When ANTI-COLLISION light is ON, NAV lights on STEADY.

6-37. Landing Light. The extend-retract landing light (see figure 6-2) is flush mounted to the underside of the fuselage. This light may be extended or retracted as desired to improve forward illumination. Electric power to operate this light is supplied from the 28 volt dc essential bus. Circuit protection is provided by circuit breakers on the dc circuit breaker panel. The light is controlled by means of switches in the switch box on the pilot's collection lever.

A **6-38. *Operation*.** a. Upper toggle switch — Move to up position marked LDG and SL ON (this position activates both landing light and search light illumination circuits).

b. Lower toggle switch—Move to up position marked LD LT EXT to obtain desired extend position of landing light. Then return to center OFF position.

c. To retract—Move lower toggle switch to RETR position, then return to OFF position.

d. To shut off landing light—Move upper toggle switch to OFF position.

Caution

> Turn landing light OFF upon landing to prevent fire hazard. Use of the landing light should be kept to an absolute minimum to avoid possibility of blinding the pilot.

B **6-39. *Operation*.** a. Upper right toggle switch—Move to ON position.

b. Lower right toggle switch—Move to LD LT EXT position to obtain desired extend position, then return to OFF position.

c. To retract — Move lower right toggle switch to RETR position, thhen to OFF position.

d. To shut off landing light—Move upper right toggle switch to OFF position.

Caution

> Turn landing light OFF upon landing to prevent fire hazard. Use of the landing light should be kept to an absolute minimum to avoid possibility of blinding the pilot.

6-40. Search Light. The remotely controllable search light (see figure 6-2) is flush mounted to the underside of the fuselage. This light can be extended or retracted as desired for search illumination. At any desired position in the light's extended and retracted arc, it may be stopped and rotated in a horizontal plane to the left or right. Electric power to operate this light is supplied from the 28 volt dc non-essential bus on UH-1A helicopters and from the 28 volt dc essential bus on UH-1B helicopters. Circuit protection is provided by circuit breakers on the dc circuit breaker panel. This light is controlled by means of switches in the switch box on the pilot's collective lever.

A **6-41. *Operation*.** a. Upper toggle switch — Move to LDG and SL ON (this position activates both search light and landing light illumination circuits).

b. SEARCH CONT switch (center circular switch) Operate to obtain desired search light position, and for directing search light.

c. To stow search light—Move upper toggle switch to SL STOW position.

d. To shut off search light—Move upper toggle switch to OFF position.

Caution

> Turn search light OFF upon landing to prevent fire hazard.

B **6-42. *Operation*.** a. Upper left toggle switch —Move to ON position.

b. SEARCH CONT switch (center circular switch) Operate to obtain desired search light position, and for directing search light.

c. To stow search light—Move upper left switch to STOW position.

d. To shut off search light—Move upper left switch to OFF position.

Caution

Turn search light OFF upon landing to prevent fire hazard.

6-43. Dome Lights. The dome lights have been provided to furnish overhead lighting for the cabin area. The forward light is controllable from a panel on the overhead console within easy reach of the pilot and crew member, marked DOME LT FWD. The aft dome lights are controlled by the medical attendant from a panel marked AFT DOME LTS and located aft of the overhead console within easy reach of the medical attendant's station. Electric power to operate the dome lights is supplied from the 28 volt dc non-essential bus on UH-1A helicopters and from the 28 volt dc essential bus on UH-1B helicopters. Circuit protection is provided by a circuit breaker on the dc circuit breaker panel.

6-44. Dome Lights Control Panel—Plt. The dome light control panel, provided for pilot's control of the forward dome light located on the overhead console is marked DOME LT FWD and contains a three-position toggle switch. The switch is marked WHITE in the aft position, OFF in the center position and RED in the forward position, thus permitting a choice of red or white illumination or light off.

6-45. Aft Dome Lights Control Panel — Medical Attendant. The aft dome lights control panel is conveniently located aft of the overhead console to provide the medical attendant control of the aft dome lights when required. This panel is marked AFT DOME LTS and contains one three-position toggle switch and a knob operated rheostat. The three-position switch is marked WHITE in the aft position OFF in the center position and RED in the forward position, thus permitting a choice of red or white illumination or lights off. The rheostat marked OFF, MED and BRT functions to increase or decrease the brightness of aft dome lights as desired.

6-46. Cockpit Lights. Cockpit lights are provided at two locations. One is located at the right of the overhead console within easy reach of the pilot, one is located at the left of the overhead console within easy reach of the copilot or crew member. Rheostat operating switches for each light are mounted on the light assembly body. Brightness is controlled by operation of the rheostat. Brightness is increased by turning rheostat clockwise and dimmed by turning counterclockwise. Electric power to operate these lights is supplied from the 28 volt dc non-essential bus on UH-1A helicopters, and from the 28 volt dc essential bus on UH-1B helicopters. Circuit protection is provided by a circuit breaker on the dc circuit breaker panel.

6-47. Transmission Oil Level Light. A transmission oil level light has been installed and positioned to provide necessary illumination to visually check the transmission oil sight gage. This light is mounted within the transmission cowling at the transmission oil sight gage. The light circuit is activated by a button operated switch, marked TRANS OIL LEVEL LIGHT SWITCH, located below the transmission at the right side of the helicopter aft of the fire door. Transmission oil sight gage can be illuminated and visually checked by actuating the switch, and opening the fire door to check the sight gage. Electric power for transmission oil level sight gage light circuit is supplied from the 28 volt dc non-essential bus on UH-1A helicopters and from the 28 volt dc essential bus on UH-1B helicopters. Circuit protection is provided by the battery voltmeter circuit breaker located in the electrical compartment on the left side of the fuselage.

6-48. Instrument Lights Control Panel. The instrument lights control panel is located on the right section of the overhead console. This panel contains five switch type rheostats for activating and dimming various instrument lights. The switch type rheostats are marked as follows: CONSOLE, PED, SEC (Secondary) ENGine and PILOT plus COPILOT (UH-1B). Electric power to the instrument lights control panel is supplied from the 28 volt dc essential bus. Circuit protection is provided by circuit breakers on the dc circuit breaker panel.

6-49. Pilot's Instrument Lights. The pilot's instrument lights furnish illumination for the following instruments: Gas producer tachometer, torquemeter, exhaust temperature indicator, dual tachometer, airspeed indicator, clock, vertical velocity indicator, turn and slip indicator, altimeter, attitude indicator, radio compass, omni indicator, gyro-magnetic compass and standby compass. These lights are all on one circuit and are controlled by a switch type rheostat (PILOT) on the instrument lights control panel. Clockwise rotation of rheostat knob turns on lights and increases brilliance. Counterclockwise rotation of the knob dims lights and the final motion (OFF) breaks the circuit to all the pilot's instrument lights. Electrical power to operate these lights is supplied from 28 volt dc essential bus. Circuit protection is provided by a circuit breaker on the dc circuit breaker panel.

B **6-50. *Copilot's Instrument Lights.*** The copilot's instrument lights furnish illumination for the instruments on the copilot's section of the instrument panel. These instruments consist of: Airspeed indicator, attitude indicator, altimeter, vertical velocity indicator, and radio compass indicator. Copilot's instrument lights are all on one circuit and control is accomplished by a switch type rheostat (COPILOT) on the instrument lights control panel. Clockwise rotation of rheostat knob turns on lights and increases brilliance. Counterclockwise rotation of the knob dims with the final motion (OFF) breaking the electrical circuit to copilot's instrument lights. Electric power to operate lights is supplied from the 28 volt dc electrical system and circuit protection is provided by a circuit breaker on the dc circuit breaker panel.

6-51. *Engine Instrument Lights.* The engine instrument lights furnish the illumination for the following instruments: Transmission oil temperature, fuel quantity, transmission oil pressure, engine oil pressure, engine oil temperature, fuel pressure, loadmeters, ac voltmeter and dc voltmeter. Each instrument is individually illuminated and brilliance control is accompished by means of a switch type rheostat (ENGINE), located on the instrument lights control panel. Clockwise rotation of the rheostat knob turns engine lights on and increases brilliance. Counterclockwise rotation of rheostat knob dims with final movement (OFF) breaking the circuit to all engine instrument lights. Electric power to operate these lights is supplied from the 28 volt dc essential bus. Circuit protection is provided by a circuit breaker on the dc circuit breaker panel.

6-52. *Secondary Lights — Instrument Panel.* The four secondary instrument lights are spaced across the top of instrument panel. These lights furnish secondary illumination for the instrument panel face. The lights are activated and brilliance controlled by means of a switch type rheostat (SEC) on the instrument light control panel. Clockwise rotation of the rheostat knob turns on the four secondary lights and increases brilliance. Counterclockwise rotation of the knob dims with the final movement (OFF) breaking the circuit to the secondary lights. Electric power to operate these lights, is supplied from the 28 volt dc essential bus. Circuit protection is provided by a circuit breaker on the dc circuit breaker panel.

6-53. *Overhead Console Panel Light.* The overhead console panel lights furnish the illumination for the dc power panel, ac power panel, heating panel, miscellaneous panel, instrument lights panel, navigation lights panel and dome lights. Each panel is individually illuminated and brilliance control is accomplished by means of a switch type rheostat (CONSOLE) located on the instrument lights control panel. Clockwise rotation of the rheostat knob turns on the overhead console panel lights and increases brilliance. Counterclockwise rotation of the knob dims with final movement (OFF) breaking the electrical circuit to the overhead console panel lights. Electric power to operate overhead console panel lights is supplied from the 28 volt dc essential bus. Circuit protection is provided by a circuit breaker on the dc circuit breaker panel.

6-54. *Pedestal Lights.* The pedestal lights furnish illumination for the engine control panel, hydraulic control panel, caution panel and radio communication panels. Each panel is individually illuminated and brilliance control is accomplished by means of a switch type rheostat (PED) located on the instrument lights control panel. Clockwise rotation of the rheostat knob turns on the pedestal lights and increases brilliance. Counterclockwise rotation of knob dims with the final movement (OFF) breaking the circuit to all pedestal lights. Electric power to operate the pedestal lights is supplied from the 28 volt dc essential bus. Circuit protection is provided by a circuit breaker on the dc circuit breaker panel.

Section V — Oxygen System

(Not Applicable)

Section VI — Auxiliary Power Unit

(Not Applicable)

Section VII — Armament Systems

6-55. Armament Subsystem XM3, 2.75 Inch Rocket. Armament subsystem XM3 is designed to provide the UH-1B helicopter with heavy firepower against troop concentrations, groups of unarmored vehicles, and supply installations. The fully loaded launcher carries 48 rockets with high explosive warheads. Rockets can be fired in single pairs or in ripples of 2, 3, 4, 6, or 24 pairs at a rate of 6 pairs per second. Maximum effective range is 2500 meters.

6-56. Physical Description. Parts of the complete weapon are the rocket, the launcher together with its supporting structure and the fire-control system.

a. The rocket consists of a warhead, motor, and fuze.

(1) The warhead is a steel casing containing a high-explosive charge.

(2) The motor is a single grain of solid propellant enclosed in a tube. Burning gases from the propellant escape through four nozzles which are scarfed to give a slow roll to the rocket during flight for stability.

b. The parts of the subsystem are illustrated in figures 6-3 through 6-9.

(1) Figure 6-3 shows the crank and crossbeam assembly used on the left side of the helicopter. Two support members are used to attach the crossbeam assembly to the helicopter. The adjustable link allows a slight adjustment of the ped elevation during alignment and the plastic bearings allow an adjustment of the pod azimuth during alignment. Two through

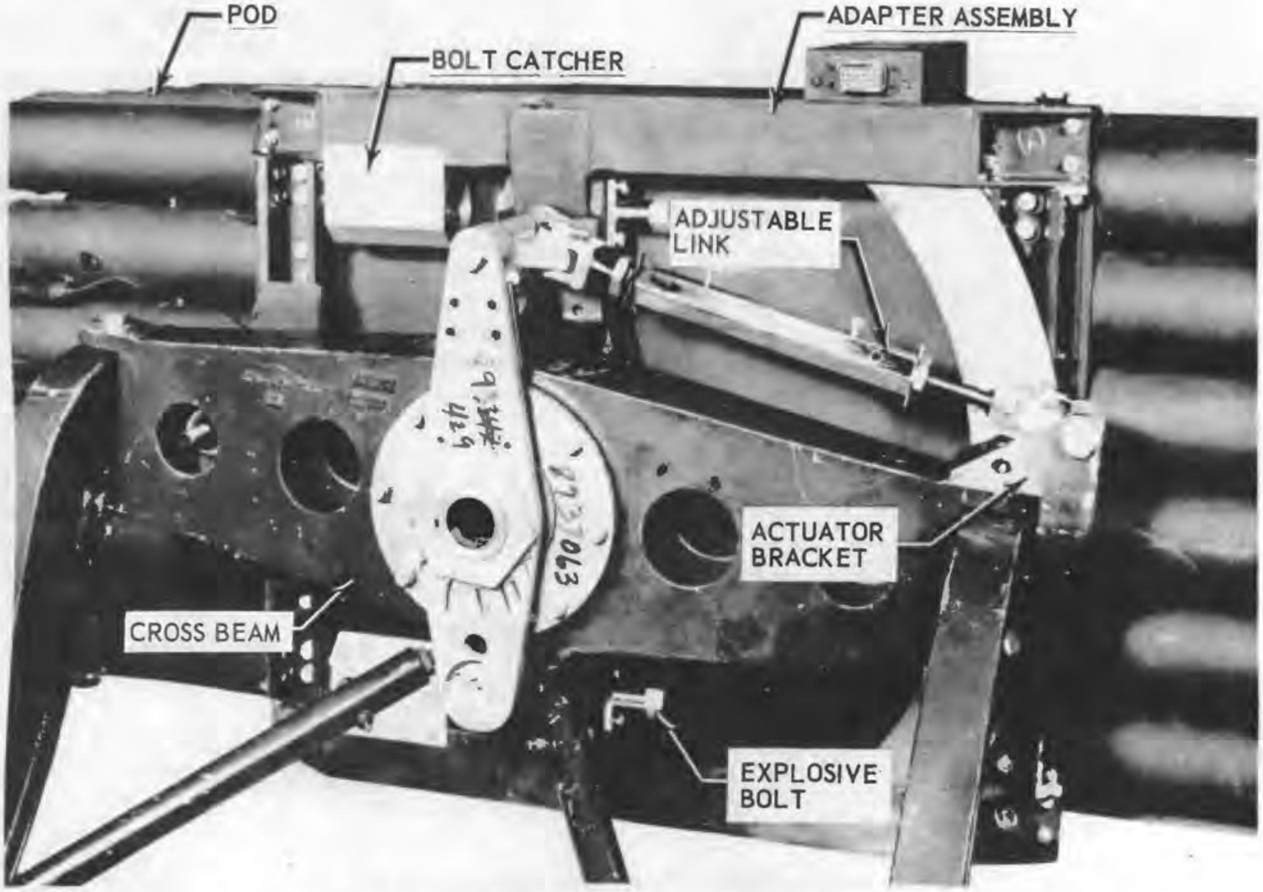


Figure 6-3. XM3 Rocket — crank and crossbeam assembly

bolts hold the crossbeam and actuator-connecting bracket to the ends of the support members.

(2) Figure 6-4 shows the adapter frame to which the pod (figure 6-5) is attached. The two explosive bolts are used to attach the adapter frame to the crank; in an emergency, they can be exploded to jettison the pod. The two bolt catchers prevent damage to the helicopter when the bolts are exploded. The four module attaching brackets, one at each corner of the adapter frame, are the attaching points for the inner module of a pod.

(3) Figure 6-5 shows the launcher pod consisting of four modules assembled, ready to attach to the four module attaching brackets on the adapter frame.

(4) Figure 6-6 shows the interconnecting box which is installed in the helicopter baggage compartment and contains the circuits to fire the rockets and the explosive bolts. It is connected electrically to the other fire control circuits through six of the connectors visible on the front. (Two of the connectors, J6, and J8, are not used for subsystem operation.)

(5) Figure 6-7 shows the rocket armament panel which is installed in the lower left of the pilot's pedestal and has controls and indicators for arming the firing circuits, selecting the number of rockets to be fired, and firing the explosive bolts.

(6) Figure 6-8 shows the infinity reflex sight which is mounted on the instrument panel and is used to aim the rockets.

(7) Figure 6-9 shows the firing switch which is pressed to fire the number of pairs of rockets selected on the rocket armament panel. One firing switch is on the pilot's cyclic control stick and one on the copilot's.

(8) Figure 6-10 shows the intensity control panel which is located on the lower left of the pilot's pedestal and has controls for selecting one or the other filament in the sight lamp

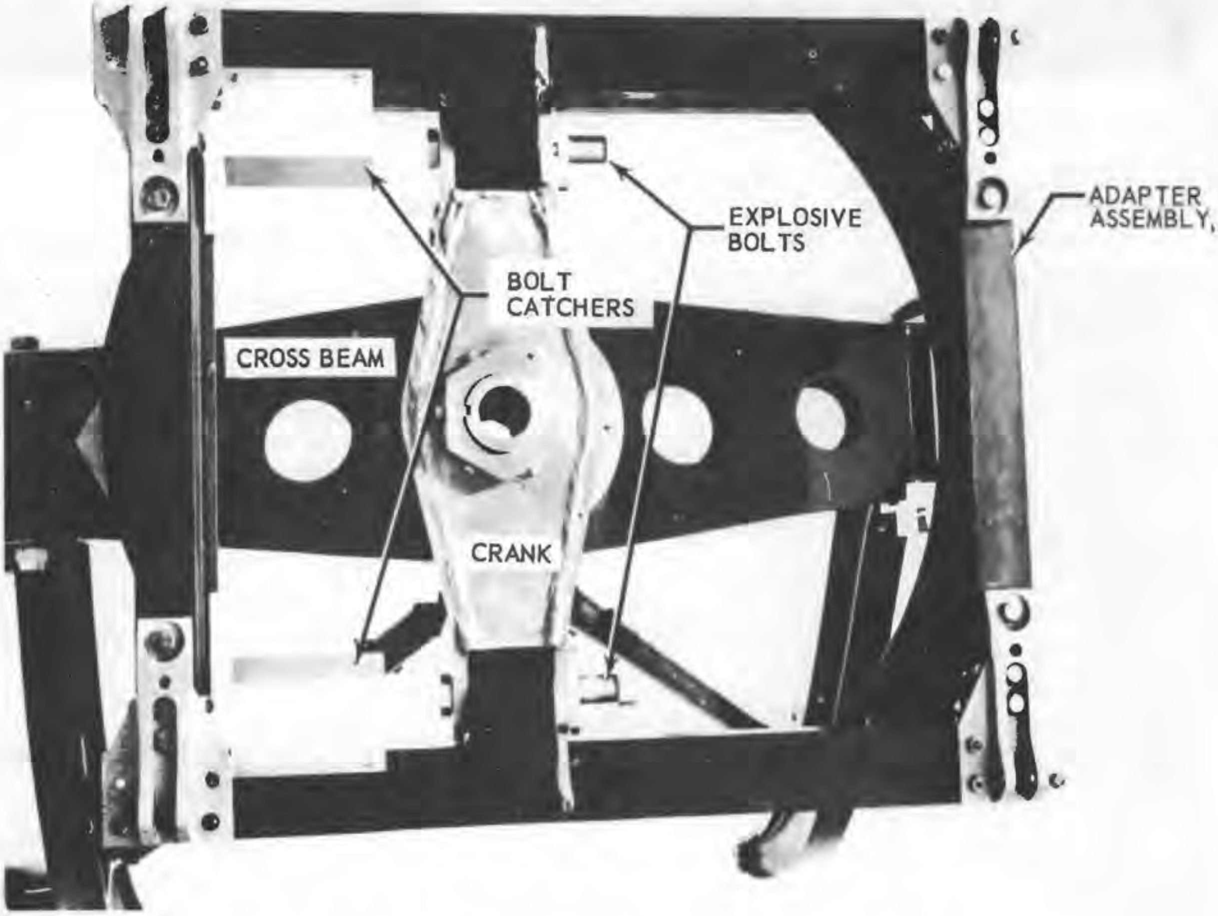


Figure 6–4. XM3 Rocket — crank, crossbeam and adapter

Figure 6–5. XM3 Rocket — launcher pod

and varying the intensity of illumination of the sight reticle.

(9) External electrical cables and harness assemblies connect parts of the subsystem not connected by the permanently installed helicopter wiring. On each side of the helicopter, one cable and one harness assembly run from a connector on the helicopter skin to the explosive bolts and to the lanyard disconnect on the launcher, from which a cable runs to a junction box on the pod.

6-56. There are two circuit breakers for the subsystem on the overhead breaker panel. The rocket jettison circuit breaker is rated 15 amps at 28 volts dc, and the sight illumination circuit breaker is rated 5 amps at 28 volts dc.

6-57. ***Preflight Check.*** The preflight check by the pilot consists of a visual inspection and brief operation check of the subsystem in preparation for firing.

Warning

The launcher pods must be empty before the preflight check is made.

6-58. ***Exterior.*** Outside of cockpit, check for secure attachment of:

a. The modules to each other and to the adapter frame.

b. The three plastic bearings to their mounting points.

c. The adapter frames to the cranks with explosive bolts.

d. The front and rear bearing arcs to the adapter frames

e. Nuts and keeper washers on the ends of the crank-and-crossbeam assembly shaft.

f. Supporting structures to the hard points on the helicopter.

g. Electrical cables to connectors on the helicopter skin and to the pods and explosive bolt squibs.

6-59. ***Interior.*** Inside the cockpit, make the following checks:

a. Pull the rocket jettison circuit breaker out.

b. Connect an external electrical power unit or start the helicopter engine to provide power for the subsystem. Before turning on power to the subsystem check for the following conditions:

(1) The POWER switch is set to OFF.
(2) The ARM switch is set to SAFE.
(3) The JETTISON switch is set to OFF.

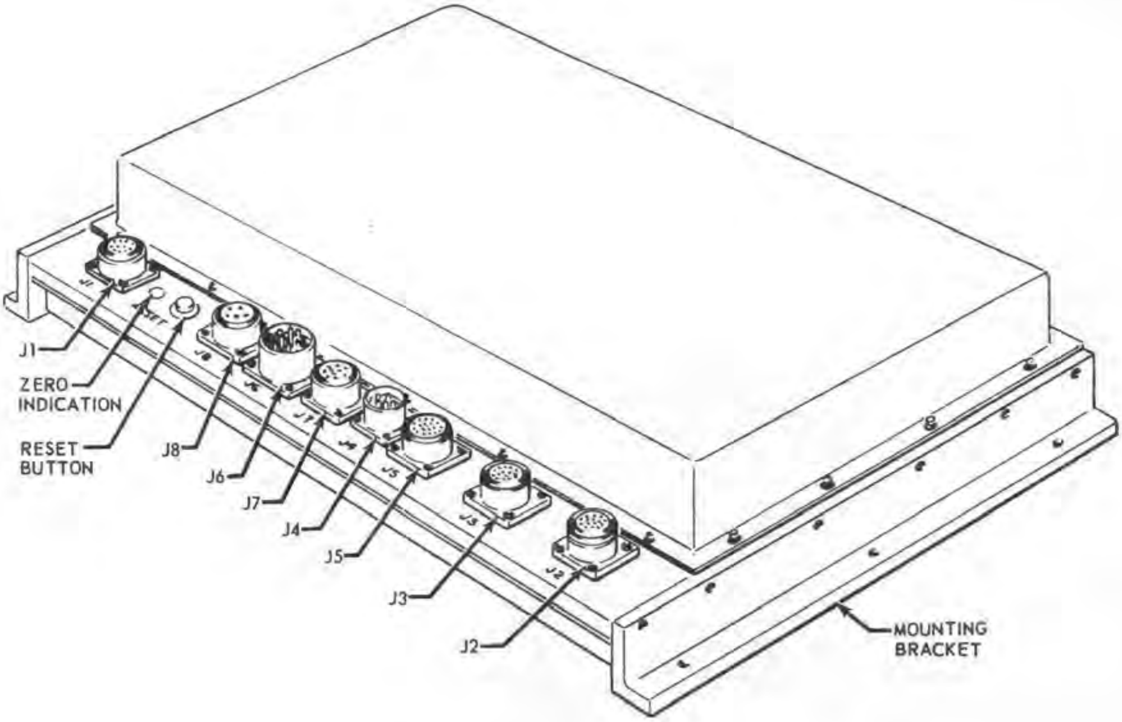


Figure 6-6. XM3 Rocket — interconnecting box

(4) The following indicators are out: SYSTEM POWER ON, JETTISON POWER ON, JETTISON COMPLETE, ARM SAFE, and ZERO.

c. Close the rocket jettison circuit breaker. The JETTISON POWER ON indicator glows.

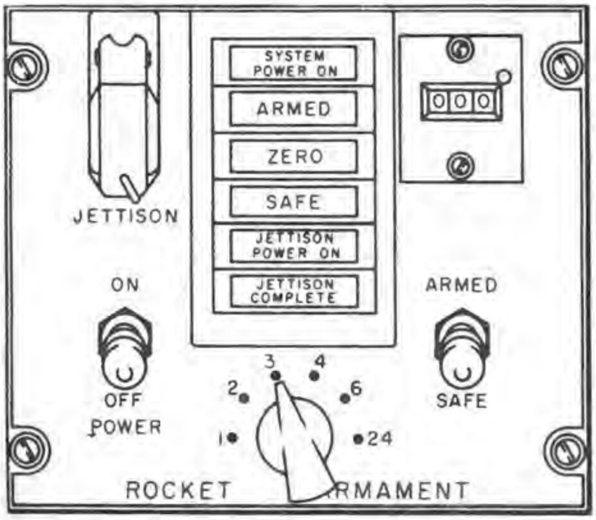


Figure 6–7. XM3 Rocket — armament panel

d. Set the POWER switch to ON. On the rocket armament panel, the SAFE, ZERO, and SYSTEM POWER ON indicators glow. If the ZERO indicator does not glow, press the RESET button on the interconnecting box and hold it down until the ZERO indicator does glow.

e. See that the ZERO indicator on the interconnecting box glows.

f. Press the ARMED and JETTISON COMPLETE indicators on the rocket armament panel. Each indicator glows while pressed.

g. Turn the POWER switch to OFF. All indicators except the JETTISON POWER ON indicator go out.

h. Pull out the rocket jettison circuit breaker. The JETTISON POWER ON indicator goes out.

i. Close the sight illumination circuit breaker.

j. Turn the filament switch to both FIL-1 and FIL-2 positions. See that the sight reticle is illuminated in both positions.

k. Pull out the sight illumination circuit breaker.

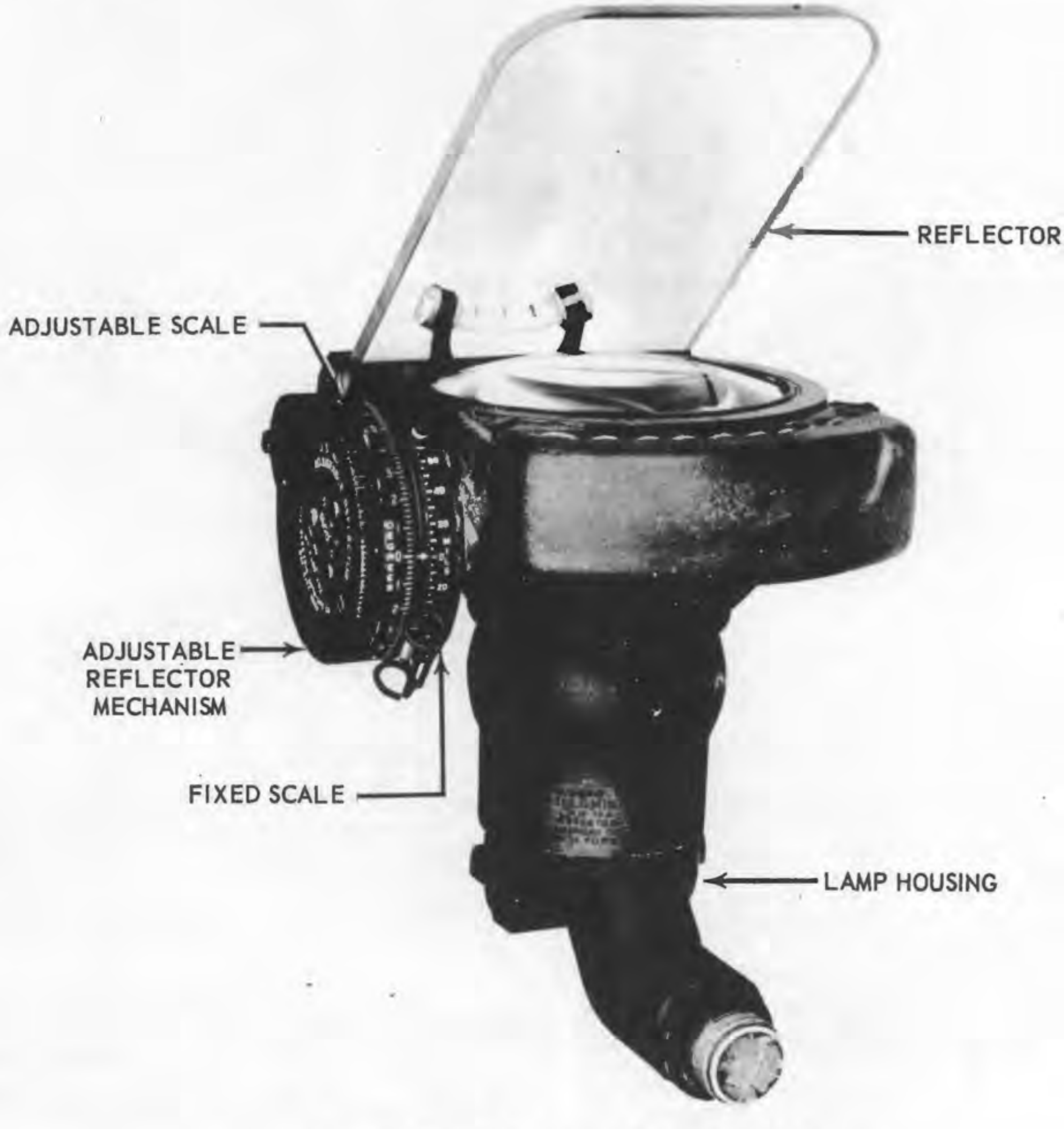


Figure 6–8. XM3 Rocket — infinity reflex sight

6-60. Operation. Before firing:

a. Before take-off, close the rocket jettison circuit breaker; the JETTISON POWER ON indicator glows.

b. After takeoff, to prepare for firing, set the POWER switch to ON: the SYSTEM POWER ON, SAFE, and ZERO indicators on the rocket armament panel should glow.

Warning

All windows and doors should be closed during rocket firing.

6-61. ***Firing.*** a. Set the selector switch on the rocket armament panel for the number of pairs of rounds to be fired.

b. Set the arm switch to ARMED. The SAFE indicator goes out, and the ARMED indicator glows.

c. Keep the target within the sight reticle by aiming the helicopter.

d. When ready, fire the rockets by pressing and holding the firing switch on the cyclic

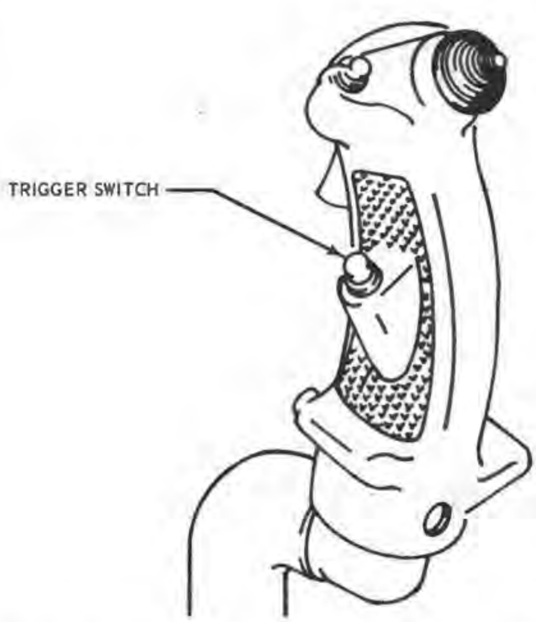


Figure 6—9. XM3 Rocket— firing switch — cyclic stick

control stick. The ZERO indicator will go out when the first pair of rockets is fired.

Note

> The number of pairs of rockets selected need not all be fired. To interrupt the ripple, release the firing switch again, the interrupted ripple will not be resumed, but a new one will begin.

6-62. *After Firing.* a. Set the arm switch to SAFE. The ARMED indicator goes out and the SAFE INDICATOR GLOWS.

b. When firing is ended, set the POWER switch to OFF. All indicators except the JETTISON POWER ON go out.

c. After landing, set the rocket armament panel counter to 000. In addition, press the RESET BUTTON on the interconnecting box, and hold it down until the ZERO indicator lights. This is done in preparation for reloading.

d. Pull out the rocket jettison circuit breaker. The JETTISON POWER ON indicator goes out.

e. If there are misfired rounds remaining in the tubes, they will be removed according to instructions FAILURE TO FIRE.

6-63. *Emergency Procedures.* Emergency procedures are explained in the following paragraphs.

6-64. *Failure to Fire.* If there is a misfire, continue mission firing until all 24 pairs of rockets should have been fired. Then set the selector switch to 24, hold down the firing switch until the ZERO indicator on the rocket armament panel glows (the counter should indicate 33), and release the firing switch. Leave the selector switch set on 24, aim the helicopter at a target, and press and hold the firing switch until the ZERO indicator glows. (The counter should indicate 66.) If the misfired rounds do not fire on this second attempt, set the POWER switch to OFF and wait 10 minutes before unloading rockets. Rockets will be unloaded by organizational maintenance personnel.

6-65. *Jettisoning.* To jettison the pods, first make sure the JETTISON POWER ON indicator glows. When ready to jettison set the JETTISON switch to the FIRE position. Both pods will be jettisoned, and the JETTISON COMPLETE indicator will glow. Pull out the rocket jettison circuit breaker.

6-66. *Ammunition.* The 2.75-inch folding-fin aircraft rocket (FFAR) is fired by armament subsystem XM3. The rocket consists of a warhead, motor, and nose fuze.

Warning

> Helicopters with loaded launchers or launchers being loaded and unloaded should be pointed in a direction which offers the least exposure to personnel or property in event of accidental ignition of the rockets.

a. The tactical warhead is high-explosive loaded. The steel casing contains 1.4 pounds of HEX-1 explosive. The practice warhead is loaded with the same weight of plaster.

b. The motor contains a single grain of solid propellant (ballistite).

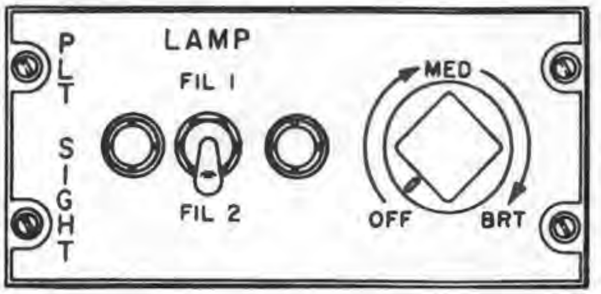


Figure 6–10. XM3 Rocket — intensity control panel

c. The MK176 fuze used in the warhead, which is designed for delayed action has a delay element in a rotor between the primer and detonator. The rotor is not drilled completely through. A thin diaphragm is left between the well for the primer and the well for the delay element and the detonator. When the primer is initiated by the firing pin, the detonation collapses the diaphragm. The movement of the diaphragm initiates the pressure sensitive delay element. The MK 176 nose fuze is armed by acceleration.

6-67. *Classification*. Two types of ammunition are used in the rocket launcher. They are classified, according to the warhead, as high-explosive and practice. The high-explosive warhead is used for blast, fragmentation, or demolition. The practice warhead, with inert fuze and load, is used for target practice.

6-68. *Destruction of Material to Prevent Enemy Use*. Armament subsystem XM3 will be destroyed in the combat zone to prevent enemy capture and use only by order of the unit commander. If destruction becomes necessary, the equipment must be so thoroughly wrecked that it cannot be restored to use in the combat zone. If lack of time prevents destruction of the whole system, destroy components in the following order:

a. Control Equipment.
  (1). Interconnecting box.
  (2). Rocket armament panel and chassis.
  (3). Cables and harness assemblies.
  (4). Infinity reflex sight.

b. Rocket.
  (1). Warhead.
  (2). Motor.

6-69. *Destruction Plan*. Each installation maintaining or storing the subsystem or any of its components should have a standard operating procedure (SOP) for destruction The SOP should contain the priority of items to be destroyed, destruction methods, quantities of explosives required, and instructions for placement of explosives. The plan should be flexible enough to work in any situations.

6-70. *Destruction Methods*. If the rocket cannot be destroyed by launching it toward the enemy, use explosives or gunfire to destroy it. The control equipment may be destroyed by mechanical means (axe, crowbar, sledge, etc.), burning, explosives, and gunfire. Burning is the best method of destroying the cables.

Warning

> Do not try to destroy the assembled rocket or warhead by mechanical means. Take cover when firing artillery, rifle grenades, or rockets to destroy the subsystem.

6-71. *Exterior Inspection*. a. Armament subsystem components — INSTALLED.

b. Armament subsystem electrical connectors CONNECTED.

c. Ammunition — CHECK.

6-72. *On Entering the Helicopter Before Take-Off (Power On)*. a. Rocket jettison circuit breaker — CLOSED.

b. JETTISON POWER ON indicator — ON.

c. Arm switch — SAFE.

d. SYSTEM POWER ON, SAFE, and ZERO indicators — OUT.

e. POWER switch — OFF.

f. JETTISON switch — OFF; COPPER BREAK WIRE IN PLACE.

g. JETTISON COMPLETE INDICATOR — OUT.

6-73. *Inflight, After Take-Off (Before Firing)*. a. Rocket jettison circuit breaker — CLOSED.

b. Power switch — ON.

c. ARM switch — SAFE.

d. SAFE, ZERO, SYSTEM POWER ON, and JETTISON POWER ON indicators — ON.

e. Sight illumination circuit breaker — CLOSED.

6-74. *Firing*. a. Selector switch on intervalometer — SET.

b. Arm switch — SET TO ARMED.

c. SAFE indicator — OUT.

d. ARMED indicator — ON.

e. Sight — HOLD TARGET IN RETICLE.

f. Firing switch — PRESS TO FIRE.

g. ZERO indicator — OUT.

6-75. *After Firing*. a. Firing switch — RELEASE.

b. Arm switch — SET TO SAFE.

c. ARMED indicator — OUT.

d. SAFE indicator — ON.

6-76. *Before Leaving The Helicopter*. a. POWER switch — OFF.

b. RESET button — PRESS TO ZERO.

c. Sight illumination circuit breaker—PULL OUT.

d. Rocket jettison circuit breaker—PULL OUT.

e. All indicators — OUT.

6-77. Armament Subsystem M6 Quad 7.62 MM Machine Gun. (Figure 6-11 and

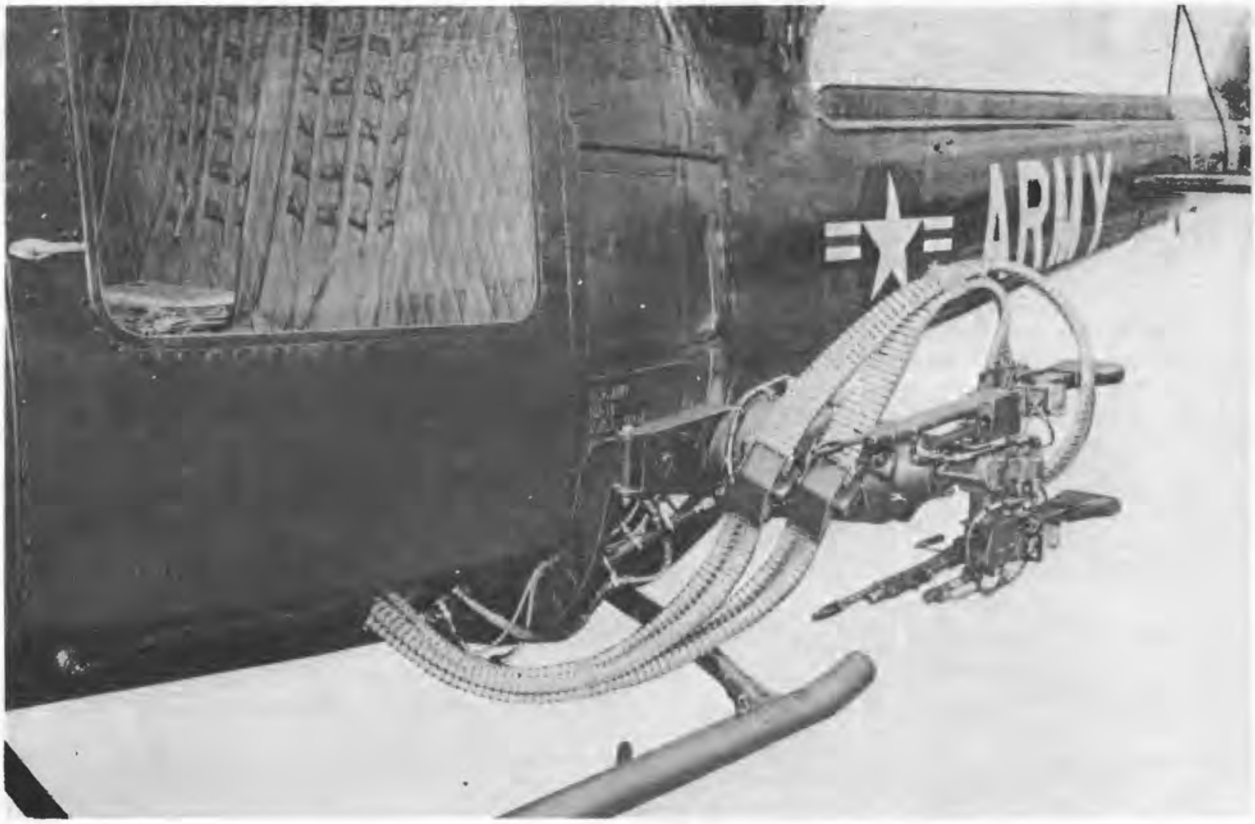


Figure 6–11. XM6E3 Machine gun — left front view

Figure 6–12. XM6E3 Machine gun — right front view

6-12.) The subsystem is designed for use on the UH-1B helicopter and is intended to be used as a fire-suppressive deterrent to ground troops and soft target installations.

6-78. *Physical Description.* Parts of the complete subsystem consist basically of the helicopter quad machine gun mount, one ammunition feed group, one circuit control panel, one sighting station, four fixed 7.62-mm machine guns, and attaching hardware.

a. Gun mount assemblies. (See figure 6-13.) The flexible gun mount assemblies provide support for four 7.62-mm M60C machine guns, and the necessary mechanism to position them as directed by the gunner. There is a left-hand and right-hand gun mount assembly provided for each subsystem and they are not interchangeable. The axis system employed is an elevation-deflection system. The guns may be moved through an angle of plus nine degrees and minus 66 degrees in elevation and from 12 degrees inboard to 70 degrees outboard about the deflecting axis. The larger end of the gun mount assembly is provided with a mounting flange for attaching it to the mounting ring which is an integral part of the helicopter mounting bracket. A supporting hinge, half of which is fastened to the gun mount assembly and half to the aircraft mounting ring, is provided to facilitate installation, removal and servicing. The hinges allow the gun mount assembly to be mounted on the aircraft in only one position.

b. CHARGER CYLINDER ASSEMBLY. (See figure 6-11.) The charger cylinder assembly is a hydraulically operated, double acting cylinder which mechanizes the manual cocking and charging action of the M60C machine

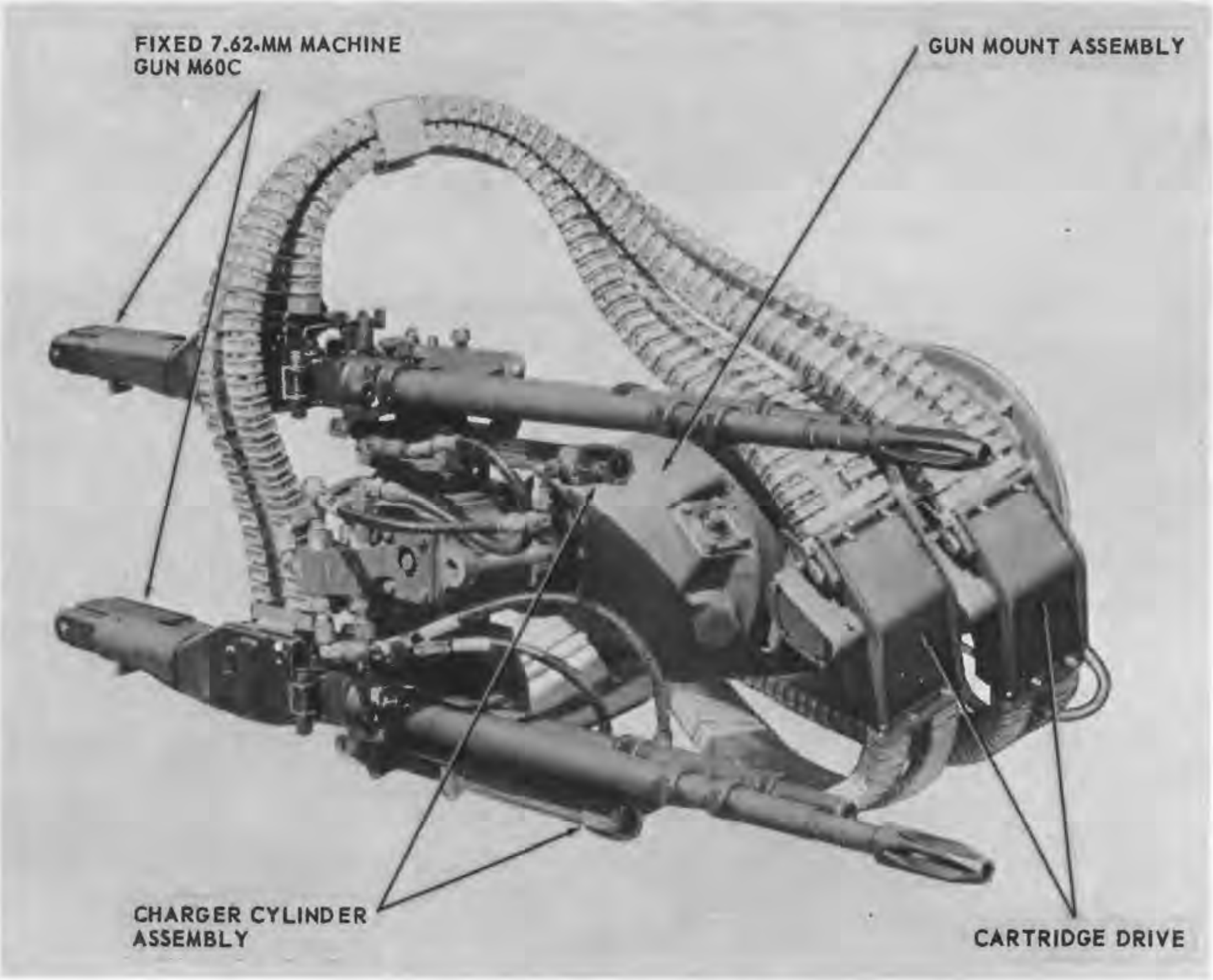


Figure 6–13. XM6E3 Machine gun — quad machine gun and mount

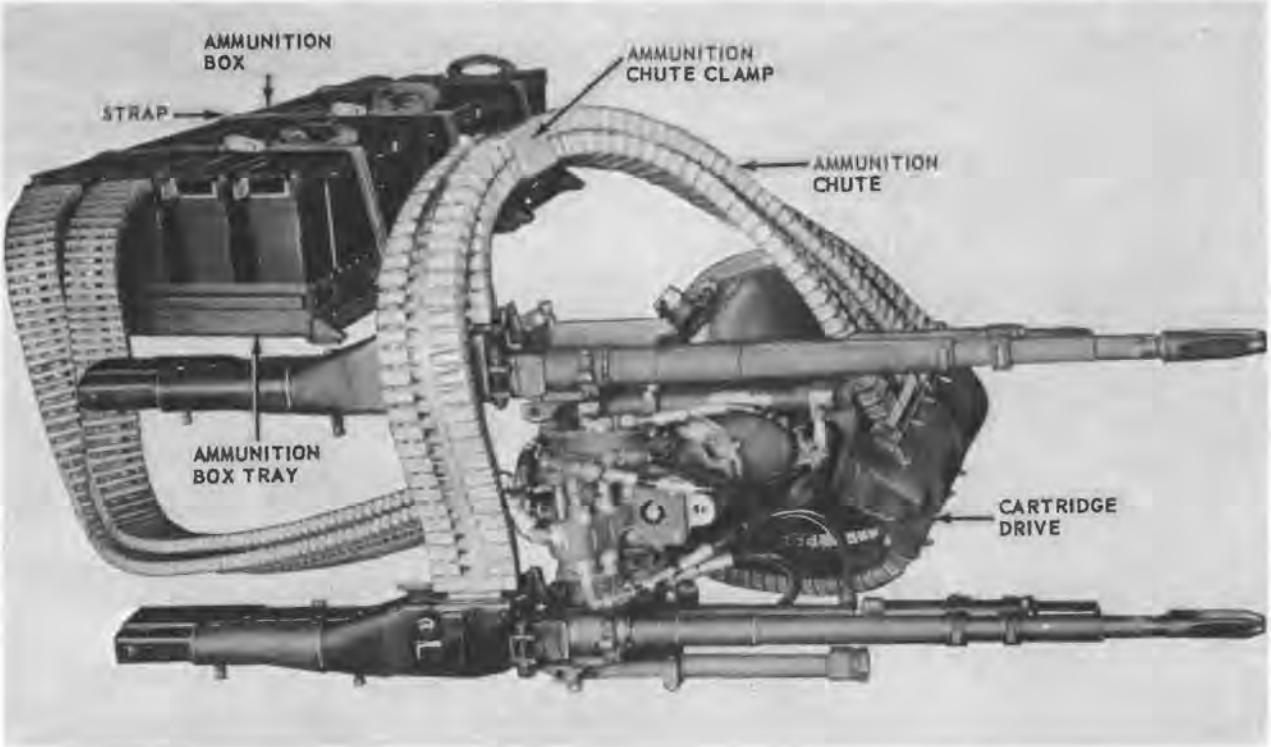


Figure 6–14. XM6E3 Machine gun — ammunition feed group

gun. The cylinder body is bolted to the gun mount, forward of the M60C cocking handle grip. The end of the charger actuating rod is locked onto the gun cocking handle grip by a spring-loaded finger latch.

c. AMMUNITION FEED GROUP. (See figure 6-14.) The ammunition feed group is composed of four cartridge drives, twelve ammunition boxes with ammunition box tray and tie down straps, and eight ammunition chutes. The ammunition boxes are constructed of sheet metal, divided into three compartments, having a total capacity of approximately 500 rounds per box. However, the maximum ammunition load specified for the M6 subsystem is 353.21 pounds (5,434 rounds), or approximately 450 rounds per box. The ammunition boxes, three for each gun, are arranged in four rows in the ammunition box tray across the ship in the aft portion of the cargo compartment, and held in place by three straps fastened to the cargo tiedown points at the base of the tray. The tray is bolted to the floor of the cargo deck with twelve screws. Four sections of flexible ammunition chutes lead from the boxes through holes in the cargo deck, then outward from the exterior of the fuselage and rearward to the underside of the gun mount assemblies, where they are connected to the bottom of the cartridge drives. Four more sections are connected to the top of the cartridge drives, and hence in an arc to the feed trays. The chutes are clamped together with ammunition chute clamps between the cartridge drives and the gun and the ammunition boxes and cartridge drives. The cartridge drives attached to the gun mount assemblies, aid in transporting the ammunition through the chuting.

d. CIRCUIT CONTROL PANEL. (See figure 6-15.) The circuit control panel consists of the OFF-SAFE-ARMED switch and the gun selector switch mounted on a panel which, in turn, is mounted in a sheet metal box containing the servo amplifiers and relays. This assembly is mounted in the aircraft pedestal console. Both switches are safety type "bat handle" switches and the ends of the switch handles must be pulled upward to move either switch to another position.

e. SIGHTING STATION. (See figure 6-16.) The sighting station provides the means of remotely directing and firing the guns. The axis system is the elevation-deflection system of the gun mount assemblies so that the correct relationship between sighting station and gun mount assemblies may be maintained throughout the field of fire by moving the grip assembly in elevation, depression, and left and right deflection. The suspension linkage is a space parallelogram arrangement which supports the controller and provides a means for sighting and aiming the controller around cockpit obstructions without prejudicing the reference planes of the axes. One end of the linkage contains the mounting pad which is bolted to the cockpit overhead. The opposite end bolts to the controller elevation drive shaft. A counterbalance assembly supports the controller weight in all positions so that operator fatigue is negligible. The upper end of the deflection shaft mounts the optical sight head. A grip assembly is coupled to the lower end of the deflection shaft with a coupling nut. The shaft is a hollow tube inside of which the gun sight reticle lamp is located. The elevator shaft is mounted in bearings in the housing so that the housing is pivoted to rotate about the shaft. Both gun mounts follow the position of the sighting

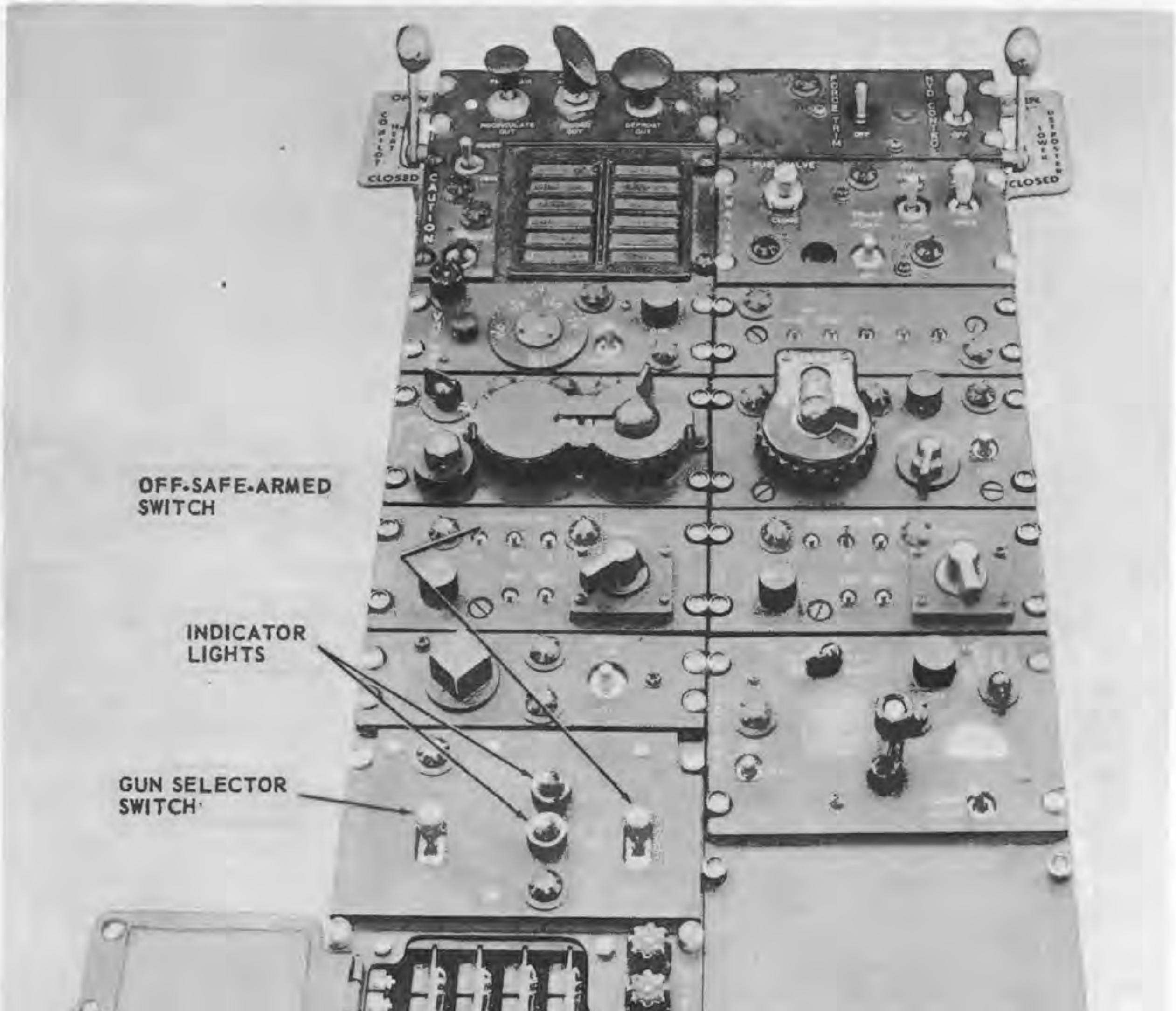


Figure 6–15. XM6E3 Machine gun — circuit control panel

station, but the limits of motion possible for the two mount assemblies are not the same about the deflection axis. When moving the mounts through the field of coverage provided in deflection, it is necessary to stop one mount at its inboard limit while permitting the other mount to continue its movement outboard. This is accomplished by providing two command variable resistors in the sighting station, one for each mount. These variable resistors provide a fixed command position, thus preventing any movement of the gun mount beyond that limit. Therefore, a mount that is being driven toward the aircraft will stop at the inboard limit and be held in that position even though the sighting station and the other gun continue to move. Power to the firing solenoids and the cartridge drives of the stalled gun mount is interrupted by a switch located on the mount, so the guns can no longer fire when they cease to bear on the target. The sighting station is stowed out of the way when not in use by

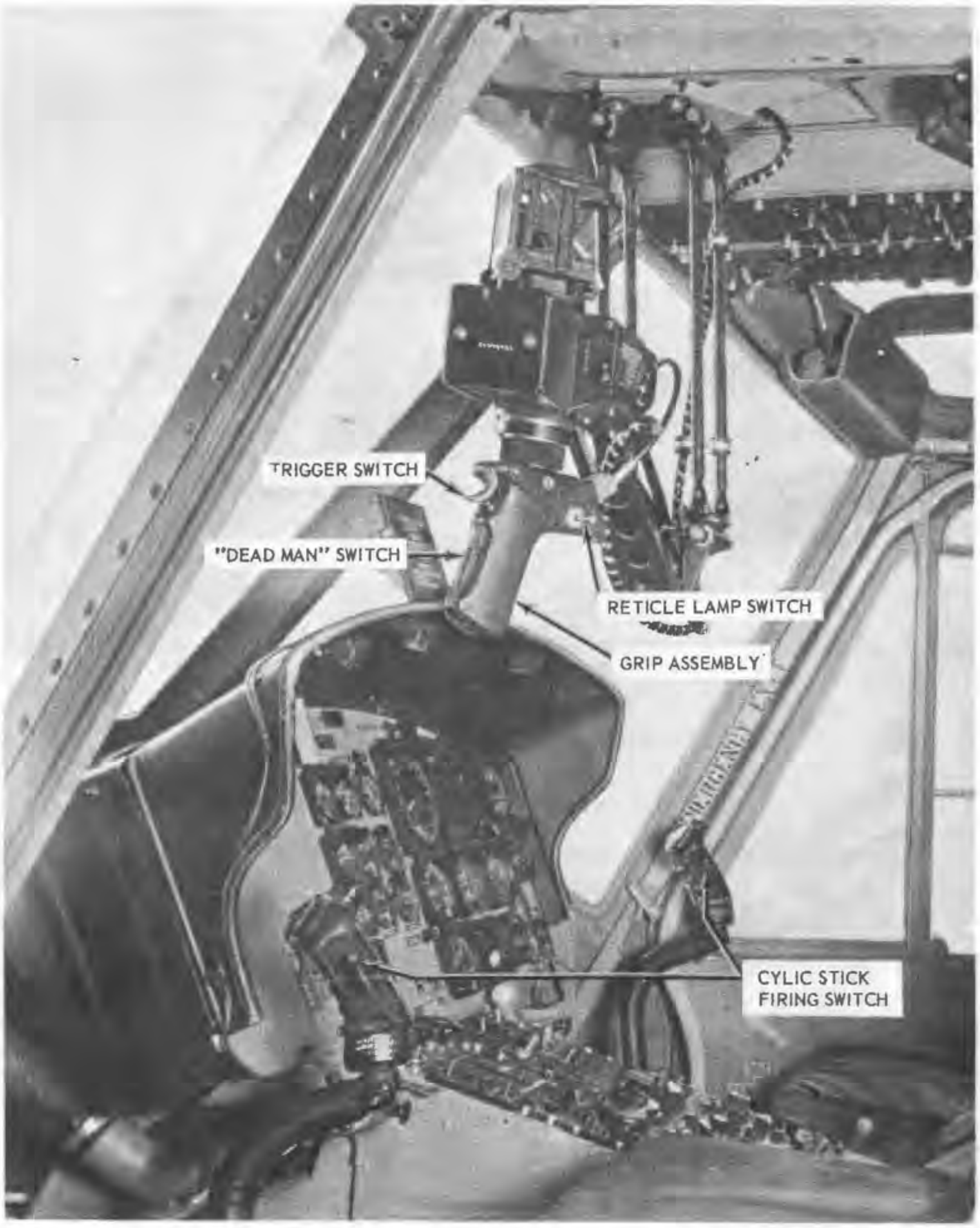


Figure 6–16. XM6E3 Machine gun — armament controls

moving it into the suspension linkage. A detent lock on the end of the counterbalance spring cartridge holds the sighting station in this position. To use the sighting station, the operator pulls it outward, away from the linkage, by the grip assembly. The detent is over-ridden and the sighting station is ready for use.

f. FIXED 7.62-MM MACHINE GUN M60C. (See figure 6-11.) The fixed 7.62-mm machine gun M60 modified for adaptation to the helicopter armament subsystem. Four guns are required. They are mounted on their right sides one above the other, two in each gun mount on either side of the helicopter. The cover assemblies of the guns mounted on the right side face outboard. They are fed from above and the cartridge cases are ejected downward. The machine guns are interchangeable and can be quickly detached from the mount assemblies.

6-79. ***Tabulated Data.*** (See Tables 6-1 and 6-2 for Tabulated Data.)

6-80. ***Preflight Checks.*** The preflight inspection by the pilot consists of a visual check of the subsystem preparatory to firing.

Note

NO STEP markings on armament and helicopter should be observed at all times during preflight check.

6-81. ***Exterior.*** Outside cabin, check for secure attachment of:

a. Trigger actuator assemblies to machine gun receivers.

b. Hydraulic hoses to charger cylinder assemblies and to charger manifolds.

c. Firing solenoid wiring harness electrical connector to mating receptacle on firing solenoid.

d. Machine guns to mounts by gun locks.

e. Cartridge deflector plates to machine guns.

f. Charger deflector plates to machine guns.

g. Ammunition chutes to machine guns and cartridge drives.

h. Ammunition chute clamps around ammunition feed chutes.

i. All external electric connections connected.

j. All external hydraulic connectors connected.

k. Gun mount assemblies to helicopter with mounting bolts.

l. Cartridge drives to gun mount assemblies.

m. Charger cylinder assembly rods locked onto gun cocking handles by spring loaded finger latches.

6-82. ***Interior.*** Make the following checks inside cabin.

a. OFF-SAFE-ARMED switch is in OFF position and both indicator lights off.

b. Move grip assembly to determine that counterbalance retains sighting station in position and that suspension linkage operates freely.

c. Ammunition boxes loaded.

d. Ammunition chutes securely fastened to ammunition boxes.

e. Metal ammunition box tray separators properly installed and secure.

f. Ammunition box tray securely fastened to the floor of the helicopter.

g. Webbing straps securely fastened over ammunition boxes.

Table 6–1. XM6E3 Machine gun — weights

ITEM	WEIGHT LBS	ITEM	WEIGHT LBS
Gun Mount Assembly (2 mount assemblies, including 4 gun chargers)	120	Cartridge Drives (4 required	7.50
Charger Cylinder Assembly (4 chargers)	8	Ammunition Box Tray (Capacity - 12 ammunition)	20
Ammunition Boxes (12 required) (Capacity - 500 rds per box)	40	Control Panel	6.12
Ammunition Feed Chutes (8 required)	25	Sighting Station	9.42
Firing Switches	-	Fixed 7.62-mm Machine Gun M60C (4 machine guns)	84

Table 6–2. XM6E3 Machine gun — controls and indicators

CONTROL OR INDICATOR (On The Control Panel)	TYPE	FUNCTION
OFF-SAFE-ARMED Switch	Toggle	When OFF no power to system. When set to SAFE power is supplied to the electrical system and hydraulic power is available. Manual gun mount movement is possible but guns cannot be fired. When set to ARMED chargers are ready to allow firing.
GUN SELECTOR Switch	Toggle	Permits selection of upper gun of both mounts, lower gun of both mounts or all guns if maximun fire power is desired.
ARMED Indicator	Lamp	Glows red when OFF-SAFE-ARMED switch is in ARMED position.
SAFE Indicator	Lamp	Glows green when OFF-SAFE-ARMED switch is in SAFE position.
"DEAD MAN" Switch	Squeeze Grip	When depressed after OFF-SAFE-ARMED switch is in ARMED position motion of the gun mount assemblies will follow the sighting station commands, and the system is ready for operation.
TRIGGER Switch	Trigger	Depress when "DEAD MAN" switch is depressed to fire machine gun.
GRIP Assembly	Grip	Controls movement of machine guns and mounts through full limits of travel.
RETICLE Lamp Switch	Toggle	Turns reticle lamp on and off.
FIRING Switch	Push Button	Cyclic stick grip depress to fire machine gun, when "DEAD MAN" switch not depressed.

h. Thick edge of sighting station mounting plate facing front of helicopter.

i. Sighting station electrical receptacle connector to rear of grip assembly handle connected to mating receptacle.

j. Sighting station securely attached to mounting plate of helicopter.

k. Sighting station electrical receptacle connector connected to mating receptacle in top of helicopter.

6-83. *In Flight Operation*. a. Move the OFF-SAFE-ARMED switch to the SAFE position.

b. Move the gun selector switch to desired position.

c. Grasp the sighting station grip assembly and pull down and to the left to disengage the sighting station from its "stow" position.

d. Move the reticle lamp switch to either side of the OFF position.

e. Move the OFF-SAFE-ARMED switch to ARMED position.

f. Depress the "Dead Man" switch.

g. With the "Dead Man" switch depressed, the guns may be fired ONLY by depressing the trigger switch.

h. With "Dead Man" switch released, the mounts and guns automatically return to "stow" position (0° elevation, 0° deflection). Guns are then fired by pilot or copilot by depressing the firing switches on the cyclic sticks. Dispersion of fire power in this condition is controlled by maneuvering the helicopter.

6-84. *After Firing*. To safety the armament subsystem, it is only necessary to place the OFF-SAFE-ARMED switch in the OFF position.

6-85. *Emergency Procedures*. The two main emergencies are explained in the following paragraphs.

6-86. ***Failure To Fire.*** If a gun stoppage occurs during firing, release the grip assembly, move the OFF-SAFE-ARMED switch to the SAFE position, then back to the ARMED position. This action will chamber a new cartridge in the machine guns. Depress "Dead Man" switch, then depress trigger switch. If guns still fail to fire, place OFF-SAFE-ARMED switch in the SAFE and then in the OFF position.

6-87. ***Runaway Gun(s).*** If the gun(s) continue to fire after the trigger switch on the grip assembly has been released, immediately release "Dead Man" switch and grip assembly and place the OFF-SAFE-ARMED switch in the OFF position.

6-88. ***Ammunition.*** Classification: a. Armor-piercing cartridge, for use against light armored or other bullet resisting targets where armor piercing effects are desired.

Warning

The use of armor-piercing cartridges is prohibited in demonstrations in which tanks take part. When using armor-piercing ammunition, the cores of the bullets which fail to penetrate will rebound. The radius of rebound depends on several factors but may be estimated as approximately 100 yards for 7.62-mm ammunition.

b. Ball cartridge, for use against light material targets and personnel.

c. Tracer cartridge, for use to reveal the path of the bullet. Secondary purposes are for incendiary effect and signaling.

d. Dummy cartridge, for training in loading, unloading, and operation of the weapon.

6-89. ***Destruction of Material to Prevent Enemy Use.*** Armament subsystem M6 will be destroyed in the combat zone to prevent enemy capture and use only by order of the unit commander. If destruction becomes necessary, the equipment must be so thoroughly wrecked that it cannot be restored to use in the combat zone. However, when lack of time and personnel prevent destruction of all parts, priority is given to the destruction of those parts most difficult to replace. Equally important, the same essential parts must be destroyed on all like material, so that the enemy cannot construct one complete unit from several damaged units.

Note

If destruction is directed, due consideration should be given to observance of appropriate safety precautions.

6-90. ***Destruction Plan.*** Each installation maintaining or storing the subsystem or any of its components should have standard operating procedure (SOP) for destruction. The SOP should contain the priority of items to be destroyed, destruction methods, quantities of explosives required, and instructions for placement of explosives. The plan should be flexible enough to work in any situation.

6-91. ***Destruction Methods.*** Ordinarily the armament should be destroyed in conjunction with the destruction of the helicopter. However, if limitation of time, personnel, and materials preclude simultaneous destruction of armament with the helicopter, the armament may be destroyed by mechanical means (axe, crowbar, sledge, etc.), burning, explosives or disposal.

6-92. ***Exterior Inspection.*** a. Armament subsystem components — INSTALLED.

b. Armament subsystem electrical connectors — CONNECTED.

c. Armament subsystem hydraulic connectors — CONNECTED.

d. Charger cylinder assembly — CHARGER PISTON IN "OUT OF BATTERY" position.

6-93. ***On Entering The Helicopter.*** a. SAFE and ARMED indicator lights — PRESS TO TEST.

b. OFF-SAFE-ARMED switch — SAFE.

c. "Dead Man" switch — DEPRESS.

d. Grip assembly — OPERATE.

e. Reticle lamp switch — TEST.

6-94. ***Firing.*** a. OFF-SAFE-ARMED switch — ARMED.

b. Gun selector switch — SELECT.

c. Sighting station — POSITION ON TARGET.

d. Reticle lamp switch — ON.

e. "Dead Man" switch — DEPRESS.

f. Grip assembly — OPERATE AS REQUIRED.

g. Trigger switch — DEPRESS.

6-95. ***After Firing.*** a. Trigger switch — RELEASE.

b. "Dead Man" switch — RELEASE.

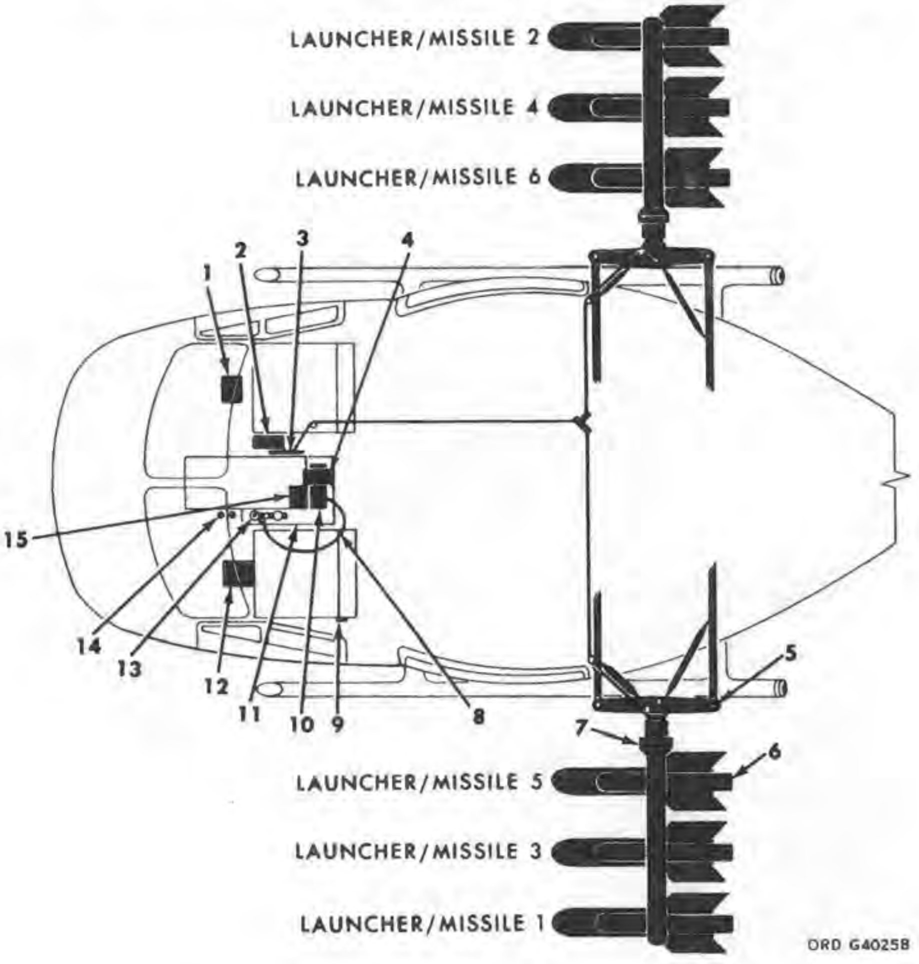
c. Grip assembly — "STOW" POSITION.

d. Reticle lamp switch — OFF.

e. OFF-SAFE-ARMED switch — SAFE.

6-96. M22 Guided Missile — Armament Subsystem. The M22 armament subsystem meets the most important requirements of a tactical weapon. It is a highly mobile assault weapon designed to support front line troops; and, although designed as an anti-tank weapon, the M22 is versatile enough to be used effectively against fortified gun emplacements, pillboxes, and similar hard-point targets. Six AGM 22B missiles with HEAT warheads are attached to and launched from launcher support assemblies attached to the sides of the helicopter. A gunner sits in the cockpit, fires the missiles, and guides them to target. The gunner's guidance commands are transmitted through two steel wires that unwind from inside the missile while it is in flight. When the missile reaches its target, the gunner electrically jettisons the missile guidance wires. Missiles can be fired while the helicopter is hovering or flying forward. As a safety feature the gunner is provided with an electrical jettison control from which he can jettison the launchers and attached missiles, either one at a time or all at once. The pilot can also jettison all of the launchers and attached missiles electrically; or he can jettison both launchers, complete with missiles, mechanically.

6-97. Physical Description. The subsystem (figure 6-17) consists of three basic equipment



1. Pilot's sight
2. Overhead circuit breaker panel
3. Mechanical jettison
4. Missile selection box
5. External stores support
6. Fixed housing
7. Launcher support assemblies
8. Remote firing cable
9. Seat adjustment
10. GCU
11. Floor mounting plate
12. Gunner's sight
13. Control stick
14. Floor plugs
15. Pilot's jettison panel

Figure 6-17. M22 Guided missile — component location groups: the missile support and launching equipment; the guidance and control equipment; and the gunner's and pilot's tracking and aiming sights.

a. MISSILE SUPPORT AND LAUNCHING EQUIPMENT. The launcher assemblies (see figure 6-18) consists of a right and left housing assembly, a right and left launcher support assembly, and three fixed housing with launchers on each launcher support assembly.

b. HOUSING ASSEMBLIES. (See figure 6-18.) The housing assemblies mate to the external stores supports of the helicopter (see figure 6-18). The support assemblies attach to the housing, and are held in place by a release hook inside each housing. Steel cable runs from the hook, to a group of pulleys, and into the side of the helicopter. Just inside the skin of the ship, the cable mates to another cable that leads to the pilot's mechanical jettison lever. A pull on the jettison lever lifts the hooks in the housings and releases the support assemblies, allowing them to fall away. Electrical connections between the guidance equipment inside the helicopter and the launchers and missiles are inside the housing assemblies. The heavy electrical cable on the side of the helicopter fastens inside the housing assembly and mates with an electrical cable running through the launcher support assembly. The connectors are quick-disconnect types, allowing easy separation when the launcher supports are mechanically jettisoned with the mechanical release lever (see figure 6-19) on the right side of the pedestal.

c. LAUNCHER SUPPORT ASSEMBLIES (see 1, figure 6-16). These tubular booms are the supporting structures onto which the fixed housings and missile launchers are attached. The inboard ends of the supports fit

1. Launcher support assembly
2. Housing assembly
3. External stores support assembly
4. Missile launcher
5. Fixed housing

Figure 6–18. M22 Guided Missile — support and launching assembly

Figure 6–19. M22 Guided missile — mechanical jettison lever

snugly into the housing assembly. The cable inside of the boom branches at the locations of the three fixed housings and provides the electrical circuits for the fixed housings and launchers.

d. FIXED HOUSINGS. (See 5, figure 6-16.) The fixed housings are U-bolted directly to the support booms. The underside of the fixed housing is designed to mate with the missile launcher, which is attached with an explosive bolt. The bolt is detonated when the launchers are jettisoned. A plug on the bottom of the fixed housing mates with a receptacle on top of the launcher. This connection breaks when the launchers are jettisoned. A hinged door on the top of the fixed housing provides access to the electrical circuits. To prevent accidental detonation, the circuit to the explosive bolt can be disconneced and attached to a shorting plug.

e. MISSILE LAUNCHERS. (See 4, figure 6-16.) (1) Two sets of wing-like hooks on top of the missile, one forward and one aft, attach it to the underside of the launcher. These hooks are fitted into guide rails underneath the launcher and hold the missile up against the launcher.

(2) To prevent the missiles from sliding forward, and possibly out of the launcher during transport, a spring-loaded hook is lowered and mated into a slot on the top front of the missile. The spring-loaded hook is held in the locked position by an explosive cartridge that is inserted at the time the missile is installed.

(3) The explosive cartridge detonates when the missile is fired; and the spring snaps the hook up, releasing the missile. This action also closes a microswitch that allows the firing current to reach the motors in the missile. The motors cannot fire until the microswitch is closed.

(4) When the missile leaves the launcher, the missile junction box remains hooked to the launcher. After the missile flight is ended, the gunner activates devices in the junction box that jettison the guidance wires.

f. GUIDANCE AND CONTROL EQUIPMENT. (See figure 6-20.) The guidance and control (G and C) equipment for the subsystem is mounted in cockpit on specially designed supports. The main items of G and C equipment are the guidance control unit (GCU), the control stick, the selection box, and the remote firing switch.

(1) G and C SUPPORT ASSEMBLY. The G and C support assembly is installed on the floor of the cockpit directly behind the pedestal. The assembly is designed so that all controls on the G and C equipment are within arm's reach of the missile gunner.

(2) MISSILE SELECTION BOX. (See 3, figure 6-20.) This unit is the control center of the M22 subsystem and allows the gunner to energize the GCU; select the missile to be launched; jettison the missile wires after firing has ended, jettison any of the six launchers or jettison all of them at the same time. The order in which missiles are numbered is shown in figure 6-17.

(3) GCU (See 4, figure 6-20). The GCU controls the launching sequence of the missiles and provides the electronic command signals that control their flight path. The basic guidance commands are generated by the missile gunner as he operates the control stick. Inside the GCU, an electronic coder shapes the basic directional (pitch and yaw) signals from the control stick into the guidance signals that are transmitted to the missile through the two-wire command link.

(4) CONTROL STICK (see 1, figure 6-20). This is an aircraft-type control stick that is used by the missile gunner in guiding the missile. It is mounted on the arm rest of the G and C assembly.

(5) REMOTE FIRING SWITCH (see 2, figure 6-20). This unit is also mounted on the arm rest of the G and C support assembly. The remote firing switch allows the gunner to fire a missile without having to reach for the GCU. Only the missile firing sequence can be activated by the remote firing switch, it cannot reset the firing switch on the GCU after a firing has ended.

g. GUNNER'S AND PILOT'S SIGHT. (1). GUNNER'S SIGHT. A set of binoculars mounted in a specially designed frame and suspended from the roof of the helicopter is the gunner's sight. The frame design allows sight adjustment in azimuth and elevation. When not in use, the sight can be swung upward and locked out of the way. To reduce the effect of vibration during the helicopter's flight, the binoculars are shock-mounted to the frame. A padded, adjustable headrest prevents the gunner from disturbing the binocular's shock-action when he sights through them. This sight magnifies the target and the missile during a firing.

(2) PILOT'S SIGHT. The pilot's sight is used to align the helicopter with the target before the missile is fired. It does not magnify the target or the missile. When not in use, the pilot's sight can also be pushed upward and locked out of the way.

(3) THE MISSILE. (See figure 6-21.) The AGM22B missile is propelled by solid-propellant rocket motors, a booster and a sustainer. Four wings that are canted slightly from the center line of the missile body cause it to spin during its flight. Gas pressure from the sustainer motor arms the warhead within 3.5 seconds after the missile is launched or approximately 350 meters away from the point of launch. Command guidance signals from the control stick are transmitted to the missile through the GCU (see figure 6-23) and the two

1. Control stick
2. Remote firing switch
3. Missile selection box
4. GCU
5. Base plate

Figure 6–20. M22 Guided Missile — G & C support assembly

Figure 6–21. M22 Guided missile — AGC22B missile

guidance wires that unwind from bobbins inside the missile while it is in flight. These basic commands are converted to coded electronic guidance signals in the GCU, and decoded inside the missile, where they are routed to the appropriate missile control devices that actuate the jet deflectors in the exhaust of the sustainer motor, and guide the missile.

6-98. ***Tabulated Data.*** Table 6-3 contains the necessary physical data on the M22 subsystem. Table 6-4 contains tabulated operational data on the AGM22B missile. Tables 6-5 through 6-11 list controls and indicators of the subsystem, and are keyed to an illustration.

6-99. ***Preflight Checks.*** The preflight check by the gunner is a visual check of the missile subsystem in preparation for a firing mission.

Note

> Observe all NO STEP markings on the armament and on the helicopter while making the preflight checks.

6-100. ***Exterior.*** a. All missiles locked in launchers and security of all missile-release cartridges — CHECK.

b. Explosive bolt cables in fixed housings — REMOVE from the shorting plug and CONNECT to live plug.

c. Access covers on fixed housings — CLOSE and LOCK.

d. Locking pin in both housings — REMOVE.

6-101. ***Interior.*** a. Key switch on missile selection box — OFF (remove key for remainder of preflight check).

b. SS-11 MISSILE JETTISON and SS-11 MISSILE POWER circuit breakers — OUT.

c. Gunner sight and pilot sight — ADJUST. (Correctly adjusted when a distant target centered in the pilot sight reticle falls approximately in the center of the gunner sight field of view.)

d. All cable connections — CHECK security.

e. Arm rest for control stick — ADJUST as desired.

Table 6–3. M22 Guided Missile — tabulated physical data

	Length (In.)	Width (In.)	Height (In.)	Diameter (In.)	Weight (Lbs.)
Missile	45.91	20.47		6.46	64.00
Selection Box	11.00	11.00	4.00		10.05
Guidance Control Unit T10K3	12.25	5.5	7.75		16.00
Control Stick Assembly	8.25	4.75	8.25	4.00	3.00
Gunner Sight	12.00	6.00	10.00		10.05
Pilot Sight	6.00	5.00	6.50		6.00
Launcher	42.5	4.75	13.50		23.00
Launcher Support Assembly	48.85	31.00	7.5		33.85 (w/housings and cables)
Adapter	8.00			7.12	
Complete System w/six missiles installed					634.80

6-102. ***In Flight Procedures.***

Caution

Make certain that both the selection switch on the missile selection box and the safety switch on the GCU are in the 0 (zero) position until immediately before firing.

6-103. ***Before Firing.*** a. Energize the subsystem.

(1) SS-11 POWER and SS-11 MISSILE JETTISON circuit breakers — IN.

(2) Key switch on selection box — ON position.

(3) FF-VF switch on GCU — VF position.

b. Perform a guidance command check of the GCU.

(1) Hold the safety switch on the GCU to the C (test) position.

(2) With the control stick in neutral in both yaw and pitch, the yaw test lamp (orange) should be indicating (flickering) with medium

Table 6–4. M22 Guided missile — tabulated operational data

Item	Data	
Missile	Cruise speed:	180 meters/sec (400 mph)
	Maximum Flight Time	22 Seconds
	Maximum Practical Range:	3000 Meters
	Minimum Practical Range:	500 Meters
	Range at which warhead is armed: Normally 350 meters. Arming is caused by gas pressure from the sustainer motor and is not dependent on time elapsed or distance traveled.	

intensity and the pitch test lamp (white) should be indicating flickering with dim intensity.

(3) With the control stick in the maximum pitch UP position, the pitch test lamp should be OFF.

(4) With the control in the maximum pitch DOWN position, the pitch test lamp should be indicating with medium intensity.

(5) With the control stick in the maximum yaw LEFT position, the yaw test lamp should glow brightly (does not flicker).

(6) With the control stick in the maximum yaw RIGHT position, the yaw test lamp should be off (not glowing).

6-104. ***Firing Run Procedures.*** a. PILOT. Using the pilot sight as an aid, align the helicopter with the target. Hold the alignment until missile impact.

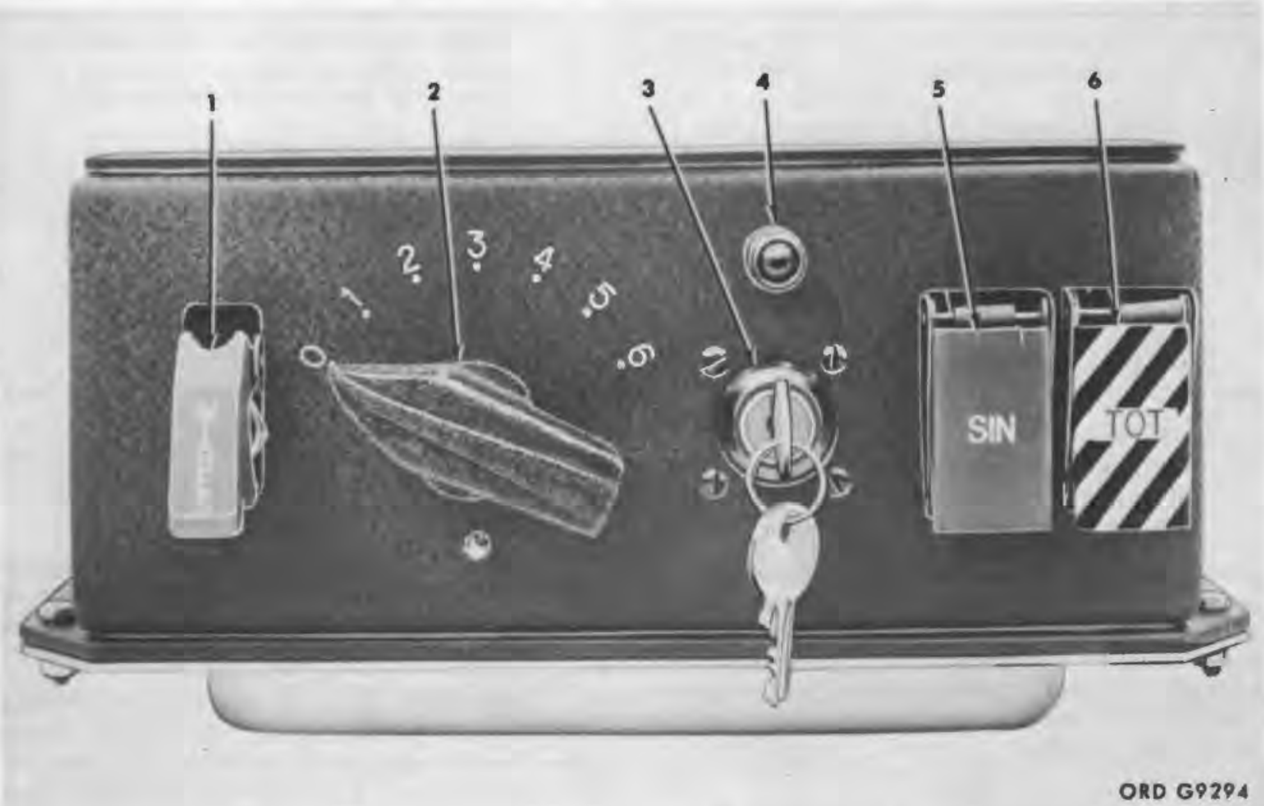
b. GUNNER. (1). Set the missile selection switch to the number of the missile to be fired.

(2) When target is within range, fire the missile by pressing the remote firing switch assembly knob.

(3) Before using the gunner sight, attain visual contact with the missile in flight as soon as possible and gain control of it, shift to gunner's sight when necessary.

(4) Using the control stick and gunner sight, maintain guidance control of the missile until it impacts.

(5) Immediately after impact, operate the WIRE jettison switch on the selection box, then rotate the firing switch on the GCU to the 0 (zero) position.



1. WIRES switch
2. Missile selection switch
3. Key switch
4. Power lamp
5. SIN jettison switch
6. TOT jettison switch

Figure 6–22. M22 Guided missile — missile selection box

Table 6–5. M22 Guided missile — missile selection box, controls and indicators

Key	Control or Indicator	Type	Function
1	WIRES switch (under cover)	Spring-loaded toggle	Applies voltage to wire-jettison cartridges in missile junction box.
2	Missile selection switch	Seven-position rotary	Connects firing, guidance wire-jettison and individual jettison and circuits to missiles and launchers. 0 position is off; positions 1 through 6 correspond to missiles or launchers 1 through 6 (figure 3-15).
3	Key switch	Ignition type, key operated	Connects voltage from helicopter supply to missile subsystem.
4	Power lamp	Indicating (adjustable blackout)	Glows when key switch is turned on, indicates that voltage from helicopter supply is applied to missile subsystem.
5	SIN jettison switch (under protective hood)	Spring-loaded push button	Applies voltage to the explosive bolt for one launcher, which is selected by the missile selection switch.
6	TOT jettison switch (under protective hood)	Spring-loaded push button	Applies voltage to the explosive bolts securing the launchers to the fixed housings. Jettisoning all launchers simultaneously. WARNING The TOT switch activates the explosive bolts regardless of the position of the KEY switch.

(6) If another missile is to be fired, repeat steps a. through e., above.

Caution

The missile should not be fired where the guidance wires might cross over, and contact, electrical power lines.

6-105. ***Emergency Procedures.*** a. Jettisoning is mandatory when a hang fire or misfire occurs while firing a missile with an explosive warhead (single jettisoning), or before a forced landing with autorotation (total jettison if no missiles have been fired, or jettisoning of the remaining missiles).

Note

For either single or total electrical jettison, the SS-11 MISSILE JETTISON circuit breaker must be IN. The jettison circuit is independent of all other system controls.

b. Total jettisoning is accomplished by the pilot with either the mechanical-jettison lever or the JETTISON switch on the pedestal. The gunner can jettison all missiles with the TOT jettison switch on the selection box. Do not jettison in autorotation until sinking rate becomes stable; and, if possible, do not jettison in friendly troop areas.

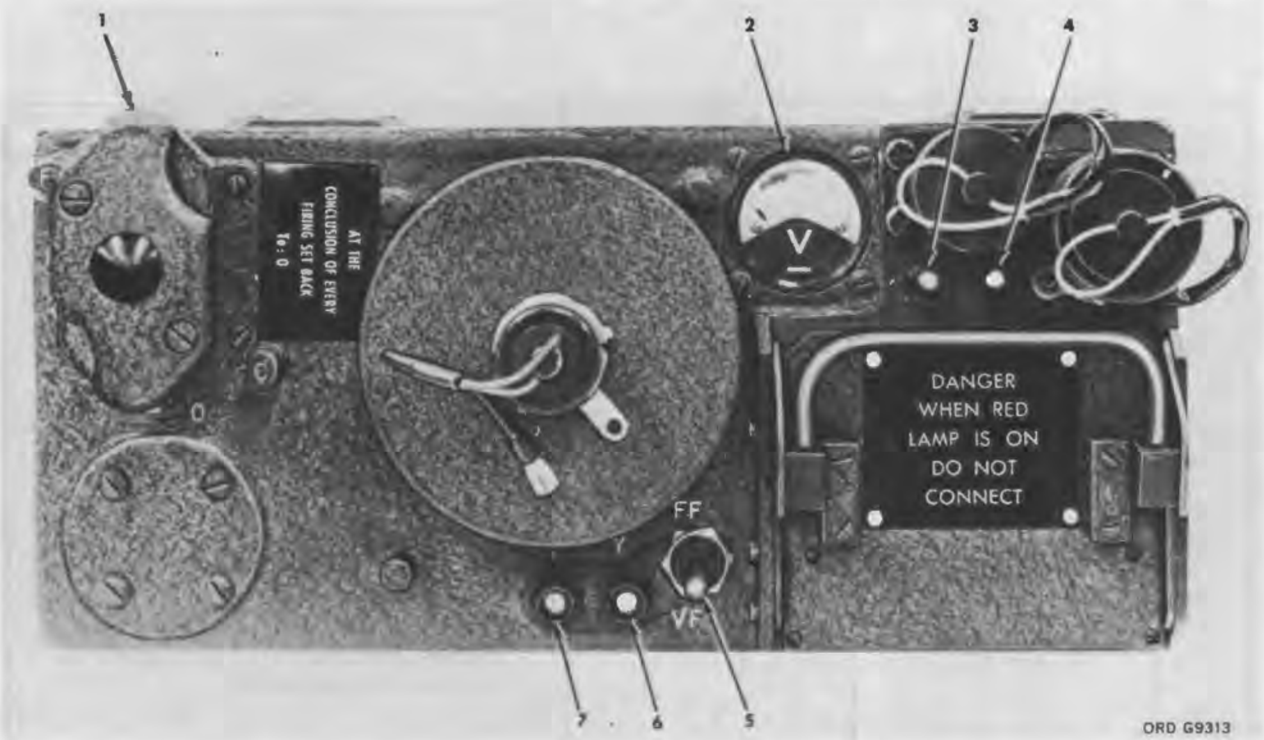
c. Single jettison is accomplished by setting the missile selection switch to the number of the missile to be jettisoned and pressing the SIN jettison switch on the selection box.

d. Table 6-11 lists several possible system failures (or personnel errors) which would cause the missile not to leave the launcher, or fail during flight. The table also includes procedures to be performed to correct the situation whenever possible.

6-106. ***Return Flight Procedures.*** a. DE-ENERGIZE THE SUBSYSTEM. When a firing mission is completed, set the firing switch on the GCU and the selection switch on the missile box to the 0 (zero) position. Set the key switch

Table 6–6. M22 Guided missile — guidance control unit, controls and indicator

Key	Control or Indicator	Type	Function
1	Firing switch	Spring-wound clock mechanism; held at off (0) position by mechanical stop.	Permits testing of the input voltage and the pitch and yaw signals output of the coder when held counterclockwise in the C (test position). When switch is released, automatic spring action turns the switch clockwise through IG, UG, FB, and F positions.
2	Voltmeter		Indicates voltage input to subsystem from helicopter supply.
3	Safety lamp	Indicating (green)	Glow when firing switch is at position F and continues to glow until switch is reset to 0 position. Indicates that ignition and firing circuits are disconnected.
4	Firing lamp	Indicating (red)	Glows when firing switch (1) is at IG, UG, or FB positions, indicating that power is applied to the ignition circuits of the missiles and launchers.
5	FF/VF switch	Two-position toggle	Controls frequency of guidance signals produced by signals gen module. At VF position module produces a signal which increases from 10 to 16.5 cycles per second.
6	Yaw test lamp	Indicating (orange)	Oscillates on and off to indicate yaw command output of signals gen module. Intensity of illumination of lamp indicates strength of gen signals.
7	Pitch test lamp	Indicating (white)	Oscillates on and off to indicate pitch command output of signals gen module. Intensity of illumination of lamp indicates strength of pitch signals.



1. Firing switch
2. Voltmeter
3. Safety lamp
4. Firing lamp
5. FF/VF switch
6. Yaw test lamp
7. Pitch test lamp

Figure 6–23. M22 Guided missile — guidance control unit

on the missile selection box to the OFF position. De-energize (pull out) the SS-11 MISSILE POWER circuit breaker, but DO NOT de-energize the SS-11 MISSILE JETTISON circuit breaker until the return flight is completed.

b. STOW THE GUNNER'S SIGHT (See figure 6-24). Lock the gimbals. Press the travel lock, push the sight forward and up, then release the travel lock.

c. STOW THE PILOT'S SIGHT (See figure 6-25). Press the locking lever, push the sight to the left and release the lever when the sight locks.

6-107. *Post Flight Checks*. a. After a flight is completed, de-energize the SS-11 MISSILE JETTISON circuit breaker. (See figure 6-26.)

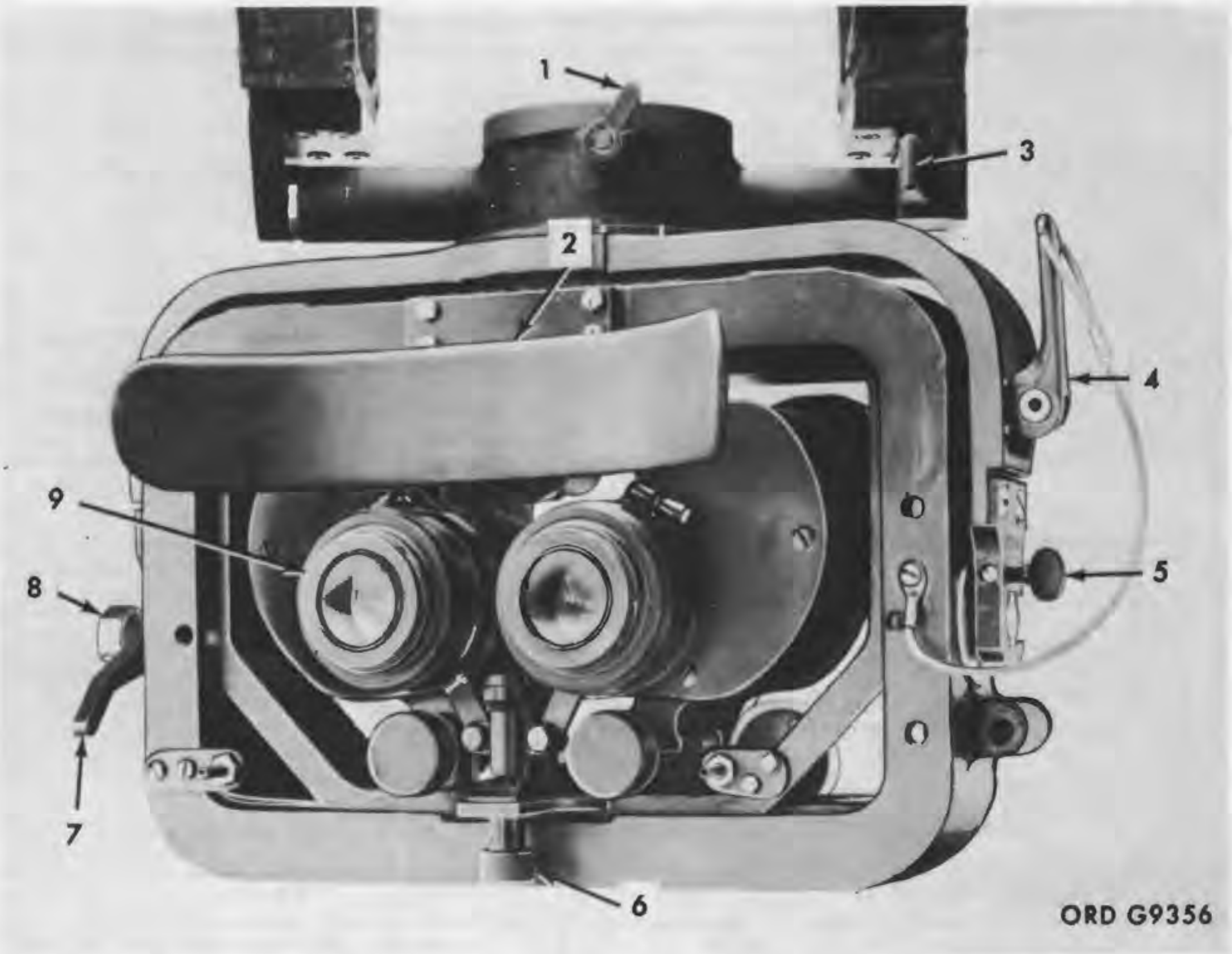
b. Install the locking pin in the housing assembly. (See figure 6-27.)

Warning

> Connect the explosive bolt cable to the shorting plug and make certain that the shorting wire in the rear of the shorting plug is between pins 1 and 3.

c. Have the organizational maintenance personnel remove any unfired missiles.

6-108. *Destruction of Material to Prevent Enemy Use*. a. GENERAL. The missile, its components, or guidance equipment should be destroyed within the combat zone to prevent enemy capture and use only upon orders of the unit



1. Asimuth locking lever
2. Head rest
3. Spring lock
4. Gimbal locking pin
5. Elevation locking thumbscrew
6. Interpupilary adjusting screw
7. Locking lever
8. Retaining nut
9. Binocular

Figure 6–24. M22 Guided missile — gunner's sight

commander. If destruction becomes necessary, missiles and components and guidance equipment should be so thoroughly wrecked that they cannot be restored to serviceable condition in the combat zone. To prevent the enemy from assembling a complete system by cannibalization, the same components of all systems should be destroyed. When conditions prevent destruction of all components, priority should be given to the most vital parts of the system.

b. DESTRUCTION PLAN. Each installation maintaining or storing the system or any of its components should have a standard operating procedure (SOP) for destruction. The SOP should contain the priority of items to be destroyed, destruction methods, quantities of explosives required, and instructions for placement of explosives. The plan should be flexible enough to work in any situation.

c. PRIORITY OF DESTRUCTION. Priority of destruction of the components is as follows:

Guidance Equipment.

a. T10K control.

b. Selection box.

c. Control stick assembly.

d. Cables.

e. Sights.

Table 6–7. M22 Guided missile — gunner's sight, controls and indicators

Key	Control or Indicator	Type	Function
1	Azimuth Locking Lever	Screw Clamp	Allows adjustment of gunner's sight in azimuth
2	Headrest	Pad	To prevent gunner from touching sight
3	Spring Lock	Spring	Secures the sight in the operating or stowed position
4	Gimbal Locking Pin	Pin	Locks components of the sight and support when not in use
5	Elevation Locking	Screw	Secures the sight in the pitch or elevation altitude
6	Interpupilary Adjusting Knob	Screw	Adjust the distance between the two eyepieces
7	Locking Lever	Friction Clamp	Secures or releases the sight so that the sight rotates about the horizontal axis
8	Retaining Nut	Screw	Secures the locking lever on shaft
9	Binocular		To magnify target area

Table 6–8. M22 Guided missile — pilot's sight, controls and indicators

Key	Control or Indicator	Type	Function
1	Locking Clamp	Spring	Locks the sight in the operation or stowed position
2	Lamp Housing	Tubular	Contains the lamp for lighting the reflector
3	Mounting Bolts	Screw Type	Secures the sight to the mount
4	Adjustable Knob	Knob	Controls the position of the reflector
5	Fixed Scale		Not used for M22 subsystem

Table 6–9. M22 Guided missile — pedestal, controls and indicators

Panel	Control or Indicator	Purpose
PLT SIGHT	FIL-1/FIL-2 Switch	Switches power from one to the other filament of the reticle lamp
	OFF-MED-BRT	Controls intensity of illumination of sight reticle, from off to medium or bright
SS-11	JETTISON-SAFE	Enables pilot to jettison electrically all missiles and launchers

1. Locking clamp
2. Lamp housing
3. Mounting bolts
4. Adjustable knob
5. Fixed scale

Figure 6–25. M22 Guided missile — pilot's sight

Figure 6–26. M22 Guided missile — circuit breaker panel

6-109. *Destruction Methods.* The missiles should be destroyed by explosives or gunfire. The guidance equipment may be destroyed mechanically or by burning, explosives or gunfire. Burning is the best method for destroying the cables.

Warning

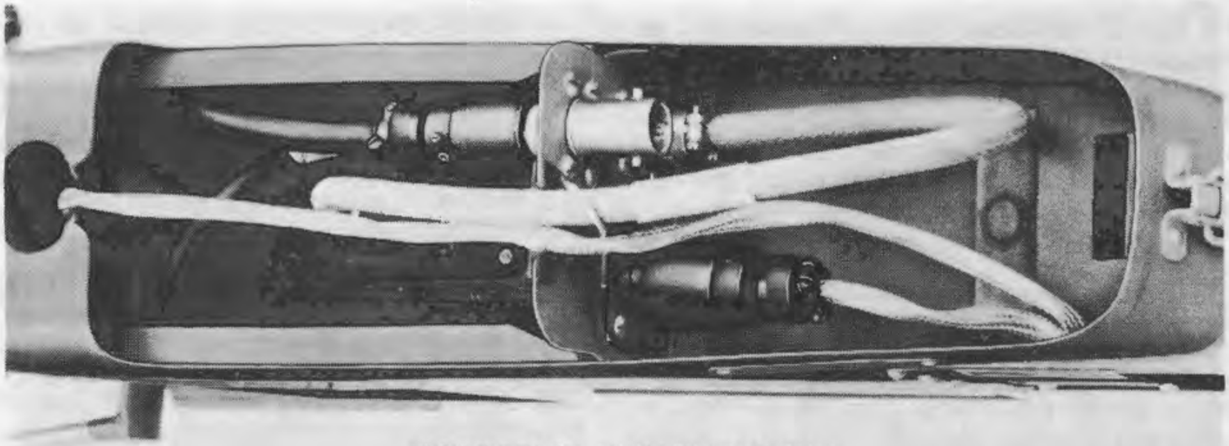
DO NOT try to destroy the assembled missile or the warhead by mechanical means. Take cover before firing artillery from ranges of 500 yards or less, and before firing rifle grenades or rockets.

Table 6–10. M22 Guided missile — circuit breaker panel, controls and indicators

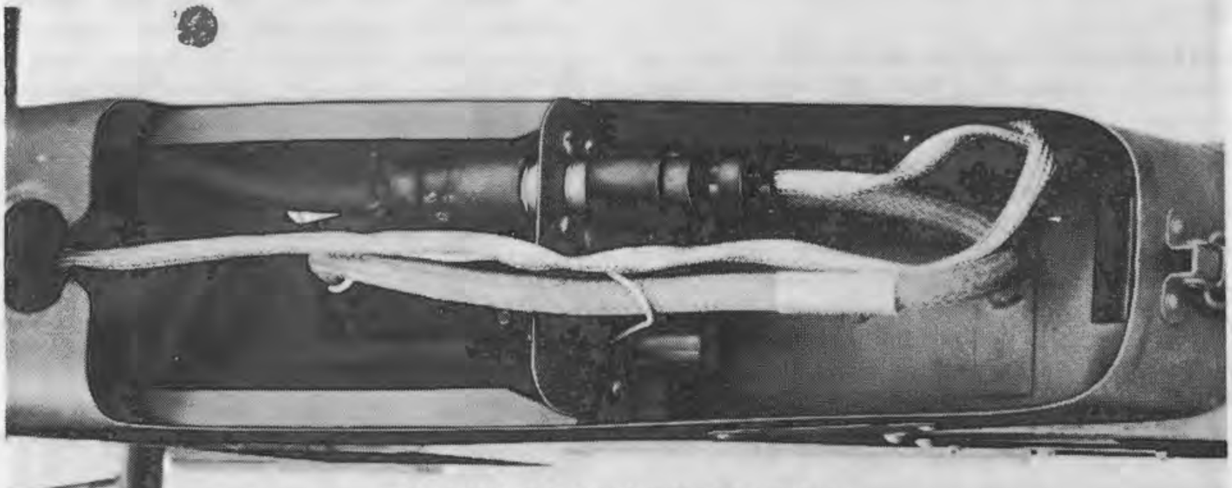
Control or Indicator	Purpose
MK VII SIGHT PWR	Applies Power to the pilot's sight
SS-11 MISSILE POWER circuit breaker	Applies primary power to missile subsystem
SS-11 MISSILE JETTISON circuit breaker	Applies power to M2 electrical jettison circuits of missile subsystem

Table 6–11. M22 Guided missile — system failures, causes and procedures

Malfunction	Probable Cause and Procedure
No ignition of explosive cartridge, flare, or booster.	a. SS-11 MISSILE POWER circuit breaker pulled out, or selection box key switch off. Push in circuit breaker, or set key switch to on. b. Wrong setting on missile selection switch. Select the proper missile. c. Cables broken or not connected, low voltage supply, faulty selection box, faulty explosive cartridge, or faulty GCU. Upon return of the helicopter, circuits, should be tested with the circuit tester.
Ignition of explosive cartridge, release hook disengages, but missile flares or rocket motors do not ignite	Defective cables, selection box, microswitch in launcher, or missile. Jettison the missile WARNING: Missiles with HEAT warheads should be jettisoned from an altitude of at least 1500 feet. Select the proper missile.
Explosive cartridge ignites, but release hook does not disengage	Defective launcher. Jettison the missile. Select the next missile.
Ignition of explosive cartridge and flares, but not ignition of booster	Faulty booster (ignition circuit) Missile should be jettisoned. WARNING: Missiles with HEAT warheads should be jettisoned from an altitude of at least 1500 feet.
Ballistic flight.	Defective missile. No procedure required.
Spiraling flight	Defective missile. No procedure required.
Missile goes down and right.	Broken control wire or low helicopter supply voltage. No procedure required.
Missile takes a maximum left or right path.	Defective missile, control stick, or GCU. Give maximum down command on control stick. If this does not ground the missile, cut the power at the selection box.
Missile takes a maximum up or down path.	Defective missile, control stick or GCU. Guide the missile straight down range until impact. WARNING: Do not cut the power at the selection box unless the missile takes a maximum up and left path. If the malfunction is in the decoder pitch channel, and the power switch is cut, the missile will take a maximum up and right path.
Missile takes a maximum up and right (or left) path	Defective missile, control stick, selection box, or GCU Set the key switch in the selection box to the OFF position.



CONNECTOR IN SAFE POSITION



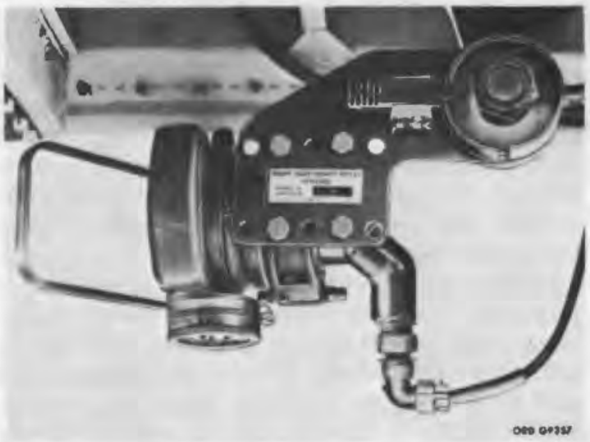
CONNECTOR IN FIRING POSITION

ORD G9359

Figure 6–27. M22 Guided missile — explosive bolt, safe and unsafe

ORD G9358

Figure 6–28. M22 Guided missile — gunner's sight, stowed



ORD G9357

Figure 6–29. M22 Guided missile — pilot's sight, stowed

6-110. Description and Operation of Armament Subsystem 40 Millimeter Grenade Launcher M5. The 40 millimeter grenade launcher helicopter armament subsystem M5 as used on the UH-1B helicopters consists of two major components, 40 millimeter grenade launcher M75 and the grenade launcher mount. (See figure 6-30.)

6-111. Physical Description, 40 Millimeter Grenade Launcher M75. (See figure 6-31.) The grenade launcher is an air-cooled, electric motor driven, rapid fire weapon capable of launching 40-mm antipersonnel projectiles. The electric motor drives the launcher through the entire operational cycle of feeding, chambering, cocking, locking, firing, unlocking, extracting, and ejecting.

6-112. Grenade Launcher Mount. The mount is basically composed of the following six components.

a. TURRET ASSEMBLY. The turret assembly is used to mount the grenade launcher. It is ball-shaped and attaches to three hard points outside the helicopter electric equipment compartment by retaining pins. Removing the lower pin permits the turret to be pointed downward to gain access to the electrical equipment compartment. The top and forward enclosure assemblies are easily removed to permit access to the launcher and the turret components. The forward enclosure assembly has a rectangular slot which is closed by a protective brush assembly through which the barrel of the launcher protrudes. The top enclosure assembly has an opening through which the ammunition feed chute assembly and electric cable assembly enters the turret. Elevation and azimuth of the launcher is accomplished by a gimbal assembly and saddle assembly arrangement. The gimbal assembly rotates on bearings at the top of the support of the turret and is held and driven by the azimuth power trunnion at the bottom. The saddle assembly is mounted through the elevation axis to the gimbal assembly and controlled by the elevation power trunnion assembly. The powered trunnion assemblies are driven by direct current motors powered by their respective servo-amplifiers. Rotational travel of the powered trunnion assemblies are limited by fixed mechanical stops and by adjustable limit switches. The launcher is driven by a direct current motor through a belt drive arrangement, which is connected to the launcher drive assembly mounted on the saddle.

b. AMMUNITION FEED SYSTEM. The ammunition feed system is that portion of the subsystem that stores the ammunition, provides a flow path and assists in feeding ammunition to the launcher. It consists of an ammunition box and cover assembly, front and rear ammunition chute assemblies, ammunition booster assembly, and ammunition feed chute assembly.

(1). The ammunition box and cover assembly is located in the center of the aircraft, under the passenger seat, and is held in place by toe plates in the deck and webbing assemblies which are attached by hook snaps to standard cargo tiedown points. It is of stainless steel construction and is capable of storing 85 rounds of linked ammunition. Handles are riveted to the ends of the box for easy handling. An ammunition loading instruction plate on the cover assembly and a stenciled instruction on the ammunition box assembly are provided to aid in the proper loading of ammunition.

(2) The rear ammunition chute assembly (82 links) leads from the ammunition box to the ammunition booster assembly. It is routed along the left side of the pedestal console and under the instrument panel to the booster assembly. The front ammunition chute assembly (26 links) leads from the exit end of the booster assembly and connects to the ammunition feed chute assembly, which is attached to the launcher.

(3) The ammunition feed chute assembly consists of a feed tray assembly and a collar connected by six shaped tubes with ends welded to both the tray and the collar. The shaped tubes translate the ammunition 90° counterclockwise so that it is in the proper position for entry into the launcher. An instruction plate, fixed to the top-right corner of the tray, illustrates the proper position and location of the first round when loading the subsystem.

(4) The ammunition booster assembly is used to assist the launcher in pulling ammunition from the ammunition box and cover assembly and through the front and rear chute assemblies. The direct current booster motor drives sprockets which contact and pull the ammunition forward whenever the launcher is fired. The booster motor can also be energized independently of the operation of the subsystem for purposes of loading and unloading ammunition by pressing a switch on the right-front side of the ammunition booster assembly.

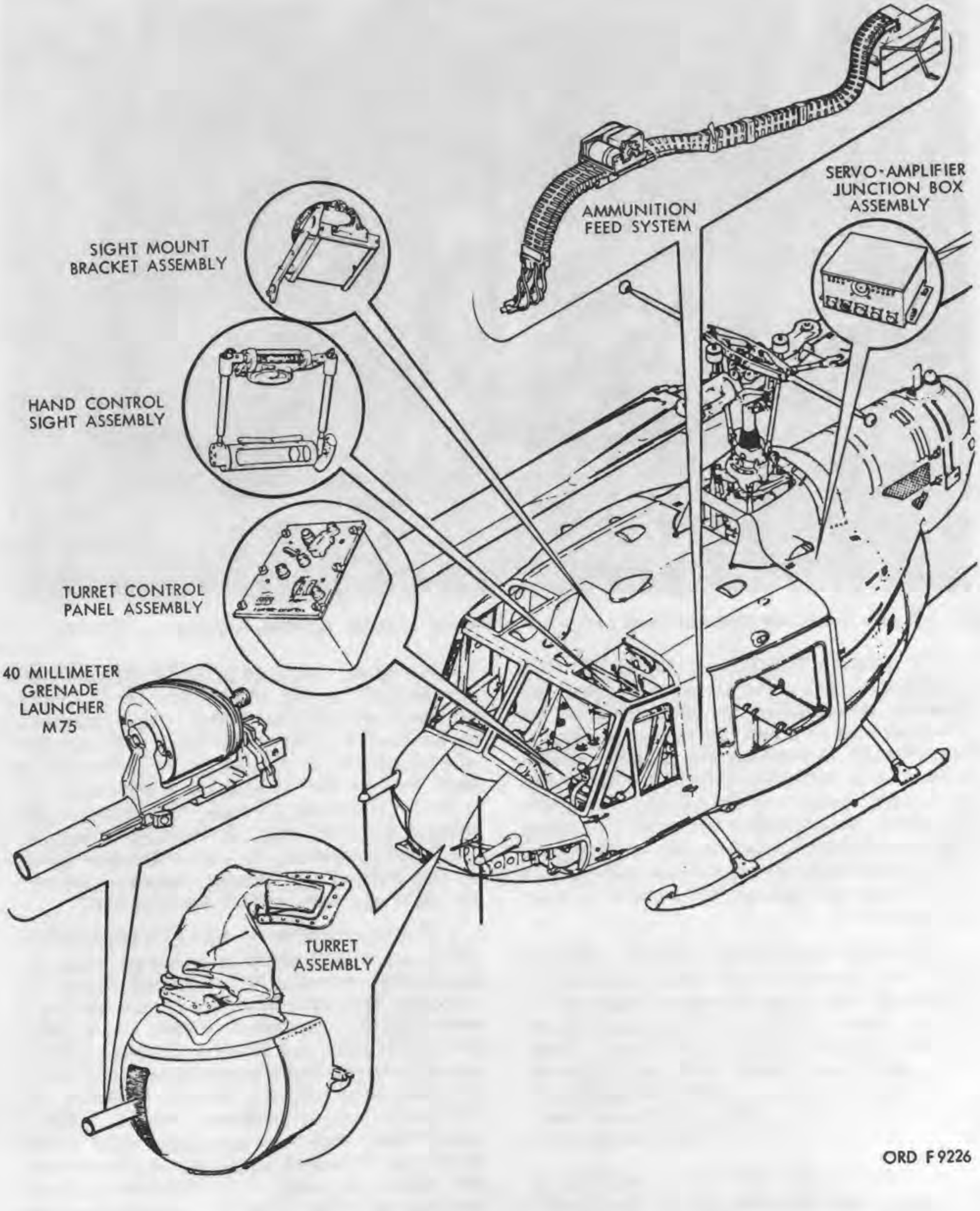
Figure 6–30. M5 Grenade launcher — 40 millimeter grenade launcher installed on UH-1B

c. SERVO-AMPLIFIER JUNCTION BOX ASSEMBLY. The servo-amplifier junction box assembly is located in the aft section of the helicopter and is accessible from the baggage compartment. It contains two amplifier module assemblies, a control module and a subsystem relay switching and control circuits. The amplifier module assemblies are identical in construction and are interchangeable. Air circulation for cooling is provided by an exhaust type blower which draws air through the louvers on opposite sides of the box.

d. TURRET CONTROL PANEL ASSEMBLY. The turret control panel assembly is mounted in the lower left-hand corner of the pedestal console. The front of the control panel assembly contains the main power toggle switch, gun power toggle switch (provided with a toggle safety guard), operate indicator lamp, gun elevation control, rounds remaining indicator, and four aircraft panel illuminating lamps.

e. SIGHT MOUNT BRACKET ASSEMBLY. The sight mount bracket assembly is secured to a plate in an overhead position on the left (copilot's) side of the cabin of the helicopter. It is used to mount the hand control sight assembly. As the sight is slid into the bracket assembly, an electrical connector mates with a receptacle in the bracket. Proper mating of the connector and receptacle is insured by an index pin on each side of the receptacle. A retaining pin assembly inserted through the front of the bracket assembly locks the sight assembly into the bracket assembly. Spring loaded stow hooks at the ends of the bracket assembly support the sight assembly in the stow position.

f. HAND CONTROL SIGHT ASSEMBLY. The hand control sight assembly provides the means for remotely directing and firing the launcher. The sight assembly is composed of a mount group, suspension system, and a sight. The mount group permits the sight assembly to rotate in azimuth with stops limiting the travel. A reticle lamp intensity control, elevation differential synchro transmitter, azimuth synchro transmitter, and a reticle lamp stow cutoff switch are contained in the mount. The suspension system consists of two telescoping tubes which pivot at the upper end so that they can be raised or lowered. The sight assembly is attached between the two lower ends of the tubes.



ORD F9226

Figure 6–31. M5 Grenade launcher — components of subsystem

The tube assemblies are under spring tension when extended and the upper pivot point is also under spring tension when extended and the upper pivot point is also under spring tension when lowered from the stow position. The sight consists of right and left-hand support assembly, a guide, and a controller grip assembly. The support assemblies are attached to the ends of the tubes of the suspension system. The left-hand support assembly contains the reticle housing assembly, reticle lamp, and elevation transmitter synchro assembly. The right-hand support assembly provides a bearing surface for the shaft which connects the guide with the controller grip assembly. The left-hand support assembly is also bearing mounted which permits the guide to be easily rotated through the movement of the grip assembly. The guide contains a reflector and a spherical mirror housing assembly. The reflector is mounted at an angle of 45° to the line of sight of the gunner and slightly to the right of the center line of the guide. The guide is open and both sides of the reflector to provide the gunner with a clear view of the target area. The controller grip assembly is a pistol grip shaped housing containing the launcher firing switch and the turret control switch.

6-113. *Controls.* Descriptions and locations of the controls used by the pilot or copilot to operate, sight and fire the armament subsystem M5, are outlined in paragraphs 6-113 through 6-118.

6-114. *Alternating Current Circuit Breakers.* The ac circuit breakers (see figure 6-32) are in the panel located on the right-hand side of the pedestal base. The armament subsystem circuits are activated or reset by pushing in the circuit breakers.

6-115. *Direct Current Circuit Breakers.* The dc circuit breakers are located on the panel of the overhead console (see figure 6-33). The armament subsystem circuits are activated or reset by pushing in the circuit breakers.

6-116. *Turret Control Panel Assembly.* (See figure 6-34.) The turret control panel assembly is located in the lower left corner of the pedestal console. The panel assembly provides the following indicator and switches.

a. MAIN POWER TOGGLE SWITCH. The MAIN POWER toggle switch is a three-pole toggle switch which energizes the armament subsystem when placed in the ON position. When placed in the ON position, 115 volt ac, 400 cps; 26 volt ac, 400 cps; and 28 volt dc are applied to the subsystem.

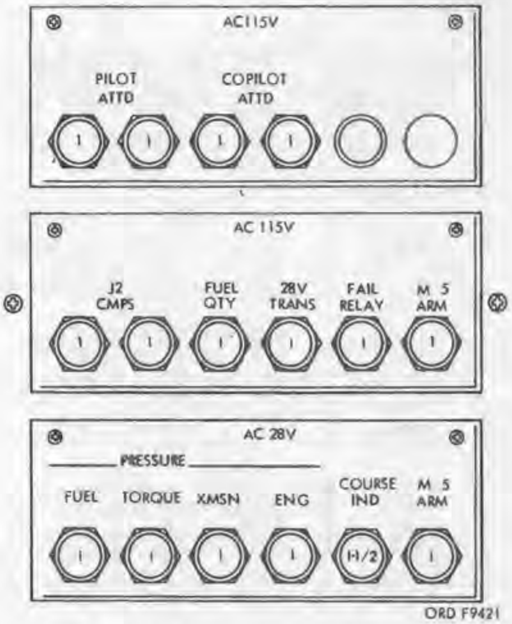


Figure 6-32. M5 Grenade launcher — AC circuit breakers

b. GUN POWER toggle switch. The GUN POWER toggle switch is a four-pole toggle switch which applies power to the grenade launcher firing circuits when placed in the HOT (FIRING) position. A toggle guard is provided to prevent the switch from being inadvertently set to the firing position. The guard has to be raised to move the switch from the SAFE to HOT position.

c. OPERATE indicator light. The OPERATE indicator light is a press-to-test indicator which lights when the MAIN POWER switch is set to ON. The indicator light will go out during operation if the positional error between the sight assembly and the turret assembly is excessive or when the turret has entered an azimuth or elevation limit. This provides a visual indication to the pilot that the launcher cannot be fired.

d. GUN ELEVATION control. The GUN ELEVATION control is used to select the desired launcher elevation when firing the launcher by the firing switch in either cyclic stick and without the use of the sight assembly. Turning the control in the direction of DN depresses the

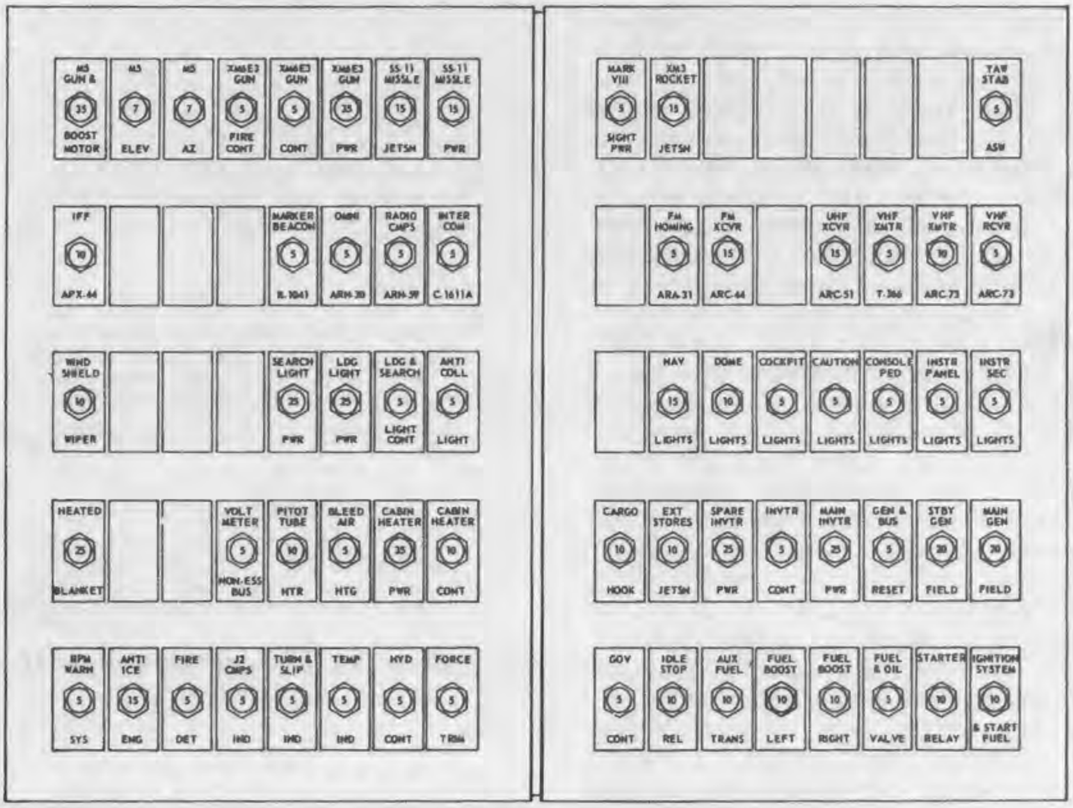


Figure 6–33. M5 Grenade launcher — DC circuit breakers

launcher; in the direction of UP elevates the launcher. The dial of the control is graduated in 5° increments between 15° in elevation to 35° in depression, that is, for a total range of 50°.

e. ROUNDS REMAINING indicator. The ROUNDS REMAINING indicator shows the number of rounds of ammunition remaining to be fired. A straight serrated cylindrical reset knob permits the counter to be set to the number of rounds loaded. Push in on knob and turn clockwise until desired number is registered on the dial of the indicator.

6-117. ***Cyclic Stick Firing Switch.*** Both the pilot's and copilot's cyclic sticks contain a grenade launcher firing switch. (See figure 6-35.) It is located in the center left side of the cyclic stick grip. Press to fire. This switch is used to fire the launcher whenever the sight assembly is not being employed.

6-118. ***Sight Mount Bracket and Assemblies.*** (See figures 6-36 and 6-37.)

a. SIGHT STOW HOOKS. The sight assembly is held in the stow position by two spring loaded hooks attached to the right and left end

Figure 6–34. M5 Grenade launcher — turret control panel

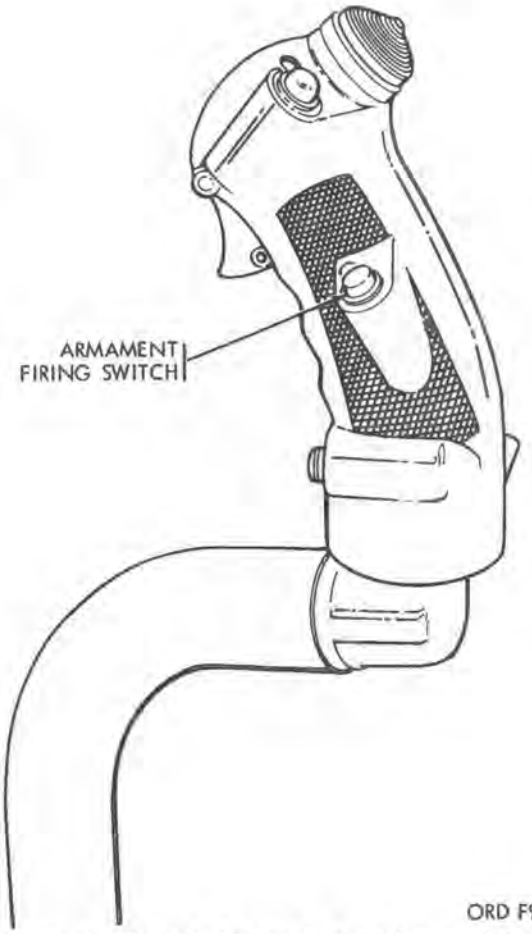


Figure 6–35. M5 Grenade launcher — firing switch, cyclic stick

of the mount bracket assembly. Rotate hooks outward from sight assembly to release sight from mount bracket.

b. RETICLE LAMP CONTROLS. There are two controls provided; a single-pole double-throw toggle switch which permits the gunner to use either of the filaments of the double filament reticle lamp; and a variable resistor to control the intensity of the illumination of the reticle lamp. The toggle switch is ON in either position. Placing the toggle in its other position, switches the circuit to the other filament of the double filament reticle lamp. Turning the knob of the variable resistor counterclockwise increases the intensity of the illumination of the reticle lamp. Both of these controls are located on the left side of the sight mount bracket of the sight assembly.

c. CONTROLLER GRIP ASSEMBLY. The grip assembly contains two switches. The firing switch in the upper section and the turret control switch directly beneath the firing switch. In order to fire the launcher, the turret control switch must be pressed and held, and then the firing switch is pressed to fire. In addition, the turret control switch must be pressed and held in order for the turret to follow the movement of the sight assembly. The grip assembly is also used to move the sight assembly in both the horizonal and vertical plane to keep the sight on the target.

d. FLASHING RETICLE. The flashing reticle provides a visual signal informing the copilot that the launcher cannot be fired. This signal appears only when the positional error between the sight assembly and the turret is excessive, when turret has entered an azimuth or elevation limit, or if turret contol switch is not pressed and held when using the sight assembly.

6-119. ***Normal Operations.*** The preflight inspection by the pilot will consist of a visual check of the armament subsystem M5 prior to a firing mission.

6-120. ***Exterior Checks.*** a. Turret assembly mounting point—secured.

b. Boost assembly—fastened.

c. Top and forward enclosure assemblies of turret—secured.

6-121. ***Interior Checks.*** Ammunition box and cover assembly—cover fastened and webbing assembly secured to tiedown fittings.

b. Rear chuting assembly—unobstructed and secured to cover of ammunition box.

c. GUN POWER toggle switch—SAFE.

d. MAIN POWER toggle switch—ON.

e. Armament Subsystem AC and DC Circuit Breakers—IN.

f. Check OPERATE indicator light.

g. GUN ELEVATION control — operate through its full limit of travel, observing that launcher responds.

h. ROUNDS REMAINING indicator — records the number of rounds loaded.

i. SIGHT ASSEMBLY — release from stow position and observe flashing reticle image on the reflector. Depress and hold turret control switch, turret should assume the position of the sighting station. Move sight assembly until turret has entered both azimuth and elevation limits to observe flashing reticle. Return sight assembly to STOW position.

j. MAIN POWER toggle switch—OFF.

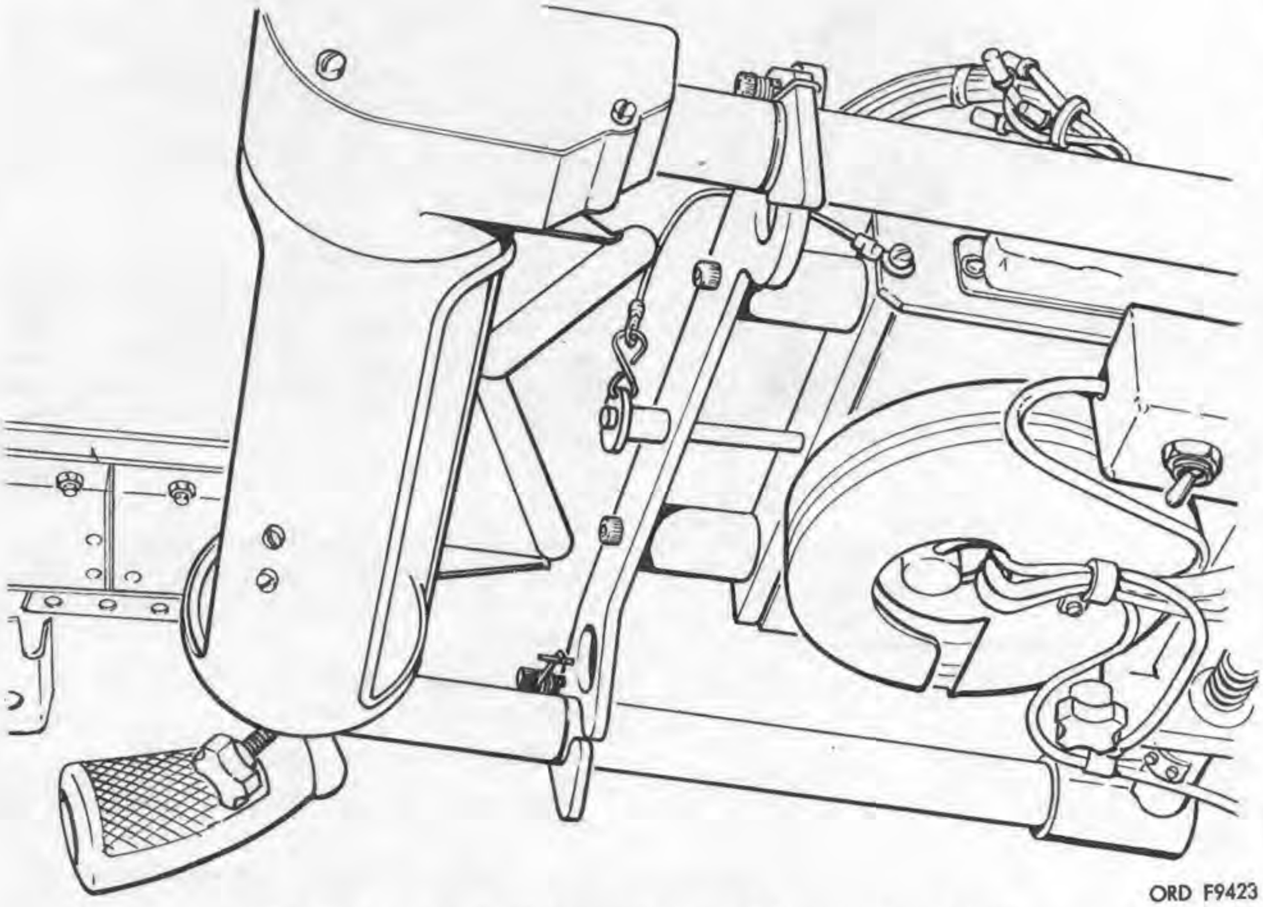


Figure 6–36. M5 Grenade launcher — sight assembly, stored

6-122. ***Preparation for Firing.*** a. Push in the following armament subsystem circuit breakers:

(1) AC M5 ARM (2 places).

(2) DC M5 GUN AND BOOSTER MOTOR.

(3) DC M5 AZ.

(4) DC M5 ELEVATION.

b. Place MAIN POWER toggle switch in ON position—OPERATE indicator light should illuminate.

c. Raise guard of GUN POWER toggle switch and place toggle in HOT (FIRE) posiion.

6-123. ***Firing.*** There are two methods in which the armament subsystem can be operated to execute a firing mission. The launcher can be fired either from the cyclic sticks or from the sight assembly.

a. Cyclic stick procedure.

(1) Set the desired elevation into the launcher by using the GUN ELEVATION control.

(2) Fire a short burst by pressing the firing switch of the cyclic stick and observe strikes of rounds fired.

(3) Make necessary corrections in azimuth by change in attitude of the helicopter. Changes in elevation are made through changing attitude of helicopter and/or through use of the GUN ELEVATION control.

(4) After corrections in azimuth and elevation are made, proceed with firing.

Note

After firing switch is released, the launcher will continue to fire one or two times before attaining the "safe position" with barrel forward and an empty case in the chamber.

b. Sight assembly procedure.

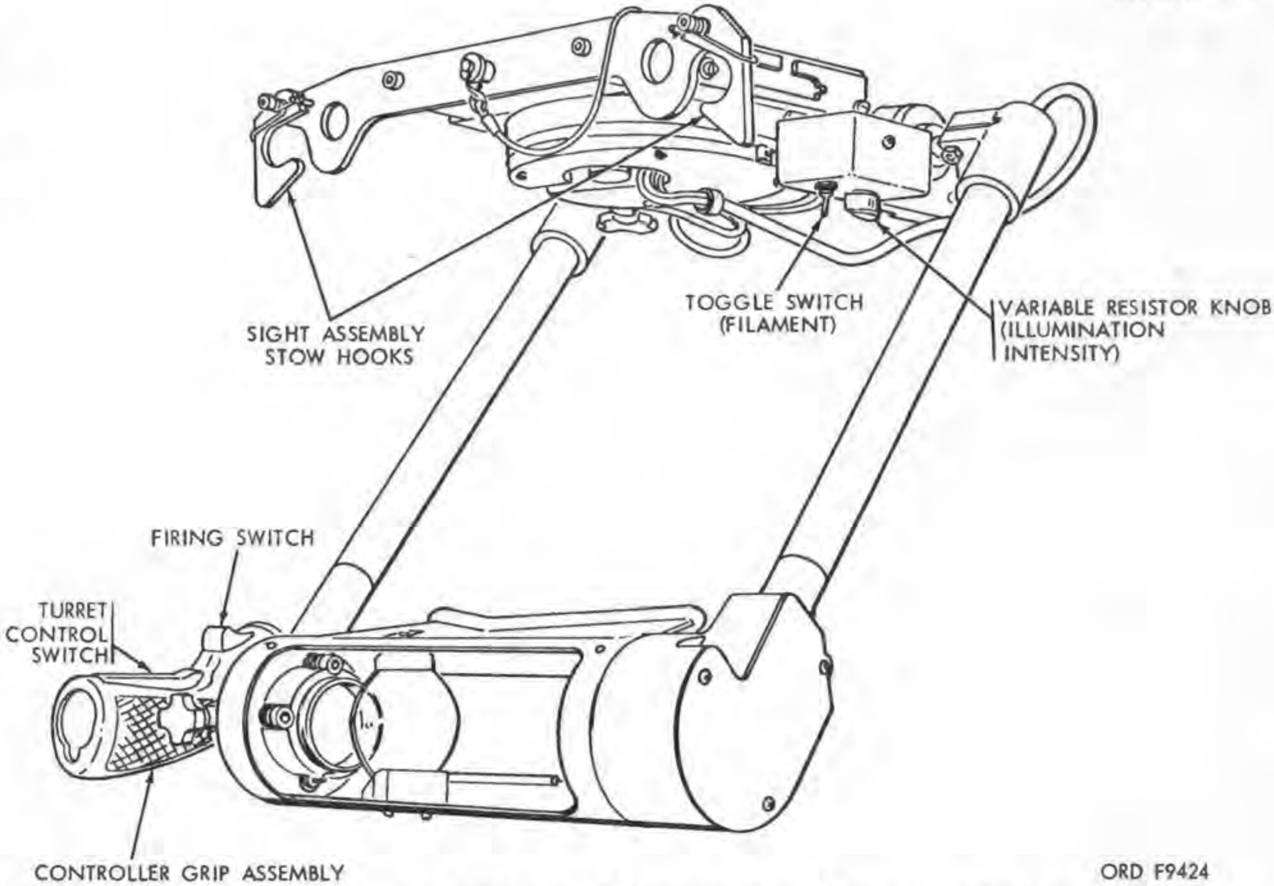


Figure 6–37. M5 Grenade launcher — sight assembly, released from stored position

(1) Release sight assembly from its STOW position, pull sight assembly down to eye-level, and place forehead into contoured shield.

(2) Depress and hold turret control switch in grip of sight, if necessary adjust intensity of illumination of reticle display by turning knob of variable resistor control.

(3) Move sight assembly to place reticle on target and fire launcher by depressing firing switch in grip assembly.

Note

Do not use erratic or jerky movements in keeping sight on target; movement should be steady and smooth to maintain coordination between sight and turret. A flashing reticle will be displayed on the reflector if there is a correspondence error between sight and turret, also the OPERATE indicator light will not be illuminated. Launcher firing cannot be initiated while the flashing reticle is displayed. A flashing reticle will also be displayed on the reflector when turret control switch is not depressed or when turret has entered an azimuth or elevation limit.

6-124. *Before Leaving Helicopter.* a. Close guard of GUN POWER toggle switch, this action places the switch in the SAFE position.

b. Set MAIN POWER toggle switch to OFF; OPERATE indicator light goes out.

c. Place sight assembly in STOW position.

d. Pull out the following circuit breakers:

(1) AC M5 ARM (2 places).

(2) DC M5 GUN AND BOOSTER MOTOR.

(3) DC M5 AZ.

(4) DC M5 ELEVATION.

6-125. *Emergency Operation.* Emergency operation is explained in paragraph 6-126 and 6-127.

6-126. *Malfunction in Azimuth and Elevation.* If subsystem fails to respond in azimuth and/or elevation, the aircraft can be maneuvered to keep fire on the target.

6-127. ***Runaway Launcher.*** In the event of a runaway launcher place the GUN POWER toggle switch in SAFE position and place MAIN POWER toggle switch in OFF position.

6-128. ***Exterior Inspection.*** a. Turret Assembly — SECURED. Top Enclosure Assembly — FASTENED. Forward Enclosure Assembly — FASTENED.

b. Boot Assembly — FASTENED.

6-129. ***On Entering the Helicopter.*** a. GUN POWER Toggle Switch Guard — DOWN.

b. MAIN POWER Toggle Switch — OFF.

c. Armament AC and DC Circuit Breakers — IN.

d. Sight Assembly — STOWED.

e. Ammunition — LOADED.

6-130. ***Inflight.*** a. Firing (using sight assembly).

(1) MAIN POWER Toggle Switch — ON.

(2) GUN POWER Toggle Switch — HOT (FIRE).

(3) ROUNDS REMAINING indicator — CHECK.

(4) Sight Assembly — Released from STOWED POSITION.

(5) Turret Control Switch — DEPRESSED.

(6) Firing Switch — PRESS TO FIRE.

b. Firing (Sight Assembly Stowed).

(1) MAIN POWER Toggle Switch — ON.

(2) GUN POWER Toggle Switch — HOT (FIRE).

(3) ROUNDS REMAINING Indicator — CHECK.

(4) FIRING SWITCH (Cyclic Stick) — PRESS TO FIRE.

6-131. ***After Firing.*** a. Using Sight Assembly.

(1) Sight Assembly — STOW.

(2) GUN POWER Toggle Switch—SAFE.

(3) MAIN POWER Toggle Switch—OFF.

b. With Sight Assembly Stowed.

(1) GUN POWER Toggle Switch—SAFE.

(2) MAIN POWER Toggle Switch—OFF.

c. Before Leaving Helicopter.

(1) MAIN POWER Toggle Switch—OFF.

(2) GUN POWER Toggle Switch—SAFE.

(3) AC and DC ARM circuit breaker — OUT.

(4) Sight Assembly — STOWED.

6-132. Armament Subsystem XM16—7.62 MM Machine Gun and 2.75 In. Rocket Launcher. The 7.62 millimeter machine gun and 2.75 inch rocket launcher helicopter armament subsystem XM16 is adaptable for installation of the UH-1B helicopter. (See figure 6-38.) The machine gun with mount is basically armament subsystem M6 modified. (See figure 6-39.) The main components of the rocket launcher with mount are shown in figure 6-40.

6-133. ***Tabulated Data.*** Machine gun and machine gun mount (Refer to ARMAMENT SUBSYSTEM M6 QUAD 7.62 MM MACHINE GUN) this section.

6-134. ***Rocket Launcher, XM157 — and Mount.***

Weight (per launcher)	50.2 pounds
Capacity	7 rockets
Ground Clearance	12 inches
Mount Weight	70 pounds

6-135. ***Controls.*** Machine gun and machine gun mount (Refer to ARMAMENT SUBSYSTEM M6 QUAD 7.62 MM MACHINE GUN) this section.
Rocket launcher, XM157 (NONE).
Intervalometer and Manual jettison — Controls (See figure 6-41).
Rocket launcher mount (See figures 6-40 and 6-42).
Infinity sight XM60 and mount (See figures 6-44).

6-136. ***Operation — Pre-Flight Check.*** a. EXTERIOR.

(1) MACHINE GUN AND MACHINE GUN MOUNT (Refer to ARMAMENT SUBSYSTEM M6 QUAD 7.62 MM MACHINE GUN) this section.

(2) ROCKET LAUNCHER. Rockets loaded and detents secure, electrically connected and secure in rack of mount.

(3) ROCKET LAUNCHER MOUNT. Firing switch (rack) — ARMED position.

b. COCKPIT CHECK.

(1) MACHINE GUN AND MACHINE GUN MOUNT. (Refer to ARMAMENT SUBSYSTEM M6 QUAD).

(2) ROCKET LAUNCHER AND MOUNT.
ROCKETS/GUNS switch — GUNS.
RKT PAIR SELECTOR switch — SET to "O".
Guard on JETTISON switch — Down.
Manual jettison handle — FORWARD position.

6-137. ***In-Flight Operation.*** a. MACHINE GUNS. Refer to ARMAMENT SUBSYSTEM M6 QUAD 7.62 MM MACHINE GUN, this section.

b. ROCKET LAUNCHER.

(1) Make sure the following machine gun in-flight operations are performed.
OFF-SAFE-ARMED switch — ARMED.
Dead-man — NOT depressed.

(2) RKT PAIR SELECTOR — Set to number to be fired.

(3) ROCKETS/GUNS switch — ROCKETS.

(4) Remove sight from STOWED position; place reticle dot on target; check elevation-depression dial and make correction if necessary.

(5) Depress cyclic firing switch.

Note

Hold in the firing switch for full second. If the firing switch is released before completion of a multiple rocket burst, not all the desired number of rockets will fire. The subsystem will then reset itself. When the firing switch is squeezed again, the subsystem will attempt to fire all the rockets for which it was originally set.

6-138. ***Emergency Procedure.*** a. MACHINE GUNS. Refer to ARMAMENT SUBSYSTEM M6 QUAD 7.62 MM MACHINE GUN, this section.

b. ROCKET LAUNCHER.

(1) ROCKETS FAIL TO FIRE.
Make sure the following switches are positioned as listed below:
OFF-SAFE-ARMED — ARMED.
RKT PAIR SELECTOR — NOT on "O".
ROCKETS/GUNS — ROCKETS.
Dead-man — NOT depressed.

Figure 6–38. XM16 Machine gun and rocket — subsystem left-side down

Press firing switch, if rockets still fail to fire, move ROCKETS/GUNS switch to GUNS.

(2) ALL ROCKETS FIRE FROM ONE OR BOTH ROCKET LAUNCHERS. If all rockets fire from one or both launchers when the RKT PAIR SELECTOR switch is not set for maximum burst, place ROCKETS/GUNS to GUNS.

(3) ROCKET LAUNCHERS MUST BE JETTISONED. Raise guard of JETTISON switch and place switch in ON position. If electrical circuits malfunction, pull manual jettison handle rearward.

6-139. *Ammunition*. AMMUNITION, 7.62 MILLIMETER. Refer to ARMAMENT SUBSYSTEM M6 7.62 MM MACHINE GUN, this section.

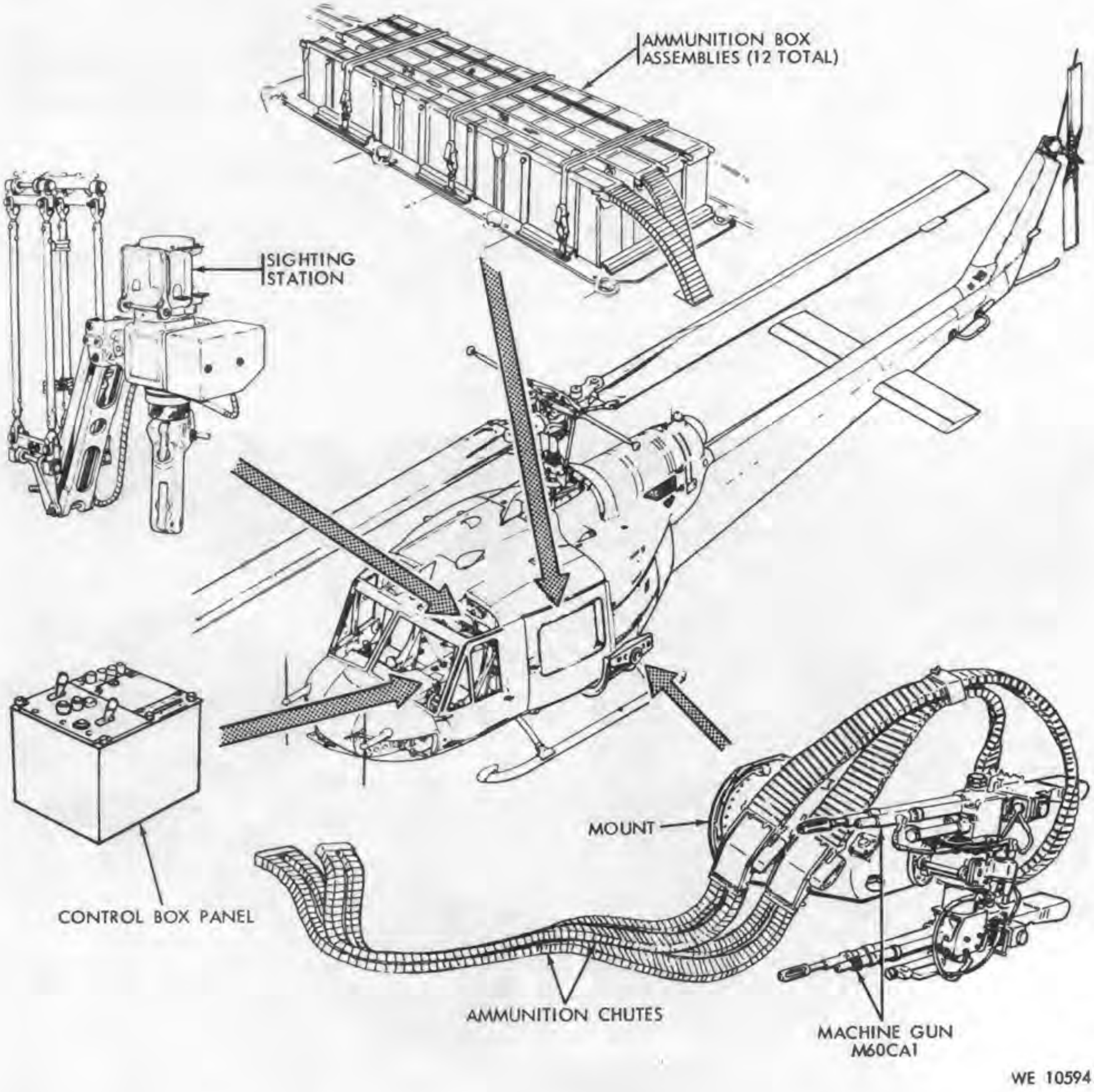


Figure 6–39. XM16 Machine gun and rocket — machine gun portion — left front view

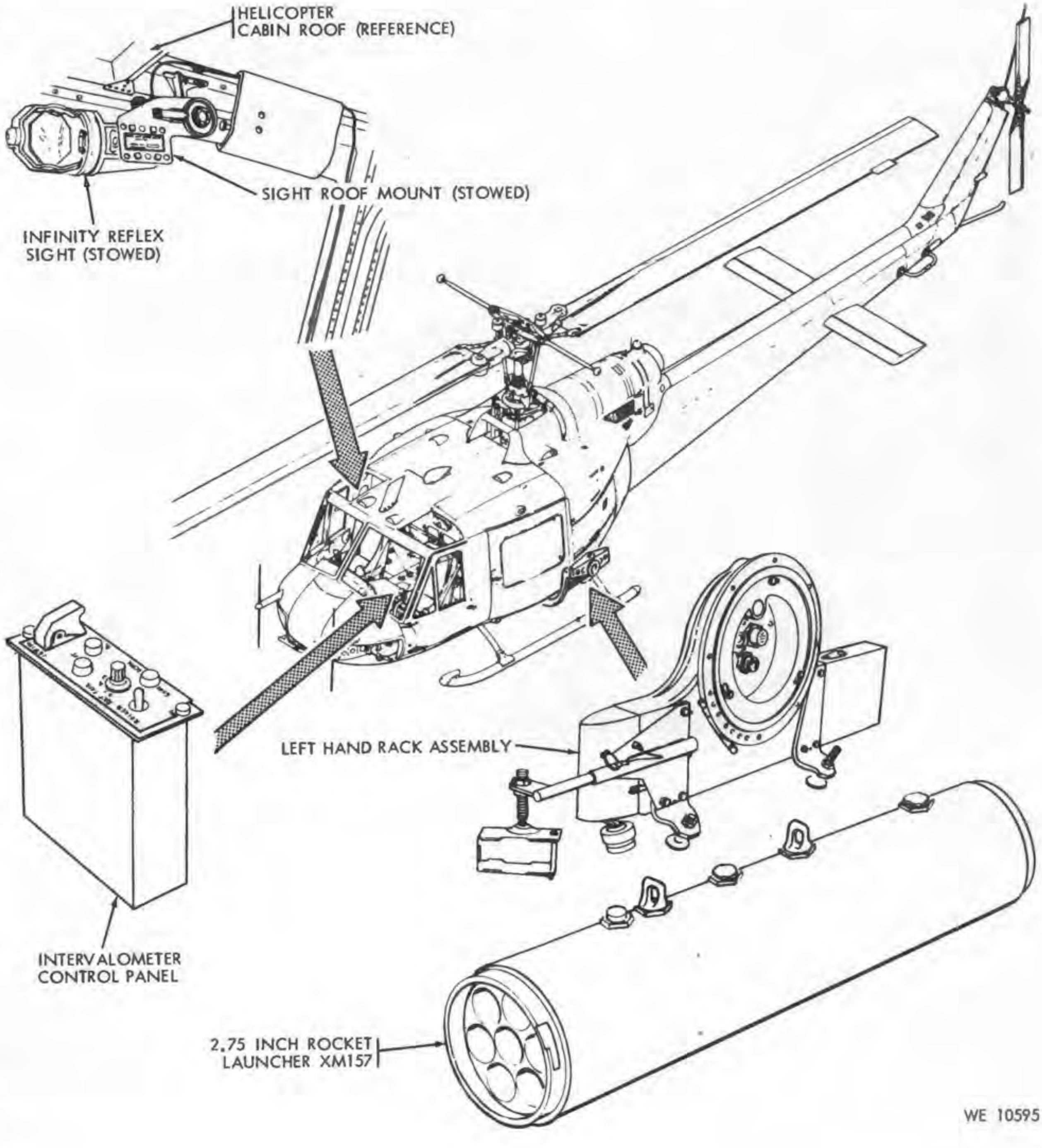


Figure 6-40. XM16 Machine gun and rocket — rocket launcher portion — left front view

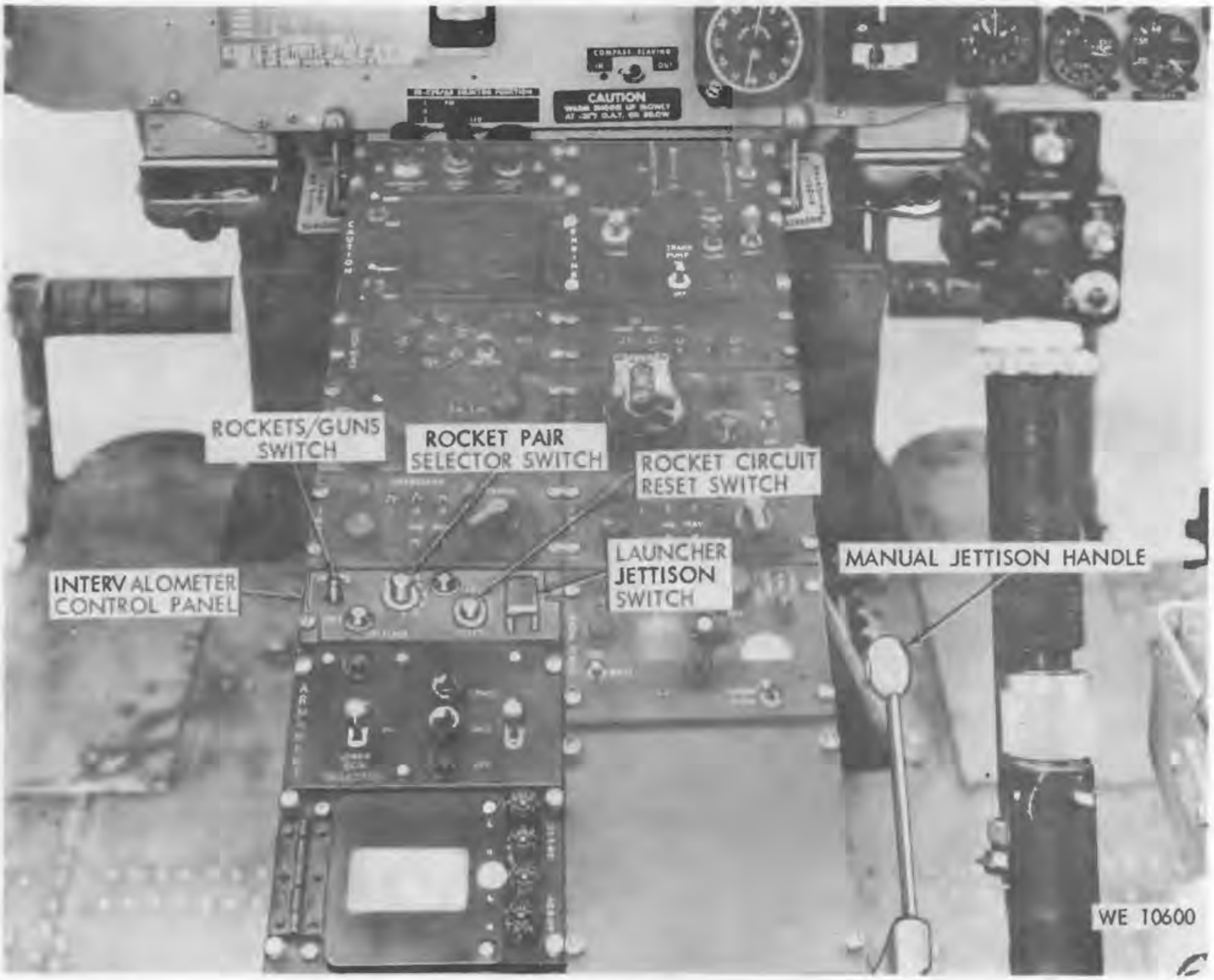


Figure 6–41. XM16 Machine gun and rocket — intervalometer and manual jettison, controls

6-140. *FFAR Rockets, 2.75 Inch.* a. HIGH EXPLOSIVE.

(1) Warhead, MK1 and mods (HBX-1 loaded) w/fuze, PD,MK176 and mods.

(2) Rocket motor, MK2 and MK4 with mods. W/propellant MK43 and mods.

b. INERT.

(1) Warhead, 2.75-inch, MK1, Mod 3 (and mods).

(2) Rocket motor, 2.75-inch, MK1 Mod 3 with propellant, MK 31 Mod 1.

c. PRACTICE.

(1) Warhead, 2-75-inch, MK1 and mods, inert loaded.

(2) Rocket motor, MK2 and MK4 with mods, with propellant, MK3 and mods.

6-141. *Operator's Checklist.* The operator's checklist is broken down in the following sequence.

6-142. *Exterior Inspection.* a. Rocket launcher — secure.

b. Rockets loaded — Desired number.

c. Firing switch (rack) — Armed.

6-143. *On Entering the Helicopter.* a. Intervalometer control panel.
ROCKETS/GUNS — GUNS.
RKT PAIR SELECTOR — 0 (ZERO).
JETTISON — Guard down.

b. Manual jettison handle — Forward.

c. Infinity sight — STOWED.

6-144. ***Firing Rockets.***

Note

> Machine gun OFF-SAFE-ARMED switch must be on ARMED position and deadman switch of sighting station grip assembly released.

a. ROCKETS/GUNS — ROCKETS.

b. RKT PAIR SELECTOR — SET.

c. Infinity sight — ON TARGET.

d. Cyclic stick firing switch — DEPRESS.

6-145. ***After Firing Rockets.*** a. Cyclic stick firing switch — RELEASE.

b. RKT RESET — DEPRESS.

c. ROCKETS/GUNS — GUNS.

d. Infinity sight — STOWED.

6-146. ***Jettisoning Rocket Launchers.*** a. OFF-SAFE-ARMED — ARMED.

b. ROCKETS/GUNS — ROCKETS.

c. JETTISON — Raise guard, flip switch up.

d. If rockets do not jettison — Pull manual jettison handle rearward.

6-147. ***Before Leaving Helicopter.*** a. Firing switch (rack) — RESET.

b. OFF-SAFE-ARMED — OFF.

c. ROCKETS/GUNS — GUNS.

d. JETTISON — GUARD DOWN.

6-148. Operating Instructions XM14, 50 Cal. Gun Pod Helicopter Armament (UH-1B) Aircraft.

(Information Not Available)

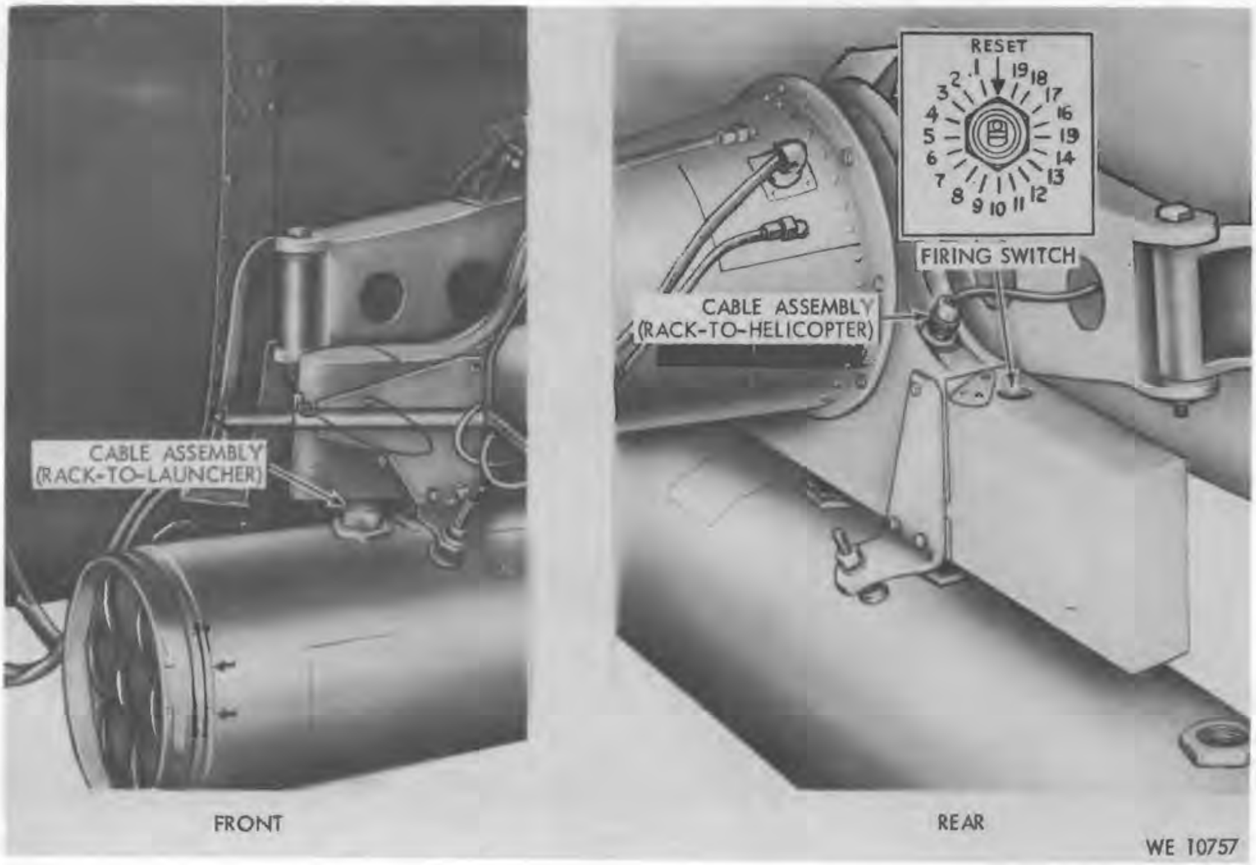


Figure 6–42. XM16 Machine gun and rocket — rack and support assembly, controls

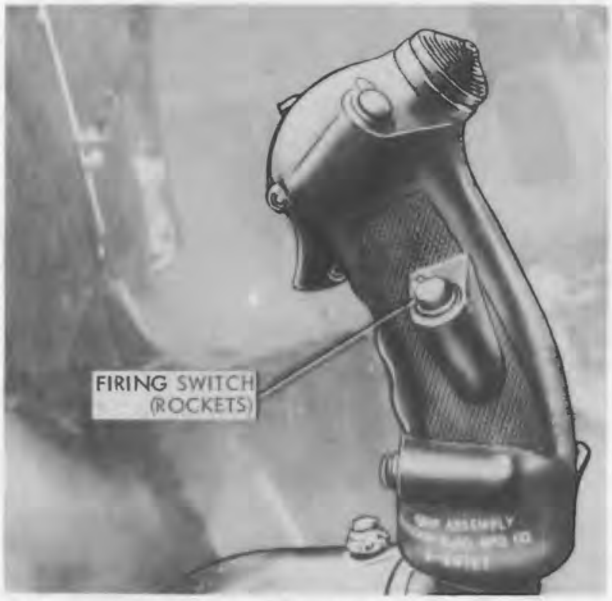


Figure 6–43. XM16 Machine gun and rocket — rocket firing switch, cyclic stick

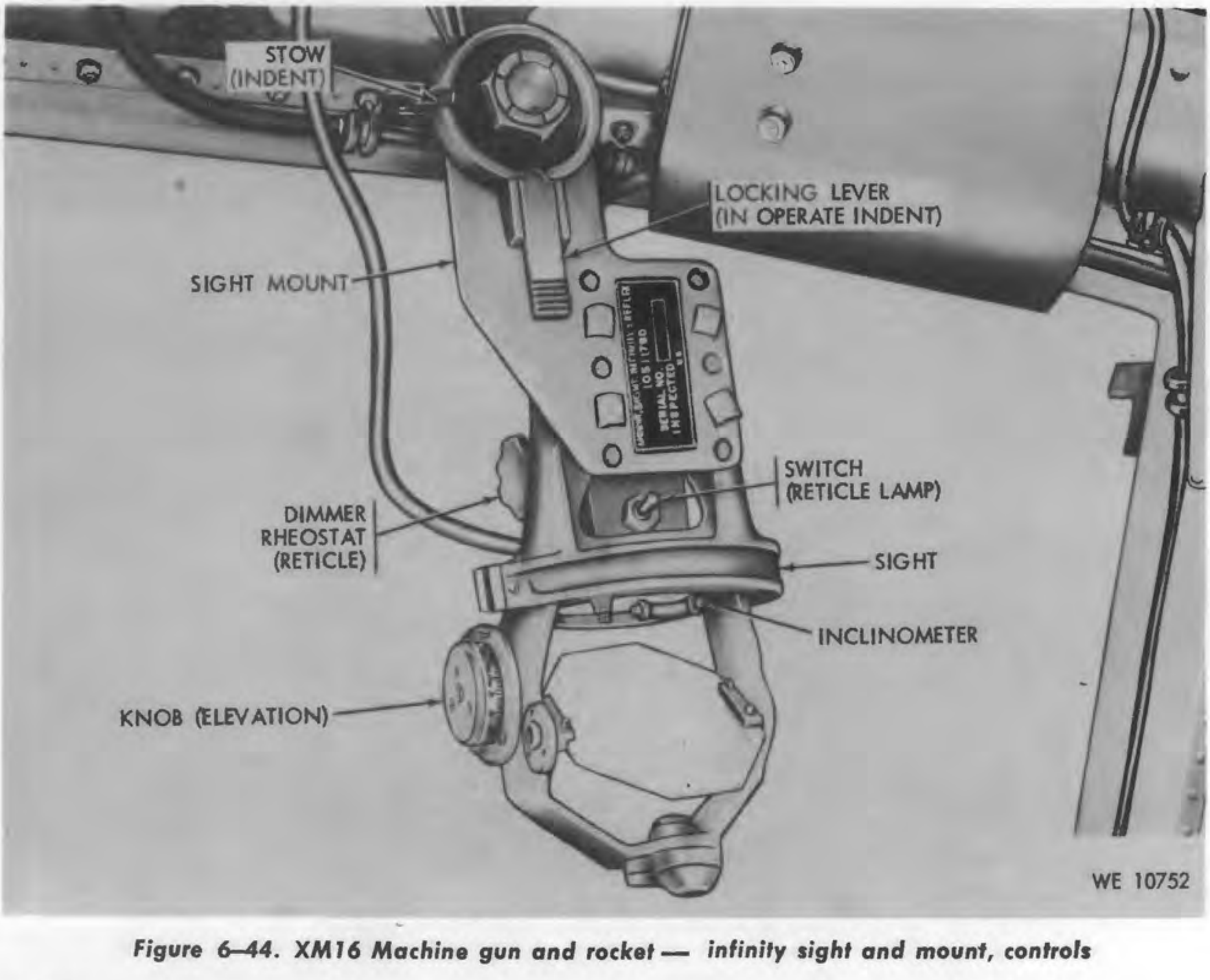


Figure 6–44. XM16 Machine gun and rocket — infinity sight and mount, controls

Section VIII — Photographic Equipment

(Not Applicable)

Section IX — Aerial Delivery Equipment

(Not Applicable)

Section X — Miscellaneous Equipment

6-149. Windshield Wiper. The windshield wiper is installed on the right or pilot's section of the windshield. The wiper is driven by an electric motor, powered from the 28 volt dc electric system. Circuit protection is provided by a circuit breaker, marked WINDSHIELD WIPER, located on the dc circuit breaker panel. The windshield wiper switch is located in the MISCellaneous control panel on the overhead console. This switch is a rotatable type with five positions: HIGH, MED, LOW, OFF and PARK. Do not operate the wiper on dry windshield because dust and grit will scratch the windshield.

B **6-150. *Copilot's Windshield Wiper.*** A windshield wiper is supplied for the copilot in addition to the one for the pilot. A control switch on the control panel permits the operation of windshield wipers for pilot-copilot or both as desired.

A **6-151. Instrument Trainer Equipment.** UH-1A helicopters Serial No. 59-1658 through 59-1671 have necessary equipment installed for instrument flight training. (See figures 6-45 and 6-46.) Simulated (IFR) weather conditions, in which instrument flight rules apply, can be duplicated to a high degree for the student trainee.

A **6-152. *Seating Arrangement — Instrument Trainer.*** The seating arrangement provides for the student in the right seat, instructor in the left seat and a student observer seated aft of the instructor and student. The student observer's seat secures to the cabin floor near the center line of the helicopter and is equipped with standard approved seat belt and shoulder harness (figure 6-45). Simulated IFR conditions, for the student, are accomplished by means of sliding cloth hood and cloth covers for the upper and lower transparent panels in right-hand cabin area.

A **6-153. *Instrument Panel — Instrument Trainer.*** The student's section of the instrument panel is enclosed when hood is down contains the following instruments and indicators:

Dual Tachometer
Airspeed Indicator
Attitude Indicator
Altimeter
Turn and Slip Indicator
Radio Magnetic Compass Indicator
Vertical Velocity Indicator
Standby Compass and Correction Card
Course Selector and Cross-Pointer Meter
Marker Beacon Light
Clock
Exhaust Temperature Indicator
Torquemeter
Gas Producer Tachometer

A **6-154. *Instructor's "Back Up" Flight and Engine Instruments.*** The instructor's section of the instrument panel contains the following instruments and indicators:

Dual Tachometer
Airspeed Indicator
Atttitude Indicator
Altimeter
Turn and Slip Indicator
Radio Magnetic Compass Indicator
Vertical Velocity Indicator
Standby Compass and Correction Card
Course Selector and Cross-Pointer Meter
Marker Beacon Light
Clock
Exhaust Temperature Indicator
Torquemeter
Gas Producer Tachometer
Fuel Pressure Indicator
Fuel Quantity Indicator
Engine Oil Pressure Indicator
Engine Oil Temperature Indicator
Transmission Oil Pressure Indicator
Transmission Oil Temperature Indicator
Main Generator Loadmeter
Standby Generator Loadmeter
DC Voltmeter
AC Voltmeter

6-155. Casualty Carrying Equipment. A Provisions have been made for the helicopter to be adapted to accept litters. A foldable rack (see figure 4-1) has been provided to accommodate a standard Army medical service litter and to permit loading a second litter on the cabin floor below the litter supported by the rack. The litter rack may be removed or folded for installation of the passenger seats. Two of the passenger safety belts are used for each of the litter patients.

B 6-156. Helicopters Serial Nos. 60-3591 through 60-3619 and 61-686 through 61-803 are equipped with three standard litters arranged one above the other. The bottom litter rests on the cabin floor, while the other two, placed directly above it, are supported on channel rails extending between, and attached to, curved stanchions. Helicopters Serial No. 62-1872 and subsequent, also carry three litters, with the lower one resting on the floor and the others arranged above it. These litters are supported by adjustable brackets attached to tracks on the aft cabin bulkhead and by two vertical stanchions on the forward side.

6-157. Fire Detector Warning System. The fire detector warning system consists of a right hand engine cowl fire detection element, a left hand engine cowl fire detection element, fire detection control unit, fire detector test switch and a fire warning light. The fire detector elements are strategically placed around the engine and attached to the engine cowling. Excessive heat from the engine compartment causes the illumination of the FIRE WARNING light located on the upper right section of the instrument panel. This light and the other fire detector warning system units are

Figure 6–45. Instrument trainer — interior arrangement

powered by 28 volt dc from the essential bus. The press-to-test (FIRE DETECTOR TEST) switch is located to the left of the fire warning light, and when the switch is pressed, the electrical circuit is closed, causing the detector element to heat and illuminate the FIRE WARNING light.

Caution

> The press-to-test switch should not be depressed for more than 15 seconds to prevent overheating the detector elements.

6-158. Cargo Loading Equipment. The helicopter cargo areas do not require any special loading aids or equipment to accomplish loading and unloading, therefore, no special equipment has been provided.

6-159. Heated Blanket Receptacles. Two electrical receptacles are provided to furnish 28 volt dc for heated blankets. One is located at the right side of the aft cabin bulkhead above passenger's seat back. The other receptacle is located on the left side of the aft cabin bulkhead above passenger's seat back. Electrical power to these receptacles is supplied from the 28 volt non-essential bus. Circuit protection is provided by a circuit breaker on the dc circuit breaker panel.

6-160. Data Case. A data case for maps, flight reports, etc., has been provided and conveniently located on the aft end of the instrument pedestal.

6-161. Pilot's Check List. The pilot's check list is conveniently located in the center of the

204075-16A

Figure 6-46. Instrument trainer — instrument panel and pedestal arrangement instrument panel. The check list is used in lieu of take-off and landing data card.

6-162. Mooring Fittings. Mooring fittings are provided at three locations on the helicopter. Two fittings are installed under the fuselage just aft of the pilot's and copilot's station, one at the right-hand side and one at the left-hand side. The other fitting is installed under the fuselage just aft of the skid landing gear. UH-1B, helicopters Serial No. 62-1872 and subsequent have four fittings.

6-163. Tow Rings. To facilitate towing the helicopter with ground handling wheels lowered, a tow ring has been provided near the forward end of each of the landing gear skids. These rings will receive a standard tow bar.

6-164. Ground Handling Wheels. Ground handling wheels have been provided on each of the landing gear skids. These wheels can be extended to accomplish ground handling, i.e., pushing and towing the helicopter; however, it must be understood that the wheels must be manually retracted or removed when the helicopter engine is in operation.

6-165. Blackout Curtains. Provisions have been made for installing blackout curtains on the two passenger compartment windows and behind pilot's and copilot's seats. These curtains can be quickly snap-fastened into place on the inside of the two cargo-passenger cabin doors and to compartment fasteners.

6-166. Blood Bottle — Hangers. Three blood bottle hangers have been provided on each side of the inside cabin roof structure within easy reach of the medical attendant's station, to permit administering of blood to litter patients in flight.

6-167. Rotor Tie Down. Rotor tie downs are provided for use in mooring the aft blade of the main rotor and the tail rotor to prevent the rotors from see-sawing when the helicopter is parked. The tie downs stow in the cargo compartment when not in use.

6-168. Cargo Tie Down Fittings. Twelve cargo tie down fittings are located on the cabin floor, of UH-1A helicopters; and twenty seven tie down fittings are located on the cabin floor of UH-1B helicopters. The purpose of these fittings is to guard against and prevent cargo shifting during flight.

B 6-169. Cargo Tie Down Net. A latex treated webbing cargo net is supplied to assure the firm control of cargo in flight. Hooks for attachment to tie down fittings and quick adjustment straps are advantageous for ease of loading and unloading cargo.

B 6-170. External Cargo Hook-Up Mirror. A mirror is installed under the right-hand lower nose window to give the pilot clear visibility of the external cargo. This mirror is easily removed and stowed when not in use.

6-171. Tailpipe Cover. An olive drab tailpipe cover of duck material is supplied to cover the tailpipe during storage or tie down. Streamers are sewed on to warn personnel with white stencil, REMOVE BEFORE FLIGHT.

6-172. Pitot Tube Cover. A cover for the pitot tube is supplied. This cover is made of duck material is olive drab and has a streamer to warn personnel with white stencil REMOVE BEFORE FLIGHT.

B 6-173. Paratroop Static Line. Provisions are included in the cabin for the attachment of a static line for parachutes, designed at a load of 3500 pounds ultimate. This kit is attached to the aft cabin bulkhead and consists of attachment fittings, spreader bar and static line.

6-174. Mechanical External Stores Jettison. A mechanical jettison device is attached to the outboard end of the left and right-hand external stores support assembly. These devices retain the inboard end of the boom assemblies and are equipped with a mechanical release assembly, which makes it possible to jettison the boom assemblies in case of emergency. The mechanical release assembly is activated by the mechanical jettison lever on the right aft edge of the pedestal. The external stores support assemblies consists of beams and sway bars attached to the "hard points".

6-175. Engine Vibration Check Equipment. Provisions are provided to permit the use of engine vibration check equipment as a maintenance aid. The provisions consist of an AC electrical receptacle, associated wiring hardware and a circuit breaker. The receptacle and circuit breaker are located on the AC circuit breaker panel. (Effective Serial No. 65-9416 and subsequent).

6-176. The purpose of these provisions is to facilitate the use of the Lycoming engine vibration check equipment. The 115 volt, 60 to 400 cps power source for the aircraft corresponds to the requirements of the check equipment. The electrical outlet eliminates the necessity for elaborate wiring of the equipment into the aircraft electrical distribution system to provide operating power.

Section XI — Auxiliary Fuel Equipment

6-177. Auxiliary Fuel System. Structural provisions have been provided for installing an auxiliary fuel equipment kit in the helicopter cargo-passenger compartment for extended distance and ferry missions. UH-1A helicopters are equipped to carry an additional 60 U.S. gallons (390 pounds) of fuel or a larger 165 U.S. gallons (1072.5 pounds) tank. UH-1B helicopters are equipped to carry the 165 U.S. gallons (1072.5 pounds) tank or a larger 350 U.S. gallons (2275 pounds) tank, or the 60 U.S. gallons (390 pounds), or the 50 U.S. gallons (325 pounds) tank.

Caution

> UH-1A helicopters Serial Nos. 58-2078 through 58-2093 and 58-3017 through 58-3047 are equipped with quick disconnect couplings (Aeroquip No. 370201-) which do not match the couplings on the auxiliary fuel tanks. For ferry or long range purposes the disconnect couplings on above Serial Nos. must be replaced with (Areo quip couplings Nos. 375201-), before installation of auxiliary fuel tank.

6-178. The kit consists of tank, fittings, fuel lines, vent lines, drain lines, valves, a pump and necessary electrical equipment. The 165 U.S. gallon tank supports secure to the deck by bolts to the cargo tie down fittings in the cabin and to the aft bulkhead fittings and turnbuckles. The tank is secured to the support by tie down straps. The 350 U.S. gallon tank is secured to the deck by bolts to the cargo tie down fittings in the cabin and to the aft bulkhead by means of tie rod assemblies between the tank fittings and bulkhead fittings. The 50 U.S. gallon tank or the 60 U.S. gallon tank are secured to the deck by straps attached to the tie down fitting.

6-179. Fuel is pumped from the auxiliary fuel tank to the main fuel cells by an electrically driven transfer pump located in the auxiliary tank. Control of the transfer pump is accomplished from a two-position toggle switch marked TRANSfer PUMP ON - OFF, located on the ENGINE control panel. The pilot is alerted to auxiliary tank low condition by means of a worded segment, on the CAUTION panel which illuminates when activated by the auxiliary tank fuel level switch. A check valve incorporated in the auxiliary fuel flow line prevents fuel flow from the main fuel cells to the auxiliary tank. This valve is so set that fuel cannot free flow from the auxiliary tank to the main fuel cells if fuel cells contain twenty four inches or more fuel, thus eliminating the danger of overfilling the main fuel cells with transfer pump switch in OFF position.

6-180. Electrical power to operate the fuel transfer pump and the low level switch is supplied from the 28 volt dc essential bus. Circuit protection for the transfer pump and low level switch electrical circuit is provided by a circuit breaker marked FUEL PUMP on UH-1A helicopters and FUEL BOOST RIGHT and TRANS on UH-1B helicopters, located on the dc circuit breaker panel.

6-181. *Operation — Transfer Pump*. The procedure herein outlined assumes that the complete auxiliary fuel equipment has been securely installed in the helicopter and the electric transfer pump and the low level switch electrical cables are connected.

a. TRANSFER PUMP switch (on ENGINE control panel) — Position up to ON.

Note

> When the auxiliary fuel tank has emptied of all fuel, the fuel low level switch will function to cause the illumination of the MASTER CAUTION indicator on the instrument panel and the AUX FUEL LOW worded segment on the pedestal mounted caution panel. The pilot must then position the RESET-TEST switch on the caution panel to RESET to extinguish the master caution indicator. The AUX FUEL LOW worded segment will be extinguished when the TRANSfer PUMP switch is OFF.

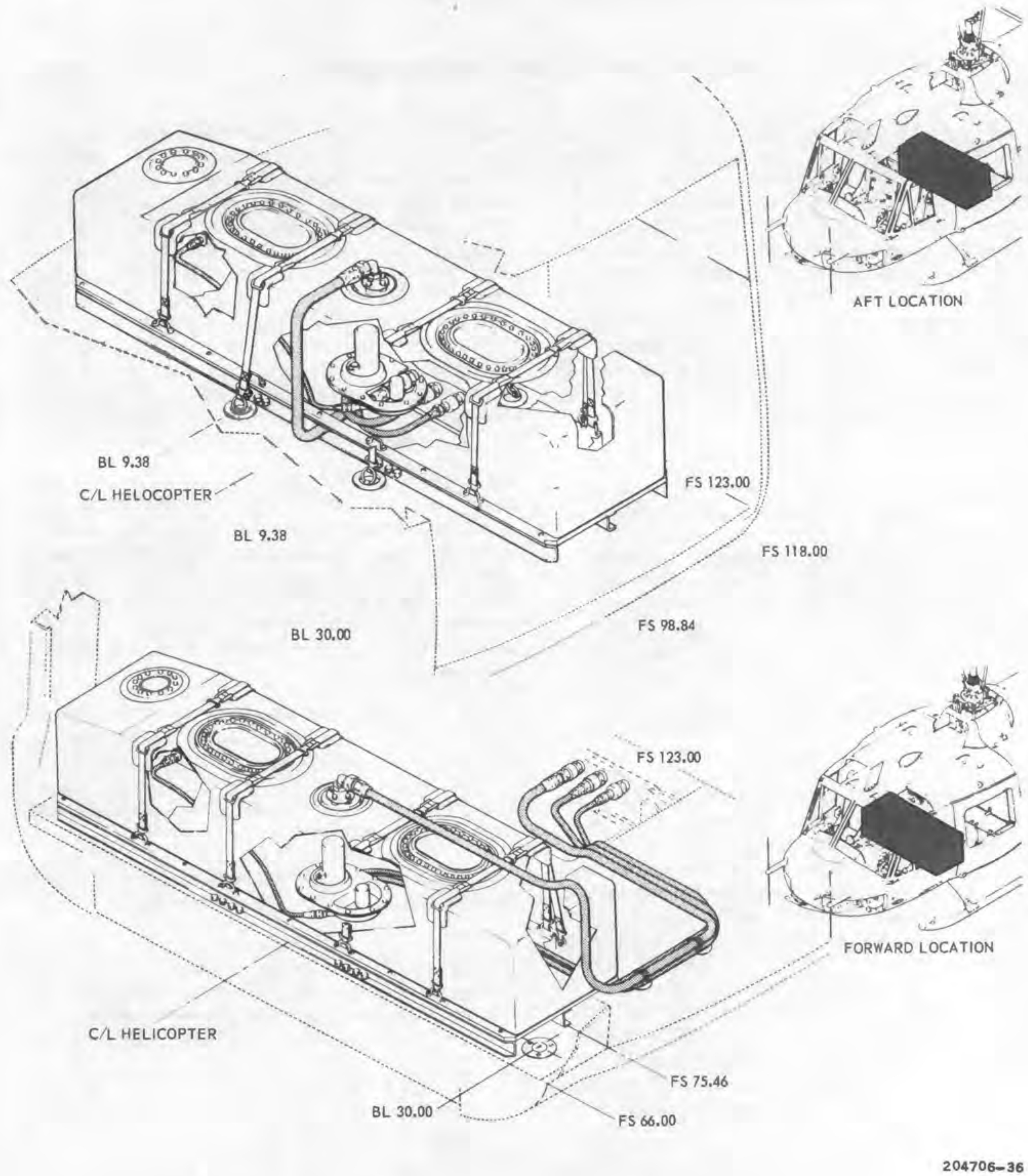
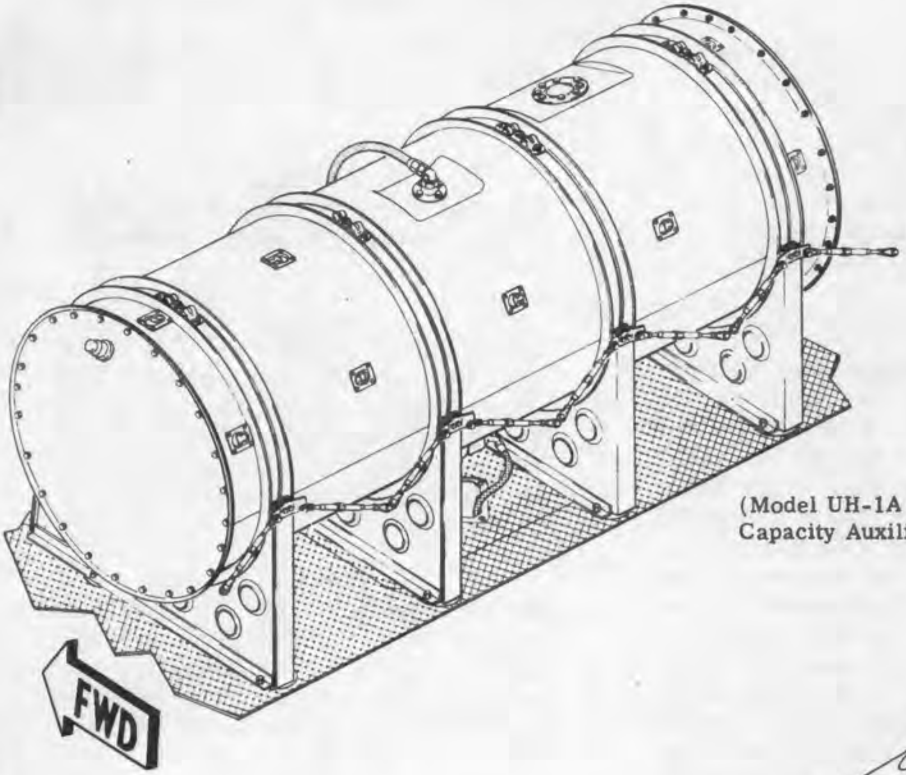
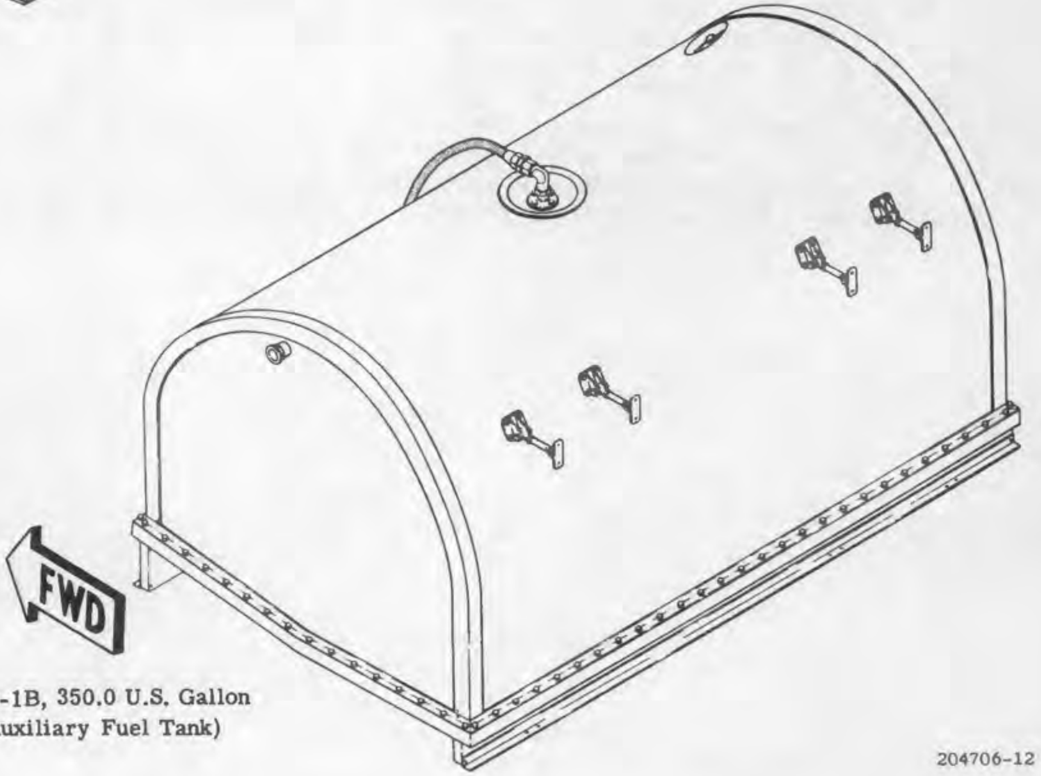


Figure 6-47. Auxiliary fuel equipment (Sheet 1 of 2)



(Model UH-1A & UH-1B, 165.0 U.S. Gallon Capacity Auxiliary Fuel Tank)



(Model UH-1B, 350.0 U.S. Gallon Capacity Auxiliary Fuel Tank)

204706-12

Figure 6-47. Auxiliary fuel equipment (Sheet 2 of 2)

b. TRANSfer PUMP switch — Position down to OFF.

Note

An automatic high-low float switch installed in the left main fuel cell prevents inadvertent overfilling of main fuel cells when TRANSFER PUMP is ON. The pump will not operate when approximately 900 pounds of fuel is in the main cells and will operate when fuel in main cells reaches approximately 700 pounds. Power is supplied from the 28 volt dc essential bus.

B 6-182. External Auxiliary Fuel System. Permanent auxiliary fuel lines and electric lines are installed beneath the floor of the cabin and extending to the lower aft of the cabin area. The terminations of these lines are quick disconnects. Two external auxiliary fuel tanks can be installed, one on each side of the helicopter. Pylons attached to the external stores racks support the external auxiliary fuel tanks. Each tank has an air pump in the top section of the tank. These pumps pressurize the tanks and act as transfer pumps. When the FUEL TRANS PUMP switch on EXT FUEL control panel, is in the ON position fuel is transferred to the main fuel cells, right tank transfers to right cell and left tank transfers to left cell. Float switches in main fuel cells prevent overfilling of main cells. Check valves in lines prevent fuel from draining from main fuel cells to external auxiliary fuel tanks. A JETTISON switch on the EXT FUEL control panel electrically jettisons both tanks if necessary or desirable. An EMERGENCY JETTISON manual release lever is located on the right side of the pedestal. This lever has decals reading, DANGER — PULL TO JETTISON EXTERNAL STORES.

Warning

External fuel tanks should not be jettisoned during transition to autorotation.

Warning

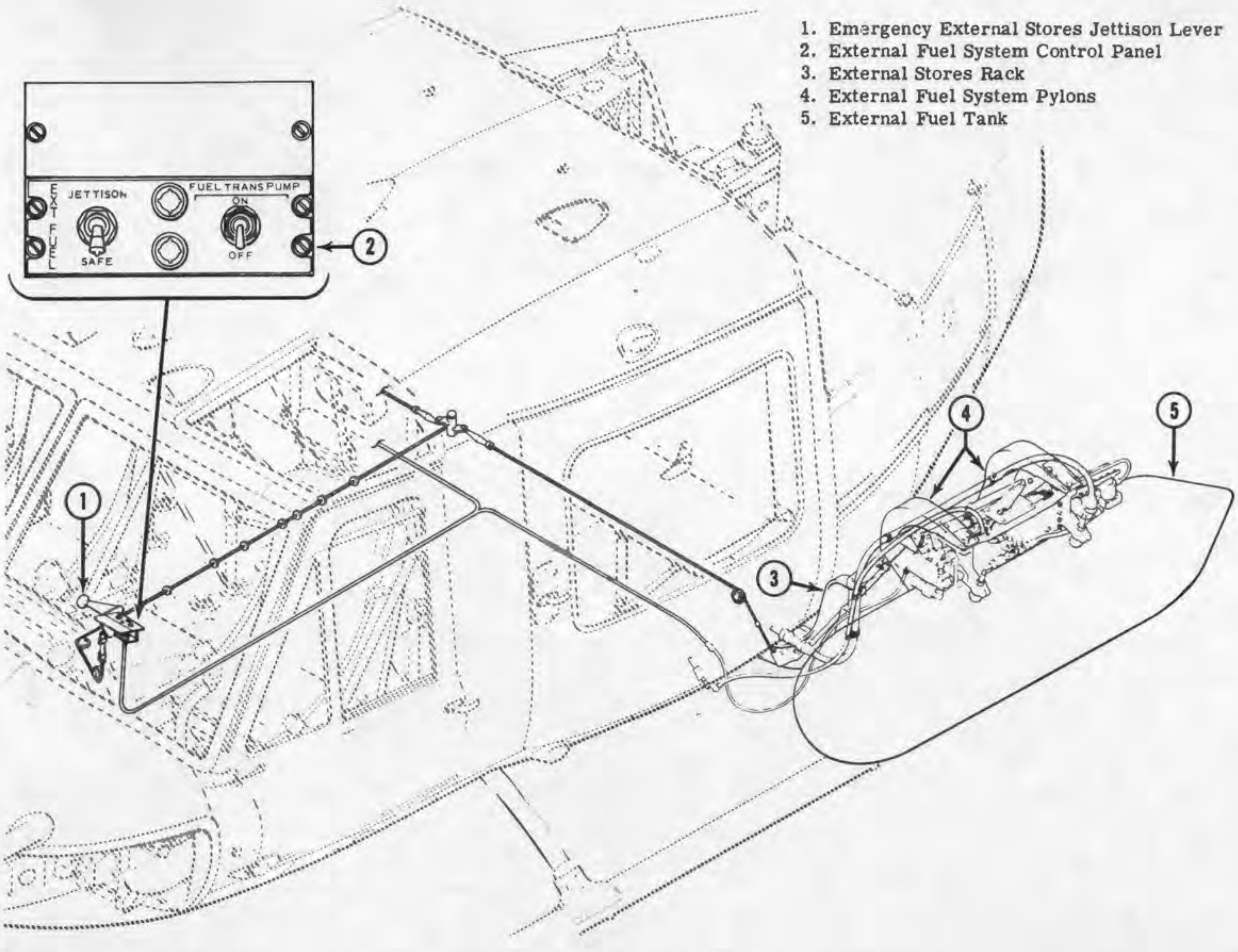
Lateral stick limitations can occur when the aircraft is flown with one full external fuel tank and the other empty or not installed. Hover flights should not be attempted in cross winds of over 10 knots from the side opposite the full tank.

Caution

The external auxiliary fuel system is not electrically connected to the MASTER CAUTION system; therefore, the only indication will be derived by monitoring the main fuel quantity indicator.

Caution

Empty external fuel tanks should not be jettisoned above 60 KIAS. Fuel tanks can be jettisoned in level flight up to the maximum allowable airspeed.



1. Emergency External Stores Jettison Lever
2. External Fuel System Control Panel
3. External Stores Rack
4. External Fuel System Pylons
5. External Fuel Tank

Figure 6–48. External auxiliary fuel system

CHAPTER 7

OPERATING LIMITS

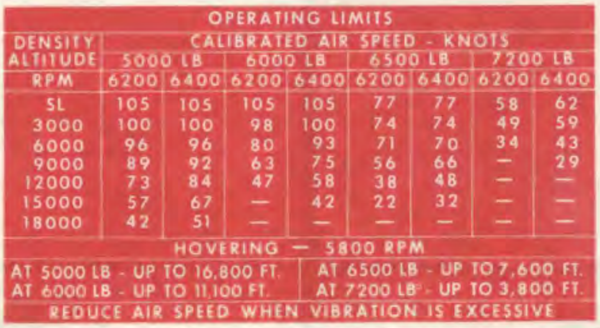
Section I — Scope

7-1. Scope of Operating Limitations Data. All important limitations that must be observed during normal operations of the helicopter are provided in this Chapter.

7-2. Limitations that are characteristic only to a specialized phase of operation are not repeated here.

Section II — Limitations

7-3. Introduction. The flight and engine limitations set forth in this Chapter are the direct result of numerous flight test programs and actual operation experiences. Compliance with these limits will allow YOU, THE PILOT, to safely perform the assigned missions and permit YOU to derive maximum utility from the helicopter, when used for intended purpose. The operating limits decal (see figure 7-1) will serve as a constant reminder during operations. Additional limits concerning maneuvers, (G and loading are also covered in this Chapter.) Close attention must be given to the instrument markings, since they represent limitations that are not necessarily repeated in the text.



OPERATING LIMITS

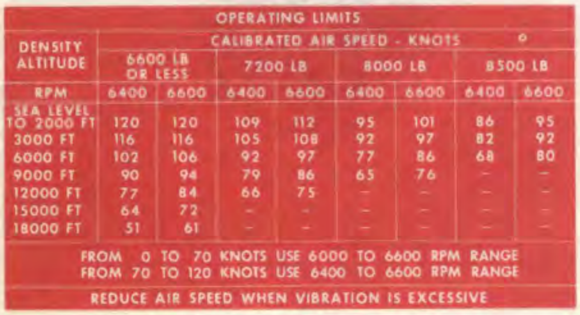
DENSITY ALTITUDE	CALIBRATED AIR SPEED - KNOTS							
	5000 LB		6000 LB		6500 LB		7200 LB	
RPM	6200	6400	6200	6400	6200	6400	6200	6400
SL	105	105	105	105	77	77	58	62
3000	100	100	98	100	74	74	49	59
6000	96	96	80	93	71	70	34	43
9000	89	92	63	75	56	66	—	29
12000	73	84	47	58	38	48	—	—
15000	57	67	—	42	22	32	—	—
18000	42	51	—	—	—	—	—	—

HOVERING — 5800 RPM

AT 5000 LB - UP TO 16,800 FT.
AT 6000 LB - UP TO 11,100 FT.
AT 6500 LB - UP TO 7,600 FT.
AT 7200 LB - UP TO 3,800 FT.

REDUCE AIR SPEED WHEN VIBRATION IS EXCESSIVE

UH-1A



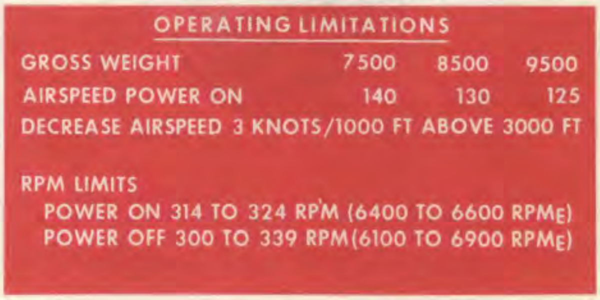
OPERATING LIMITS

DENSITY ALTITUDE	CALIBRATED AIR SPEED - KNOTS							
	6600 LB OR LESS		7200 LB		8000 LB		8500 LB	
RPM	6400	6600	6400	6600	6400	6600	6400	6600
SEA LEVEL TO 2000 FT	120	120	109	112	95	101	86	95
3000 FT	116	116	105	108	92	97	82	92
6000 FT	102	106	92	97	77	86	68	80
9000 FT	90	94	79	86	65	76	—	—
12000 FT	77	84	66	75	—	—	—	—
15000 FT	64	72	—	—	—	—	—	—
18000 FT	51	61	—	—	—	—	—	—

FROM 0 TO 70 KNOTS USE 6000 TO 6600 RPM RANGE
FROM 70 TO 120 KNOTS USE 6400 TO 6600 RPM RANGE

REDUCE AIR SPEED WHEN VIBRATION IS EXCESSIVE

UH-1B



OPERATING LIMITATIONS

GROSS WEIGHT	7500	8500	9500
AIRSPEED POWER ON	140	130	125

DECREASE AIRSPEED 3 KNOTS/1000 FT ABOVE 3000 FT

RPM LIMITS
POWER ON 314 TO 324 RPM (6400 TO 6600 RPM_E)
POWER OFF 300 TO 339 RPM(6100 TO 6900 RPM_E)

UH-1B (540)

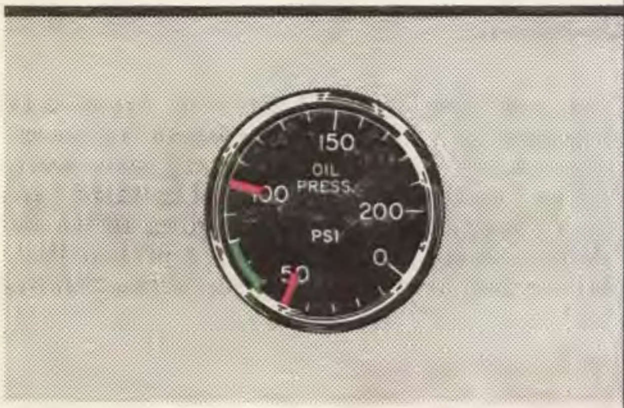
204072-28

Figure 7–1. Operating limits decals

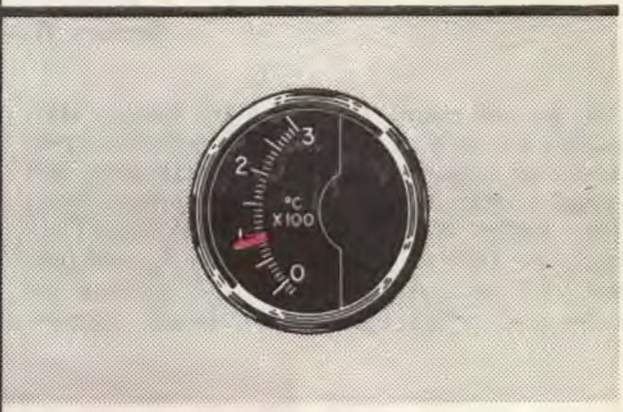
INSTRUMENT MARKINGS

FUEL
GRADE
JP-4

FUEL PRESSURE
🟩 5 to 20 PSIG Continuous Operation



ENGINE OIL PRESSURE
🟥 50 PSI Minimum
🟩 60 to 80 PSI Continuous Operation
🟥 100 PSI Maximum



ENGINE OIL TEMPERATURE
🟥 88°C Maximum

TRANSMISSION OIL PRESSURE
🟥 30 PSI Minimum
🟩 40 to 60 PSI Continuous Operation
🟥 70 PSI Maximum

TRANSMISSION OIL TEMPERATURE
🟥 110°C Maximum

204070-75-1A

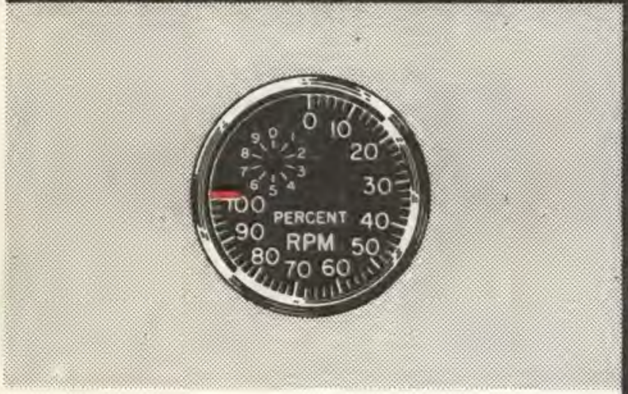
Figure 7–2. Instrument markings (UH-1A) (Sheet 1 of 6)

INSTRUMENT MARKINGS

AIR SPEED

🟥 105 Knots Maximum
🟨 Above 70 Knots 6200 RPM Min.

FUEL
GRADE
JP-4

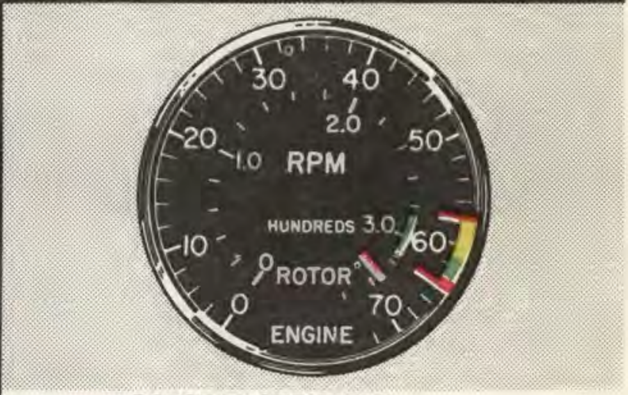


GAS PRODUCER TACHOMETER

🟥 98% Maximum

EXHAUST TEMPERATURE

🟩 385°C to 570°C Continuous Operation
🟥 595°C 30 Minute Limit
🟥 760°C Maximum During Starting and Acceleration



ROTOR TACHOMETER

🟩 285 to 314 RPM Continuous Operation
🟥 330 RPM Maximum for Autorotation

ENGINE TACHOMETER

🟥 5800 RPM Minimum for Flight
🟨 5800 to 6200 RPM 0 to 70 Knots
🟩 6200 to 6400 RPM Continuous Operation
🟥 6400 RPM Maximum

TORQUEMETER

🟥 34 PSI Maximum

204070-75A

Figure 7–2. Instrument markings (UH-1A) (Sheet 2 of 6)

INSTRUMENT MARKINGS

FUEL
GRADE
JP-4

FUEL PRESSURE
🟩 5 to 20 PSIG Continuous Operation

ENGINE OIL PRESSURE
🟥 25 PSI Minimum
🟥 80 PSI Maximum
🟩 60 to 80 PSI Continuous Operation

🟥 ENGINE OIL TEMPERATURE
93°C Maximum

TRANSMISSION OIL PRESSURE
🟥 30 PSI Minimum
🟩 40 to 60 PSI Continuous Operation
🟥 70 PSI Maximum

TRANSMISSION OIL TEMPERATURE
🟥 110°C Maximum

204070-41-1C

Figure 7-2. Instrument markings – T53-L-5 (UH-1B) (Sheet 3 of 6)

INSTRUMENT MARKINGS

AIR SPEED

🟥 120 Knots Maximum

🟨 Above 70 Knots 6400 RPM Min.

FUEL GRADE JP-4

GAS PRODUCER TACHOMETER

🟥 98% Maximum

ROTOR TACHOMETER

🟩 294 to 324 RPM Continuous Operation

🟥 339 RPM Maximum for Autorotation

ENGINE TACHOMETER

🟨 6000 to 6400 RPM 0 to 70 Knots

🟩 6400 to 6600 RPM Continuous Operation

🟥 6600 RPM Maximum

EXHAUST TEMPERATURE

🟩 385°C to 590°C Continuous Operation

🟨 590°C to 600°C 30 Minute Limit

🟥 610°C 5 Minute Limit

🟥 760°C Max. for Starting and Acceleration

TORQUEMETER

🟥 50 PSI Maximum

204070-41-2D

Figure 7–2. Instrument markings – T53-L-5 (UH-1B) (Sheet 4 of 6)

INSTRUMENT MARKINGS

T53-L-11 ENGINES JP-4 OR JP-5

FUEL PRESSURE
🟩 5 to 25 PSI Continuous Operation

ENGINE OIL PRESSURE
🟥 25 PSI Minimum
🟥 80 PSI Maximum

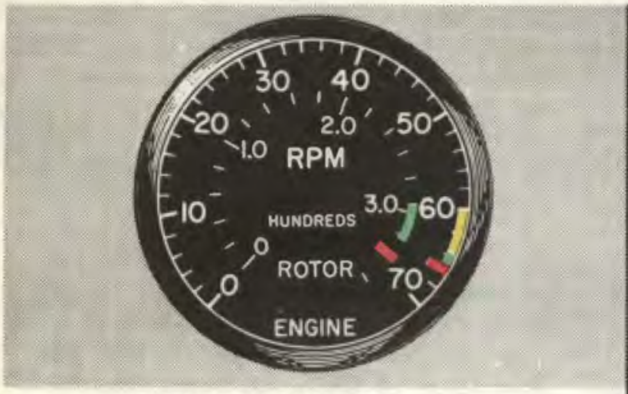
ENGINE OIL TEMPERATURE
🟥 93°C Maximum

TRANSMISSION OIL PRESSURE
🟥 30 PSI Minimum
🟩 40 to 60 PSI Continuous Operation
🟥 70 PSI Maximum

TRANSMISSION OIL TEMPERATURE
🟥 110°C Maximum

204070-49-6A

Figure 7-2. Instrument markings – T53-L-9/11 (UH-1B) (Sheet 5 of 6)



ROTOR TACHOMETER

🟩 294 to 324 RPM Continuous Operation

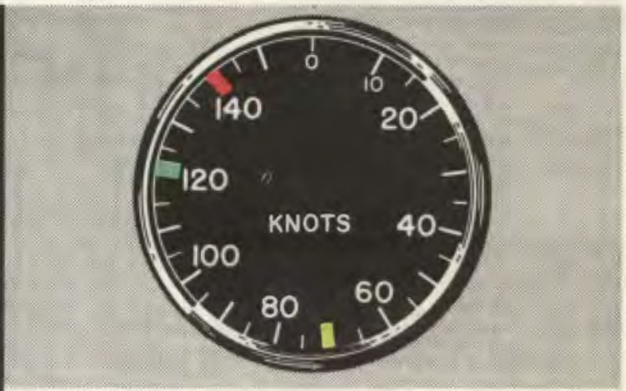
🟥 339 RPM Maximum for Autorotation

ENGINE TACHOMETER

🟨 6000 to 6400 RPM 0 to 70 Knots

🟩 6400 to 6600 RPM Continuous Operation

🟥 6600 RPM Maximum

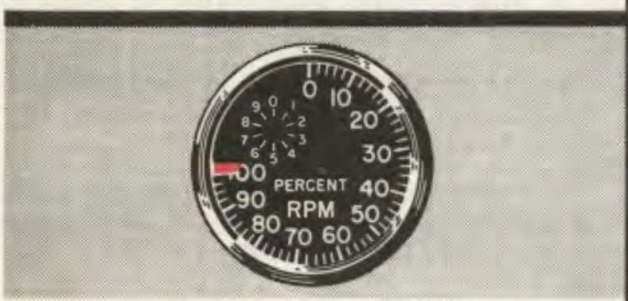


AIRSPEED

🟩 120 Knots Maximum

🟨 Above 70 Knots 6400 RPM Minimum

🟥 140 Knots Maximum (540)



GAS PRODUCER TACHOMETER

🟥 98 Percent Maximum

TORQUEMETER

🟥 50 PSI Maximum

EXHAUST TEMPERATURE

🟩 390°C to 620°C Continuous Operation

🟨 620°C to 640°C 30 Minute Limit

🟥 640°C 5 Minute Limit

🟥 760°C Maximum for Starting and Acceleration

INSTRUMENT MARKINGS

FUEL
GRADE
JP-4

T53-L-11 ENGINES JP-4 OR JP-5

204070-49-6A

Figure 7-2. Instrument markings – T53-L-9/11 (UH-1B) (Sheet 6 of 6)

7-4. Minimum Crew Requirements. The minimum crew requirements for all missions, with the exception of training missions consists of only the pilot, whose station is on the right side. Additional crew members, as required, will be added at the discretion of the Commanding Officer in accordance with appropriate Department of Army Regulations.

7-5. Instrument Markings. The operating ranges for both the helicopter and the engine are shown in figure 7-2.

A **7-6. Engine Limitations.** The T53-L-1/1A gas turbine power plant in this installation is rated to an output torque value equivalent to 860 hp at 6400 rpm for the take-off (Mil. Power) and 770 hp at 6200 to 6400 rpm for continuous operation.

B **5** 7-7. The T53-L-5 gas turbine power plant in this installation is rated to an output torque value equivalent to 960 hp at 6600 rpm for take-off and 825 hp at 6400 to 6600 rpm for continuous operation.

B **9** 7-8. The T53-L-9/9A gas turbine power plants in this installation are rated to an output torque valve equivalent to 1100 hp at 6600 rpm for take-off and 900 hp at 6400 to 6600 rpm for continuous operation.

B **11** 7-9. The T53-L-11 gas turbine power plant in this installation is rated to an output torque value equivalent to 1100 hp at 6600 rpm for take-off and 900 hp at 6400 to 6600 rpm for continuous operation.

7-10. Rotor Limitations. The normal operating range of the main rotor is 285 to 314 rpm and is marked on the dual tachometer as a green arc on the face of the instrument. Autorotation main rotor speed shall not exceed 330 rpm. Main rotor speeds in excess of 330 rpm shall be logged. Rotor Operating Limits Decal located at the lower center of the instrument panel gives limitations at conditions of specified altitudes and gross weights.

B 7-11. The normal operating range of the main rotor is 294 to 324 rpm and is marked on the dual tachometer as a green arc on the face of the instrument. Autorotation main rotor speed shall not exceed 339 rpm. Main rotor speeds in excess of 339 rpm shall be logged. Rotor Operating Limits Decal located at the lower center of the instrument panel gives limitations at conditions of specified altitudes and gross weights.

7-12. Airspeed Limitations. The maximum permissible indicated forward airspeed is 105 knots for UH-1A helicopters and 120 knots for UH-1B helicopters and 140 knots for **5** **4** **0**. Sideward and rearward airspeeds should be limited to 40 knots which necessarily must be estimated for reason of the instruments required to provide these indications have been considered unnecessary.

Warning

> When parachutists are to jump from aircraft, the indicated airspeed during the actual jumps should not be less than 50 knots nor more than 70 knots.

7-13. Prohibited Maneuvers. In-flight maneuvers are restricted as follows:

a. No aerobatic maneuvers permitted.

b. Protracted rearward flight and downwind hovering are prohibited.

c. The speed for any and all maneuvers shall not exceed the level flight velocities as stated in Airspeed Limitations.

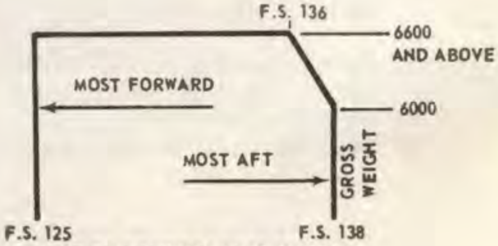
d. Partial-power descents shall be accomplished at landing approach speed not less than shown on the Landing Power Off Chart, Chapter 14.

7-14. Hovering Limitations. Hovering performance limits for the helicopter are shown in Chapter 14. Your attention is called to the fact that hovering in-ground-effect at altitudes from contact to 10 feet does not involve a time element, as there are no ground resonance characteristics peculiar to this helicopter.

7-15. Center of Gravity Limitations. Center of gravity and weight limitations are as follows:

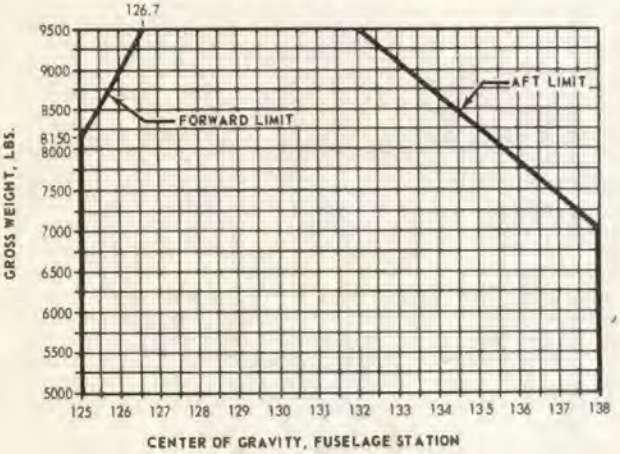
A Forward CG — Station 128.0
Aft CG — Station 137.5

B



CENTER OF GRAVITY LIMITS DIAGRAM

5 **4** **0** Forward C.G. — Station 125 to 8150 lbs. Varies to Sta. 126.7 @ 9500 lbs.
Aft C. G. — Sta. 138 to 7000 lbs. Varies to Sta. 132.0 @ 9500 lbs.



7-16. Weight Limitations Chart. The function of the weight limitations chart (see chart 7-1) is to provide the flight crew with a rapid means of determining the load carrying capabilities of the helicopter while remaining within the safe operating limits. Performance, due to the requirements of a particular mission as well as structural limitations, may restrict the maximum weight at which the helicopter can be flown. Center of gravity of the helicopter is not a consideration in the information presented in the Weight Limitations Chart. This data is available by use of the charts A and E, Chapter 12.

A **7-17.** ***Basic Operating Weight.*** The operating weight on which the chart is based is 4220 pounds. This weight is the weight of the helicopter ready to fly except for the two variables, and is the approximate basic helicopter weight shown on Chart C of Chapter 12 plus the weight of one pilot and tank of oil. The intersection of the Cargo or Passenger Load and the Fuel Load axis at zero, represents this basic operating weight. The chart indicates the various combinations that can be added to the basic operating range. Since the actual weights of the individual helicopters vary, it will be necessary to adjust the chart, determine the actual basic weight of the helicopter from Chart C of Chapter 12 and add 200 pounds for the pilot and 12 pounds for tank of oil. If the actual weight exceeds 4220 pounds, subtract the difference between actual weight and 4220 pounds from the Cargo or Passenger Load as shown on the chart. If the actual weight is less than 4220 pounds, add the difference to the Cargo or Passenger Load as shown on the chart.

A **7-18.** ***Gross Weights.*** Three gross weights of the loaded helicopter are shown as diagonal lines on the chart: 5800 pounds, 6100 pounds and 7200 pounds. Flight load factors, landing gear load factors, and performance data are shown at each of these weights.

A **7-19.** ***Structural Limitations.*** There are no structural limitations shown on the chart. The flight load factor of 2.0 is at a weight above 8100 pounds and the landing gear load factor of 2.0 is at a weight of 12,000 pounds, both of which are beyond the upper limits of the chart.

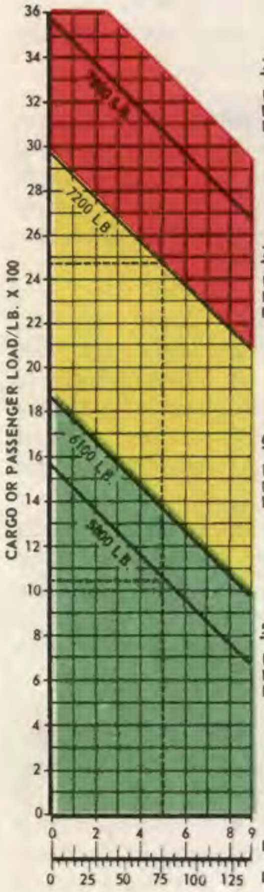
A **7-20.** ***Performance Data.*** Performance data is presented on the chart for gross weights of 5800 pounds, 6100 pounds and 7200 pounds. The maximum recommended take-off weight is established at 7200 pounds at sea level due to performance capabilities of the helicopter.

A **7-21.** ***Landing Gear Limitations.*** The landing gear on this helicopter is of a yielding type construction with a load factor of 3.29 for 6100 pounds at a sinking speed of eight feet per second. The landing gear has been safety drop tested to 5400 pounds. Landing gear load factor at this weight is 3.64.

A **7-22.** ***Green Area.*** The green area represents loading conditions that present no particular problems in regard to strength or performance except for gross weights in excess of 5850 pounds, the airspeed should be reduced according to chart 7-1. The green area is bounded by the ferry mission operating weight of 6100 pounds.

A **7-23.** ***Yellow Area.*** The yellow area represents loading of progressively increasing risk as the red area is approached. Care must be exercised when operating within this area as performance and flight load factors decrease. This area is bounded by the overload gross weight line, 7200 pounds.

A **7-24.** ***Red Area.*** The red area of the chart represents loadings that should not be used except under conditions of extreme emergency when safety of flight is of secondary importance.



7800 POUNDS

Flight Load Factor =2.08
Landing Gear Load Factor =2.72
Performance on Standard Day Out of Ground Effect
  Best Rate of Climb at Sea Level with Maximum Power = 1270 fpm at 60 Knots
  Service Ceiling with Maximum Power = 7000 Feet
  Vertical Rate of Climb at Sea Level Using Maximum Continuous Power = 90 fpm
  Hovering Ceiling = 2000 Feet

7200 POUNDS – OVERLOAD GROSS WEIGHT

Flight Load Factor = 2.25
Landing Gear Load Factor = 2.89
Performance on Standard Day Out of Ground Effect
  Best Rate of Climb at Sea Level with Maximum Power = 1540 fpm at 58 Knots
  Service Ceiling with Maximum Power = 9100 Feet
  Vertical Rate of Climb at Sea Level Using Maximum Continuous Power = 460 fpm
  Hovering Ceiling = 6600 Feet

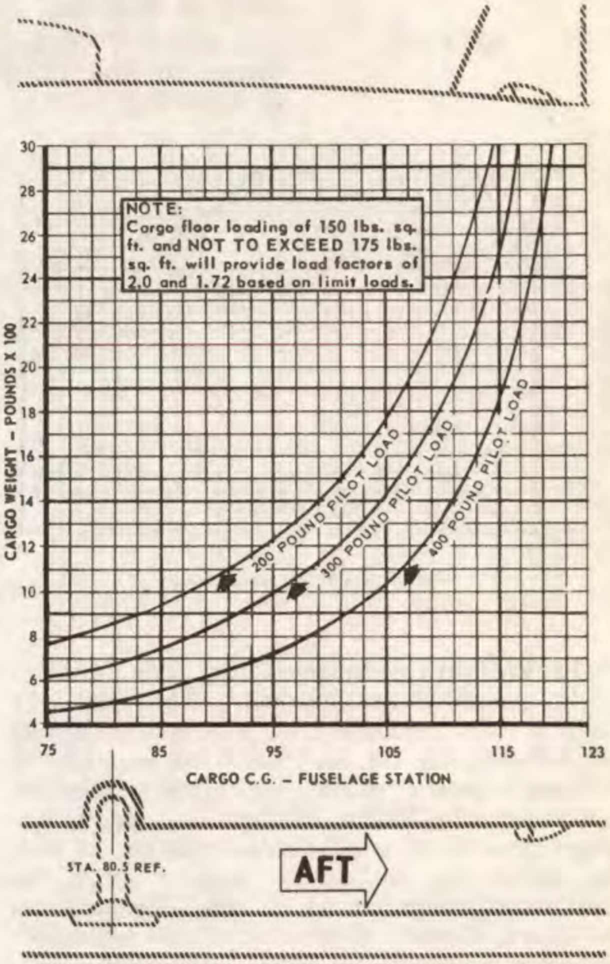
6100 POUNDS – FERRY MISSION OPERATING WEIGHT

Flight Load Factor = 2.66
Landing Gear Load Factor = 3.29
Performance on Standard Day Out of Ground Effect
  Best Rate of Climb at Sea Level with Maximum Power = 2230 fpm at 56 Knots
  Service Ceiling with Maximum Power = 13,800 Feet
  Vertical Rate of Climb at Sea Level using Maximum Continuous Power = 1420 fpm
  Hovering Ceiling = 11,900 Feet

5800 POUNDS – NORMAL GROSS WEIGHT

Flight Load Factor = 2.79
Landing Gear Load Factor = 3.42
Performance on Standard Day Out of Ground Effect
  Best Rate of Climb at Sea Level with Maximum Power = 2420 fpm at 55 Knots
  Service Ceiling with Maximum Power = 15,200 Feet
  Vertical Rate of Climb at Sea Level Using Maximum Continuous Power = 1760 fpm
  Hovering Ceiling = 13,500 Feet

FUEL CONVERSION FACTOR 6.5 LB/GALLON



WEIGHT LIMITATIONS CHART

INTERNAL CARGO CHART
WEIGHT VS CG LIMITATIONS

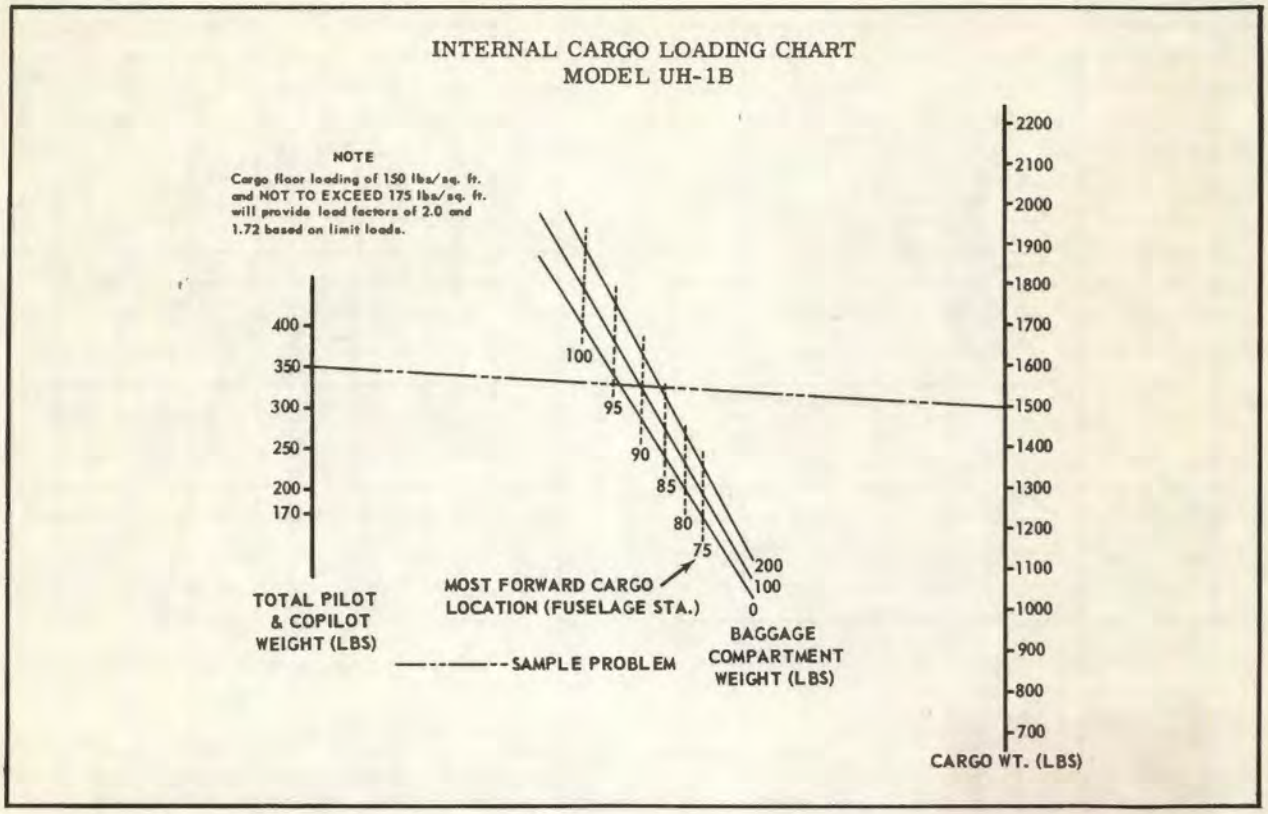
🟩	RECOMMENDED LOADING
🟨	CAUTIONARY LOADING
🟥	NOT RECOMMENDED LOADING
--------	EXAMPLE PROBLEM

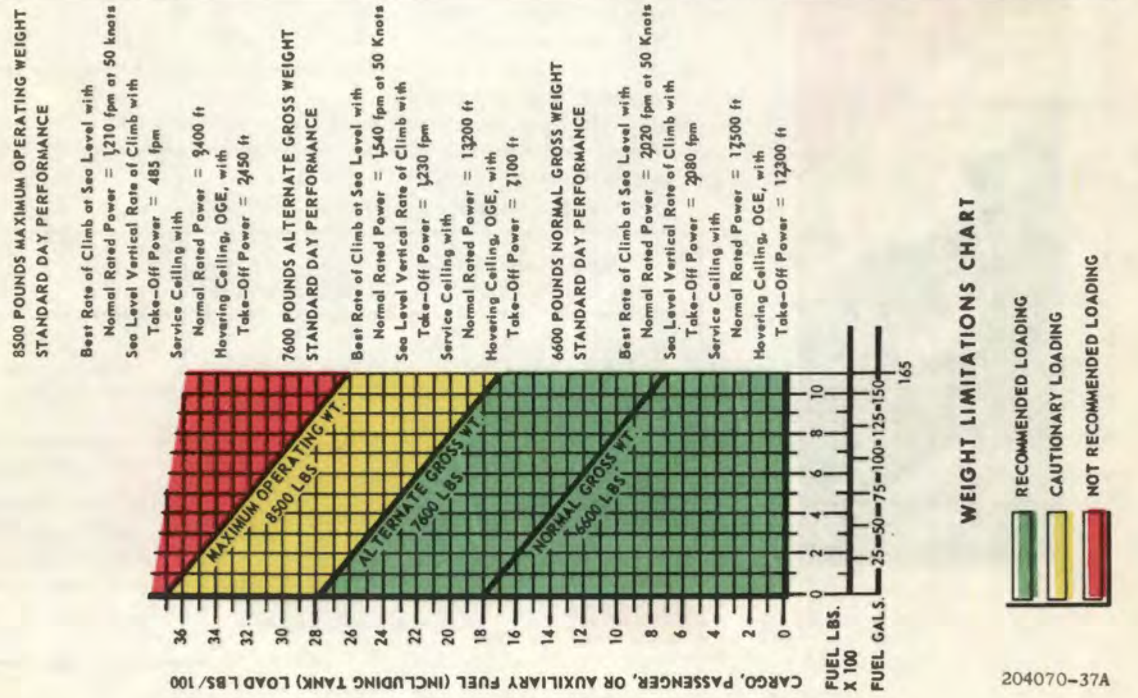
REMARKS:

1. Horizontal base line No. 4 on chart represents the deck of cargo compartment.
2. Station 75 is located just aft of the pilot's seat, and is the approximate forward edge of the cargo door.
3. Station 123 is the location of the aft cabin bulkhead.
4. The flow curves represent different pilot's or pilot's and copilot's weights as shown. CG of the cargo shall be located on or aft of the applicable fuselage station.

204900–68

Chart 7–1. Weight limitations and cargo chart — UH-1A (Sheet 1 of 3)





8500 POUNDS MAXIMUM OPERATING WEIGHT
STANDARD DAY PERFORMANCE

Best Rate of Climb at Sea Level with
Normal Rated Power = 1,210 fpm at 50 knots
Sea Level Vertical Rate of Climb with
Take–Off Power = 485 fpm
Service Ceiling with
Normal Rated Power = 9,400 ft
Hovering Ceiling, OGE, with
Take–Off Power = 2,450 ft

7600 POUNDS ALTERNATE GROSS WEIGHT
STANDARD DAY PERFORMANCE

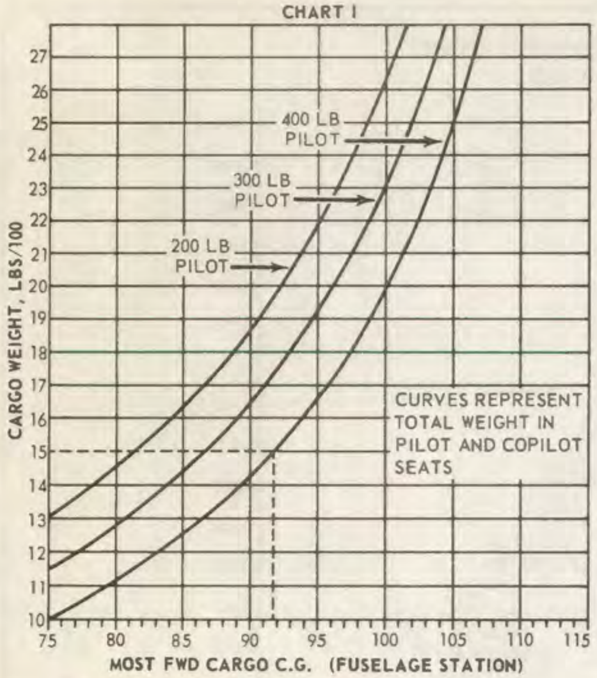
Best Rate of Climb at Sea Level with
Normal Rated Power = 1,540 fpm at 50 Knots
Sea Level Vertical Rate of Climb with
Take–Off Power = 1,230 fpm
Service Ceiling with
Normal Rated Power = 13,200 ft
Hovering Ceiling, OGE, with
Take–Off Power = 7,100 ft

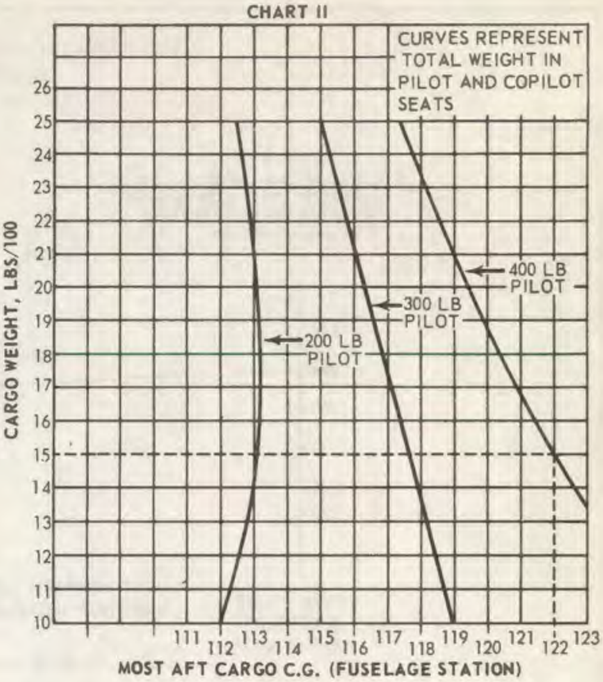
6600 POUNDS NORMAL GROSS WEIGHT
STANDARD DAY PERFORMANCE

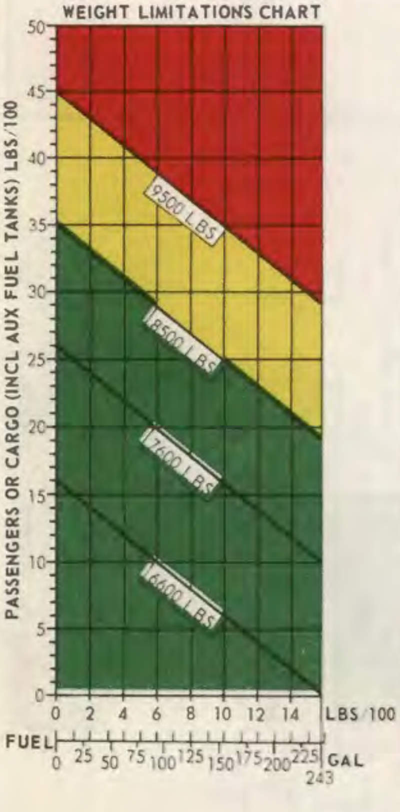
Best Rate of Climb at Sea Level with
Normal Rated Power = 2,020 fpm at 50 Knots
Sea Level Vertical Rate of Climb with
Take–Off Power = 2,080 fpm
Service Ceiling with
Normal Rated Power = 17,500 ft
Hovering Ceiling, OGE, with
Take–Off Power = 12,300 ft

204070–37A

Chart 7–1. Weight limitations and cargo chart — UH-1B (Sheet 2 of 3)







STANDARD DAY PERFORMANCE

	6600 LBS	7600 LBS	8500 LBS	9500 LBS
Best R/C @ S.L. with N.R.P (feet per minute)	1810	1410	1125	865
Vertical R/C @ S.L. with T.O.P. (feet per minute)	1960	1140	385	
Service Ceiling with N.R.P. (Feet)	21,150	16,880	13,400	9700
Hovering Ceiling, OGE, with T.O.P. (Feet)	11,800	6450	1850	
Hovering Ceiling, IGE, with T.O.P. (Feet)	15,600	10,900	6650	2250

🟩 Recommended Loading

🟨 Cautionary Loading

🟥 Not Recommended Loading

NOTE

Cargo floor loading of 150 lbs/sq.ft. and NOT TO EXCEED 175 lbs/sq.ft. will provide load factors of 2.0 and 1.72 based on limit load.

540200-2

Chart 7-1. Weight limitations and cargo chart — (UH-1B 540) (Sheet 3 of 3)

CHANGE No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *18 March 1966*

Operator's Manual

ARMY MODELS UH-1A AND UH-1B HELICOPTERS

TM 55-1520-211-10, 28 December 1965, is changed as follows:

1. Remove and insert pages as indicated below.

	Remove pages	*Insert pages*
Chapter 3, section II	3-5 and 3-6	3-5 and 3-6

2. Retain this transmittal sheet in front of the manual for future reference.

By Order of the Secretary of the Army:

HAROLD K. JOHNSON,
General, United States Army,
Chief of Staff.

Official:
J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

Distribution:
To be distributed in accordance with DA Form 12-31 requirements for Operator and Crew Instructions for UH-1 Aircraft.

☆ U. S. GOVERNMENT PRINTING OFFICE: 1966—204433/2176

nn. MARKER BEACON light–TEST.

oo. CARGO RELEASE ARMED warning light–TEST.

pp. CAUTION panel and MASTER CAUTION–TEST.

qq. GOVernor RPM INCRease–DECRease switch–Decrease 8 to 10 seconds.

rr. Search light switch–STOW.

ss. Landing light switches–OFF and RETRact.

tt. Throttle–Position the throttle just below the ENGINE IDLE stop release (for abort start purposes).

3–20. Starting Engine.

a. Fire Guard Posted

b. Check Rotor Blades Clear

c. Energize Starter and Start Clock (Start fuel flow and ignition occur simultaneously)

CAUTION

Check DC Voltmeter, if voltage drops below 14 volts, abort ~~start.~~

d. Start Fuel Switch – Off at 400°C.

CAUTION

Monitor EGT to avoid a hot start. If uneven or intermittent acceleration is accompanied by a rapid rise in EGT, shut down engine and immediate investigate. During starting or acceleration, the MAXIMUM allowable EGT is 760°C. If this limit is exceeded, perform a hot end inspection. If during the start operation of T53L-5, T53-L-9 or T53-L-9A engines, EGT exceeds 620°C for more than five seconds, record a hot start on DA Form 2408A, and three such hot starts shall require a hot end inspection. If during the start operation of the T53-L-11 engine, EGT exceeds 650°C for more than five seconds, perform a hot end inspection.

e. Release Starter Switch at 40% nl speed.

CAUTION

Limit starter energize time to 40 seconds. If engine does not start, a three minute cooling period is recommended after which a second starting cycle may be attempted. Only three forty-second starting attempts are permissible in any one hour period.

f. Slowly advance the throttle over the ENGINE IDLE stop.

g. INVERTER-Spare ON

h. ENGINE AND TRANSMISSION OIL PRESSURES – CHECK

CAUTION

~~If no oil pressure is evident at this time,~~ shut down engine immediately and investigate the cause.

i. START FUEL SWITCH – ON

j. Radios and Headsets – ON

3-21. Engine Run-Up. Retard the throttle to the ENGINE IDLE stop and check the following:

a. GAS PRODUCER, 56% to 58% RPM.

b. ENGINE and TRANSmission OIL PRESSure–in the green.

c. FUEL PRESSURE– in the green.

d. CAUTION panel and MASTER CAUTION–all lights OFF.

e. LOW RPM switch—AUDIO then OFF.

f. Copilot's attitude indicator—CAGE.

g. FUEL (QUANITY) GAGE TEST switch—TEST.

h. PITOT HEATER—ON-note LOAD meter increase then OFF.

i. AC power voltmeter—CHECK all Phases for 115 (plus or minus three) volts (on SPARE INVerter).

j. INVerter—MAIN ON.

k. AC power voltmeter—CHECK all Phases for 115 (plus or minus three) volts.

l. DC power voltmeter—CHECK all positions and leave in NON-ESSential BUS position.

m. STARTER GENerator—STand BY GENerator.

n. MAIN GENerator—OFF note that MAIN GENerator LOADmeter zeros and STand BY GENerator LOAD meter registers.

o. DC power voltmeter—CHECK voltage zero (with NON-ESSential BUS power OFF).

p. NON-ESSential BUS-NORMAL ON.

q. DC power voltmeter—MAIN GENerator.

r. MAIN GENerator—ON-note that MAIN GENerator LOAD meter registers and STand BY GENerator LOADmeter zeros.

s. STand BY GENerator—START.

t. Pilot's attitude indicator—SET. Increase throttle to 70% gas producer rpm and perform. Emergency Power Control Test as follows:

(1) GOVernor swtch—EMERgency.

(2) GAS PRODUCER RPM—note decrease to 65% rpm.

(3) GOVernor switch—AUTOmatic—note increase to 70% GAS PRODUCER RPM. This constitutes an adequate test of ability to switch from AUTOmatic to EMERgency and then back to AUTOmatic only.

u. Increase throttle slowly to FULL OPEN noting that the engine rpm stabilizes at 6000 plus or minus 50 rpm. Then accomplish the following:

v. All engine and transmission instruments normal or in the green.

w. DE-ICE switch—ON. Note EGT rise.

x. DE-ICE switch—OFF. Note EGT decrease.

y. LOW RPM switch—AUDIO.

z. GOVernor RPM INCRease—DECRease switch. Actuate through full range:

A 5800 to 6700 rpm plus or minus 50 rpm set at 6400 rpm.

B 6000 to 6700 rpm plus or minus 50 rpm set at 6600 rpm.

Note

Check that audio LOW RPM warning ceases and visual LOW RPM warning light goes off.

aa. FORCE TRIM — OFF — Check control freedom then ON.

bb. HYDRaulic CONTROL — OFF — CAREFULLY check for control freedom then — ON.

5 **4** **0** Check System number 1 and system number 2 then BOTH.

Caution

Extreme care must be exercised if the collective pitch is raised, as an upward force is present which could cause the helicopter to rise from the ground unexpectedly if the hydraulic off forces are not properly adjusted.

cc. ANTI-COLLision light—ON.

3-22. Before Take-Off. Just prior to take-off check:

Note

Taxiing as literally interpreted is not applicable for reason of the skid type landing gear. Movement of the helicopter from one ground position to another can be accomplished by the pilot flying from spot to spot at any altitude in close proximity to ground surface.

a. Collective pitch control—Minimum pitch and friction adjusted as desired.

b. Cyclic control—Neutral or slightly into wind.

B Friction as desired.

c. Flight instruments—Check operation and settings.

Note

Operating weight should never exceed that required for the mission, since unnecessary risk and equipment wear will result. The data shown on the chart is for information and guidance; however, take-off weight must be considered, especially at high ground altitude, as to the available runways, surrounding terrain, atmospheric temperatures, mission requirements, and urgency of the mission. Whenever the helicopter has been operated at gross weight above 7200 pounds, a suitable entry of airspeed and weight should be made in DA Form 2804 A.

A ***7-25. Use of the Chart — Problem.*** In accomplishing a particular mission it is necessary to carry 500 pounds of fuel. Determine the maximum cargo load that can be carried.

7-26. Solution. The chart basic operating weight will be used as actual helicopter weight in this problem. Step e. and f. will show how to adjust the chart for actual basic weight variations.

a. Establish the basic operating weight of the helicopter by completing a Form F of Chapter 12 using the latest basic weight from Chart C of Chapter 12. Actual weight assumed to the chart weight (4220 pounds) for this problem.

b. Project the fuel weight of 500 pounds vertically until the normal gross weight line (5800 pounds) is intersected. From the intersection of the two lines, project horizontally to the cargo load scales and read 1050 pounds. This weight is the maximum cargo load that can be carried with 500 pounds of fuel to remain at normal gross weight.

c. If it is necessary to exceed the normal gross weight and the reduced load factor and performance at a higher gross weight is satisfactory for the requirements of the particular mission, project the fuel weight of 500 pounds vertically until the overload gross weight line (7200 pounds) is intersected. From this intersection, project horizontally to the cargo scale and read 2480 pounds.

d. When this information is obtained, it is then necessary to refer to the Internal Cargo Chart-Weight vs CG Limitations chart 7-1, to obtain cargo placement information so that the center of gravity of the helicopter will be within the operating range.

e. If the actual weight of the helicopter is 4270 pounds instead of 4220 pounds, the chart must be adjusted by reducing the cargo weight. Therefore, in step b., above, the cargo weight will be 1050 pounds minus 50 pounds, which the helicopter is overweight or 1000 pounds. In step c., above, the cargo weight will be 2480 pounds minus 50 pounds equals to 2430 pounds.

f. If the actual weight of the helicopter is 4170, the chart must be adjusted by increasing the cargo weight. For normal gross weight cargo will be 1050 pounds which equals 1100 pounds. At overload gross weight the cargo will be 2480 pounds plus 50 pounds or 2530 pounds.

B ***7-27. Basic Operating Weight.*** The operating weight on which the chart is based is 4835 pounds. This weight is the weight of the helicopter ready to fly, except for the two variables, cargo or passenger load and fuel, and is the approximate basic helicopter weight shown on Chart C of Chapter 12, plus the weight of one pilot and tank of oil. The intersection of the Cargo or Passenger Load and the Fuel Load axis at zero, represents the basic operating weight. The chart indicates the various combinations that can be added to the basic operation weight to remain within the safe operating range. Since the actual weight of individual helicopters vary, it will be necessary to adjust the chart to these individual weights. To adjust the chart, determine the actual basic weight of the helicopter from Chart C of Chapter 12 and add 200 pounds for the pilot and 28 pounds for tank of oil. If the actual weight exceeds 4835 pounds, subtract the difference between the actual weight and 4835 from the Cargo or Passenger Load as shown on the chart. If the actual weight is less than 4710 pounds, add the difference to the Cargo or Passenger Load as shown on the chart.

B ***7-28. Gross Weight and Performance Data.*** Three gross weights of the loaded helicopter are shown as diagonal lines on the chart: 6600 pounds, 7600 pounds and 8500 pounds. Performance data is also presented on the chart for 6600 pounds normal gross weight, 7600 pounds alternate gross weight and 8500 pounds maximum operating weight. The maximum recommended take-off weight is established at 8500 pounds, at sea level.

B ***7-29. Green Area.*** The green area on the chart represents loading conditions that present no particular problems in regard to strength or performance. The green area is bounded by the alternate gross weight of 7600 pounds.

B 7-30. ***Yellow Area.*** The yellow area represents loading of progressively increasing risk as the red area is approached. Care must be exercised when operating within this area as performance and flight load factors decrease. This area is bounded by the maximum operating weight line of 8500 pounds.

B 7-31. ***Red Area.*** The red area of the chart represents loading that should not be used except under conditions of extreme emergency when safety of flight is of secondary importance.

> ***Note***
>
> Operating weight should never exceed that required for the mission since unnecessary risk and equipment wear will result. The data shown on the chart is for information and guidance: however, take-off weight must be considered, especially at high ground altitude, as to available runways, surrounding terrain, atmospheric temperatures, mission requirements, and urgency of the mission.

B 7-32. ***Use of the Chart — Problem.*** In accomplishing a particular mission it is necessary to carry 800 pounds of fuel. Determine the maximum cargo load that can be carried.

7-33. ***Solution.*** The chart basic operating weight will be used as actual helicopter weight in this problem. Steps e. and f. will show how to adjust the chart for actual basic weight variations.

a. Establish the basic operating weight of the helicopter by completing form F of Chapter 12 using the latest basic weight from Chart C of Chapter 12. Actual weight assumed to be Chart weight (4835 pounds) for this problem.

b. Project the fuel weight of 800 pounds vertically until the normal gross weight line 6600 pounds is intersected. From the intersection of the two lines, project horizontally to the cargo load scales and read 965 pounds. This weight is the maximum cargo load that can be carried with 800 pounds of fuel to remain at normal gross weight.

c. For the requirements of a particular mission, if it is necessary to exceed the normal gross weight and the reduced load factor and performance (at a higher gross weight) is satisfactory, then project the fuel weight of 800 pounds vertically until the alternate gross weight line (7600 pounds) is intersected. From this intersection, project horizontally to the cargo load scale and read 1965 pounds.

d. When this information is obtained, it is then necessary to refer to the Internal Cargo Loading Chart to obtain cargo placement information so that the center of gravity of the helicopter will be within the operating range.

e. If the actual weight of the helicopter is 4885 pounds instead of 4835 pounds, the chart must be adjusted by reducing the cargo weight. Therefore, in step c., the cargo weight will be 965 pounds minus 50 pounds, amount the helicopter is overweight, or 915 pounds. In step b. the cargo weight will be 1965 pounds minus 50 pounds or 1915 pounds.

f. If the actual weight of the helicopter is 4660 pounds, instead of 4835 pounds, the chart must be adjusted by increasing the cargo weight. For normal gross weight, cargo will be 965 pounds plus 50 pounds which equals 1015 pounds. At alternate gross weight the cargo will be 1965 pounds plus 50 pounds or 2015 pounds.

5 **4** **0** 7-34. ***Basic Operating Weight.*** The operating weight on which the chart is based is 5000 pounds. This weight is the weight of the helicopter ready to fly, except for the two variables, cargo or pasenger load and fuel, and is the approximate basic helicopter weight shown on Chart C of Chapter 12, plus the weight of one pilot and tank of oil. The intersection of the Cargo or Passenger Load and the Fuel Load axis at zero, represent this basic operating weight. The chart indicates the various combinations that can be added to the basic operating weight to remain within the safe operating range. Since the actual weight of individual helicopters vary, it will be necessary to adjust the chart to these individual weights. To adjust the chart, determine the actual basic weight of the helicopter from Chart C of Chapter 12 and add 200 pounds for the pilot and 28 pounds for tank of oil. If the actual weight exceeds 5000 pounds, subtract the difference between the actual weight and 5000 from the Cargo or Passenger Load as shown on the chart. If the actual weight is less than 5000 pounds, add the difference to the Cargo or Passenger Load as shown on the chart.

5 **4** **0** 7-35. ***Gross Weight and Performance Data.*** Four gross weights of the loaded helicopter are shown as diagonal lines on the chart: 6600 pounds, 7600 pounds, 8500 pounds, and 9500 pounds. Performance data is presented for each of these gross weights.

5 **4** **0** 7-36. ***Green Area.*** The green area on the chart represents loading conditions that present no particular problems in regard to strength or performance. The green area is bounded by the 8500 pound line.

5 4 0 7-37. ***Yellow Area.*** The yellow area represents loading of progressively increasing risk as the red area is approached. Care must be exercised when operating within this area as performance and flight load factors decrease. This area is bounded by the 9500 pound line.

5 4 0 7-38. ***Red Area.*** The red area of the chart represents loadings that should not be used except under conditions of extreme emergency when safety of flight is of secondary importance.

Note

> Operating weight should never exceed that required for the mission since unnecessary risk and equipment wear will result. The data shown on the chart is for information and guidance; however, take-off weight must be considered, especially at high ground altitude, as to available runways, surrounding terrain, atmospheric temperatures, mission requirements and urgency of the mission.

5 4 0 7-39. ***Use of the Chart — Problem.*** In accomplishing a particular mission it is necessary to carry 1573 pounds of fuel. Determine the maximum cargo load that can be carried.

7-40. ***Solution.*** The chart basic operating weight will be used as actual helicopter weight in this problem. Steps e. and f. will show how to adjust the chart for actual basic weight variations.

a. Establish the basic operating weight of the helicopter by completing Form F of Chapter 12 using the latest basic weight from Chart C of Chapter 12. Actual weight assumed to be Chart weight (5000 pounds) for this problem.

b. Project the fuel weight of 1573 pounds vertically until the 8500 pound gross weight line is intersected. From the intersection of the two lines, project horizontally to the cargo load scales and read 1925 pounds. This weight is the maximum cargo load that can be carried at 8500 pounds.

c. For the requirements of a particular mission, if it is necessary to exceed the normal gross weight and the reduced load factor and performance (at a higher gross weight) is satisfactory, then project the fuel weight of 1573 pounds vertically until the 9500 pounds gross weight line is intersected. From this intersection, project horizontally to the cargo load and read 2925 pounds.

d. When this information is obtained, it is then necessary to refer to the Internal Cargo Loading Charts to obtain cargo placement information so that the center of gravity of the helicopter will be within the operating range.

e. If the actual weight of the helicopter is 5050 pounds instead of 5000 pounds, the chart must be adjusted by reducing the cargo weight. Therefore, in step c., the cargo weight will be 2925 pounds minus 50 pounds, amount the helicopter is overweight, or 1875 pounds. In step b. the cargo weight will be 1925 pounds minus 50 pounds or 1875 pounds.

f. If the actual weight of the helicopter is 4950 pounds, instead of 5000 pounds, the chart must be adjusted by increasing the cargo weight. For 8500 pounds gross weight, cargo will be 1925 pounds plus 50 pounds or 1975 pounds. At 9500 pounds gross weight the cargo will be 2925 pounds plus 50 pounds or 2975 pounds.

B 7-41. Cargo Loading Chart. The Internal Cargo Loading Chart (see chart 7-1), provides loading data information, for both the fore and aft cargo areas and the most forward allowable CG position of the cargo by a straight line method of computation. The variables shown on the chart are crew weight, forward cargo weight and most forward position allowable, and aft cargo load. A sample problem is shown on the chart by a (—) dashed line and working of the problem and the results are as follows:

PROBLEM:

Determine the most forward cargo CG location for the known weight conditions as follows:

Crew Weight (Pilot and Copilot)	350 lbs.
Cargo Weight in Forward Area	1500 lbs.
Cargo (baggage) weight in aft area	0 lbs.
	100 lbs.
	200 lbs.

ANSWER:

Draw a straight line from 350 pounds. Total pilot and copilot weight to 1500 pounds. Cargo weight. Read most forward cargo location to be:

F.S. 94 for 0 pounds baggage compartment weight.

F.S. 90 for 100 pounds baggage compartment weight.

F.S. 86 for 200 pounds baggage compartment weight.

Note

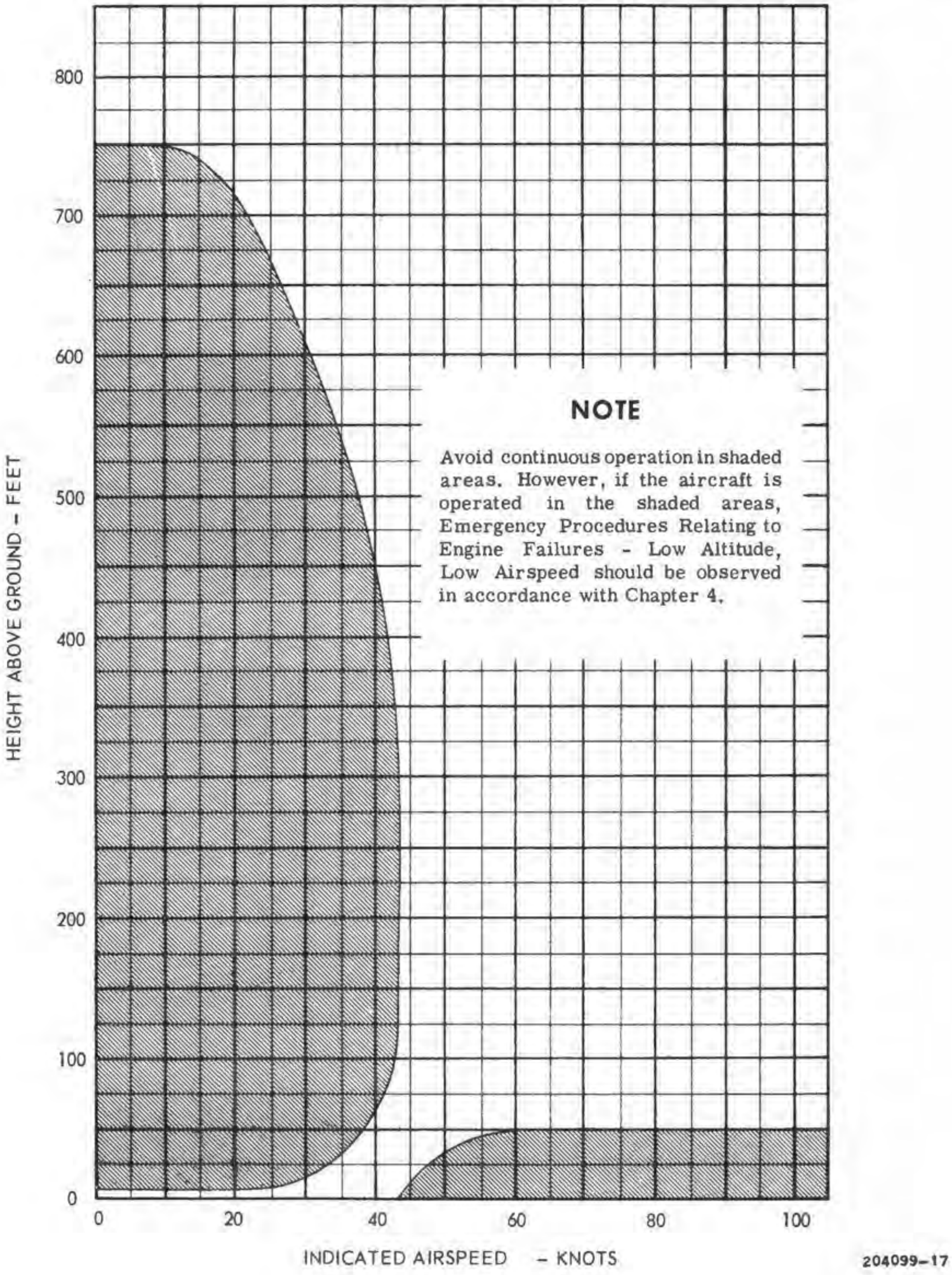
> The cargo CG location as determined from the chart, is the most forward position for a safe condition; however, cargo CG may be positioned at any position aft of the most forward cargo CG location.

5 4 0 7-42. Cargo Loading Charts. The Internal Cargo Loading Charts (see chart 7-1) provides a means for determining the most forward and most aft locations for placing cargo in the forward cargo area. If cargo is placed on or between the points indicated on the two charts, the aft cargo area, or baggage compartment, can be loaded from 0 pounds to 200 pounds while maintaining a flight c.g. within the established limits. A sample problem is shown on the charts by a (—) dashed line. The problem and solution are as follows:

PROBLEM:
Determine the location for 1500 pounds of cargo for a crew weight of 400 pounds.

ANSWER:
From 1500 pounds cargo point, on the left side of the charts, project horizontal line to intersect 400 pound pilot weight line. From this intersection, draw vertical line down and read Most Forward Cargo C.G. of Station 92 and Most Aft Cargo C.G. of Station 122. The c.g. of the cargo can therefore be any place between Station 92 and Station 122.

7-43. Towing the Helicopter Limitations. Towing the helicopter on the ground handling gear (ground handling wheels), on unprepared surfaces, at gross weights in excess of 7400 pounds will cause permanent set in the aft cross tube.



NOTE

Avoid continuous operation in shaded areas. However, if the aircraft is operated in the shaded areas, Emergency Procedures Relating to Engine Failures - Low Altitude, Low Airspeed should be observed in accordance with Chapter 4.

Figure 7–3. Height velocity diagram

CHAPTER 8

FLIGHT CHARACTERISTICS

Section I — Scope

8-1. Purpose. The purpose of this Chapter is to describe the unique flight characteristics of the aircraft. Emphasis has been placed on the advantageous flight characteristics as well as any dangerous tendencies.

8-2. The information herein is based on operations at maximum gross weight.

Section II — General Flight Characteristics

8-3. Operating Characteristics. The flight characteristics of this helicopter in general are similar to other single rotor helicopters. The paticular noticeable difference is the additional stability that is evident during take-off, hovering and all flight speeds. This stable condition is the result of the gyroscopic action of the stabilizer bar. The control system, with hydraulic servo assist, provides the pilot with a near zero force required for contol movement; however; control feeling is induced into the cyclic stick and tail rotor control pedals by means of a force trim system. To increase helicopter forward speed, simultaneuosly apply forward control stick and increase main rotor pitch; power is automatically adjusted to maintain constant rpm. Constant altitude is maintained throughout the entire range of forward flight speeds by fore and aft use of the cyclic control stick in coordination with power and main rotor pitch application. Direction and heading are controlled by the application of lateral cyclic control and the appropriate tail rotor contol pedal.

8-4. Blade Stall. Blade stall is caused by a high angle of attack on the retreating blade and starts at the inboard section and progresses outboard with increased airspeed. However, this condition will not be encountered when the helicopter is operated within the limits imposed in the preceding chapters of this manual. Blade stall is the result of numerous contributing factors such as gross weight, engine rpm, airspeed, acceleration and altitude. The condition is most likely to occur at the higher airspeeds and low operating rpm; it also follows that the condition will occur sooner with higher values of altitude and gross weight. One of the more important features of the two-bladed, semi-rigid rotor system is its warning to the pilot of impeding blade stall. Prior to progressing fully into the stall region the pilot will feel a marked increase in both airframe vibration and vibration in the controls. Consequently, corrective action can be taken before the stall condition becomes severe.

8-5. *Blade Stall — Corrective Area.* In the event blade stall should occur, it will be noticeable by a vibration roughness of the airframe. When blade stall is evident the condition may be eliminated by accomplishing one or a combination of the following corrective actions.

a. Increasing operating rpm.

b. Reduce power and airspeed.

c. Descend to lower altitude.

d. Decrease the severity of the maneuver.

8-6. Rotor Capabilities. The UH-1A and UH-1B helicopters are capable of delivering a maximum thrust commensurate with rotor-engine limitations and the density of the atmosphere in which they are operating. Maximum thrust can be utilized to obtain maximum airspeed optimum rate of climb, or, at some reduced airspeed, the maximum maneuver potentiability. The pilot may employ the capabilities of the helicopter within maximum limitations and in accordance with the environment under which he is operating.

8-7. The Rotor Limits Decal (see figure 7-1) can be utilized to determine maneuver capabilities of the helicopter such as angle of bank, gross weight, etc. During maneuvering turns, a greater "G" load, which varies with the angle of bank, is exerted on the rotor. In a stabilized angle of bank a constant load intensity will result. As the bank attitude is increased, the weight imposed on the rotor will increase. For instance, a 30 degree bank angle will produce 1.15 G's, a 45 degree bank angle 1.4 G's, a 60 degree bank angle 2.0 G's. Based on the fact that the rotor experiences a 1.0 G load in level flight, it can readily be seen that this factor increases 100% in a stabilized bank of 60 degrees. The observed airspeed should be reduced during maneuvers in accordance with the rotor limits decal (see figure 7-1).

8-8. A descending turn or autorotational turn at a given angle of bank and stabilized rate of descent imposes the same "G" load on the rotor. Hence, if the turn is too abrupt (tight) and rotor limits are exceeded, further application of controls will not check the rate of descent if the turn is continued. In order to aleviate this condition the pilot must roll out of the turn to reduce the rotor load and provide control response, and reduce rate of descent. The permissible bank angles vs altitudes and gross weights will affect the turning radius of the helicopter. A light gross weight helicopter turns within an area comparable in size to that contained within the boundaries of a football field. The same helicopter at normal gross weight and at a density altitude of 12,000 feet will require a much larger area to accomplish the same turn.

8-9. Maneuvering Flight. Action and response of the controls during maneuvering flight is normal at all times when the helicopter is operated within the limitations set forth in this manual.

8-10. Hovering Capability. Hovering capability is affected by in-ground-effect (IGE), out-of-ground (OGE), outside air temperature (OAT), density and pressure altitude, wind speed, engine torque (power available), and gross weight of the helicopter. Hovering IGE performance is better than OGE because during IGE the rotor sets up a current flow between the helicopter and the ground, providing a cushion of air to partially support the helicopter weight. Temperature variations affect engine and rotor performance. For each 4°C rise in temperature, there is approximately a four percent loss in engine power. Hovering with heavier gross weights or at higher altitudes is possible with lower temperatures and wind velocities. Lower temperatures increase engine efficiency and wind represents airspeed; therefore, either condition or both will increase hovering performance due to the ability of the main rotor to provide more lift. Factors contributing to hovering capability are briefly described below.

8-11. Operating Rules of Thumb. a. rise of three degrees centrigrade causes a loss of one psig of torque.

b. Assuming a standard temperature lapse rate, approximately 3/4 psig of torque is lost with each 1000 foot increase in altitude.

c. An increase of one psig in torque is equivalent to 200 pounds of lift capability.

d. For a given power setting, there is approximately 1000 pounds difference in gross weight between IGE and OGE hovering.

e. Hovering OGE requires approximately five more psig of torque than hovering IGE.

f. Generally, IGE performance figures should not be used for sling loads. (Refer to Chapter 14.)

Section III — Control Characteristics

8-12. Flight With External Loads. The helicopter has not unusual characteristics when carrying an external load except in strong or gusty wind, when the cargo may tend to swing. The release of external cargo while in flight results in no abnormal control reaction.

8-13. Level Flight Characteristics. The level flight characteristics of this helicopter are normal throughout the operating limits range. All control response is immediate and gives positive results.

CHAPTER 9

SYSTEMS OPERATION

Section I — Scope

9-1. Purpose. This Chapter provides additional material (to that already covered in other chapters) regarding the operation of various aircraft systems.

9-2. The operation of new or complex systems are covered herein, so as to avoid overcrowding other chapters and interrupting the continuity of thought.

Section II — Systems Operation

9-3. Freewheeling Unit. The freewheeling unit provides a positive disconnect from the engine in case of a power failure and allows the main rotor and the tail rotor to rotate in order to accomplish safe autorotation landings.

9-4. Stabilizer System. The stability of the helicopter is the result of the action of the stabilizer bar. This unit is mounted on the mast above, in the same plane and 90 degrees to the main rotor. The stabilizer bar and control linkage are so designed as to take advantage of the inertia effect of the bar and thus provide stability to the extent whereby pilot fatigue is lessened. For example: If the helicopter, while hovering in a level attitude, is tilted to the left, the bar, due to its inertia effect, will tend to remain in a horizontal level plane. By so doing, it will cause the rotor blades, by means of the mixing lever arrangement, to feather in such a manner as to return the helicopter to a near level attitude. If the bar were so completely unrestrained as to actually remain in its original plane of rotation, it would make the helicopter stable to the point of greatly reducing control from the pilot. However, due to restraint or damping in the see-saw attachment to the mast, the bar possesses a mast following characteristic. This following time is regulated by two hydraulic dampers, which are connected to the bar, outboard of the mast, one on each side. By means of these dampers, the following time may be regulated in such a manner as to give the helicopter the desired amount of stability and still leave the pilot with complete and responsive control of the helicopter.

9-5. Engine Anti-Icing System. The engine is equipped with an automatic anti-icing system, made up of a detection system and a bleed air valve system. The detector unit, through a probe in the engine air inlet, senses inlet total pressure on the forward side and something less than static pressure on the aft side. These two pressures are fed to opposite sides of a diaphragm in the detector head. The operational engine airflow induces a pressure differential across the diaphragm causing it to displace a set of electrical contacts. Icing conditions block the forward probe openings and a bleed hole in the diaphragm equalizes the pressure on both sides, causing the diaphragm to shift, along with the electrical contacts. A The repositioning of the contacts transmits an electrical signal to the interpretor, and the interpretor, in turn transmits a signal to the bleed air valve. B The positioning of the contacts illuminates the ENGINE ICING caution light. An electrical heater in the probe is energized as soon as ice is detected and the contact in the detector head has moved. This heater removes the ice from the forward side of the probe, which allows a presure differential to again build up across the diaphragm and cuts off the probe heater and forces the detector head contacts to return to the no ice position, the detector is again capable of sensing an icing condition. The lapsed time for the heating cycle is approximately four seconds. Activation of the ice detector contacts opens the bleed air valve in UH-1A helicopter, permitting air to flow through a series of holes in the outer case of the centrifugal compressor case. The hot air valve must be manually operated by the movement of the HOT AIR VALVE switch, on UH-1B helicopters. The air is collected in a manifold, passes through the hot air valve and enters the top strut of the engine inlet housing. From this point the air divides so that the larger portion of the bleed air passes through the inlet guide vane and then into the compressor, the remainder of the bleed air is ducted to the leading edge of the upper three inlet housing struts and is dumped overboard. The temperature of this area should not exceed 150°F and therefore, should not present any cooling problem in this area. The detector system is powered by 28 volts dc from the essential bus and is connected to the CAUTION panel on the pedestal and the MASTER CAUTION indicator on the instrument panel. An engine icing condition will be indicated in the cockpit by the MASTER CAUTION light and the intermittent operation of the ENGINE ICING caution light. The illumination of the ENGINE ICE DETector light will indicate the disarming of the anti-ice system or an electrical failure of the system, or that the holes in the probe are clogged with dirt.

9-6. Droop Compensator. Droop is defined is the speed change in engine rpm (nII) as power is increased from a no-load condition. It is an inherent characteristic designed into the governor system, instability would develop as engine output power was increased, resulting in nI speed over-shooting or hunting the value necessary to satisfy the new power condition. Design droop of the engine governor system is as much as 300 to 400 rpm (flat pitch to full-power). If nII power were allowed to droop, other than momentarily, the reduction in rotor speed could become critical; therefore, a droop compensator is installed on the governor control to raise nII speed as power is increased, to the rpm value selected by the pilot. The compensator is a direct mechanical linkage between the collective control lever and the speed selector lever on the nII governor. Properly rigged, the droop compensator will hold nII rpm to plus or minus 50 rpm of selective value from flat pitch to climb out power.

Note

> An improperly rigged droop compensator can result in the engine not developing rated power. Always check droop compensator rigging prior to checking full power.

Caution

> A shear pin is incorporated in the droop compensator linkage to permit collective control in the event of a bind occuring in the droop compensator linkage. When the pin is sheared, the droop compensator is inoperative and care must be taken to maneuver within power adjustment capabilities of the governor. Sheared pin shall be replaced before new flight.

9-7. Dual Hydraulic System. Hydraulic power is supplied by a dual hydraulic system, (No. 1 and No. 2) which minimizes the force required by the pilot to move the cyclic, collective and directional control systems. Basically, the two systems are identical excluding the portion of system No. 1, which supplies pressure to the armament system and the portion of system No. 2, which supplies pressure to the directional control system. The systems contain the following major components peculiar to both systems: reservoirs, pumps (transmission driven), modules and three dual actuating cylinders (two for cyclic and one for collective controls) with dual servo valves. Each system module is comprised of the following units: pressure line filter, pressure line filter indicator, pressure switch, system ON-OFF solenoid valve, system relief valve, return line filter, return line filter indicator and two ground test connections.

9-8. System No. 1. Hydraulic fluid from the reservoir passes through the constant pressure, variable delivery piston pump, and is delivered at 1500 psi to the module. Inside the module the fluid applies pressure to the pressure line filter indicator, flows through the pressure line filter applying pressure to the pressure switch and system pressure relief valve, through the system ON-OFF solenoid valve and out of the module into the system. From the module system, pressure flows to the flight control actuating cylinders (cyclic and collective) and also to the armament system. The fluid entering the armament system, after leaving the system module, passes through a system ON-OFF solenoid valve and to the armament actuating cylinders. All return fluid flows into a common manifold and returns to the system module. In the module this fluid applies pressure to the return line filter indicator, flows through the return line filter, out of the module and to the system reservoir.

9-9. System No. 2. System No. 2 functions basically the same as system No. 1, with the following exceptions: Only system No. 1 is connected to the armament system. System No. 1

operates the collective and cyclic control systems in common with system No. 2. Only system No. 2 is connected to the directional control system. Pressurized hydraulic fluid, supplied by system No. 2 for the directional controls, after leaving the system module, flows through a relief valve (pressure reducer) lowering the pressure supplied to the directional control actuating cylinder. An interconnect line, which incorporates a relief valve is installed between the directional control system return and pressure lines, to facilitate the operation of the directional controls with hydraulic pressure off, and to aid in illuminating control "feed back" force. This relief valve (60 psi max.) permits flow from the return line to the pressure line, yet requires for 1135 psi to 1295 psi before permitting fluid flow from pressure line to return.

CHAPTER 10

WEATHER OPERATIONS

Section I — Scope

10-1. Scope of Weather Operation Instructions. The purpose of this chapter is to provide information relative to operation under conditions of instrument flight and approach. This includes ground control approach, turbulent air flight, extreme cold and hot weather operations, night flying, etc. Description of the equipment is not covered, since that information is appropriately covered in other chapters.

10-2. Except for some repetition which is necessary for continuity of thought, the flight procedures in this chapter contain only the procedures that differ from, or are in addition to normal procedures covered in Chapter 3. The checklists presented in Chapter 3, and the operating procedures for the navigation equipment in Chapter 5, are to be used in conjunction with the information presented in this chapter.

Section II — Instrument Flight Procedures

10-3. Introduction. The helicopter has been provided with the necessary instruments and navigation radio equipment to accomplish missions from prepared or unprepared take-off or landing areas, under instrument oeprations including light icing conditions, day or night flying and to navigate by dead reckoning or by use of radio aids to navigation.

10-4. Instrument flights should be carefully planned, keeping in mind that icing conditions, turbulent air and thunderstorms will greatly affect the flight. Except for some repetition which is necessary for continuity of thought, the instrument flight procedures contain only the procedures that differ or are in addition to normal procedures covered in other sections. Basic maneuvers for rotor wing aircraft are contained in TM1-215.

Caution

> Be sure external cargo hook-up mirror cover is on before all night and instrument operations.

10-5. Preflight and Ground Checks. Perform the normal preflight inspections, including the night flight checks, as outlined in the normal operating instructions in Chapter 3. Particular attention should be paid toward proper operation of flight instruments, navigation equipment, external and internal lighting, windshield wipers and defrosters, pitot heat, generators, inverters and engine ice protection.

Note

> Ground check of the engine ice protection system is accomplished by pulling the anti-ice (engine) circuit breaker and determining:
> a. A rise in the engine EGT.
> b. Actuation of the engine ice detector disarmed light.

Note

> If possible, set and check altimeters for error before engine start. After engine start, note the decrease in altimeter reading induced by rotor downwash effect. This decrease will be approximately 20 feet with a collective pitch setting calling for 15 pounds of torque.

10-6. Instrument Take-Off. The attitude indicator, heading indicator and torque meter are primary for instrument take-offs. By use of these instruments, along with the following procedures, ITO's are easily accomplished.

10-7. After positioning the aircraft on a level or near level surface and into the wind, set aircraft heading to top of the heading indicator and adjust the horizon bar of the attitude indicator so that the miniature airplane will appear approximately two bar widths above the horizon bar. Apply sufficient friction to the collective pitch control to minimize over-controlling.

10-8. With a steady, smooth motion apply collective pitch until five pounds of torque more than that required for hovering is obtained. As the aircraft leaves the ground, position the cyclic so that the miniature airplane will appear one to two bar widths below the horizon bar. Maintain directional control (heading) with the pedals until airspeed increases, generally (30-40 knots) then transition to coordinate flight.

10-9. The take-off (miniature airplane one to two bars below horizon) and power setting (five psi plus hovering power) is to be maintained until the airspeed approaches the desired climbing air speed (70 knots IAS). As the airspeed reaches 70 knots the pitch attitude is adjusted to the climbing attitude (miniature aircraft on the horizon bar). As climbing airspeed and attitude are attained, the power (collective pitch) should be adjusted to result in a 500 fpm rate of climb (approximately 20 pounds of torque). Higher rates of climb may be used for extended climbs.

Warning

> The airspeed and vertical speed indicators and altimeter are unreliable below 25 knots IAS because of rotor downwash effect on the pitot static system. During takeoff, do not rely on these instruments until the airspeed indicator reads at least 25 knots IAS. The time required to reach this speed will be approximately seven seconds.

10-10. Vertical Take-Off. Vertical take-offs are not compatible with, and are not recommended for instrument conditions.

10-11. Instrument Climb. These helicopters handle well in climbs and climbing turns. The recommended climb is 500 fpm at 70 knots IAS. No change should be made in the collective pitch setting unless the airspeed and vertical speed vary over plus or minus five knots IAS and plus or minus 100 fpm. Turns should be made utilizing the attitude indicator to obtain the recommended 15 degree angle of bank which approximates a standard rate turn of three degrees per second. Using approximately 20 pounds of torque with the cyclic pitch set so that the miniature aircraft on the attitude indicator is level with the horizon bar should give the recommended climb airspeed and vertical speed. Any pitch attitude corrections should not exceed one bar width. The angle of bank should never exceed 20 degrees.

Note

> When rolling into and out of turns, the turn and bank indicator initially indicates a turn in the opposite direction. The attitude indicator has negligible precession error and should be utilized for establishing and maintaining angles of bank.

10-12. Instrument Cruising Flight. As previously mentioned, the constant diligence required to conduct instrument flight produces pilot fatigue. This is especially true on long missions. To lessen the fatigue factor, the pilot should handle the cyclic stick with a loose grip and not make collective pitch change unless the airspeed varies plus or minus 10 knots IAS or the altitude varies plus or minus 200 feet. Upon establishing the recommended cruise speed, the attitude indicator should be set for a nose level indication. Thereafter, any pitch or bank corrections should be made utilizing the attitude indicator. Pitch corrections should not exceed one bar width. The recommended angle of bank for cruising turns is 15 degrees and should not exceed 20 degrees.

Note

> The attitude indicator should never be reset in flight except to align the miniature airplane with the horizon bar. This adjustment is to be always made in straight and level flight at recommended cruise speed.

10-13. The VFR cruise speeds are not recommended for instrument cruising because of their close proximity to the speeds at which induced vibration occur. As the vibration level permits, use operating limits as specified on the OPERATING LIMITS decal. (Refer to Chapter 7.)

Caution

> Instrument cruising flight at speeds less than 60 knots IAS is not recomemnded. The aircraft handling qualities at speeds less than 60 knots (because of power required characteristics) are not compatable with instrument flying. For the UH-1A, the altitude and speed restrictions at gross weights greater than 6100 pounds dictate that this weight not be exceeded during instrument flight.

10-14. Radio and Navigation Equipment. The UHF radio (AN/ARC-55) reception is poor when large obstructions (buildings, mountains, etc.) lie between the helicopter and the station. When poor reception is encountered on the ground, attempt to establish (by hovering or changing location) a clear "line of sight" to the communications station. When conducting low level flight in mountainous terrain and poor reception is encountered, climb if possible until readable communications are established.

10-15. The radio compass (AN/ARN-59) is satisfactory for airway navigation. However, when the station is within 30 degrees of the nose or tail of the helicopter, slight false background signals may be obtained when flying "on course". These false background signals are barely perceptible and are of no concern as their degree of intensity would not make for a false drift correction. To decrease these false signals even further, it is recommended that the radio compass be tuned for a minimum comfortable reception level.

10-16. Normal Descents. Enroute descents to traffic altitude can be initiated and maintained without difficulty using the following procedures.

a. Before commencing the descent check and reset, if necessary, the attitude indicator for a nose level indication with the helicopter in straight and level flight at the recommended cruise speed.

b. To establish the descent, reduce the torque to set up a 600 to 1000 feet per minute rate of descent and maintain recommended cruise airspeed, angle of bank and pitch attitude. During the descent the miniature airplane will remain on the horizon bar.

Note

> In general, below 7000 feet density altitude, a reduction of one pound of torque will increase the rate of descent approximately 100 feet per minute.

10-17. Maximum (Autorotative) Descents. Autorotations are not difficult on instruments. However, due to the high rate of descent, they are recommended for emergencies (loss of engine, etc.) only. The following procedures are recommended for establishing and conducting autorotations on instruments.

a. Simultaneously reduce collective pitch to maintain desired rotor rpm.

b. Assume a one bar width nose high attitude, and maintain directional control with the foot pedals. The airspeed will gradually decrease to 60 knots IAS. Approximately a one bar width nose high attitude will give this speed, which should be maintained until visual contact is made, and a reasonable 2000 to 2400 feet per minute rate of descent. As soon as the autorotation is established and the aircraft under positive control, complete the "Engine Failure During Flight", Chapter 4, check list. During the descent limit the angle of bank in turns to 15 degrees.

Warning

> Do not attempt an emergency autorotative descent on instruments unless the ceiling is as follows: 500 feet when a positive controlled approach can be assured so as to "break out" over an established landing site.
> 1000 feet when over unfamiliar terrain.
> 2000 feet when ower mountainous terrain.

10-18. Holding. Holding presents no handling or control problems if the recommended instrument cruise speed (80 knots indicated) is used. The VFR maximum endurance airspeeds are not recommended for loitering on instruments. The poor instrument handling qualities at these speeds greatly increase the work load at a time when the pilot is busy monitoring radio communications, flying a given set condition, etc. The decrease in fuel consumption realized from using maximum endurance airspeeds instead of 80 knots would be negligible for all practical purposes.

10-19. For all pitch and bank corrections, utilize the attitude indicator. Do not exceed a one bar width pitch correction for minor altitude changes and limit the angle of bank in turns of 15 degrees. It is best not to make a collective pitch change unless the airspeed varies more than plus or minus 10 knots indicated.

10-20. The double drift method should be used for wind drift corrections so that a constant bank angle can be maintained in the turns. Large angle corrections (commonly as much as 30 degrees) should be anticipated when crosswinds are encountered in the holding pattern.

10-21. Instrument Approaches. Instrument approaches are easily flown in this helicopter. Before commencing the approach have the attitude indicator properly set (i.e., miniature airplane on horizon bar at a straight and level cruise speed of 80 knots indicated). During all phases of the approach the miniature airplane is the attitude indicator and will be approximately on the horizon bar if the recommended airspeed of 80 knots is maintained.

10-22. For all pitch and bank corrections, utilize the attitude indicator. Do not exceed a one bar width pitch correction for minor altitude changes and limit the angle of bank in turn to 15 degrees.

10-23. During the descent phase of an approach, make rate of descent corrections with the cyclic pitch by reference to the attitude indicator. Allow the airspeed to vary plus or minus 10 knots during these corrections before making a collective pitch adjustment.

10-24. Radio Range and ADF Approaches. Radio Range and ADF approaches are easily conducted by reference to the procedures outlined in figure 10-1. If not VFR at the completion of the approach, execute a missed approach.

10-25. Ground Control Approach. The helicopter presents a traffic control problem because of its relatively slow speed compared to other air traffic. Therefore, the GCA operator should be notified that the airspeed will be 80 knots for the entire approach. To reduce the time required to execute a GCA, request a short pattern. This pattern is recommended to have a downwind two to three miles from the runway and four-mile final. If the procedures outlined in figure 10-2 are followed, no problems will be encountered.

Note

A normal GCA will require 20 to 25 minutes; whereas short pattern requires only 10 to 15 minutes.

Note

For a 2.8 degree glide slope and 0 wind condition, the required rate of descent at 80 knots IAS is 395 fpm. In general, to maintain 80 knots IAS and proper rate of descent, a ½ pound increase in torque is required for each 10 knots of head wind and one-half pound decrease for each ten knots of tail wind.

Note

If traffic will permit and GCA will approve, execute missed approach by making 180 degree climbing turn. Proceed under radar control out the GCA final approach reciprocal heading at glide path interception altitude and execute a 90 degree procedure turn after passing through the glide path. Then reinitiate GCA final approach procedures. This will greatly reduce the time required to execute a go around.

10-26. Missed Approach. To conduct a missed approach, apply 25 pounds of torque and establish approximately a two bar width nose high attitude indication. After the airspeed decreases to 60 knots indicated, initiate the normal instrument climb procedure.

10-27. Boost-Out Operation. It is recommended that the pilot establish VFR conditions as soon as possible if the hydraulic control boost becomes inoperative while under instrument conditions. The collective pitch force is high and the cyclic pitch experiences considerable "feedback" when the boost is inoperative. However, safe instrument approaches can be conducted with the boost-out by using the normal recommended techniques and procedures.

10-28. Night Flying. Night flying presents the same problems as instrument flying, plus additional problems introduced by illumination of the instruments and cockpit, and exterior reflections.

Note

When operating in the clouds at night, turn navigation lights to steady and anti-collision light off, to reduce distracting reflections from the clouds.

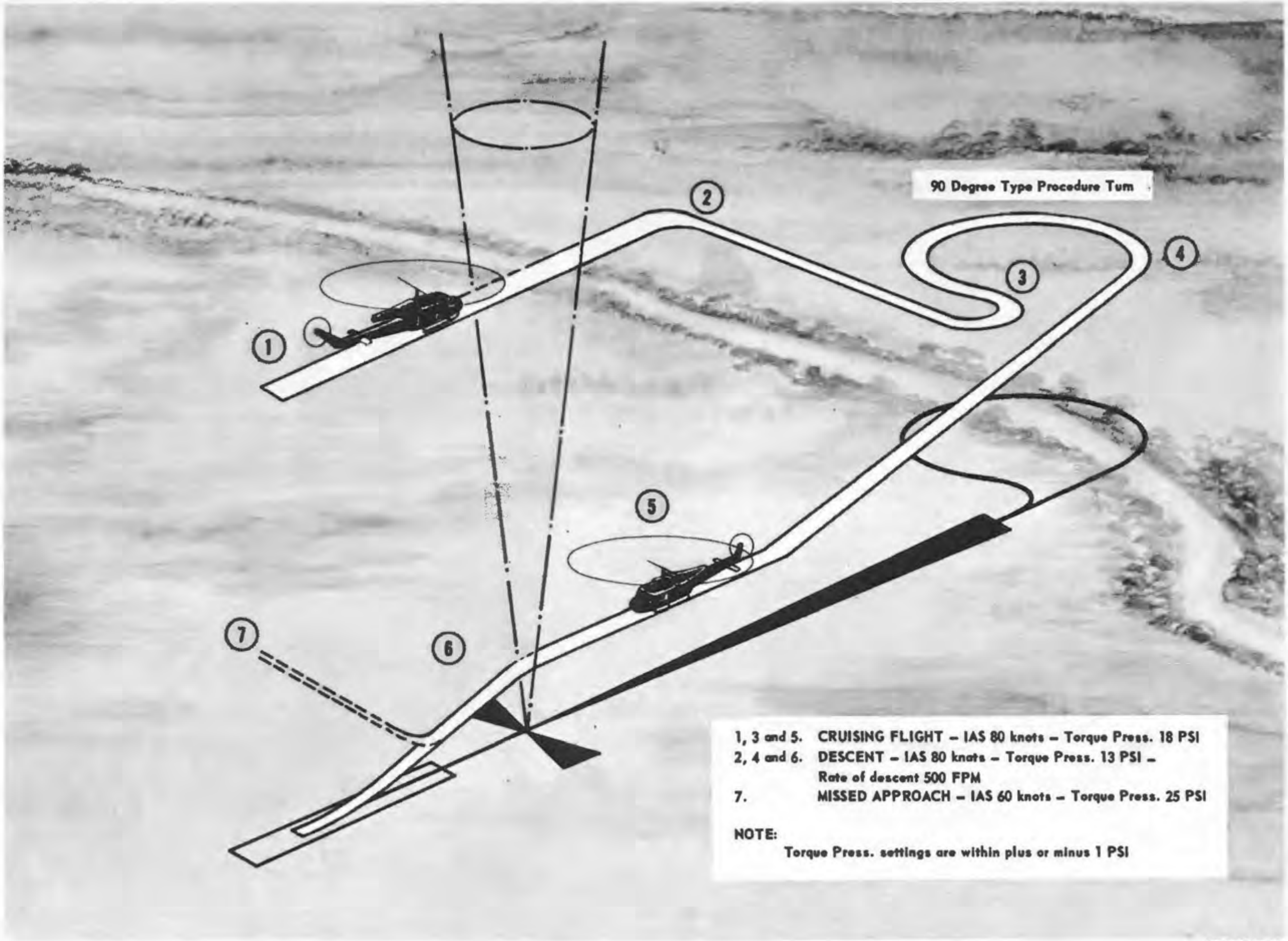
10-29. For night take-offs and approaches set the landing light approximately 15 degrees "down" from horizontal. This will give the pilot a reference point during take-off and also light the approximate touchdown area following a normal approach. During take-offs, climbs and approaches use the search light as desired to keep the intended flight path free of obstructions.

Caution

During night approaches, the lower nose canopy visibility is extremely restricted due to landing light reflection; however, the visibility improves as the lighted touch-down area comes beneath the helicopter.

Note

Night landings can be made with the navigation lights on steady if the landing and search lights are inoperative. However, exercise extreme caution, since the navigation lights do not furnish sufficient illumination for depth perception until just before touchdown.

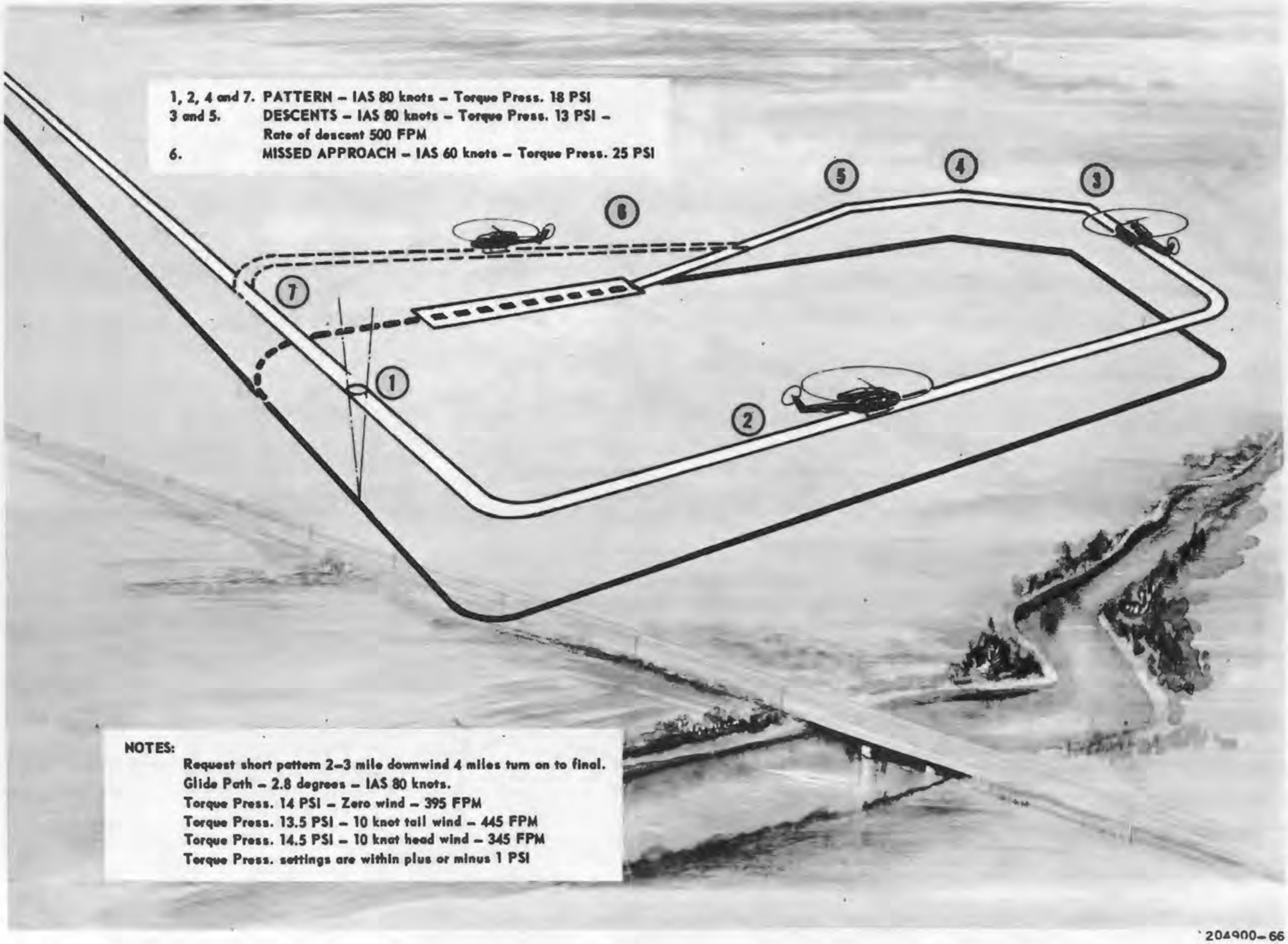


1, 3 and 5. CRUISING FLIGHT – IAS 80 knots – Torque Press. 18 PSI
2, 4 and 6. DESCENT – IAS 80 knots – Torque Press. 13 PSI – Rate of descent 500 FPM
7. MISSED APPROACH – IAS 60 knots – Torque Press. 25 PSI

NOTE:

Torque Press. settings are within plus or minus 1 PSI

Figure 10–1. Radio range approach – typical



1, 2, 4 and 7. PATTERN – IAS 80 knots – Torque Press. 18 PSI
3 and 5. DESCENTS – IAS 80 knots – Torque Press. 13 PSI – Rate of descent 500 FPM
6. MISSED APPROACH – IAS 60 knots – Torque Press. 25 PSI

NOTES:
Request short pattern 2–3 mile downwind 4 miles turn on to final.
Glide Path – 2.8 degrees – IAS 80 knots.
Torque Press. 14 PSI – Zero wind – 395 FPM
Torque Press. 13.5 PSI – 10 knot tail wind – 445 FPM
Torque Press. 14.5 PSI – 10 knot head wind – 345 FPM
Torque Press. settings are within plus or minus 1 PSI

Figure 10–2. Ground control approach – typical

Section III — Cold Weather Operation

10-30. Cold Weather Operations. Operation of the helicopter in cold weather or an arctic environment presents no unusual problems if the operators are aware of those changes that do take place and conditions that may exist because of the lower temperatures and freezing moisture.

Caution

B II

Under most ambient conditions, the scheduled starting fuel port is used for operation with all fuels. If engine fails to start with JP-5 fuel, the starting fuel line must be connected to the unscheduled fuel port. The starting procedure is the same for this configuration as for the scheduled port.

10-31. The pilot must be more thorough in the walk-around inspection when temperatures have been or are below O°C (32°F). Water and snow may have entered many parts during operation or in periods when the helicopter was parked unsheltered. This moisture often remains to form ice which will immobilize moving parts or damage structure by expansion and will occasionally foul electric circuitry. Protective covers afford majority protection against rain, freezing rain, sleet, and snow when installed on a dry helicopter prior to the precipitation. Since it is not practicable to completely cover an unsheltered helicopter, those parts not protected by covers and those adjacent to cover overlap and joints require closer attention, especially after a howling snow or freezing rain. Accumulation of snow and ice should be removed prior to flight. Failure to do so can result in hazardous flight, due to aerodynamic and center of gravity disturbances as well as the introduction of snow, water and ice into internal moving parts and electrical systems. The pilot should be particularly attentive to the main and tail rotor systems and their exposed control linkages.

Note

At temperatures of —35°C (—31°F) and lower, the grease in the spherical couplings of the main transmission drive shaft may congeal to a point that the couplings cannot operate properly. If found frozen, apply heat to thaw the couplings before attempting to start the engine. Indication of proper operation is obtained by turning the main rotor blade opposite to the direction of rotation while observer watches the drive shaft to see that there is no tendency for the transmission to "wobble" while the drive shaft is turning.

Caution

If temperatures are —44°C (—47°F) or below the pilot must be particularly careful to monitor his engine instruments for too high oil pressure.

10-32. Provisions have been made for the installation of a winterization kit to effect and maintain a cabin temperature of 5°C (40°F) when the outside temperature is —54°C (—65°F). Exclusive of the battery, the minimum operating temperature of helicopters Serial No. 58-2078 through 58-2093 and 58-3017 through 58-3047 is —40°C (—40°F) without winterization kit installed exclusive of the battery, the minimum operating temperature of helicopters Serial No. 59-1607 through 57-1716 is —32°C (—25°F) without winterization kit installed.

10-33. Before Exterior Check 0°C (32°F) and Lower. (External Power Available.) a. All switches — OFF.

b. Collective pitch control — DOWN.

c. Throttle — CLOSED.

d. External power supply connected. Check that dc voltmeter shows proper polarity.

Note

The following should be accomplished and the equipment left in warm-up operation during the exterior check.

e. Main inverter switch — ON.

f. Fuel valve — OPEN.

g. Boost pump — ON — Fuel pressure checked 12 to 16 psi.

h. Heater started and operating for defrost and cabin heating.

Caution

Insure that heat is not applied against windshield and windows too rapidly, as there is danger of cracking.

Note

With combustion-type heaters, the fuel filter in the heater fuel line, if accessible should be checked daily for accumulations of ice or water. The heater drain lines should be checked for restrictions caused by ice formation. During operation at temperatures below 0°C (32°F), water vapor in the combustion gases flowing through the drain line may condense and form ice. Under changing temperature conditions, water condenses and freezes in the rain and heater combustion sensing lines. Water produced during combustion may collect on the fuel nozzles and spark plug, and form ice after the heater is turned off. This ice may be sufficient to make it difficult if not impossible to start the heater without preheating.

i. Radio equipment — ON.
j. Battery — ON.

10-34. Before Exterior Check 0°C (32°F) and Lower. No External Power Supply Available.
a. All switches — OFF.
b. Collective pitch control — DOWN.
c. Throttle — CLOSED.

10-35. Exterior Check 0°C to —54°C (32°F to —65°F). For exterior check points, see figure 3-1.

10-36. ***Fuselage — Front.*** a. Rotor Blades — Visually check, covers removed, clear of ice and snow.
b. Antennas — Secured.
c. Cabin Area — Lower area, and all glass free of ice and snow.
d. Search Light — Stowed (underside of cabin).
e. Cabin top ventilators — Unobstructed.

10-37. ***Fuselage — Cabin Right Side.*** a. Entrance doors — Condition, operation, glass free of ice and snow.
b. Hydraulic fluid level — Check sight glass on aft bulkhead when aft cabin door is checked.
c. Cabin top — Check for ice or frozen snow.
d. Remove all loose snow that may be piled into engine during starting.
e. Antenna — Secured.
f. Air intake — Clean and free of ice and snow.
g. Landing light — Stowed (underside of cabin).
h. Landing gear — Condition, handling wheels removed.

10-38. ***Fuselage Aft of Cabin Right Side.*** a. Engine and transmission cowling — Secured for flight.
b. Fuel filler — Security of cap.
c. Oil filler — Security of cap.
d. Transmission oil sight gage — Visually check oil level.

Note

> Contraction of the oil in the transmission at extreme low temperature causes indication of low oil level. A check made just after the previous shutdown and carried forward to the walk around check is satisfactory if no leaks are in evidence. Filling when the system is cold-soaked will reveal an over-full condition immediately after flight, with the possibility of forced leaks at seals.

e. Access doors — Secured for flight.
f. Fuel and oil leaks — Visually check external area and ground surfaces under engine compartment.
g. Heater exhaust and intake — Free of ice and snow.
h. Access doors — Secured for flight.

10-39. ***Aft Fuselage — Right Side.*** Synchronized elevator—Surface free of ice and snow. See that operation will not be restricted due to the formation of ice between fuselage and elevator. Tail rotor blades — Visually check condition. Tail rotor intermediate gear box — Visually check oil level.

10-40. ***Main Rotor Blades.*** Visually check upper surface to be free of ice and frozen snow. Untie the blades and walk through 360° in the direction of rotation and check to see that there is no restriction to operation due to ice formation. Check its flapping action, observing the operation of the stabilizer bar.

Note

> At temperatures of —35°C (—31°F) and lower, the grease in the spherical couplings of the main transmission drive shaft may congeal to a point that the couplings cannot operate properly. If found frozen, apply heat to thaw the couplings before attempting to start the engine. Indication of proper operation is obtained by turning the main rotor opposite to direction of rotation while observer watches the drive shaft to see that there is no tendency for the transmission to "wobble" while the drive shaft is turning.

10-41. ***Fuselage — Full Aft.*** a. Aft fuselage extension cover — Secure for flight.

b. Tail rotor — Blades free of ice. Check movement of flapping axis, control linkages free of ice.

c. Aft antenna — Security and condition.

d. Tail rotor gear box — Visually check oil level.

10-42. ***Aft Fuselage — Left Side.*** a. Tail rotor drive shaft covers — Secured for flight, upper tail boom free of ice and snow. See that operation will not be restricted due to formation of ice between fuselage and elevator.

b. Aft fuselage — Free of ice and snow. General condition.

10-43. ***Fuselage — Aft of Cabin Left Side.*** a. Rotor head oil reservoirs — Visually check level.

Note

> It may reasonably be assumed that there is sufficient oil if the reservoirs were at an acceptable level at the last warm check and there is no evidence of oil leakage. Filling the reservoirs at low temperatures will result in overflow during operation, giving the impression of leakage.

b. Engine and transmission cowling — Secured for flight.

c. Access doors — Secured for flight.

d. Vent and drain lines — Clean and free of ice and snow.

10-44. ***Fuselage — Cabin Left Side.*** a. Entrance doors — Condition, operation, glass free of frost and snow.

b. Landing gear — Condition, handling wheels removed.

c. Cabin top antenna — Condition.

10-45. On Entering the Helicopter — Interior Check All Flights 0°C to —54°C (32°F to —65°F). a. First aid kits — Installed.

b. Fire extinguisher — Security and pressure.

c. Blade mooring block — Stowed.

d. Seat and tail rotor control pedals — Adjusted.

e. Cabin interior — Cleanliness and security of equipment.

f. All electrical switches — Check OFF with exception of the equipment left running to warm up during the exterior check.

g. All circuit breakers — Check IN.

Note

> External power should be used for starting when temperatures are below 0°C (32°F) to prevent draining the battery. When external power is connected, electrical systems will be powered and function normally.

h. Battery switch — ON (OFF if so desired when external power is connected).

i. Generator switch — ON (OFF if external power is connected).

j. External power supply — OPTIONAL (connected for starting at temperatures below 0°C (32°F).

k. Safety belt and shoulder harness — Secured and shoulder harness unlocked.

l. Headgear radio leads — Connected.

m. Inverter switch — Check spare, then switch to main if external power is connected.

n. AC phase selector (VM) — Rotate to each position and observe AC voltmeter for reading of approximately 115 volts at each position and return selector to ac position for flight.

o. Heater — Check operation (to check the heater, the boost pump should be turned ON and engine fuel valve must be ON before attempting to light the heater.

p. Pitot heater — Check operation with ground personnel.

q. Radio equipment — ON.

r. Hydraulic servo switch — ON.

s. Caution panel switch — TEST all caution lights and master caution light on instrument panel, illuminated.

t. Compass slaving switch — IN (slaved or OUT free gyro) as desired.

u. Fuel quantity gage test — PRESS and HOLD switch. Observe indicator needle for travel counterclockwise. Upon releasing switch, the needle will return (clockwise rotation) to the actual fuel quantity reading.

v. Fire warning indicator light — PRESS to test.

w. Gyro magnetic compass — SET.

x. Attitude indicator gyro — SET after flag has disappeared.

y. Altimeter — SET.

z. Clock — SET.

aa. Controls — Check for smooth movement and full travel.

Note

> When an engine start is to be made without external power, steps m through x and the night flight checks shall be performed after engine start is accomplished and the electrical loadmeter shows an indication of sufficient generator output to prevent drain.

10-46. Interior Check — Night Flights 0°C to —54°C (32°F to —65°F). External Power Connected.

a. Cockpit lights — CHECK.

b. Dome lights — CHECK.

c. Navigation lights — CHECK.

d. Instrument lights — CHECK.

e. Anti-collision light — CHECK.

f. Landing and search lights — CHECK.

g. Flashlight — CHECK.

Note

Use of the anti-collision light on the ground shall be kept to an absolute minimum because excessive heat created in the unit, while on the ground, is deterimental to bulb life, thus increasing maintenance problems. In addition, the operating anti-collision light could confuse rescue operatins since emergency ground vehicles use a similar light.

10-47. Engine Pre-Start Check 0°C to —54° C (32°F to —65°F). External Power Connected. Determine that the compressor rotor turns freely. As the engine cools to an ambient temperature below 0°C (32°F) after engine shutdown condensed moisture may freeze engine seals. Ducting hot air from an external source through the air inlet housing will free a frozen rotor.

Caution

DO NOT use the starter to free a frozen rotor.

a. Fuel valve switch — ON.

b. Oil valve switch — ON.

c. Governor switch — AUTO.

d. Throttle — FULL OFF.

e. Collective pitch control — MINIMUM and release downlock.

f. RPM increase — Decrease switch — HOLD in DECREASE position several seconds for minimum governor setting.

g. Cyclic control — CENTERED.

h. Fire guard posted — Check that rotors will have sufficient obstruction clearance.

10-48. Engine Starting 0°C to —54°C (32°F to —65°F) — External Power Connected. During starting procedure, monitor the gas producer (percent) tachometer', exhaust gas temperature and engine oil pressure indicator.

Caution

B **II**

At low ambient temperatures, JP-5 fuel may cause slower engine starts. If the engine fails to start with JP-5 fuel, the starting fuel line must be disconnected from the scheduled fuel port and connected to the unscheduled fuel port. The starting procedure for this configuration is the same as the scheduled port.

a. Fuel valve — Checked OPEN.

b. Oil valve — Checked OPEN.

c. Fuel boost pump — ON - Pressure checked at 12 to 15 psi.

d. Engine fuel governor switch — AUTO.

e. Throttle — Set FLIGHT IDLE.

f. Starter ignition switch — PULL AND HOLD until an indicated 34% gas producer speed. If engine does not continue to accelerate, maintain exhaust gas temperature below 760°C (1400°F) by closing throttle for a few seconds while still holding the starter-ignition switch engaged. As soon as the exhaust gas temperature drops below 650°C (1202°F) again open the throttle.

Caution

Limit the starter energize time to 40 seconds. If engine does not start, a two-minute cooling period is recommended after which a second starting cycle may be attempted. Only three 40-second starting attempts are permissible in any one hour period.

g. Check engine oil pressure.

Caution

If no oil pressure is indicated by the time the engine has fired; immediately shut down engine and investigate.

h. With the engine operating and the throttle set in the flight idle detent, check the following:

(1.) Gas producer, 56% to 58% rpm.

(2.) Exhaust gas temperature steady state below 570°C (1058°F).

Note

At OAT between —21°C and —54°C (—4°F and —65°F) the exhaust gas temperature may be as low as 290°C (554°F) at flight idle.

(3) Engine oil pressure 20 to 60 psi.

(4) Transmission oil pressure, 40 psi minimum.

(5) External power supply — Disconnect. (At this point, electrical power failure will occur unless, battery or either spare or main generator is ON.)

(6) Check spare generator for operation, voltmeter indicating 27.5 ± 1.5 volts.

(7) Battery switch — ON.

(8) Main generator — O N guard down, voltmeter reading 28.5 ± 1.5 volts when operating on main generator.

(9) Check spare inverter, then switch to main.

(10) Fuel pressure checked 12 to 16 psi.

(11) Engine fuel system — Refer to Chapter 3, Section II.

(12) Cyclic control stick — Check for operation, freedom of movement, and return to neutral.

(13) Tail rotor control pedals—Check for operation, freedom of movement.

(14) Collective pitch control — Slowly move control lever up, checking for operation, freedom of movement.

(15) Functional check of force trim can be performed during control system check.

Warning

Control system checks should be performed with extreme caution when helicopter is parked on snow and ice. There is reduction in ground friction holding the helicopter stationary, controls are sensitive and response is im mediate.

10-49. Engine Run-Up. a. Throttle — ADVANCE slowly to maximum setting and observe engine oil pressure for increase.

b. Battery and generator switch — Check ON, voltage 28.5 ± 1.5.

c. Exhaust gas temperature — Steady state below 570°C (1058°F).

d. Engine oil pressure, 50 to 90 psi.

e. Engine oil temperature, 88°C (190°F) maximum, no minimum.

f. Transmission oil temperature, 110°C (230°F) maximum, no minimum.

g. Transmission oil pressure, 40 to 60 psi.

h. Check operation of nII governor by holding RPM INCR-DECR switch in increase position until desired operational setting between 5800 and 6400 UH-1A (6000 to 6600 UH-1B) is obtained, then release.

i. Torquemeter — Indication.

10-50. Cold Weather Capability. The cold weather capability has been improved in this helicopter with the installation of a nickel-cadmium battery which, because of its partial immunity to low temperatures, can be used to start engine at temperatures down to -30°C (—22°F). The operator is cautioned that a battery start should only be attempted if the battery is fully charged and that the safety margin for starting is increased if the battery has been warmed. Following each cold weather flight, the pilot should (before shutting down the engine) check the battery for charge using the following procedures:

a. Main rotor speed — minimum 250 rpm, main generator ON.

b. Note main generator loadmeter reading.

c. Switch battery OFF and note CHANGE in reading.

10-51. A ten percent (.1) change in loadmeter reading would indicate a charge rate of 30 amperes and the battery not sufficiently charged for subsequent engine starting. A change of .02 in loadmeter reading indicates a charge rate of six amperes and the battery considered reasonable charged. After a flight of one-half hour or more during which the main generator and battery were ON and the main generator and battery were ON and the main generator voltage at 28.5±1.5 volts, a battery charging rate of less than six amperes should be expected.

10-52. Emergency Engine Starting Without External Power Supply. If a battery start must be attempted when the helicopter and battery have been cold-soaked at temperatures between —26°C to —37°C, (—15°F to 35°F), preheat the engine and battery if equipment is available and time permits. Preheating will result in a faster starter cranking speed, which tends to reduce the hot start hazard by assisting the engine in reaching a self-sustaining speed (34% nI) in the least possible time.

10-53. Engine Pre-Start Check. a. Check all switches — OFF.

b. Check all circuit breakers — IN.

c. Position fuel valve switch — ON.

d. Position oil valve switch — ON.

e. Position boost pump — ON.

f. Governor switch — AUTO.

g. Hydraulic servo switch — ON.

5 **4** **0** Hydraulic servo switch—BOTH

h. Throttle — FULL OFF.

i. Collective pitch control — FULL DOWN.

j. Fire guard posted. Check that helicopter will have sufficient obstruction clearance.

10-54. Engine Starting Check. a. Battery switch — ON.

b. Spare inverter — ON. Check fuel pressure 12 to 16 psi. Engine and transmission pressure indicating zero.

c. Spare inverter switch — OFF.

d. Throttle positioned just short of the flight idle stop.

e. Starter - Ignition switch — PULL and HOLD until 34% gas producer (nI) speed is reached.

Caution

> If engine does not continue to accel erate after ignition is indicated by exhaust gas temperature (EGT) or it gives indication of climbing too fast, maintain EGT below 750°C (1382°F) by closing throttle and holding the starter-ignition switch ON until EGT drops below 650°C (1202°F). Again open the throttle to just short of the flight idle stop. With the helicopter and battery cold-soaked at —30°C (—22°F) or lower, the unassisted battery start may require two or even three throttle closing actions to control EGT before the engine accelerates to a self sustaining speed (34 percent nIrpm).

Warning

> During an unassisted battery start, the throttle must be positioned between the flight idle stop and the off position, because the electrical power necessary to release the flight idle stop may not be available due to the high battery drain during engine starter operation. To insure adequate fueling, place close to the flight idle stop.

f. Throttle — Advance to flight idle.

g. With the engine operating and throttle set in the flight idle detent check the following:

(1) Gas producer, 56% to 58% rpm.

(2) Inverter ON — Check spare, then switch to main.

(3) Exhaust gas temperature steady state below 570°C (1085°F).

Note

> At OAT between —20°C and —54°C (—4°F and —65°F) the EGT may be as low as 290°C (554°F) at flight idle.

(4) Engine oil pressure 20 to 60 psi.

(5) Transmission oil pressure 40 psi minimum with rotor above 230 rpm.

(6) Select SPARE generator. Check voltage at 27.5±1.5 volts with rotor above 230 rpm.

(7) Select main generator — Check voltage at 28.5±1.5 volts with rotor above 230 rpm.

(8) Battery switch checked ON.

(9) Fuel pressure check 12 to 16 psi.

(10) Engine fuel system — Functional check — Proceed with normal cold weather check from this point.

10-55. Take-Off. Snow take-off from an air base may be considered normal except for the following precautions that should be observed.

Warning

> Under cold weather conditions, make sure all instruments have warmed up sufficiently to insure normal operation. Check for sluggish instruments before take-off.

a. Select an area that is free of loose or powdery snow to minimize the restriction to visibility from blowing snow.

b. Before attempting to take-off make sure the landing gear skids are free and not frozen to the surface.

10-56. Landing. Snow landing at an airbase may be considered normal except for the following precautions that should be observed:

a. Select an area free of loose or powdery snow so that visibility will not be restrictetd by blowing snow.

b. Accomplish a normal landing with a minimum hover before touchdown. Limited visibility will result from swirling snow, when hovering is attempted before making a touchdown.

10-57. Evaluation of Strange Area Snow Landing Site. Landings may often be necessary in areas other than operational air bases. In addition to the basic factors in landing site evaluation, factors pertinent to snow landings are outlined in this paragraph.

a. The pilot should have knowledge of the type of terrain under the snow (bush, marsh land, tundra, etc.).

b. The snow depth is usually less in clear areas where there is little drifting snow effect. Clean areas normally form gentle swells with the crests of these swells usually crusted. The heaviest crust will generally be found on the upwind side of the crests.

c. Deep snow is usually found in the valleys and to the lee. These areas are suitable for landings and take-offs if caution is exercised.

10-58. Landing. a. Anticipate loose powdery snow and crusts on all landings on snow.

b. Landings should always be made when visual ground reference can be maintained. The reference point should be kept forward and to the right so that it will be visible to the pilot at all times.

Note

> When making an approach and landing on snow it should be one continuous operation without extended hover in order to reduce the white-out condition that results from extended hovering over snow. This white-out will usually occur on loose snow and can cause the pilot to lose all reference with the ground or any object he is approaching. If the object being used as reference should become completely obscured, accomplish a go-around.

10-59. Before Leaving the Helicopter. a. All electrical switches — OFF.

b. Radio switches — OFF.

c. Collective pitch control — FULL DOWN and LOCKED.

d. Cyclic control stick and tail rotor control pedals — NEUTRAL.

e. Pilot's and copilot's windows — OPEN approximately 1-½ inches to permit free circulation of air.

f. Request battery removal, to heated area, if helicopter is to remain at outside tiedown area for a prolonged period at —18°C (0°F) or below.

g. Request installation of protective covers.

h. Security of tie down rigging — CHECK.

10-60. Ice and Rain. In heavy rain a properly adjusted wiper can be expected to adequately clear the windshield throughout the entire speed range. However, when poor visibility is encountered while cruising in rain, it is recommended that the pilot fly by reference to the flight instruments and the copilot attempt to maintain visual reference. Rain has no noticeable effect on handling or performance of the helicopter.

Note

> If the windshield wiper does not start in LOW or MED position, turn the control to HIGH. After the wiper starts, the control may be set at the desired position.

10-61. Before entering icing conditions (visible moisture and below freezing temperatures) the pilot should actuate the pitot heat and windshield defrosters.

Warning

> This helicopter is restricted from flight in moderate to heavy icing conditions under provisions of AR 95-2.

Caution

> Continuous flight in light icing conditions is not recommended because the ice shedding induced rotor blade vibrations add greatly to the pilot work load.

10-62. During flight in icing conditions, the pilot can expect one or all of the following to occur:

a. At any temperature below freezing, a low asymetric self-shedding ice.

b. To maintain airspeed, the torque will have to be increased.

c. An increase in the engine EGT.

d. Illumination of the engine ice detector light.

Warning

> If engine ice detector light fails to illuminate in known icing conditions, or if for any other reason, the engine ice protection system is suspected not to be automatically actuated, pull the Anti-Ice (engine) Circuit Breaker and check the disarmed light. If this light does not illuminate, the pilot can be reasonably certain the engine ice detector system is inoperative and should take appropriate measures.

Note

> The side and nose chin windows may be used to effect a landing if the windshield defrosters fail to keep the windshield clear of ice with maximum available defrost heat.

10-63. High Altitude Operation — Preparation for Flight. a. Determine the density altitude for the area into which the flight is intended and compute maximum gross weight at which a hover may be possible.

b. Determine the existing and forecast wind conditions whenever possible.

c. Insofar as practicable, plan the flight to avoid known and probable areas of turbulence.

10-64. Engine Starting. (Refer to Chapter 3.)

10-65. Take-Off. The take-off should be made to obtain airspeed and altitude simultaneously. The take-off should begin with a slow acceleration to obtain translational lift, followed by a gradual increase in power and airspeed until a normal climb is attained.

10-66. In Flight Operations. a. All turns should be shallow. Avoid turns close to the ground.

b. Control movements should be gentle.

c. Sufficient altitude should be maintained to allow for any emergency, keeping in mind the high rate of autorotational descent associated with high altitudes.

d. Forward airspeed should be limited to prevent blade stall, which is preceded by blade "buffeting".

e. Avoid areas of known turbulence such as the base of clouds, the lee side of mountains, and steep canyons.

10-67. Descent. a. All descents should be gradual. Under no circumstances should a high rate of descent be allowed to develop.

b. Caution should be used during descents to maintain a safe airspeed. Increasing the airspeed above normal approach speed can cause the rate of descent to increase very rapidly. Low airspeed may also result in a high rate of descent and when the nose is lowered in recovery the condition is aggravated.

c. Power applications should be anticipated because UH-1A and UH-1B helicopters do not respond to power at high altitudes as rapidly as at a lower elevation.

10-68. Landing. All approaches to landings should be planned and performed to suitable, level ground.

10-69. Autorotations. Autorotations at high altitudes are characterized by higher rates of descent and less effective collective pitch control available to cushion the landing.

Note

An airspeed of approximately 60 knots should be maintained during autorotation. At an altitude of 75 to 85 feet, initiate a flare to decrease airspeed and rate of descent. At approximately 10 to 12 feet, a small amount of pitch should be applied with the helicopter still in a flare attitude. Maintain approximately 20 to 25 knots forward speed to further decrease the rate of descent. The helicopter should then be leveled and when about 6 to 12 inches above ground, sufficient collective pitch should be applied to cushion the touchdown. Caution should be used to avoid a vertical descent during the last 5 to 10 feet.

Caution

Practice autorotations at high altitudes should be made only to prepared landing areas, even when a power recovery is anticipated. Power recoveries should not be initiated below 400 to 500 feet altitude depending upon helicopter weight and field elevation, due to a combination of slow engine acceleration characteristics, high rotor blade angle of attach and accompanying drag, and the probability of encountering a high rate of descent. The presence of these factors make a quick power recovery impossible. The altitude at which safe power recovery should be initiated increases with helicopter gross weight and/or field elevation.

Section IV — Desert and Hot Weather Operations

10-70. Hot Weather Operations. Operations when outside air temperatures, are above standard day conditions, do not require any special handling technique or procedures, other than a closer monitoring of oil temperatures and EGT.

10-71. High Ambient Temperatures. At very high ambient temperatures, the helicopter loses efficiency with high gross weights.

Section V — Turbulence and Thunderstorm Operation

10-72. Turbulence and Thunderstorms. Flight in thunderstorms and heavy rain that accompanies thunderstorms should be avoided. When a thunderstorm cannot be seen, crash static on the radio will warn of its presence; however, it is not always possible to detect or avoid storm areas. If turbulence and thunderstorms are encountered in flight, the helicopter's forward speed should be reduced to reduce buffeting and increase ease of control.

10-73. Turbulence During Instrument Flight. Th helicopter instrument handling qualities are very poor in turbulence.

If moderate to severe turbulence is unavoidably encountered, the pilot should not attempt to maintain a definite altitude. All attention should be directed to maintaining track and a level attitude indication. The helicopter should be set up for normal instrument cruise conditions. Do not make a collective pitch change unless the airspeed varies over plus or minus 10 knots.

Note

The turbulence penetration speed is 80 knots IAS.

Warning

The pilot is not to intentionally encounter moderate to severe turbulence while on instruments.

CHAPTER 11
CREW DUTIES

(Not Applicable)

CHAPTER 12

WEIGHT AND BALANCE COMPUTATION

Section I — Scope

12-1. Function. This chapter contains sufficient instructions and data so that an airman, knowing the basic weight and moment of the helicopter, can compute any combinations of weight and balance.

12-2. No computers are provided for the helicopter, hence no computer instruction is included.

Section II — Introduction

12-3. Introduction. The purpose of this chapter is to provide appropriate information required for the computation of weight and balance for loading an individual helicopter. It is assumed that the crew member has available, the current basic weight and moment of the particular helicopter. Accordingly, this chapter contains definitions of weight and balance, and explanations of Chart C—Basic Weight and Balance record DD Form 365C (the source of the basic weight and moment); Chart E—Loading Data, Charts and Graphs; and a practical example of a loading problem using weight and balance clearance form, F, DD Form 365F.

Note

> For the purpose of clarity, Model UH-1A and Model UH-1B helicopters are in classes I category. Additional directives governing weight and ballance of Class I aircraft are contained in Army Regulations 95-16.

12-4. The basic weights and cg location obtained from a weighting can only be as accurate as the scale equipment employed. Scales must be calibrated as required by existing directives.

12-5. Weight Definitions. Weight definitions are described in the following paragraphs:

12-6. *Basic Weight.* The basic weight of a helicopter, is the weight which includes all fixed operating equipment and trapped fuel and oil, to which it is only necessary to add the "variable" or "expendable" load items for the various missions.

Note

> The basic weight of a helicopter varies with structural modifications and changes in the fixed operating equipment The term "basic weight", when qualified with a word indicating the type of mission such as "Basic Weight for Combat", "Basic Weight for Ferry", etc., may be used in conjunction with those directives which state what equipment shall be utilized for these missions. For example, extra fuel tanks and various items of equipment installed for long range ferry flights, and which are not norally carried on combat missions, will be included in "Basic Weight for Ferry", but not in the "Basic Weight for Combat".

12-7. *Operating Weight.* The operating weight of a helicopter is the basic weight plus those "variable" items which remain substantially constant for the type mission. These items include oil, crew, crew's baggage, emergency and extra equipment that may be required.

Section III — Definitions

Note

> In the case of special mission helicopters, the operating weight is the weight of the helicopter including the crew and all the equipment required for the mission, but excluding fuel or payload.

12-8. ***Gross Weight.*** The gross weight is the total weight of a helicopter plus its contents, as follows:

a. The take-off gross weight is the operating weight plus the variable and expendable load items which may vary with the mission. These items include fuel, cargo, passengers, ammunition, etc.

b. The landing gross weight is the take-off gross weight minus the expended load items.

12-9. Balance Definitions.

Balance definitions are described in the following paragraphs:

12-10. ***Reference Datum.*** (See figure 12-1). Reference datum is an imaginary vertical plane at the nose of the helicopter from which all horizontal distances are measured for balance purposes. This datum is referenced as fuselage station 0.0.

12-11. ***Arm.*** For balance purposes arm is the horizontal distance in inches from the reference datum to the cg of a given item. Arms may be determined from the helicopter diagram contained in Chart E.

12-12. ***Moment.*** Moment is the weight of an item multiplied by its arm. Moment divided by a constant is generally used to simplify balance calculations by reducing the number of digits.

Note

> Inches from reference datum and moment/100 has been used on Charts A, C and E for calculating weight and balance on Model UH-1A and Model UH-1B helicopters, and the same units of dimension and moment/constant must be additions to these charts.

12-13. ***Average Arm.*** Average arm is the arm obtained by adding the weight and adding the moments of a number of items and then dividing the total moment by the total weight.

12-14. ***Basic Moment.*** Basic moment is the sum of the moments of all items making up the basic weight. When using data from an actual

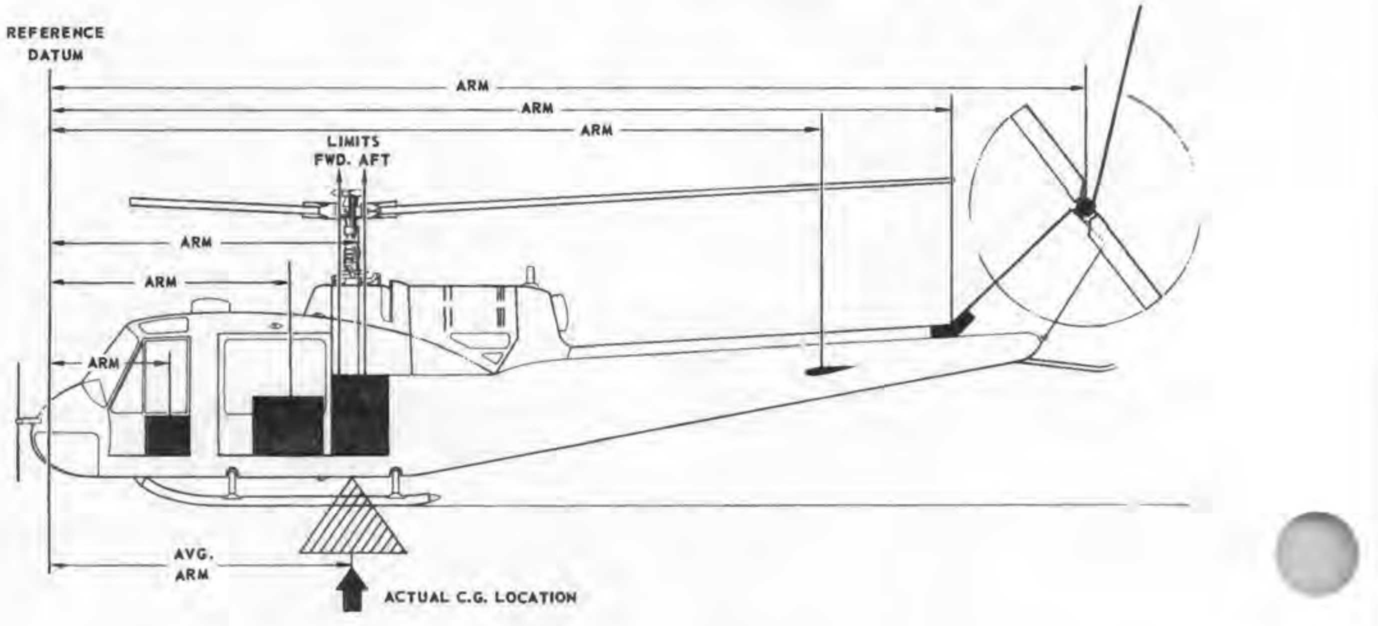


Figure 12–1. Reference datum

weighing of a helicopter, the basic helicopter with respect to the reference datum.

12-15. Center of Gravity(CG). The center of gravity is a point about which a helicopter would balance if suspended. Its distance from the reference datum is found by dividing the total moment by the gross weight of the helicopter.

12-16. CG Limits. Cg limits are the extremes of movement which the cg can have without making the helicopter unsafe to fly. The cg of the loaded helicopter must be within those limits at take-off, in the air, and on landing. In some cases separate take-off and landing limits may be specified.

12-17. Balance Computer Index. Balance computer index is a number representing the moment which, when considered in conjunction with the weight, gives the cg position.

Section IV — Chart Explanations

12-18. Chart C — Basic Weight and Balance Record — DD Form 365C. Chart C is a continuous history of the basic weight and moment resulting from structural and equipment changes. At all times the last weight and moment/constant entry is considered in current weight and balance status of the basic helicopter.

12-19. Use. (Refer to chart 12-1 for a sample of DD Form 365C.) At time of delivery of a new helicopter, the manufacturer entered the

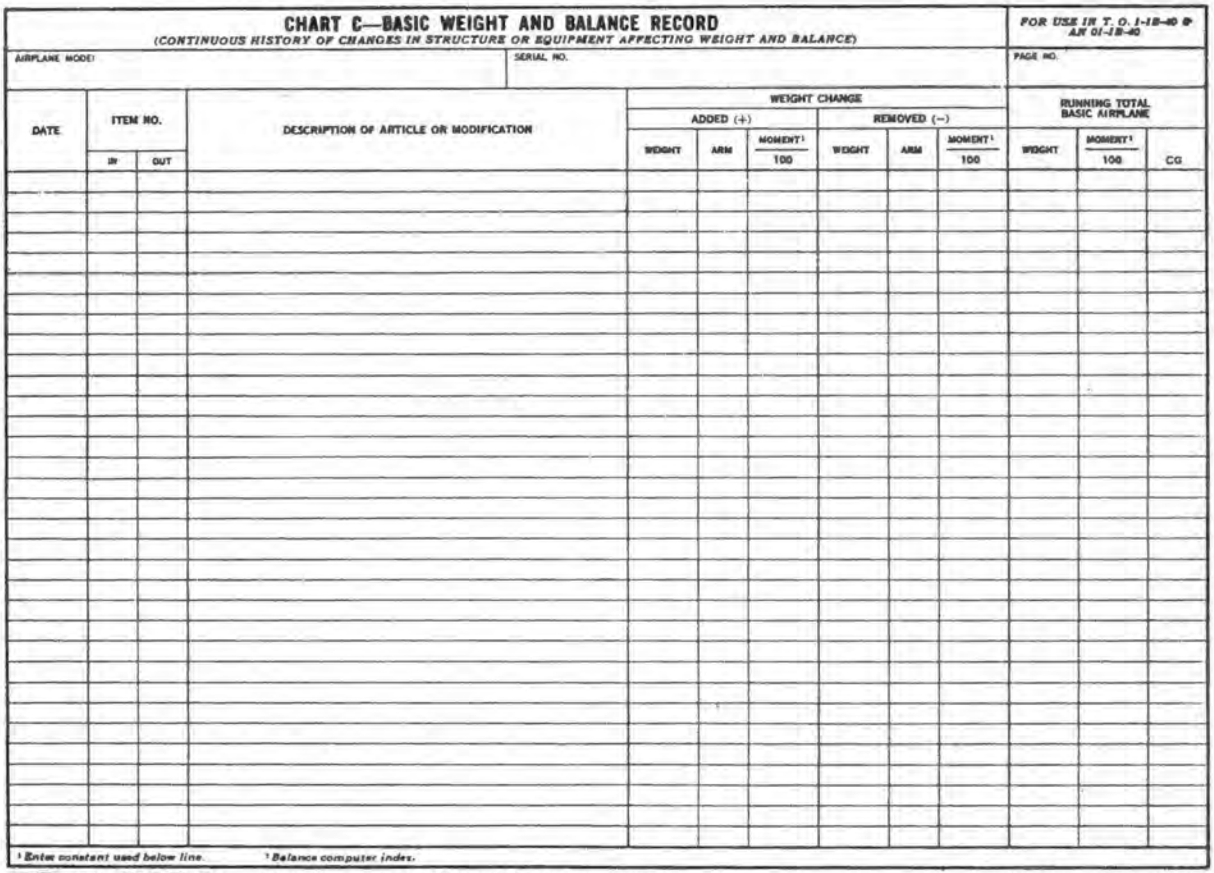


CHART C—BASIC WEIGHT AND BALANCE RECORD
(CONTINUOUS HISTORY OF CHANGES IN STRUCTURE OR EQUIPMENT AFFECTING WEIGHT AND BALANCE)

FOR USE IN T. O. 1-1B-40 & AN 01-1B-40

AIRPLANE MODEL

SERIAL NO.

PAGE NO.

DATE	ITEM NO.		DESCRIPTION OF ARTICLE OR MODIFICATION	WEIGHT CHANGE						RUNNING TOTAL BASIC AIRPLANE		
				ADDED (+)			REMOVED (−)					
	IN	OUT		WEIGHT	ARM	MOMENT[1] / 100	WEIGHT	ARM	MOMENT[1] / 100	WEIGHT	MOMENT[1] / 100	CG

[1] *Enter constant used below line.* [1] *Balance computer index.*

DD FORM 1 SEP 54 365C PREVIOUS EDITIONS OF THIS FORM MAY BE USED UNTIL STOCKS ARE EXHAUSTED.

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Chart 12–1, Sample DD form 365C

basic weight and moment/constant of the individual helicopter. This chart becomes a part of the "G" file of the helicopter. Subsequent additions or subtractions to the basic weight and moment/constant on Chart C are made by the weight and balance technician.

12-20. Chart E — Loading Data. The loading data on Chart E are intended to provide information necessary to work a loading problem for the helicopters to which this manual is applicable.

12-21. ***Use.*** From the loading tables contained in Chart E (see chart 12-2) weight and moment/constant are obtained for all variable load items and are added arithmetically to the current basic weight and moment/constant (from Chart C) to obtain the gross weight and moment.

a. The cg of the loaded helicopter is represented by a moment figure opposite the gross weight on the table.

b. If the helicopter is loaded within the forward and aft cg limits, the moment figure will fall numerically between the limiting moments.

c. The effect on cg by the expenditure in flight of such items as fuel, ammunition, etc., may be checked by subtracting the weights and moments of such items from the take-off gross weight and moment and checking the new moment with the cg table.

Note

> The check should be made to determine whether or not the cg will remain within limits during the entire flight.

HELICOPTER DIAGRAM

CHART E
SHEET 1 OF 14
MODEL UH-1A
DATE 25 MARCH, 1962

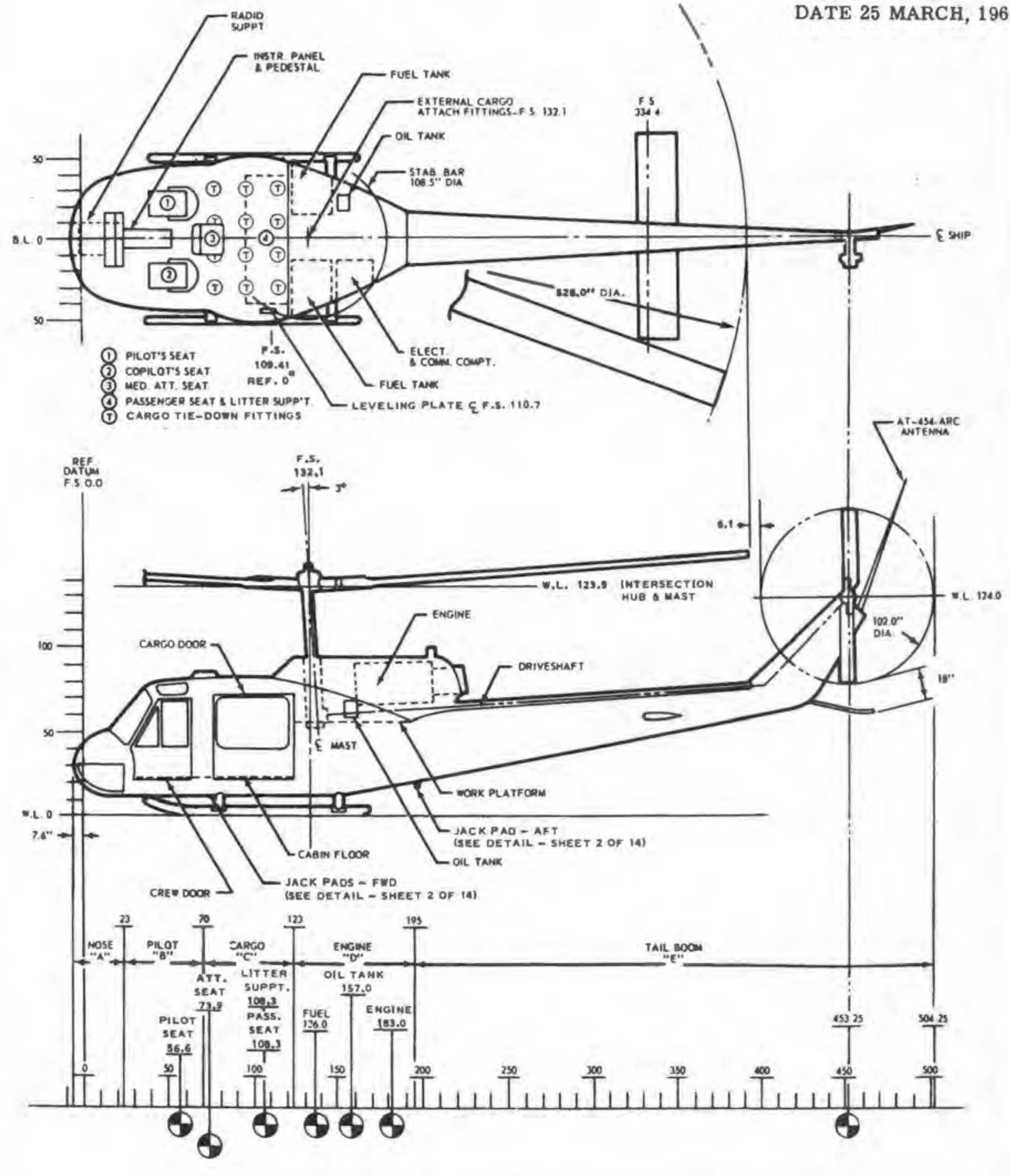
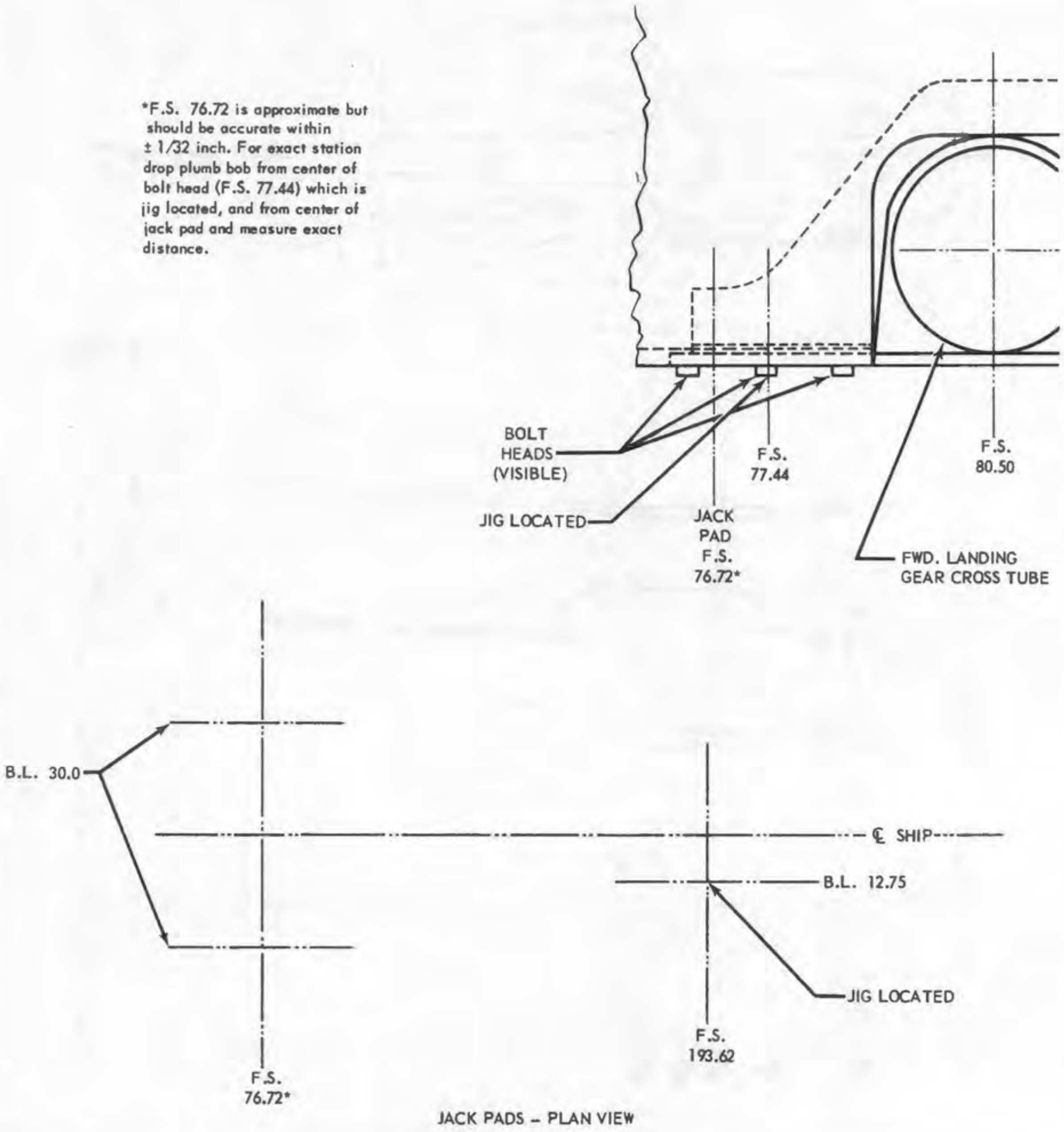


Chart 12–2. Chart E — loading data (Sheet 1 of 47)

CHART E
SHEET 2 of 14
MODEL UH-1A
DATE 25 MARCH, 1962

JACK PAD LOCATION DATA



*F.S. 76.72 is approximate but should be accurate within ± 1/32 inch. For exact station drop plumb bob from center of bolt head (F.S. 77.44) which is jig located, and from center of jack pad and measure exact distance.

Chart 12–2. Chart E — loading data (Sheet 2 of 47)

CHART E
SHEET 3 of 14
MODEL UH-1A
DATE 25 MARCH, 1962

FUEL LOADING TABLES

REGULAR

Gal.	Weight 6.5 lb./Gal.	Moment/100 Sta. 136.0
5	32.5	44.2
10	65.0	88.4
15	97.5	132.6
20	130.0	176.8
25	162.5	221.0
30	195.0	265.2
35	227.5	309.4
40	260.0	353.6
45	292.5	397.8
50	325.0	442.0
55	357.5	486.2
60	390.0	530.4
65	422.5	574.6
70	455.0	618.8
75	487.5	663.0
80	520.0	707.2
85	552.5	751.4
90	585.0	795.6
95	617.5	839.8
100	650.0	884.0
105	682.5	928.2
110	715.0	972.4
115	747.5	1016.6
120	780.0	1060.8
125	812.5	1105.0
130	845.0	1149.2
135	877.5	1193.4
140	910.0	1237.6
145	942.5	1281.8
150	975.0	1326.0
155	1007.5	1370.2
160	1040.0	1414.4

AUXILIARY

Gal.	Weight 6.5 lb./Gal.	Moment/100 Sta. 105.5
5	32.5	34.3
10	65.0	68.6
15	97.5	102.9
20	130.0	137.2
25	162.5	171.4
30	195.0	205.7
35	227.5	240.0
40	260.0	274.3
45	292.5	308.6
50	325.0	342.9
55	357.5	377.2
60	390.0	411.5
65	422.5	445.7
70	455.0	480.0
75	487.5	514.3
80	520.0	548.6
85	552.5	582.9
90	585.0	617.2
95	617.5	651.5
100	650.0	685.8
105	682.5	720.0
110	715.0	754.3
115	747.5	788.6
120	780.0	822.9
125	812.5	857.2
130	845.0	891.5
135	877.5	925.8
140	910.0	960.1
145	942.5	994.3
150	975.0	1028.6
155	1007.5	1062.9
160	1040.0	1097.2
165	1072.5	1131.5

FUEL TANK SEQUENCE:

When auxiliary tank is installed, fuel is pumped from the auxiliary tank to the regular tank. Fuel level in regular tank is controlled by float switches. The auxiliary tank is emptied before any appreciable amount is removed from the regular tank.

Chart 12–2. Chart E — loading data (Sheet 3 of 47)

CHART E
SHEET 4 of 14
MODEL UH-1A
DATE 25 MARCH, 1962

OIL LOADING TABLE

Gal.	Weight	Moment/100 Sta. 157.0	Gal.	Weight	Moment/100 Sta. 157.0
.5	3.8	6.0	2.0	15.0	23.6
1.0	7.5	11.8	2.5	18.8	29.5
1.5	11.3	17.7			

EXTERNAL CARGO LOADING TABLE

Weight	Moment/100 Sta. 132.1	Weight	Moment/100 Sta. 132.1	Weight	Moment/100 Sta. 132.1
50	66.1	1050	1387.1	2050	2708.1
100	132.1	1100	1453.1	2100	2774.1
150	198.2	1150	1519.2	2150	2840.2
200	264.2	1200	1585.2	2200	2906.2
250	330.3	1250	1651.3	2250	2972.3
300	396.3	1300	1717.3	2300	3038.3
350	462.3	1350	1783.4	2350	3104.4
400	528.4	1400	1849.4	2400	3170.4
450	594.5	1450	1915.5	2450	3236.5
500	660.5	1500	1981.5	2500	3302.5
550	726.6	1550	2047.6	2550	3368.6
600	792.6	1600	2113.6	2600	3434.6
650	858.7	1650	2179.7	2650	3500.7
700	924.7	1700	2245.7	2700	3566.7
750	990.8	1750	2311.8	2750	3632.8
800	1056.8	1800	2377.8	2800	3698.8
850	1122.9	1850	2443.9	2850	3764.9
900	1188.9	1900	2509.9	2900	3830.9
950	1255.0	1950	2576.0	2950	3897.0
1000	1321.0	2000	2642.0	3000	3963.0

Chart 12–2. Chart E — loading data (Sheet 4 of 47)

CHART E
SHEET 5 of 14
MODEL UH-1A
DATE 25 MARCH, 1962

INTERNAL CARGO LOADING TABLE

MOMENT/100

Cargo Weight (Pounds)	CARGO CENTER OF GRAVITY - FUSELAGE STATION									
	75	80	85	90	95	100	105	110	115	120
50	37.5	40.0	42.5	45.0	47.5	50.0	52.5	55.0	57.5	60.0
100	75.0	80.0	85.0	90.0	95.0	100.0	105.0	110.0	115.0	120.0
150	112.5	120.0	127.5	135.0	142.5	150.0	157.5	165.0	172.5	180.0
200	150.0	160.0	170.0	180.0	190.0	200.0	210.0	220.0	230.0	240.0
250	187.5	200.0	212.5	225.0	237.5	250.0	262.5	275.0	287.5	300.0
300	225.0	240.0	255.0	270.0	285.0	300.0	315.0	330.0	345.0	360.0
350	262.5	280.0	297.5	315.0	332.5	350.0	367.5	385.0	402.5	420.0
400	300.0	320.0	340.0	360.0	380.0	400.0	420.0	440.0	460.0	480.0
450	337.5	360.0	382.5	405.0	427.5	450.0	472.5	495.0	517.5	540.0
500	375.0	400.0	425.0	450.0	475.0	500.0	525.0	550.0	575.0	600.0
550	412.5	440.0	467.5	495.0	522.5	550.0	577.5	605.0	632.5	660.0
600	450.0	480.0	510.0	540.0	570.0	600.0	630.0	660.0	690.0	720.0
650	487.5	520.0	552.5	585.0	617.5	650.0	682.5	715.0	747.5	780.0
700	525.0	560.0	595.0	630.0	665.0	700.0	735.0	770.0	805.0	840.0
750	562.5	600.0	637.5	675.0	712.5	750.0	787.5	825.0	862.5	900.0
800	600.0	640.0	680.0	720.0	760.0	800.0	840.0	880.0	920.0	960.0
850	637.5	680.0	722.5	765.0	807.5	850.0	892.5	935.0	977.5	1020.0
900	675.0	720.0	765.0	810.0	855.0	900.0	945.0	990.0	1035.0	1080.0
950	712.5	760.0	807.5	855.0	902.5	950.0	997.5	1045.0	1092.5	1140.0
1000	750.0	800.0	850.0	900.0	950.0	1000.0	1050.0	1100.0	1150.0	1200.0
1050	787.5	840.0	892.5	945.0	997.5	1050.0	1102.5	1155.0	1207.5	1260.0
1100	825.0	880.0	935.0	990.0	1045.0	1100.0	1155.0	1210.0	1265.0	1320.0
1150	862.5	920.0	977.5	1035.0	1092.5	1150.0	1207.5	1265.0	1322.5	1380.0
1200	900.0	960.0	1020.0	1080.0	1140.0	1200.0	1260.0	1320.0	1380.0	1440.0
1250	937.5	1000.0	1062.5	1125.0	1187.5	1250.0	1312.5	1375.0	1437.5	1500.0

CAUTION

It is possible to exceed forward cg limit by improper loading. Fuel consumption, cargo weight and placement and correct crew weight must be determined for satisfactory balance. All necessary information may be obtained from this handbook.

Chart 12-2. Chart E — loading data (Sheet 5 of 47)

CHART E
SHEET 6 of 14
MODEL UH-1A
DATE 25 MARCH 1962

CARGO TIE DOWN FITTING DATA

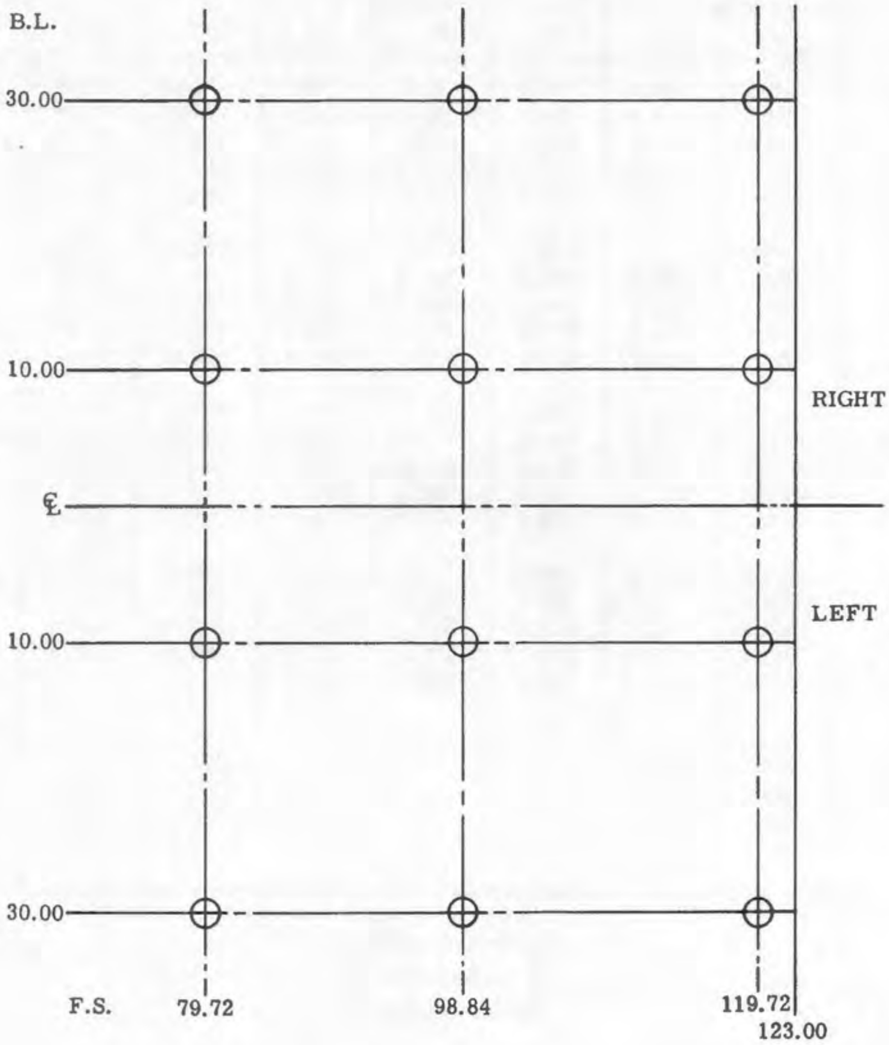


Chart 12–2. Chart E — loading data (Sheet 6 of 47)

CHART E
SHEET 7 of 14
MODEL UH-1A
DATE 25 MARCH, 1962

TABLE OF MOMENTS FOR PERSONNEL

MOMENT/100

WEIGHT	Pilot or Copilot Sta. 46.7	Attendant Sta. 78.4	Patients Sta. 109.6	Passengers Sta. 108.2
150	70.1	117.6	164.4	162.3
160	74.7	125.4	175.4	173.1
170	79.4	133.3	186.3	183.9
180	84.1	141.1	197.3	194.8
190	88.7	149.0	208.2	205.6
200	93.4	156.8	219.2	216.4
210	98.1	164.6	230.2	227.2
220	102.7	172.5	241.1	238.0
230	107.4	180.3	252.1	248.9
240	112.1	188.2	263.0	259.7
250	116.8	196.0	274.0	270.5

TABLE OF MOMENTS FOR CREW MOVEMENT

MOMENT/100		To Position			
From Position		4	3	2	1
Pilot or Copilot Seat	1	+123.0	+125.8	+ 63.4	------
Attendant Seat	2	+ 59.6	+ 62.4	------	- 63.4
Litter Rack	3	------	------	- 62.4	-125.8
Passenger Seat	4	------	------	- 59.6	-123.0

NOTE: Based on 200 pounds per man

Chart 12-2. Chart E — loading data (Sheet 7 of 47)

CHART E
SHEET 8 of 14
MODEL UH-1A
DATE 25 MARCH, 1962

CENTER OF GRAVITY TABLE

Gross Weight (Pounds)	Moment/100					
	← Forward		C.G. Limits			Aft →
	128.0	130.0	132.0	134.0	136.0	137.5
4000	5120.0	5200.0	5280.0	5360.0	5440.0	5500.0
4025	5152.0	5232.5	5313.0	5393.5	5474.0	5534.4
4050	5184.1	5265.0	5346.0	5427.0	5508.0	5568.8
4075	5216.0	5297.5	5379.0	5460.5	5542.0	5603.1
4100	5248.0	5330.0	5412.0	5494.0	5576.0	5637.5
4125	5280.0	5362.5	5445.0	5527.5	5610.0	5671.9
4150	5312.0	5395.0	5478.0	5561.0	5644.0	5706.3
4175	5344.0	5427.5	5511.0	5594.5	5678.0	5740.6
4200	5376.0	5460.0	5544.0	5628.0	5712.0	5775.0
4225	5408.0	5492.5	5577.0	5661.5	5746.0	5809.4
4250	5440.0	5525.0	5610.0	5695.0	5780.0	5843.8
4275	5472.0	5557.5	5643.0	5728.5	5814.0	5878.1
4300	5504.0	5590.0	5676.0	5762.0	5848.0	5912.5
4325	5536.0	5622.5	5709.0	5795.5	5882.0	5946.9
4350	5568.0	5655.0	5742.0	5829.0	5916.0	5981.3
4375	5600.0	5687.5	5775.0	5862.5	5950.0	6015.6
4400	5632.0	5720.0	5808.0	5896.0	5984.0	6050.0
4425	5664.0	5752.5	5841.0	5929.5	6018.0	6084.4
4450	5696.0	5785.0	5874.0	5963.0	6052.0	6118.8
4475	5728.0	5817.5	5907.0	5996.5	6086.0	6153.1
4500	5760.0	5850.0	5940.0	6030.0	6120.0	6187.5
4525	5792.0	5882.5	5973.0	6063.5	6154.0	6221.9
4550	5824.0	5915.0	6006.0	6097.0	6188.0	6256.3
4575	5856.0	5947.5	6039.0	6130.5	6222.0	6290.6
4600	5880.0	5980.0	6072.0	6164.0	6256.0	6325.0
4625	5920.0	6012.5	6105.0	6197.5	6290.0	6359.4
4650	5952.0	6045.0	6138.0	6231.0	6324.0	6393.8
4675	5984.0	6077.5	6171.0	6264.5	6358.0	6428.1
4700	6016.0	6110.0	6204.0	6298.0	6392.0	6462.5
4725	6048.0	6142.5	6237.0	6331.5	6426.0	6496.9
4750	6080.0	6175.0	6270.0	6365.0	6460.0	6531.3
4775	6112.0	6207.5	6303.0	6398.5	6494.0	6565.6
4800	6144.0	6240.0	6336.0	6432.0	6528.0	6600.0
4825	6176.0	6272.5	6369.0	6465.5	6562.0	6634.4
4850	6208.0	6305.0	6402.0	6499.0	6596.0	6668.8
4875	6240.0	6337.5	6435.0	6532.5	6630.0	6703.1

Chart 12–2. Chart E — loading data (Sheet 8 of 47)

CHART E
SHEET 9 of 14
MODEL UH-1A
DATE 25 MARCH, 1962

CENTER OF GRAVITY TABLE

Gross Weight (Pounds)	Moment/100					
	← Forward		C.G. Limits			Aft →
	128.0	130.0	132.0	134.0	136.0	137.0
4900	6272.0	6370.0	6468.0	6566.0	6664.0	6737.5
4925	6304.0	6402.5	6501.0	6599.5	6698.0	6771.9
4950	6336.0	6435.0	6534.0	6633.0	6732.0	6806.3
4950	6368.0	6467.5	6567.0	6666.5	6766.0	6840.6
5000	6400.0	6500.0	6600.0	6700.0	6800.0	6875.0
5025	6432.0	6532.5	6633.0	6733.5	6834.0	6909.4
5050	6464.0	6565.0	6666.0	6767.0	6868.0	6943.8
5075	6496.0	6597.5	6699.0	6800.5	6902.0	6978.1
5100	6528.0	6630.0	6732.0	6834.0	6936.0	7012.5
5125	6560.0	6662.5	6765.0	6867.5	6970.0	7046.9
5150	6592.0	6695.0	6798.0	6901.0	7004.0	7081.3
5175	6624.0	6767.5	6831.0	6934.5	7038.0	7115.6
5200	6656.0	6760.0	6864.0	6968.0	7072.0	7150.0
5225	6688.0	6792.5	6897.0	7001.5	7106.0	7184.4
5250	6720.0	6825.0	6930.0	7035.0	7140.0	7218.8
5275	6752.0	6857.5	6963.0	7068.5	7174.0	7253.1
5300	6784.0	6890.0	6996.0	7102.0	7208.0	7287.5
5325	6816.0	6922.5	7029.0	7135.5	7242.0	7321.9
5350	6848.0	6955.0	7062.0	7169.0	7276.0	7356.3
5375	6880.0	6987.5	7095.0	7202.5	7310.0	7390.6
5400	6912.0	7020.0	7128.0	7236.0	7344.0	7425.0
5425	6944.0	7052.5	7161.0	7269.5	7378.0	7459.4
5450	6976.0	7085.0	7194.0	7303.0	7412.0	7493.8
5475	7008.0	7117.5	7227.0	7336.5	7446.0	7528.1
5500	7040.0	7150.0	7260.0	7370.0	7480.0	7562.5
5525	7072.0	7182.5	7293.0	7403.5	7514.0	7596.9
5550	7104.0	7215.0	7326.0	7437.0	7548.0	7631.3
5575	7136.0	7247.5	7359.0	7470.5	7582.0	7665.6
5600	7168.0	7280.0	7392.0	7504.0	7616.0	7700.0
5625	7200.0	7312.5	7425.0	7537.5	7650.0	7734.4
5650	7232.0	7345.0	7458.0	7571.0	7684.0	7768.8
5675	7264.0	7377.5	7491.0	7604.5	7718.0	7803.1
5700	7296.0	7410.0	7524.0	7638.0	7752.0	7837.5
5725	7328.0	7442.5	7557.0	7671.5	7786.0	7871.9
5750	7360.0	7475.0	7590.0	7705.0	7820.0	7906.3
5775	7392.0	7507.5	7623.0	7738.5	7854.0	7940.6

Chart 12–2. Chart E — loading data (Sheet 9 of 47)

CHART E
SHEET 10 of 14
MODEL UH-1A
DATE 25 MARCH, 1962

CENTER OF GRAVITY TABLE

Gross Weight (Pounds)	Moment/100					
	← Forward		C. G. Limits			Aft →
	128.0	130.0	132.0	134.0	136.0	137.0
5800	7424.0	7540.0	7656.0	7772.0	7888.0	7975.0
5825	7456.0	7572.5	7689.0	7805.5	7922.0	8009.4
5850	7488.0	7605.0	7722.0	7839.0	7956.0	8043.8
5875	7520.0	7637.5	7755.0	7872.5	7990.0	8078.1
5900	7552.0	7670.0	7788.0	7906.0	8024.0	8112.5
5925	7584.0	7702.5	7821.0	7939.5	8058.0	8146.9
5950	7616.0	7735.0	7854.0	7973.0	8092.0	8181.3
5975	7648.0	7767.5	7887.0	8006.5	8126.0	8215.6
6000	7680.0	7800.0	7920.0	8040.0	8160.0	8250.0
6025	7712.0	7832.5	7953.0	8073.5	8194.0	8284.4
6050	7744.0	7865.0	7986.0	8107.0	8228.0	8318.8
6075	7776.0	7897.5	8019.0	8140.5	8262.0	8353.1
6100	7808.0	7930.0	8052.0	8174.0	8296.0	8387.5
6125	7840.0	7962.5	8085.0	8207.5	8330.0	8421.9
6150	7872.0	7995.0	8118.0	8241.0	8364.0	8456.3
6175	7904.0	8027.5	8151.0	8274.5	8398.0	8490.6
6200	7936.0	8060.0	8184.0	8308.0	8432.0	8525.0
6225	7968.0	8092.5	8217.0	8341.5	8466.0	8559.4
6250	8000.0	8125.0	8250.0	8375.0	8500.0	8593.8
6275	8032.0	8157.5	8283.0	8408.5	8534.0	8628.1
6300	8064.0	8190.0	8316.0	8442.0	8568.0	8662.5
6325	8096.0	8222.5	8349.0	8475.5	8602.0	8696.9
6350	8128.0	8255.0	8382.0	8509.0	8636.0	8731.3
6375	8160.0	8287.5	8415.0	8542.5	8670.0	8765.6
6400	8192.0	8320.0	8448.0	8576.0	8704.0	8800.0
6425	8224.0	8352.5	8481.0	8609.5	8738.0	8834.4
6450	8256.0	8385.0	8514.0	8643.0	8772.0	8868.8
6475	8288.0	8417.5	8517.0	8676.5	8806.0	8903.1
6500	8320.0	8450.0	8580.0	8710.0	8840.0	8937.5
6525	8352.0	8482.5	8613.0	8743.5	8874.0	8971.9
6550	8384.0	8515.0	8646.0	8777.0	8908.0	9006.3
6575	8416.0	8547.5	8679.0	8810.5	8942.0	9040.6
6600	8448.0	8580.0	8712.0	8844.0	8976.0	9075.0
6625	8480.0	8612.5	8745.0	8877.5	9010.0	9109.4
6650	8512.0	8645.0	8778.0	8911.0	9044.0	9143.8
6675	8544.0	8677.5	8811.0	8944.5	9078.0	9178.1

Chart 12–2. Chart E — loading data (Sheet 10 of 47)

CHART E
SHEET 11 of 14
MODEL UH-1A
DATE 25 MARCH, 1962

CENTER OF GRAVITY TABLE

Gross Weight (Pounds)	Moment/100					
	← Forward		C. G. Limits			Aft →
	128.0	130.0	132.0	134.0	136.0	137.0
6700	8576.0	8710.0	8844.0	8978.0	9112.0	9212.5
6725	8608.0	8742.5	8877.0	9011.5	9146.0	9246.9
6750	8640.0	8775.0	8910.0	9045.0	9180.0	9281.3
6775	8672.0	8807.5	8943.0	9078.5	9214.0	9315.6
6800	8704.0	8840.0	8976.0	9112.0	9248.0	9350.0
6825	8736.0	8872.5	9009.0	9145.5	9282.0	9384.4
6850	8768.0	8905.0	9042.0	9179.0	9316.0	9418.8
6875	8800.0	8937.5	9075.0	9212.5	9350.0	9453.1
6900	8832.0	8970.0	9108.0	9246.0	9384.0	9487.5
6925	8864.0	9002.5	9141.0	9279.5	9418.0	9521.9
6950	8896.0	9035.0	9174.0	9313.0	9452.0	9556.3
6975	8928.0	9067.5	9207.0	9346.5	9486.0	9590.6
7000	8960.0	9100.0	9240.0	9380.0	9520.0	9625.0
7025	8992.0	9132.5	9273.0	9413.5	9554.0	9659.4
7050	9024.0	9165.0	9306.0	9447.0	9588.0	9693.8
7075	9056.0	9197.5	9339.0	9480.5	9622.0	9728.1
7100	9088.0	9230.0	9372.0	9514.0	9656.0	9762.5
7125	9120.0	9262.5	9405.0	9547.5	9690.0	9796.9
7150	9252.0	9295.0	9438.0	9581.0	9724.0	9831.3
7175	9184.0	9327.5	9471.0	9614.5	9758.0	9865.6
7200	9216.0	9360.0	9504.0	9648.0	9792.0	9900.0

GROSS WEIGHT LIMITATIONS:

Takeoff ________________________*

Landing ________________________*

*Note: Service activities shall insert, or substitute, current figures from latest applicable (Technical Order) (Flight Handbook) covering operating restrictions.

Chart 12-2. Chart E — loading data (Sheet 11 of 47)

CHART E
SHEET 12 of 14
MODEL UH-1A
DATE 25 MARCH, 1962

MISCELLANEOUS DATA

PERSONNEL CENTROIDS

Compt.	Crew Member	Arm
B	Pilot Copilot	46.7 46.7
C	Medical Attendant Passengers Litter Patients	78.4 108.2 109.6

DIMENSIONAL DATA

Overall Length - Blades Extended	636.1 in.
Length - Blades Folded	471.9 in.
Maximum Height - T/R Blades Vertical	175.0 in.
Height - T/R Blades Fore and Aft	133.7 in.
Span - Blades Rotating	528.0 in.
Span - Blades Fore and Aft	100.0 in.

Chart 12-2. Chart E — loading data (Sheet 12 of 47)

CHART E
SHEET 13 of 14
MODEL UH-1A
DATE 25 MARCH, 1962

TYPICAL SERVICE LOADING

The items listed below are typical for the mission indicated. These load items are added to the Basic Weight to determine Operating Weight for the particular mission.

ITEM	ARM	LITTER EVACUATION		PERSONNEL CARRIER		INTERNAL CARGO	
		Weight	Moment/100	Weight	Moment/100	Weight	Moment/100
Pilot	46.7	200.0	93.4	200.0	93.4	200.0	93.4
Medical Attendant	78.4	200.0	156.8				
Patients (2)	109.6	500.0	548.0				
Passengers (4)	108.2			800.0	865.6		
Cargo	99.0					200.0	792.0
Litters (2)	109.6	42.0	46.0				
Fuel	136.0	812.5	1105.0	812.5	1105.0	812.5	1105.0
Oil - Engine	157.0	12.0	18.8	12.0	18.8	12.0	18.8
Special Equipment	90.0	100.0	90.0				
TOTALS		1866.5	2058.0	1824.5	2082.8	1824.5	2009.2

CAUTION

It is possible to exceed C.G. limits by overloading cabin, by improper placement of cabin load; and by carrying partial cabin load. Correct weight and placement of these variables must be determined to obtain satisfactory balance.

Chart 12-2. Chart E — loading data (Sheet 13 of 47)

CHART E
SHEET 14 of 14
MODEL UH-1A
DATE 25 MARCH, 1962

TYPICAL LOADING EXAMPLES

In the examples below, the values for Basic Weight and Moment are assumed to be as shown. Normally these values are obtained from Chart C. To arrive at "Minimum Landing Gross Weight" (Operating Weight) add to the Basic Weight those load items pertinent to the mission. Refer to the Center of Gravity Table to determine if loading falls within limits. If loading is satisfactory, then determine "Take Off Gross Weight" by adding the expendable load items to the "Minimum Landing Gross weight". Again it is necessary to check the Center of Gravity Table to determine if loading falls within the limits.

ITEM	WEIGHT	MOMENT/100
Basic Helicopter	4000	5648.0
Pilot	200	93.4
Oil - Engine	12	18.8
MINIMUM LANDING GROSS WEIGHT	4212	5760.2

The minimum Landing Gross Weight and Moment as located on the Center of Gravity Table fall within the recommended cg limits. Therefore the loading is satisfactory for landing.

Minimum Landing Gross Weight	4212	5760.2
Add: Fuel	813	1105.0
Attendant	200	156.8
Patients (2)	500	548.0
Litters (2)	42	46.0
Special Equipment	100	90.0
TAKEOFF GROSS WEIGHT	5867	7706.0

Take Off Gross Weight and Moment as located on the Center of Gravity Table fall within the recommended cg limits. Therefore the loading is satisfactory for take off.

Chart 12–2. Chart E — loading data (Sheet 14 of 47)

HELICOPTER DIAGRAM

CHART E
SHEET 1 OF 15
MODEL UH-1B

EFFECTIVITY

Serial No. 62-1872 thru 62-2105 62-4566 thru 62-4605, 62-12515 thru 62-12555 and 63-8500 thru 638738, and 63-12903 thru 63-12952 and 64-13902 thru 64-14100

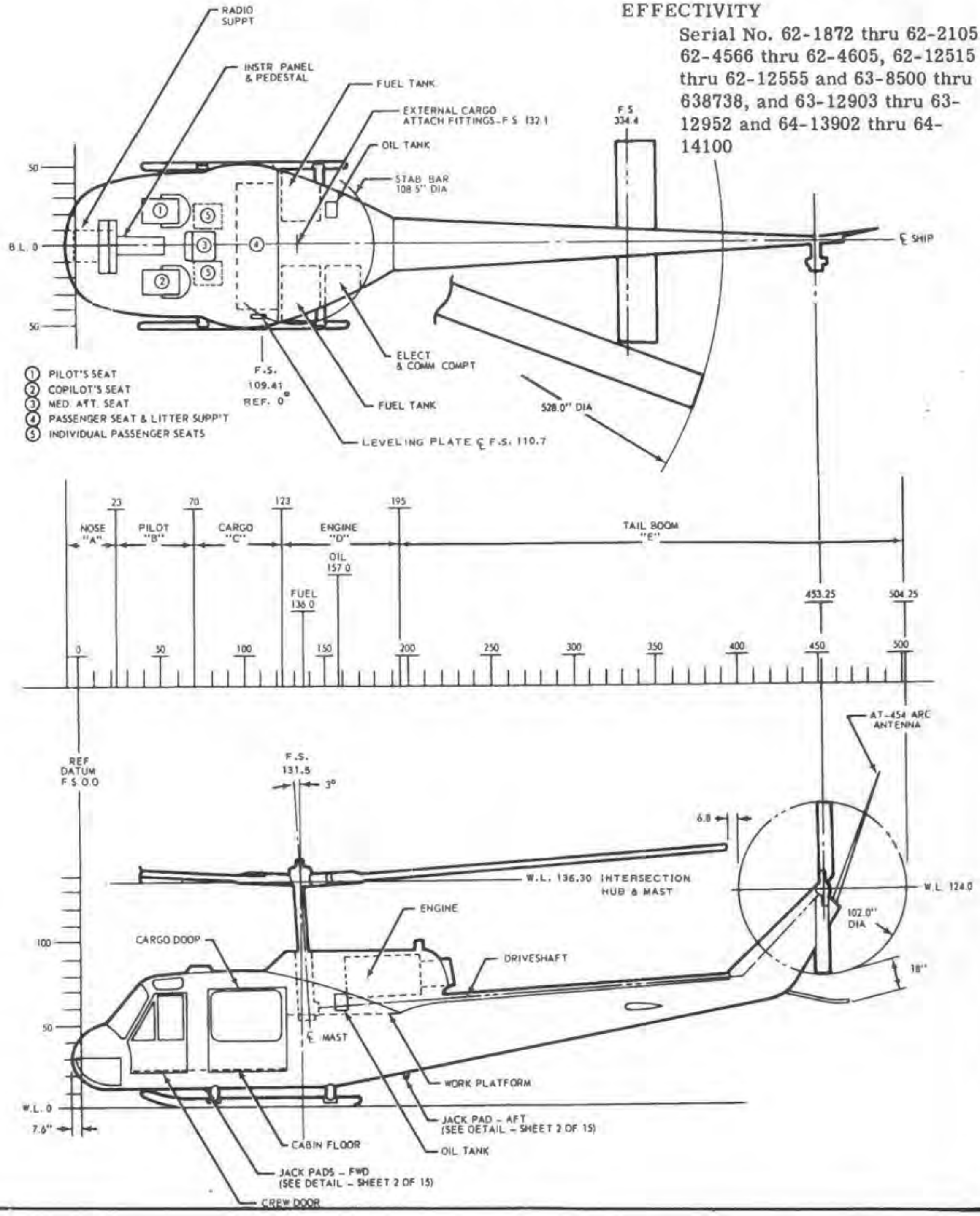
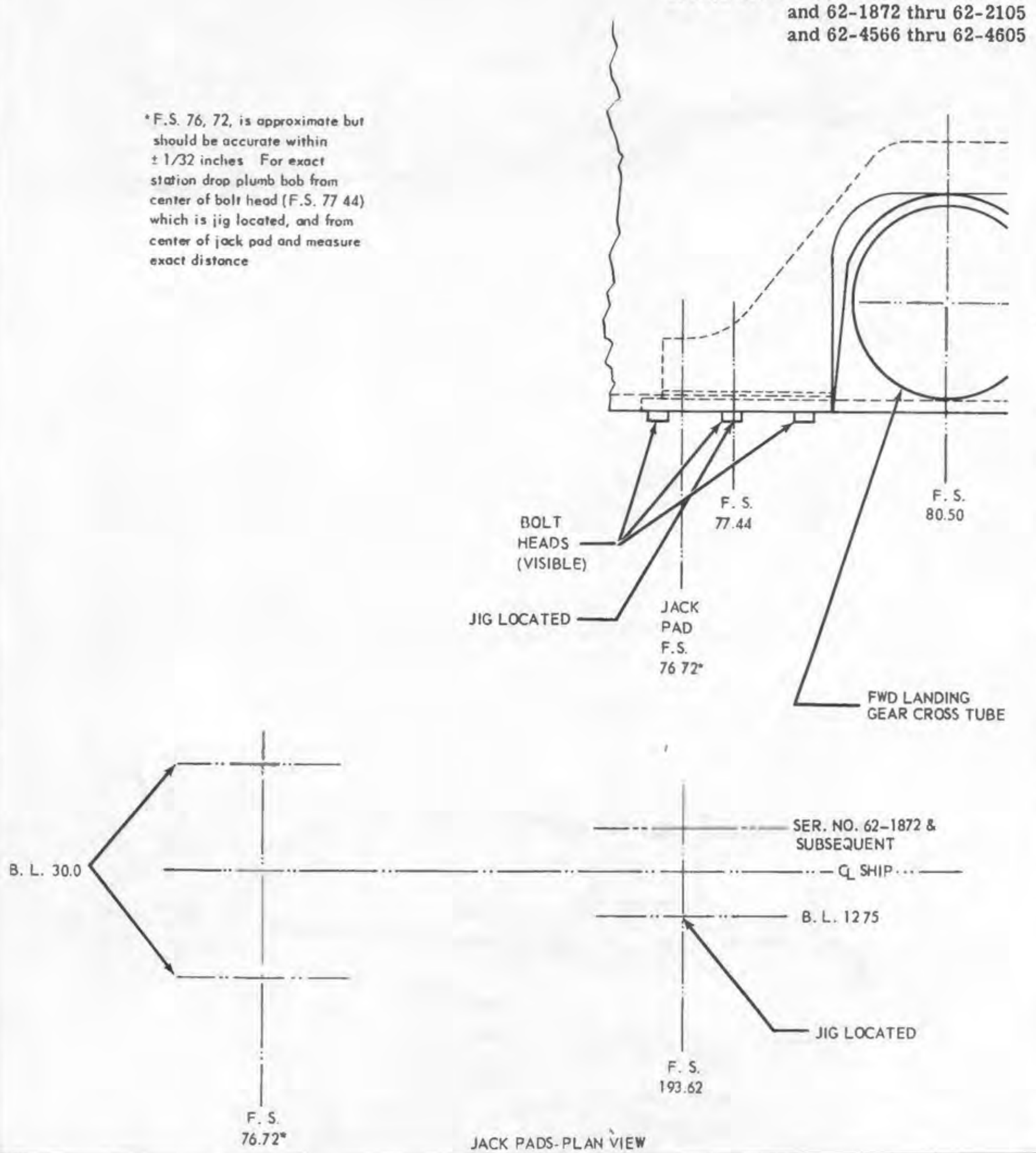


Chart 12-2. Chart E — loading data (Sheet 15 of 47)

JACK PAD LOCATION DATA

CHART E
SHEET 2 OF 15
MODEL UH-1B

EFFECTIVITY
S/N (Serial No's.) 60-3546 thru 61-803
and 62-1872 thru 62-2105
and 62-4566 thru 62-4605



*F.S. 76, 72, is approximate but should be accurate within ± 1/32 inches For exact station drop plumb bob from center of bolt head (F.S. 77 44) which is jig located, and from center of jack pad and measure exact distance

Chart 12-2. Chart E — loading data (Sheet 16 of 47)

CHART E
SHEET 3 OF 15
MODEL UH-1B

FUEL LOADING TABLES

REGULAR

GAL.	WEIGHT 6.5 LB/GAL	MOMENT/100 STA. 136.0	GAL	WEIGHT 6.5 LB/GAL	MOMENT/100 STA. 136.0
10	65.0	88	100	650.0	884
20	130.0	177	110	715.0	972
30	195.0	265	120	780.0	1061
40	260.0	354	130	845.0	1149
50	325.0	442	140	910.0	1238
60	390.0	530	150	975.0	1326
70	455.0	619	155	1007.5	1370
80	520.0	707	160	1040.0	1414
90	585.0	796	165	1072.5	1459

AUXILIARY

GAL.	WEIGHT 6.5 LB/GAL	MOMENT/100 STA. 97.2	GAL.	WEIGHT 6.5 LB/GAL	MOMENT/100 STA. 97.2
10	65	63	190	1235	1200
20	130	126	200	1300	1264
30	195	190	210	1365	1327
40	260	253	220	1430	1390
50	325	316	230	1495	1453
60	390	379	240	1560	1516
70	455	442	250	1625	1580
80	520	505	260	1690	1643
90	585	569	270	1755	1706
100	650	632	280	1820	1769
110	715	695	290	1885	1832
120	780	758	300	1950	1895
130	845	821	310	2015	1959
140	910	885	320	2080	2022
150	975	948	330	2145	2085
160	1040	1011	340	2210	2148
170	1105	1074	350	2275	2211
180	1170	1137			

FUEL TANK SEQUENCE:

When auxiliary tank is installed, fuel is pumped from the auxiliary tank to the regular tank. Fuel level in regular tank is controlled by float switches.
The auxiliary tank is emptied before any appreciable amount is removed from the regular tank.

Chart 12-2. Chart E — loading data (Sheet 17 of 47)

CHART E
SHEET 4 OF 15
MODEL UH-1B

OIL LOADING TABLE

GAL.	WEIGHT	MOMENT/100 STA. 157.0	GAL.	WEIGHT	MOMENT/100 STA. 157.0
.5	4	6	2.0	15	24
1.0	8	13	2.5	19	30
1.5	11	17			

EXTERNAL CARGO LOADING TABLE

WEIGHT	MOMENT/100 STA. 132.1	WEIGHT	MOMENT/100 STA. 132.1	WEIGHT	MOMENT/100 STA. 132.1
50	66	1550	2048	3050	4029
100	132	1600	2114	3100	4095
150	198	1650	2180	3150	4161
200	264	1700	2246	3200	4227
250	330	1750	2312	3250	4293
300	396	1800	2378	3300	4359
350	462	1850	2444	3350	4425
400	528	1900	2510	3400	4491
450	595	1950	2576	3450	4557
500	661	2000	2642	3500	4624
550	727	2050	2708	3550	4690
600	793	2100	2774	3600	4756
650	859	2150	2840	3650	4822
700	925	2200	2906	3700	4888
750	991	2250	2972	3750	4954
800	1057	2300	3038	3800	5020
850	1123	2350	3104	3850	5086
900	1189	2400	3170	3900	5152
950	1255	2450	3237	3950	5218
1000	1321	2500	3303	4000	5284
1050	1387	2550	3369		
1100	1453	2600	3435		
1150	1519	2650	3501		
1200	1585	2700	3567		
1250	1651	2750	3633		
1300	1717	2800	3699		
1350	1783	2850	3765		
1400	1849	2900	3831		
1450	1916	2950	3897		
1500	1982	3000	3963		

Chart 12-2. Chart E — loading data (Sheet 18 of 47)

CHART E
SHEET 5 OF 15
MODEL UH-1B

INTERNAL CARGO LOADING TABLE

MOMENT/100

CARGO WEIGHT (POUNDS)	CARGO CENTER OF GRAVITY (F.S.)			
	75.0	90.0	105.0	120.0
50	38	45	53	60
100	75	90	105	120
150	113	135	158	180
200	150	180	210	240
250	188	225	263	300
300	225	270	315	360
350	263	315	368	420
400	300	360	420	480
450	338	405	473	540
500	375	450	525	600
550	413	495	578	660
600	450	540	630	720
650	488	585	683	780
700	525	630	735	840
750	563	675	788	900
800	600	720	840	960
850	638	765	893	1020
900	675	810	945	1080
950	713	855	998	1140
1000	750	900	1050	1200
1050	788	945	1103	1260
1100	825	990	1155	1320
1150	863	1035	1208	1380
1200	900	1080	1260	1440
1250	938	1125	1313	1500
1300	975	1170	1365	1560
1350	1013	1215	1418	1620
1400	1050	1260	1470	1680
1450	1088	1305	1523	1740
1500	1125	1350	1575	1800
1550	1163	1395	1628	1860
1600	1200	1440	1680	1920
1650	1238	1485	1733	1980
1700	1275	1530	1785	2040
1750	1313	1575	1838	2100
1800	1350	1620	1890	2160
1850	1388	1665	1943	2220
1900	1425	1710	1995	2280
1950	1463	1755	2048	2340
2000	1500	1800	2100	2400

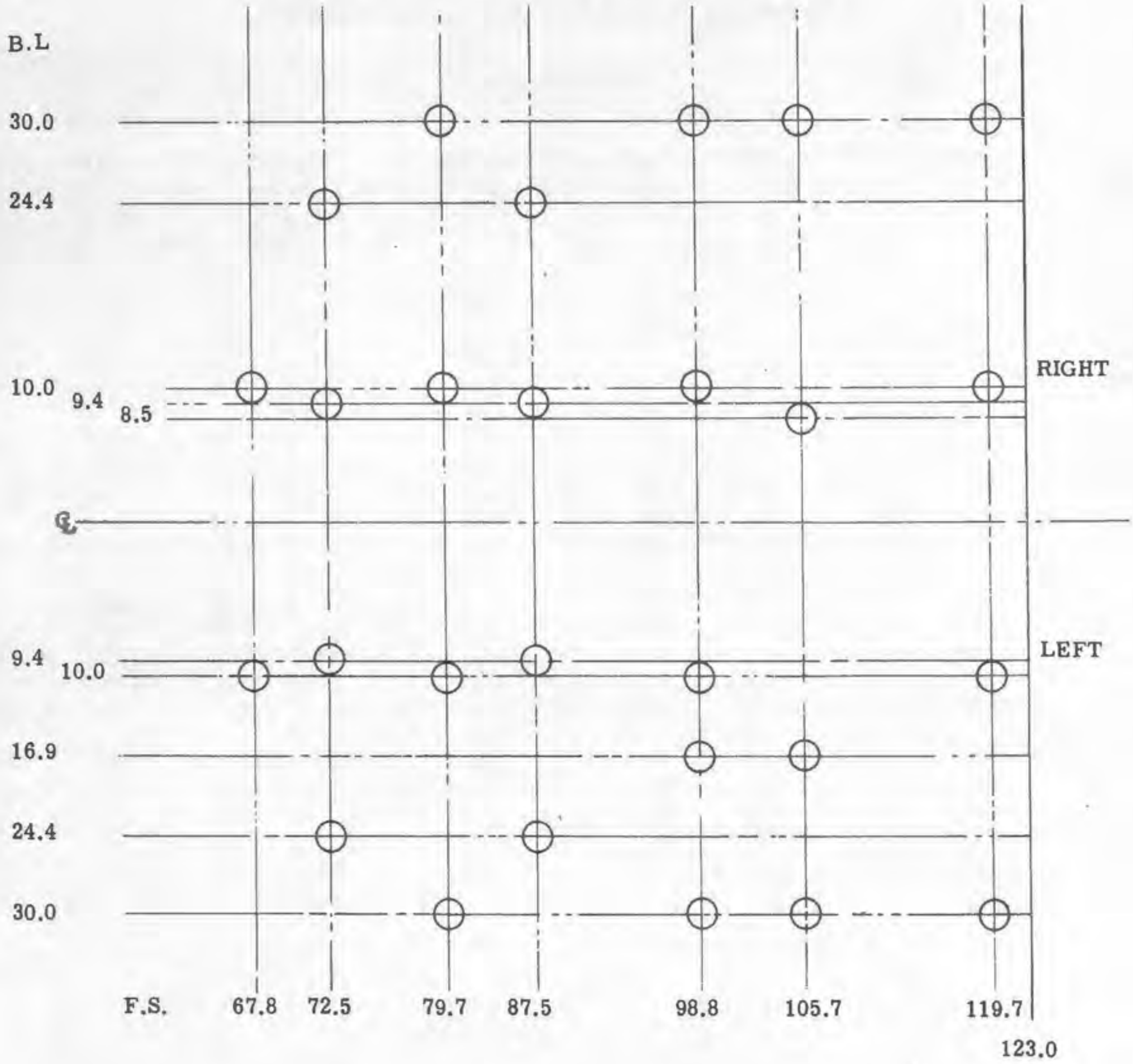
CAUTION

It is possible to exceed forward cg limit by improper loading. Fuel consumption, cargo weight and placement, and correct crew weight must be determined for satisfactory balance. All necessary information may be obtained from this manual.

Chart 12-2. Chart E — loading data (Sheet 19 of 47)

CHART E
SHEET 6 OF 15
MODEL UH-1B

CARGO TIE DOWN FITTING DATA



Cargo tie down fittings and their attachment to the floor shall be capable of withstanding an ultimate load of 1350 pounds applied upward at an angle of 22° from the vertical center line of the stud and intersecting this vertical center line at the top of the stud. The stud shall also be capable of taking 2500 pound ultimate down-load perpendicular to the floor surface. Cargo tie down fittings used to support personnel seats, litters, and ferry fuel tank shall be capable of reacting the loads imposed on them. (Ref: MIL-F-7092)

Chart 12–2. Chart E — loading data (Sheet 20 of 47)

CHART E
SHEET 7 OF 15
MODEL UH-1B

TABLE OF MOMENTS FOR PERSONNEL

MOMENT/100

WEIGHT	PILOT OR COPILOT STA. 46.7	ATTENDANT STA. 78.4	PASSENGER STA. 80.1	PATIENTS STA. 109.6	PASSENGERS STA. 108.2
150	70	118	120	164	162
160	75	125	128	175	173
170	79	133	136	186	184
180	84	141	144	197	195
190	89	149	152	208	206
200	93	157	160	219	216
210	98	165	168	230	227
220	103	173	176	241	238
230	107	180	184	252	249
240	112	188	192	263	260
250	117	196	200	274	271

TABLE OF MOMENTS FOR CREW MOVEMENT

MOMENT/100

		TO POSITION				
FROM POSITION		5	4	3	2	1
Pilot or Copilot Seat	1	+123	+126	+67	+63	----
Attendant Seat	2	+ 60	+ 62	+ 3	---	- 63
Individual Passenger Seat	3	+ 56	+ 59	---	- 3	- 67
Litter Rack	4	----	----	-59	-62	-126
Passenger Seat - 5 Place	5	----	----	-56	-60	-123

NOTE: Based on 200 pounds per man

Chart 12-2. Chart E — loading data (Sheet 21 of 47)

CHART E
SHEET 8 OF 15
MODEL UH-1B

CENTER OF GRAVITY TABLE

GROSS WEIGHT (POUNDS)	MOMENT/100						
	← Forward					Aft →	
	125.0	128.0	130.0	132.0	134.0	136.0	138.0
4600	5750	5888	5980	6072	6164	6256	6348
4625	5781	5920	6013	6105	6198	6290	6383
4650	5813	5952	6045	6138	6231	6324	6417
4675	5844	5984	6078	6171	6265	6358	6452
4700	5875	6016	6110	6204	6298	6392	6486
4725	5906	6048	6143	6237	6332	6426	6521
4750	5938	6080	6175	6270	6365	6460	6555
4775	5969	6112	6208	6303	6399	6494	6590
4800	6000	6144	6240	6336	6432	6528	6624
4825	6031	6176	6273	6369	6466	6562	6659
4850	6063	6208	6305	6402	6499	6596	6693
4875	6094	6240	6338	6435	6533	6630	6728
4900	6125	6272	6370	6468	6566	6664	6762
4925	6156	6304	6403	6501	6600	6698	6797
4950	6188	6336	6435	6534	6633	6732	6831
4975	6219	6368	6468	6567	6667	6766	6866
5000	6250	6400	6500	6600	6700	6800	6900
5025	6281	6432	6533	6633	6734	6834	6935
5050	6313	6464	6565	6666	6767	6868	6969
5075	6344	6496	6598	6699	6801	6902	7004
5100	6375	6528	6630	6732	6834	6936	7038
5125	6406	6560	6663	6765	6868	6970	7073
5150	6438	6592	6695	6798	6901	7004	7107
5175	6469	6624	6728	6831	6935	7038	7142
5200	6500	6656	6760	6864	6968	7072	7176
5225	6531	6688	6793	6897	7002	7106	7211
5250	6563	6720	6825	6930	7035	7140	7245
5275	6594	6752	6858	6963	7069	7174	7280
5300	6625	6784	6890	6996	7102	7208	7314
5325	6656	6816	6923	7029	7136	7242	7349
5350	6688	6848	6955	7062	7169	7276	7383
5375	6719	6880	6988	7095	7203	7310	7418
5400	6750	6912	7020	7128	7236	7344	7452
5425	6781	6944	7053	7161	7270	7378	7487
5450	6813	6976	7085	7194	7303	7412	7521
5475	6844	7008	7118	7227	7337	7446	7556

Chart 12-2. Chart E — loading data (Sheet 22 of 47)

CHART E
SHEET 9 OF 15
MODEL UH-1B

CENTER OF GRAVITY TABLE

GROSS WEIGHT (POUNDS)	MOMENT/100						
	←Forward						Aft→
	125.0	128.0	130.0	132.0	134.0	136.0	138.0
5500	6875	7040	7150	7260	7370	7480	7590
5525	6906	7072	7183	7293	7404	7514	7625
5550	6938	7104	7215	7326	7437	7548	7659
5575	6969	7136	7248	7359	7471	7582	7694
5600	7000	7168	7280	7392	7504	7616	7728
5625	7031	7200	7313	7425	7538	7650	7763
5650	7063	7232	7345	7458	7571	7684	7797
5675	7094	7264	7378	7491	7605	7718	7832
5700	7125	7296	7410	7524	7638	7752	7866
5725	7156	7328	7443	7557	7672	7786	7901
5750	7188	7360	7475	7590	7705	7820	7935
5775	7219	7392	7508	7623	7739	7854	7970
5800	7250	7424	7540	7656	7772	7888	8004
5825	7281	7456	7573	7689	7806	7922	8039
5850	7313	7488	7605	7722	7839	7956	8073
5875	7344	7520	7638	7755	7873	7990	8108
5900	7375	7552	7670	7788	7906	8024	8142
5925	7406	7584	7703	7821	7940	8058	8177
5950	7438	7616	7735	7854	7973	8092	8211
5975	7469	7648	7768	7887	8007	8126	8246
6000	7500	7680	7800	7920	8040	8160	8280
6025	7531	7712	7833	7953	8074	8194	**Note** Aft limit F.S. 136.0 for gross weights exceeding 6000 pounds.
6050	7563	7744	7865	7986	8107	8228	
6075	7594	7776	7898	8019	8141	8262	
6100	7625	7808	7930	8052	8174	8296	
6125	7656	7840	7963	8085	8208	8330	
6150	7688	7872	7995	8118	8241	8364	
6175	7719	7904	8028	8151	8275	8398	
6200	7750	7936	8060	8184	8308	8432	
6225	7781	7968	8093	8217	8342	8466	
6250	7813	8000	8125	8250	8375	8500	
6275	7844	8032	8158	8283	8409	8534	
6300	7875	8064	8190	8316	8442	8568	
6325	7906	8096	8223	8349	8476	8602	
6350	7938	8128	8255	8382	8509	8636	
6375	7969	8160	8288	8415	8543	8670	

Chart 12–2. Chart E — loading data (Sheet 23 of 47)

CHART E
SHEET 10 OF 15
MODEL UH-1B

CENTER OF GRAVITY TABLE

GROSS WEIGHT (POUNDS)	MOMENT/100						
	← Forward			C.G. Limits		Aft →	
	125.0	128.0	130.0	132.0	134.0	136.0	138.0
6400	8000	8192	8320	8448	8576	8704	**Note** Aft limit F.S. 136.0 for gross weights exceeding 6000 pounds.
6425	8031	8224	8353	8481	8610	8738	
6450	8063	8256	8385	8514	8643	8772	
6475	8094	8288	8418	8547	8677	8806	
6500	8125	8320	8450	8580	8710	8840	
6525	8156	8352	8483	8613	8744	8874	
6550	8188	8384	8515	8646	8777	8908	
6575	8219	8416	8548	8679	8810	8942	
6600	8250	8448	8580	8712	8844	8976	
6625	8281	8480	8613	8745	8878	9010	
6650	8313	8512	8645	8778	8911	9044	
6675	8344	8544	8678	8811	8945	9078	
6700	8375	8576	8710	8844	8978	9112	
6725	8406	8608	8743	8877	9012	9146	
6750	8438	8640	8775	8910	9045	9180	
6775	8469	8672	8808	8943	9079	9214	
6800	8500	8704	8840	8976	9112	9248	
6825	8531	8736	8873	9009	9146	9282	
6850	8563	8768	8905	9042	9179	9316	
6875	8594	8800	8938	9075	9213	9350	
6900	8625	8832	8970	9108	9246	9384	
6925	8656	8864	9003	9141	9280	9418	
6950	8688	8896	9035	9174	9313	9452	
6975	8719	8928	9068	9207	9347	9486	
7000	8750	8960	9100	9240	9380	9520	
7025	8781	8992	9133	9273	9414	9554	
7050	8813	9024	9165	9306	9447	9588	
7075	8844	9056	9198	9339	9481	9622	
7100	8875	9088	9230	9372	9514	9656	
7125	8906	9120	9263	9405	9548	9690	
7150	8938	9152	9295	9438	9581	9724	
7175	8969	9184	9328	9471	9615	9758	
7200	9000	9216	9360	9504	9648	9792	
7225	9031	9248	9393	9537	9682	9826	
7250	9063	9280	9425	9570	9715	9860	
7275	9094	9312	9458	9603	9749	9894	

Chart 12-2. Chart E — loading data (Sheet 24 of 47)

CHART E
SHEET 11 OF 15
MODEL UH-1B

CENTER OF GRAVITY TABLE

GROSS WEIGHT (POUNDS)	MOMENT/100						
	← Forward						Aft →
	125.0	128.0	130.0	132.0	134.0	136.0	138.0
7300	9125	9344	9490	9636	9782	9928	**Note** Aft limit F.S. 136.0 for gross weights exceeding 6000 pounds.
7325	9156	9376	9523	9669	9816	9962	
7350	9188	9408	9555	9702	9849	9996	
7375	9219	9440	9588	9735	9883	10030	
7400	9250	9472	9620	9768	9916	10064	
7425	9281	9504	9653	9801	9950	10098	
7450	9313	9536	9685	9834	9983	10132	
7475	9344	9568	9718	9867	10017	10166	
7500	9375	9600	9750	9900	10050	10200	
7525	9406	9632	9783	9933	10084	10234	
7550	9438	9664	9815	9966	10117	10268	
7575	9469	9696	9848	9999	10151	10302	
7600	9500	9728	9880	10032	10184	10336	
7625	9531	9760	9913	10065	10218	10370	
7650	9563	9792	9945	10098	10251	10404	
7675	9594	9824	9978	10131	10285	10438	
7700	9625	9856	10010	10164	10318	10472	
7725	9656	9888	10043	10197	10352	10506	
7750	9688	9920	10075	10230	10385	10540	
7775	9719	9952	10108	10263	10419	10574	
7800	9750	9984	10140	10296	10452	10608	
7825	9781	10016	10173	10329	10486	10642	
7850	9813	10048	10205	10362	10519	10676	
7875	9844	10080	10238	10395	10553	10710	
7900	9875	10112	10270	10428	10586	10744	
7925	9906	10144	10303	10461	10620	10778	
7950	9938	10176	10335	10494	10653	10812	
7975	9969	10208	10368	10527	10687	10846	
8000	10000	10240	10400	10560	10720	10880	
8025	10031	10272	10433	10593	10754	10914	
8050	10063	10304	10465	10626	10787	10948	
8075	10094	10336	10498	10659	10821	10982	
8100	10125	10368	10530	10692	10854	11016	
8125	10156	10400	10563	10725	10888	11050	
8150	10188	10432	10595	10758	10921	11084	
8175	10219	10464	10628	10791	10955	11118	

Chart 12–2. Chart E — loading data (Sheet 25 of 47)

CHART E
SHEET 12 OF 15
MODEL UH-1B

CENTER OF GRAVITY TABLE

GROSS WEIGHT (POUNDS)	MOMENT/100						
	Forward			C. G. Limits		Aft	
	125.0	128.0	130.0	132.0	134.0	136.0	138.0
8200	10250	10496	10660	10824	10988	11152	**Note** Aft limit F.S. 136.0 for gross weights exceeding 6000 pounds.
8225	10281	10528	10693	10857	11022	11186	
8250	10313	10560	10725	10890	11055	11220	
8275	10344	10592	10758	10923	11089	11254	
8300	10375	10624	10790	10956	11122	11288	
8325	10406	10656	10823	10989	11156	11322	
8350	10438	10688	10855	11022	11189	11356	
8375	10469	10720	10888	11055	11223	11390	
8400	10500	10752	10920	11088	11256	11424	
8425	10531	10784	10953	11121	11290	11458	
8450	10563	10816	10985	11154	11323	11492	
8475	10594	10848	11018	11187	11357	11526	
8500	10625	10880	11050	11220	11390	11560	
8525	10656	10912	11083	11253	11424	11594	
8550	10688	10944	11115	11286	11457	11628	
8575	10719	10976	11148	11319	11491	11662	
8600	10750	11008	11180	11352	11524	11696	

GROSS WEIGHT LIMITATIONS:

Takeoff ______________________________*

Landing______________________________*

*NOTE: Service activities shall insert, or substitute, current figures from latest applicable (Technical Manual) covering operating restrictions.

Chart 12–2. Chart E — loading data (Sheet 26 of 47)

CHART E
SHEET 13 OF 15
MODEL UH-1B

MISCELLANEOUS DATA

PERSONNEL CENTROIDS

COMPT.	CREW MEMBER	ARM
B	Pilot	46.7
	Copilot	46.7
C	Medical Attendant	78.4
	Passengers	80.1
	Passengers	108.2
	Litter Patients	109.6

DIMENSIONAL DATA

Overall Length - Blades Extended	639.9 in.
Length - M/R Blades Removed	471.9 in.
Maximum Height - T/R Blades Vertical	175.0 in.
Height - T/R Blades Fore and Aft	146.7 in.
Span - Blades Rotating	528.0 in.
Span - Blades Fore and Aft	100.0 in.

Chart 12–2. Chart E — loading data (Sheet 27 of 47)

CHART E
SHEET 14 OF 15
MODEL UH-1B

TYPICAL SERVICE LOADING

The items listed below are typical for the mission indicated. These load items are added to the Basic Weight to determine Operating Weight for the particular mission.

ITEM	ARM	LITTER EVACUATION		PERSONNEL CARRIER		INTERNAL CARGO	
		Weight	Moment / 100	Weight	Moment / 100	Weight	Moment / 100
Pilot	46.7	200	93	200	93	200	93
Medical Attendant	78.4	200	157				
Patients (2)	109.6	500	548				
Passengers (4)	108.2			800	866		
Cargo	99.0					800	792
Litters (2)	109.6	42	46				
Fuel	136.0	1072	1458	1072	1458	1072	1458
Oil - Engine	157.0	12	19	12	19	12	19
Special Equipment	90.0	100	90				
TOTALS		2126	2411	2084	2436	2084	2362

CAUTION

It is possible to exceed C.G. limits by overloading cabin, by improper placement of cabin load, and by carrying partial cabin load. Correct weight and placement of these variables must be determined to obtain satisfactory balance.

Chart 12–2. Chart E — loading data (Sheet 28 of 47)

CHART E
SHEET 15 OF 15
MODEL UH-1B

TYPICAL LOADING EXAMPLES

In the examples below, the values for Basic Weight and Moment are assumed to be as shown. Normally these values are obtained from Chart C. To arrive at "Minimum Landing Gross Weight" (Operating Weight) add to the Basic Weight those load items pertinent to the mission. Refer to the Center of Gravity Table to determine if loading falls within limits. If loading is satisfactory, then determine "Take Off Gross Weight" by adding the expendable load items to the "Minimum Landing Gross Weight". Again it is necessary to check the Center of Gravity Table to determine if loading falls within the limits.

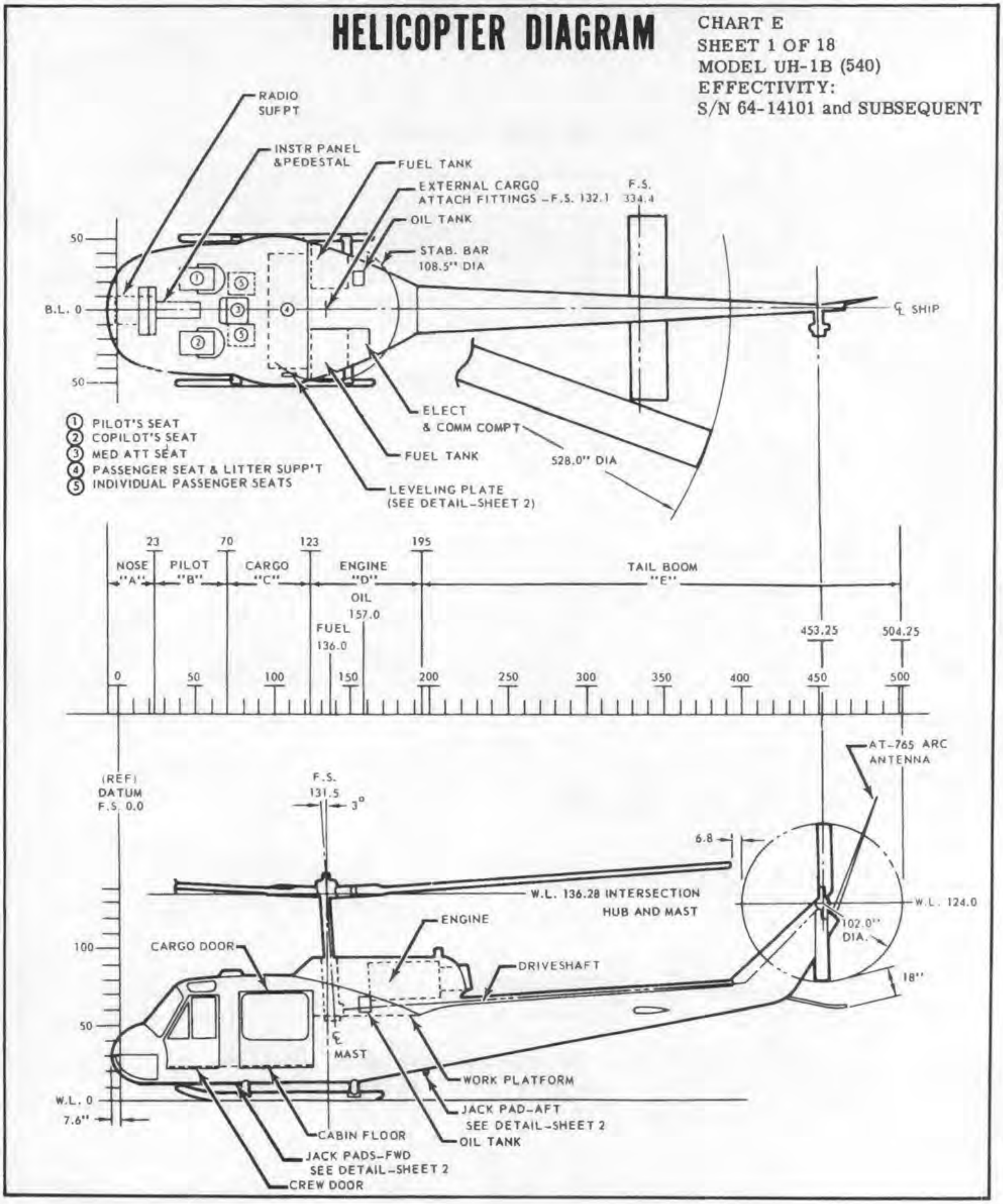
ITEM	WEIGHT	MOMENT/100
Basic Helicopter	4515	6324
Pilot	200	93
Oil -Engine	12	19
MINIMUM LANDING GROSS WEIGHT	4727	6436

The minimum Landing Gross Weight and Moment as located on the Center of Gravity Table fall within the recommended cg limits. Therefore the loading is satisfactory for landing.

Minimum Landing Gross Weight	4727	6436
Add: Fuel	1072	1458
Attendant	200	157
Patients (2)	500	548
Litters (2)	42	46
Special Equipment	100	90
TAKEOFF GROSS WEIGHT	6641	8735

Takeoff Gross Weight and Moment as located on the Center of Gravity Table fall within the recommended cg limits. Therefore the loading is satisfactory for take off.

Chart 12-2. Chart E — loading data (Sheet 29 of 47)



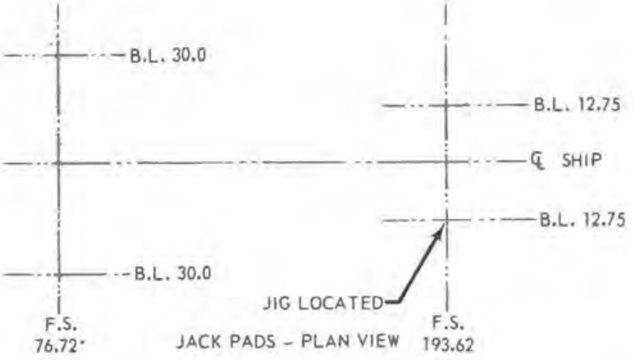
HELICOPTER DIAGRAM

CHART E
SHEET 1 OF 18
MODEL UH-1B (540)
EFFECTIVITY:
S/N 64-14101 and SUBSEQUENT

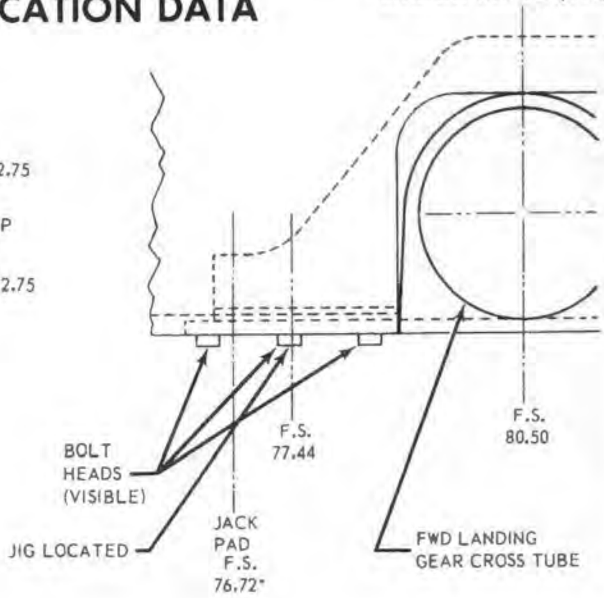
Chart 12–2. Chart E — loading data (Sheet 30 of 47)

CHART E
SHEET 2 of 18
MODEL UH-1B (540)

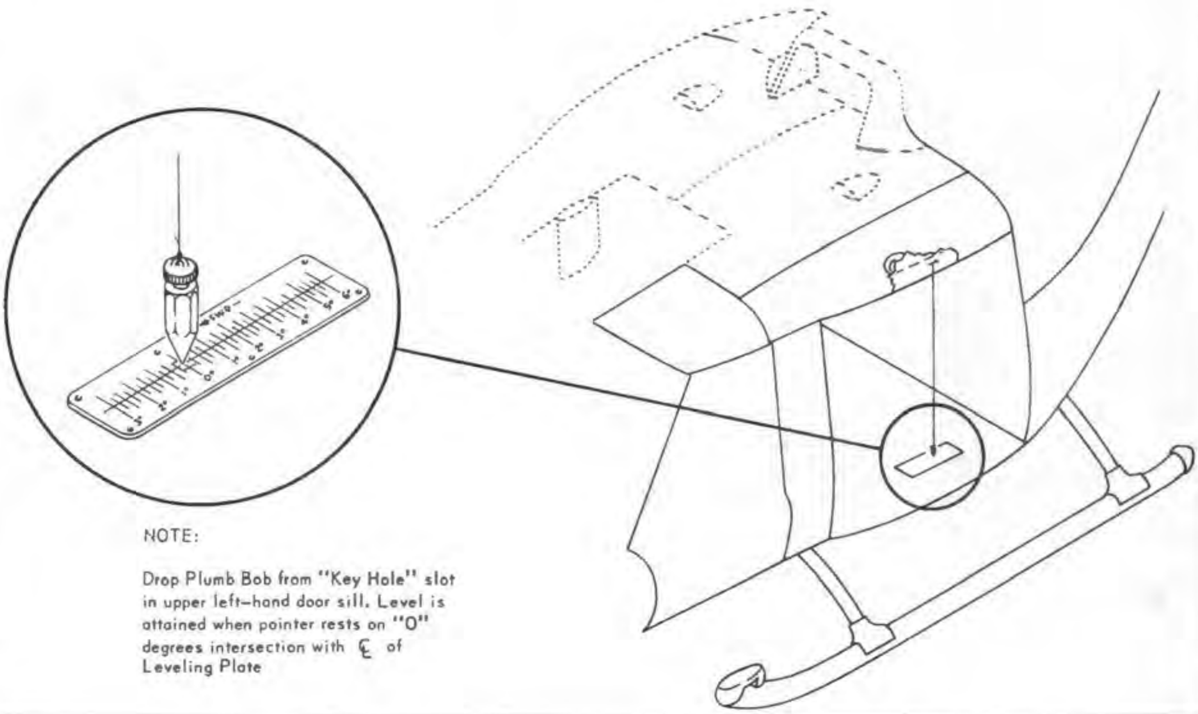
JACK PAD LOCATION DATA



*F.S. 76.72 is approximate but should be accurate within ± 1 32 inches. For exact station drop plumb bob from center of bolt head (F.S. 77.44) which is jig located, and from center of jack pad and measure exact distance.



HELICOPTER LEVELING



NOTE:

Drop Plumb Bob from "Key Hole" slot in upper left–hand door sill. Level is attained when pointer rests on "O" degrees intersection with ℄ of Leveling Plate

Chart 12–2. Chart E — loading data (Sheet 31 of 47)

CHART E
SHEET 3 OF 18
MODEL UH-1B (540)

FUEL LOADING TABLES

REGULAR

GAL	WEIGHT 6.5 LB/GAL	FUSELAGE STATION	MOMENT 100	GAL.	WEIGHT 6.5 LB/GAL	FUSELAGE STATION	MOMENT 100
10	65	135.2	88	140	910	135.7	1235
20	130	135.4	176	150	975	135.7	1323
30	195	135.5	264	160	1040	135.7	1411
40	260	135.6	353	170	1105	135.7	1499
50	325	135.6	441	180	1170	135.7	1588
60	360	135.6	529	190	1235	135.7	1676
70	455	135.6	617	200	1300	135.7	1764
80	520	135.7	706	210	1365	135.8	1854
90	585	135.7	794	220	1430	135.9	1943
100	650	135.7	882	230	1495	136.0	2033
110	705	135.7	970	240	1560	136.5	2129
120	780	135.7	1058	242	1573	136.7	2150
130	845	135.7	1147				

AUXILIARY - EXTERNAL

GAL	WEIGHT 6.5 LB/GAL	MOMENT/100 STA. 136.5	GAL	WEIGHT 6.5 LB/GAL	MOMENT/100 STA. 136.5
10	65	89	110	715	976
20	130	177	120	780	1065
30	195	266	130	845	1153
40	260	355	140	910	1242
50	325	444	150	975	1331
60	390	532	160	1040	1420
70	455	621	170	1105	1508
80	520	710	180	1170	1597
90	585	799	190	1235	1686
100	650	887	200	1300	1775

FUEL TANK SEQUENCE:

When auxiliary tank is installed, fuel is pumped from the auxiliary tank to the regular tank. Fuel level in regular tank is controlled by float switches.
The auxiliary tank is emptied before any appreciable amount is removed from the regular tank.

Chart 12–2. Chart E — loading data (Sheet 32 of 47)

FUEL LOADING TABLES

CHART E
SHEET 4 OF 18
MODEL UH-1B (540)

AUXILIARY - 165 GALLON TANK

GALLONS	WEIGHT (6.5 LBS/GAL)	MOMENT/100 F.S. 105.5	GALLONS	WEIGHT (6.5 LBS/GAL)	MOMENT/100 F.S. 105.5
10	65	69	100	650	686
20	130	137	110	715	754
30	195	206	120	780	823
40	260	274	130	845	891
50	325	343	140	910	960
60	390	411	150	975	1029
70	455	480	160	1040	1097
80	520	549	165	1073	1132
90	585	617			

AUXILIARY - 365 GALLON TANK

GALLONS	WEIGHT (6.5 LBS/GAL)	MOMENT/100 F.S. 97.2)	GALLONS	WEIGHT (6.5 LBS/GAL)	MOMENT/100 F.S. 97.2
10	65	63	190	1235	1200
20	130	126	200	1300	1264
30	195	190	210	1365	1327
40	260	253	220	1430	1390
50	325	316	230	1495	1453
60	390	379	240	1560	1516
70	455	442	250	1625	1580
80	520	505	260	1690	1643
90	585	569	270	1755	1706
100	650	632	280	1820	1769
110	715	695	290	1885	1832
120	780	658	300	1950	1895
130	845	821	310	2015	1959
140	910	885	320	2080	2022
150	975	948	330	2145	2085
160	1040	1011	340	2210	2148
170	1105	1074	350	2275	2211
180	1170	1137			

FUEL TANK SEQUENCE:

When auxiliary tank is installed, fuel is pumped from the auxiliary tank to the regular tank. Fuel level in regular tank is controlled by float switches. The auxiliary tank is emptied before the regular tank.

Chart 12–2. Chart E — loading data (Sheet 33 of 47)

FUEL LOADING TABLES

CHART E
SHEET 5 OF 18
MODEL UH-1B (540)

AUXILIARY - 50 GALLON TANK

FORWARD LOCATION

GALLONS	WEIGHT (6.5 LBS/GAL)	MOMENT/100 F.S. 75.5
10	65	49
20	130	98
30	195	147
40	260	196
50	325	245

AFT LOCATION

GALLONS	WEIGHT (6.5 LBS/GAL)	MOMENT/100 F.S. 113.6
10	65	74
20	130	148
30	195	222
40	260	295
50	325	369

AUXILIARY - 60 GALLON TANK

FORWARD LOCATION

GALLONS	WEIGHT (6.5 LBS/GAL)	MOMENT/100 F.S. 75.5
10	65	49
20	130	98
30	195	147
40	260	196
50	325	245
60	390	294

AFT LOCATION

GALLONS	WEIGHT (6.5 LBS/GAL)	MOMENT/100 F.S. 109.6
10	65	71
20	135	142
30	195	214
40	260	285
50	325	356
60	390	427

OIL LOADING TABLE

GAL	WEIGHT	MOMENT/100 STA. 157.0	GAL	WEIGHT	MOMENT/100 STA. 157.0
.5	4	6	2.0	15	24
1.0	8	13	2.5	19	30
1.5	11	17	3.0	23	36
			3.5	26	41
			3.8	28	44

Chart 12–2. Chart E — loading data (Sheet 34 of 47)

CHART E
SHEET 6 OF 18
MODEL UH-1B (540)

EXTERNAL CARGO LOADING TABLE

WEIGHT	MOMENT/100 STA. 132.1	WEIGHT	MOMENT/100 STA. 132.1	WEIGHT	MOMENT/100 STA. 132.1
50	66	1550	2048	3050	4029
100	132	1600	2114	3100	4095
150	198	1650	2180	3150	4161
200	264	1700	2246	3200	4227
250	330	1750	2312	3250	4293
300	396	1800	2378	3300	4359
350	462	1850	2444	3350	4425
400	528	1900	2510	3400	4491
450	595	1950	2576	3450	4557
500	661	2000	2642	3500	4624
550	727	2050	2708	3550	4690
600	793	2100	2774	3600	4756
650	859	2150	2840	3650	4822
700	925	2200	2906	3700	4888
750	991	2250	2972	3750	4954
800	1057	2300	3038	3800	5020
850	1123	2350	3104	3850	5086
900	1189	2400	3170	3900	5152
950	1125	2450	3237	3950	5218
1000	1321	2500	3303	4000	5284
1050	1387	2550	3369		
1100	1453	2600	3435		
1150	1519	2650	3501		
1200	1585	2700	3567		
1250	1651	2750	3633		
1300	1717	2800	3699		
1350	1783	2850	3765		
1400	1849	2900	3831		
1450	1916	2950	3897		
1500	1982	3000	3963		

Chart 12–2. Chart E — loading data (Sheet 35 of 47)

CHART E
SHEET 7 OF 18
MODEL UH-1B (540)

INTERNAL CARGO LOADING TABLE

MOMENT/100

CARGO WEIGHT (POUNDS)	CARGO CENTER OF GRAVITY (F.S)				CARGO WEIGHT (POUNDS)	CARGO CENTER OF GRAVITY (F.S.)			
	75.0	90.0	105.0	120.0		75.0	90.0	105.0	120.0
50	38	45	53	60	1050	788	945	1103	1260
100	75	90	105	120	1100	825	990	1155	1320
150	113	135	158	180	1150	863	1035	1208	1380
200	150	180	210	240	1200	900	1080	1260	1440
250	188	225	263	300	1250	938	1125	1313	1500
300	225	270	315	360	1300	975	1170	1365	1560
350	263	315	368	420	1350	1013	1215	1418	1620
400	300	360	420	480	1400	1050	1260	1470	1680
450	338	405	473	540	1450	1088	1305	1523	1740
500	375	450	525	600	1500	1125	1350	1575	1800
550	413	495	578	660	1550	1163	1395	1628	1860
600	450	540	630	720	1600	1200	1440	1680	1920
650	488	585	683	780	1650	1238	1485	1733	1980
700	525	630	735	840	1700	1275	1530	1785	2040
750	563	675	788	900	1750	1313	1575	1838	2100
800	600	720	840	960	1800	1350	1620	1890	2160
850	638	765	893	1020	1850	1388	1665	1943	2220
900	675	810	945	1080	1900	1425	1710	1995	2280
950	713	855	998	1140	1950	1463	1755	2048	2340
1000	750	900	1050	1200	2000	1500	1800	2100	2400

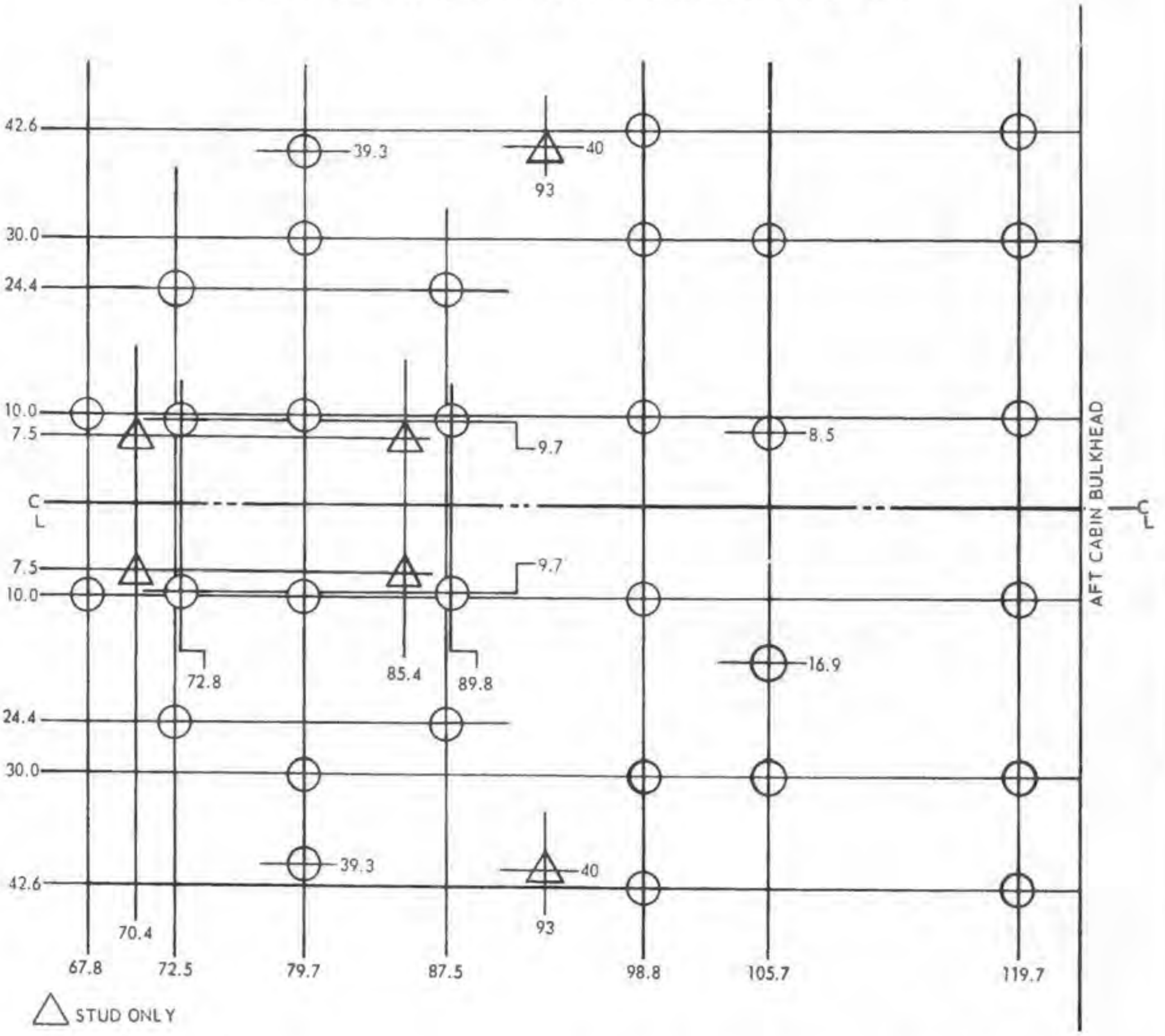
CAUTION

It is possible to exceed forward cg limit by improper loading. Fuel consumption, cargo weight and placement, and correct crew weight must be determined for satisfactory balance. All necessary information may be obtained from this manual.

Chart 12–2. Chart E — loading data (Sheet 36 of 47)

CHART E
SHEET 8 of 18
MODEL UH-1B (540)

CARGO TIE DOWN FITTING DATA



Cargo tie down fittings and their attachment to the floor shall be capable of withstanding an ultimate load of 1350 pounds applied upward at an angle of 22° from the vertical center line of the stud and intersecting this vertical center line at the top of the stud. The stud shall also be capable of taking 2500 pound ultimate down-load perpendicular to the floor surface. Cargo tie down fittings used to support personnel seats, litters, and ferry fuel tank shall be capable of reacting the loads imposed on them. (Ref: MIL-F-7092)

Chart 12-2. Chart E — loading data (Sheet 37 of 47)

CHART E
SHEET 9 OF 18
MODEL UH-1B (540)

TABLE OF MOMENTS FOR PERSONNEL

MOMENT/100

WEIGHT	PILOT OR COPILOT STA. 46.7	ATTENDANT STA. 78.4	PASSENGER STA. 80.1	PATIENTS STA. 109.6	PASSENGERS STA. 108.2
150	70	118	120	164	162
160	75	125	128	175	173
170	79	133	136	186	184
180	84	141	144	197	195
190	89	149	152	208	206
200	93	157	160	219	216
210	98	165	168	230	227
220	103	173	176	241	238
230	107	180	184	252	249
240	112	188	192	263	260
250	117	196	200	274	271

TABLE OF MOMENTS FOR CREW MOVEMENT

MOMENT/100

		TO POSITION				
FROM POSITION		5	4	3	2	1
Pilot or Copilot Seat	1	+123	+128	+67	+63	----
Attendant Seat	2	+ 60	+ 62	+ 3	---	- 63
Individual Passenger Seat	3	+ 56	+ 59	---	- 3	- 67
Litter Rack	4	----	----	-59	-62	-126
Passenger Seat - 5 Place	5	----	----	-56	-60	-123

Note Based on 200 pounds per man

Chart 12–2. Chart E — loading data (Sheet 38 of 47)

CHART E
SHEET 10 OF 18
MODEL UH-1B (540)

FLIGHT CENTER OF GRAVITY LIMITS

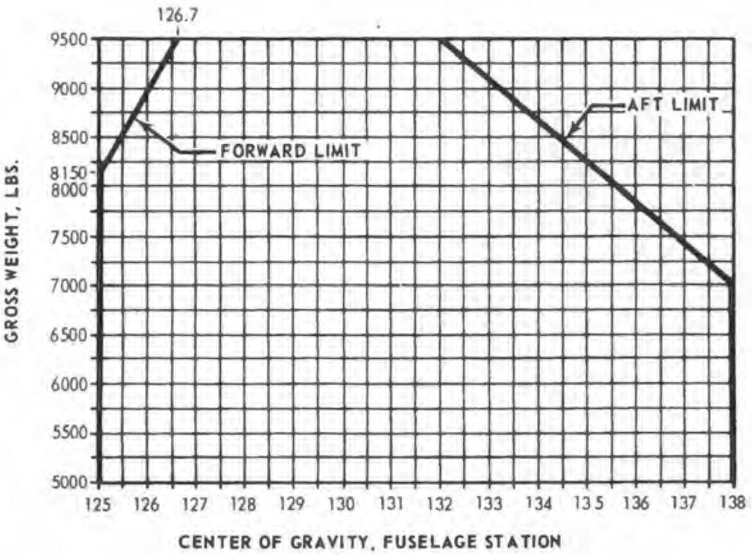


Chart 12–2. Chart E — loading data (Sheet 39 of 47)

CENTER OF GRAVITY TABLE

CHART E
SHEET 11 OF 18
MODEL UH-1B (540)

MOMENT/100

GROSS WEIGHT (POUNDS)	APPROXIMATE FLIGHT LIMITS SHOWN BY HEAVY VERTICAL LINE. NUMBERS IN ITALICS ARE ACTUAL MOMENT LIMITS FOR WEIGHTS INDICATED BUT NOT FOR STATIONS SHOWN IN COLUMN HEAD.											
	125.0	126.0	127.0	128.0	129.0	130.0	132.0	133.0	134.0	135.0	136.0	137.0	138.0
5100	6375	6426	6477	6528	6579	6630	6732	6783	6834	6885	6936	6987	7038
5125	6406	6458	6509	6560	6611	6663	6765	6816	6868	6919	6970	7021	7073
5150	6438	6489	6541	6592	6644	6695	6798	6850	6901	6953	7004	7056	7107
5175	6469	6521	6572	6624	6676	6728	6831	6883	6935	6986	7038	7090	7142
5200	6500	6552	6604	6656	6708	6760	6864	6916	6968	7020	7072	7124	7176
5225	6531	6584	6636	6688	6740	6793	6897	6949	7002	7054	7106	7158	7211
5250	6563	6615	6668	6720	6773	6825	6930	6983	7035	7088	7140	7193	7245
5275	6594	6647	6699	6752	6805	6858	6963	7016	7069	7121	7174	7227	7280
5300	6625	6678	6731	6784	6837	6890	6996	7049	7102	7155	7208	7261	7314
5325	6656	6710	6763	6816	6869	6923	7029	7082	7136	7189	7242	7295	7349
5350	6688	6741	6795	6848	6902	6955	7062	7116	7169	7223	7276	7330	7383
5375	6719	6773	6826	6880	6934	6988	7095	7149	7203	7256	7310	7364	7418
5400	6750	6804	6858	6912	6966	7020	7128	7182	7236	7290	7344	7398	7452
5425	6781	6836	6890	6944	6998	7053	7161	7215	7270	7324	7378	7432	7487
5450	6813	6867	6922	6976	7031	7085	7194	7249	7303	7358	7412	7467	7521
5475	6844	6899	6953	7008	7063	7118	7227	7282	7337	7391	7446	7501	7556
5500	6875	6930	6985	7040	7095	7150	7260	7315	7370	7425	7480	7535	7590
5525	6906	6962	7017	7072	7127	7183	7293	7348	7404	7459	7514	7569	7625
5550	6938	6993	7049	7104	7160	7215	7326	7382	7437	7493	7548	7604	7659
5575	6969	7025	7080	7136	7192	7248	7359	7415	7471	7526	7582	7638	7694
5600	7000	7056	7112	7168	7224	7280	7392	7448	7504	7560	7616	7672	7728
5625	7031	7088	7144	7200	7256	7313	7435	7481	7538	7594	7650	7706	7763
5650	7063	7119	7176	7232	7289	7345	7458	7515	7571	7628	7684	7741	7797
5675	7094	7151	7207	7264	7321	7378	7491	7548	7605	7661	7718	7775	7832
5700	7125	7182	7239	7296	7353	7410	7524	7581	7638	7695	7752	7809	7866
5725	7156	7214	7271	7328	7385	7443	7557	7614	7672	7729	7786	7843	7901
5750	7188	7245	7303	7360	7418	7475	7590	7648	7705	7763	7820	7878	7935
5775	7219	7277	7334	7392	7450	7508	7623	7681	7739	7796	7854	7912	7970
5800	7250	7308	7366	7424	7482	7540	7656	7714	7772	7830	7888	7946	8004
5825	7281	7340	7398	7456	7514	7573	7689	7747	7806	7864	7922	7980	8039
5850	7313	7371	7430	7488	7547	7605	7722	7781	7839	7898	7956	8015	8073
5875	7344	7403	7462	7520	7579	7638	7755	7814	7873	7931	7990	8049	8108
5900	7375	7434	7493	7552	7611	7670	7788	7847	7906	7965	8024	8083	8142
5925	7406	7466	7525	7584	7643	7703	7821	7880	7940	7999	8058	8117	8177
5950	7438	7497	7557	7616	7676	7735	7854	7914	7973	8033	8092	8152	8211
5975	7469	7529	7588	7648	7708	7768	7887	7947	8007	8066	8126	8186	8246

Chart 12–2. Chart E — loading data (Sheet 40 of 47)

CENTER OF GRAVITY TABLE

CHART E
SHEET 12 OF 18
MODEL UH-1B (540)

MOMENT/100

GROSS WEIGHT (POUNDS)	APPROXIMATE FLIGHT LIMITS SHOWN BY HEAVY VERTICAL LINE. NUMBERS IN ITALICS ARE ACTUAL MOMENT LIMITS FOR WEIGHT INDICATED BUT NOT FOR STATIONS SHOWN IN COLUMN HEAD											
	125.0	126.0	127.0	128.0	129.0	130.0	132.0	133.0	134.0	135.0	136.0	137.0	138.0
6000	7500	7560	7620	7680	7740	7800	7920	7920	8040	8100	8160	8220	8280
6025	7531	7592	7652	7712	7772	7833	7953	8013	8074	8134	8194	8254	8315
6050	7563	7623	7684	7744	7805	7865	7986	8047	8107	8168	8228	8289	8350
6075	7594	7655	7715	7776	7837	7898	8019	8080	8141	8201	8262	8323	8384
6100	7625	7686	7747	7808	7869	7930	8052	8113	8174	8235	8296	8357	8418
6125	7657	7718	7779	7840	7901	7963	8085	8146	8208	8269	8330	8391	8453
6150	7688	7749	7811	7872	7934	7995	8118	8180	8241	8303	8364	8426	8487
6175	7719	7781	7842	7904	7966	8028	8151	8213	8275	8336	8398	8460	8522
6200	7750	7812	7874	7936	7998	8060	8084	8346	8308	8370	8432	8494	8556
6225	7781	7844	7906	7968	8030	8093	8217	8279	8342	8404	8466	8528	8591
6250	7813	7875	7938	8000	8063	8125	8250	8313	8375	8438	8500	8563	8625
6275	7844	7907	7969	8032	8095	8158	8283	8346	8409	8471	8534	8597	9660
6300	7875	7938	8001	8064	8127	8190	8316	8379	8442	8505	8568	8631	8694
6325	7906	7970	8033	8096	8159	8223	8349	8412	8476	8539	8602	8665	8729
6350	7938	8001	8065	8128	8192	8255	8382	8446	8509	8573	8636	8700	8763
6375	7969	8033	8096	8160	8224	8288	8415	8479	8543	8606	8670	8734	8798
6400	8000	8064	8128	8192	8256	8320	8448	8512	8576	8640	8704	8768	8832
6425	8031	8096	8160	8224	8288	8353	8481	8545	8610	8674	8738	8802	8867
6450	8063	8127	8192	8256	8321	8385	8514	8579	8643	8708	8772	8837	8901
6475	8094	8159	8223	8288	8353	8418	8547	8612	8677	8741	8806	8871	8936
6500	8125	8190	8255	8320	8385	8450	8580	8645	8710	8775	8840	8905	8970
6525	8156	8222	8287	8352	8417	8483	8613	8678	8744	8809	8874	8939	9005
6550	8188	8253	8319	8384	8450	8515	8646	8712	8777	8843	8908	8974	9039
6575	8219	8285	8350	8416	8482	8548	8679	8745	8811	8876	8942	9008	9074
6600	8250	8316	8382	8448	8514	8580	8712	8778	8844	8910	8976	9042	9108
6625	8281	8348	8414	8480	8546	8613	8745	8811	8878	8944	9010	9076	9143
6650	8313	8379	8446	8512	8579	8645	8778	8845	8911	8978	9044	9111	9177
6675	8344	8411	8477	8544	8611	8678	8811	8878	8945	9011	9078	9145	9212
6700	8375	8442	8509	8576	8643	8710	8844	8911	8978	9045	9112	9179	9246
6725	8406	8474	8541	8608	8675	8743	8877	8944	9012	9079	9146	9213	9281
6750	8438	8505	8573	8640	8708	8775	8910	8978	9045	9113	9180	9248	9315
6775	8469	8537	8604	8672	8740	8808	8943	9011	9079	9146	9214	9282	9350
6800	8500	8568	8636	8704	8772	8840	8976	9044	9112	9180	9248	9316	9384
6825	8531	8600	8668	8736	8804	8873	9009	9077	9146	9214	9282	9350	9419
6850	8563	8631	8700	8768	8837	8905	9042	9111	9179	9248	9316	9385	9453
6875	8594	8663	8731	8800	8869	9075	9144	9144	9213	9281	9350	9419	9488

Chart 12–2. Chart E — loading data (Sheet 41 of 47)

CENTER OF GRAVITY TABLE

CHART E
SHEET 13 OF 18
MODEL UH-1B (540)

MOMENT/100

GROSS WEIGHT (POUNDS	APPROXIMATE FLIGHT LIMITS SHOWN BY HEAVY VERTICAL LINE. NUMBERS IN ITALICS ARE ACTUAL MOMENT LIMITS FOR WEIGHTS INDICATED BUT NOT FOR STATIONS SHOWN IN COLUMN HEAD.											
	125.0	126.0	127.0	128.0	129.0	130.0	132.0	133.0	134.0	135.0	136.0	137.0	138.0
6900	8625	8694	8763	8832	8901	8970	9108	9177	9246	9315	9384	9453	9522
6925	8656	8726	8795	8864	8933	9003	9141	9210	9280	9349	9418	9487	9557
6950	8688	8757	8827	8896	8966	9035	9174	9244	9313	9383	9452	9522	9591
6975	8719	8789	8858	8928	8998	9068	9207	9277	9347	9416	9486	9556	9626
7000	8750	8820	8890	8960	9030	9100	9240	9310	9380	9450	9520	9590	9660
7025	8781	8852	8922	8992	9062	9133	9273	9343	9414	9484	9554	9624	
7050	8813	8883	8954	9024	9095	9165	9306	9377	9447	9518	9588	9659	*9721*
7075	8844	8913	8985	9056	9127	9198	9339	9410	9481	9551	9622	9693	
7100	8875	8946	9017	9088	9159	9230	9372	9443	9514	9585	9656	9727	*9781*
7125	8906	8978	9049	9120	9191	9263	9405	9476	9548	9619	9690	9761	
7150	8938	9009	9081	9152	9224	9295	9438	9510	9581	9653	9724	9796	*9841*
7175	8969	9041	9112	9184	9256	9328	9471	9543	9615	9686	9758	9830	
7200	9000	9072	9144	9216	9288	9360	9504	9576	9648	9720	9792	9864	*9901*
7225	9031	9104	9176	9248	9320	9393	9537	9609	9682	9754	9826	9898	
7250	9063	9135	9208	9280	9353	9425	9570	9643	9715	9788	9860	9933	*9962*
7275	9094	9167	9239	9312	9385	9458	9603	9676	9749	9821	9894	9967	
7300	9125	9198	9271	9344	9417	9490	9636	9709	9782	9855	9928	10001	*10021*
7325	9156	9230	9303	9376	9449	9523	9669	9742	9816	9889	9962	10035	
7350	9188	9261	9335	9408	9482	9555	9702	9776	9849	9923	9996	10070	*10081*
7375	9219	9293	9366	9440	9514	9588	9735	9809	9883	9956	10030	10104	
7400	9250	9324	9398	9472	9546	9620	9768	9842	9916	9990	10064	10138	*10141*
7425	9281	9356	9430	9504	9578	9654	9801	9875	9950	10024	10098		
7450	9313	9387	9462	9536	9611	9685	9834	9909	9983	10058	10132	*10201*	
7475	9344	9419	9493	9568	9643	9718	9867	9942	10017	10091	10166		
7500	9375	9450	9525	9600	9675	9759	9900	9975	10050	10125	10200	*10260*	
7525	9406	0482	9557	9632	9707	9783	9933	10008	10084	10159	10234		
7550	9438	9513	9589	9664	9740	9815	9966	10042	10117	10193	10268	*10319*	
7575	9469	9545	9620	9696	9772	9848	9999	10075	10151	10226	10302		
7600	9500	9576	9652	9728	9804	9880	10032	10108	10184	10260	10336	*10379*	
7625	9531	9608	9684	9760	9836	9913	10065	10141	10218	10294	10370		
7650	9563	9639	9716	9792	9869	9945	10098	10175	10251	10328	10404	*10438*	
7675	9594	9671	9749	9824	9901	9978	10131	10208	10285	10361	10438		
7700	9625	9702	9779	9856	9933	10010	10164	10241	10318	10395	10472	*10497*	
7725	9656	9734	9811	9888	9965	10043	10197	10274	10352	10429	10506		
7750	9688	9765	9843	9920	9998	10075	10230	10308	10385	10463	10540	*10556*	
7775	9719	9797	9874	9952	10030	10108	10263	10341	10419	10496	10574		

Chart 12–2. Chart E — loading data (Sheet 42 of 47)

CHART E
SHEET 14 OF 18
MODEL UH-1B (540)

CENTER OF GRAVITY TABLE

MOMENT/100

GROSS WEIGHT (POUNDS)	APPROXIMATE FLIGHT LIMITS SHOWN BY HEAVY VERTICAL LINE. NUMBERS IN ITALICS ARE ACTUAL MOMENT LIMITS FOR WEIGHTS INDICATED BUT NOT FOR STATIONS SHOWN IN COLUMN HEAD.											
	125.0	126.0	127.0	128.0	129.0	130.0	132.0	133.0	134.0	135.0	136.0	137.0	138.0
7800	9750	9828	9906	9984	10062	10140	10296	10374	10452	10530	10608	*10614*	
7825	9781	9860	9938	10016	10094	10173	10329	10407	10486	10564	10642		
7850	9813	9891	9970	10048	10127	10205	10362	10441	10519	10598	*10673*		
7875	9844	9923	10001	10080	10159	10238	10395	10474	10553	10631			
7900	9875	9954	10033	10112	10191	10270	10428	10507	10586	10665	*10731*		
7925	9906	9986	10065	10144	10223	10303	10461	10540	10620	10699			
7950	9938	10017	10097	10176	10256	10335	10494	10574	10653	10733	*10790*		
7975	9969	10049	10128	10208	10288	10368	10527	10607	10687	10766			
8000	10000	10080	10160	10240	10320	10400	10560	10640	10720	10800	*10848*		
8025	10031	10112	10192	10272	10352	10433	10593	10673	10754	10834			
8050	10063	10143	10224	10304	10385	10465	10626	10707	10787	10868	*10906*		
8075	10094	10175	10255	10336	10417	10498	10659	10740	10821	10901			
8100	10125	10206	10287	10368	10449	10530	10692	10773	10854	10935	*10964*		
8125	10156	10238	10319	10400	10481	10563	10725	10806	10888	10969			
8150	10188	10269	10351	10432	10514	10595	10758	10840	10921	11003	*11022*		
8175		10301	10382	10464	10546	10628	10791	10873	10955	11036			
8200	*10255*	10332	10414	10496	10578	10660	10824	10906	10988	11070	*11080*		
8225		10364	10446	10528	10610	10693	10857	10939	11022	11104			
8250	*10322*	10395	10478	10560	10643	10725	10890	10973	11055	11138			
8275		10427	10509	10592	10675	10758	10923	11006	11089				
8300	*10390*	10458	10541	10624	10707	10790	10956	11039	11122	*11195*			
8325		10490	10573	10656	10739	10823	10989	11072	11156				
8350	*10458*	10521	10605	10688	10772	10855	11022	11106	11189	*11252*			
8375		10553	10636	10720	10804	10888	11055	11139	11223				
8400	*10525*	10584	10668	10752	10836	10920	11088	11172	11256	*11310*			
8425		10616	10700	10784	10868	10953	11121	11205	11290				
8450	*10594*	10647	10732	10816	10901	10985	11154	11239	11323	*11367*			
8475		10679	10763	10848	10933	11018	11187	11272	11357				
8500	*10663*	10710	10795	10880	10965	11050	11220	11305	11390	*11424*			
8525		10742	10827	10912	10997	11083	11253	11338	11424				
8550	*10730*	10773	10859	10944	11030	11115	11286	11372	11457	*11481*			
8575		10805	10890	10976	11062	11148	11319	11405	11491				
8600	*10798*	10836	10922	11008	11094	11180	11352	11438	11524	*11538*			
8625		10868	10954	11040	11127	11213	11385	11471	11558				
8650	*10867*	10899	10986	11072	11159	11245	11418	11505	11591	*11594*			
8675		10931	11017	11104	11191	11278	11451	11538					

Chart 12–2. Chart E — loading data (Sheet 43 of 47)

CHART E
SHEET 15 OF 18
MODEL UH-1B (540)

CENTER OF GRAVITY TABLE

MOMENT/100

GROSS WEIGHT (POUNDS)	APPROXIMATE FLIGHT LIMITS SHOWN BY HEAVY VERTICAL LINE. NUMBERS IN ITALICS ARE ACTUAL MOMENT LIMITS FOR WEIGHT INDICATED BUT NOT FOR STATIONS SHOWN IN COLUMN HEAD.												
	125.0	126.0	127.0	128.0	129.0	130.0	132.0	133.0	134.0	135.0	136.0	137.0	138.0
8700	*10936*	10962	11049	11136	11223	11310	11484	11571	*11651*				
8725		10994	11081	11168	11255	11343	11517	11604					
8750	*11003*	11025	11113	11200	11288	11375	11550	11638	*11708*				
8775		11057	11144	11232	11320	11408	11583	11671					
8800	*11072*	11088	11176	11264	11352	11440	11616	11704	*11764*				
8825		11120	11208	11296	11384	11473	11649	11737					
8850	*11140*	11151	11240	11328	11417	11505	11682	11771	*11820*				
8875		11183	11271	11360	11449	11538	11715	11804					
8900	*11210*	11214	11303	11392	11481	11570	11748	11837	*11876*				
8925		11246	11335	11424	11513	11603	11781	11870					
8950		*11279*	11367	11456	11546	11635	11814	11904	*11932*				
8975			11398	11488	11578	11668	11847	11937					
9000		*11346*	11430	11520	11610	11700	11880	11970	*11988*				
9025			11462	11552	11642	11733	11913	12003					
9050		*11416*	11494	11584	11675	11765	11946	12037	*12044*				
9075			11525	11616	11707	11798	11979	12070					
9100		*11484*	11557	11648	11739	11830	12012	*12099*					
9125			11589	11680	11771	11863	12045						
9150		*11553*	11621	11712	11804	11895	12078	*12155*					
9175			11652	11744	11836	11928	12111						
9200		*11621*	11684	11776	11868	11960	12144	*12210*					
9225			11716	11808	11900	11993	12177						
9250		*11690*	11748	11840	11933	12025	12210	*12266*					
9275			11779	11872	11965	12058	12243						
9300		*11760*	11811	11904	11997	12090	12276	*12321*					
9325			11843	11936	12029	12123	12309						
9350		*11828*	11875	11968	12062	12155	12342	*12376*					
9375			11906	12000	12094	12188	12375						
9400		*11898*	11938	12032	12126	12220	12408	*12431*					
9425			11970	12604	12158	12253	12441						
9450		*11967*	12002	12096	12191	12285	12474	*12485*					
9475			12033	12128	12223	12318	12507						
9500		*12037*	12065	12160	12255	12350	12540						

Chart 12–2. Chart E — loading data (Sheet 44 of 47)

CHART E
SHEET 16 OF 18
MODEL UH-1B (540)

MISCELLANEOUS DATA

GROSS WEIGHT LIMITATIONS:

Takeoff ______________________________ *

Landing ______________________________ *

*NOTE: Service activities shall insert, or substiture, current figures from latest applicable (Technical Manual) covering operating restrictions.

PERSONNEL CENTROIDS

COMPT.	CREW MEMBER	ARM
B	Pilot Copilot	46.7 46.7
C	Medical Attendant Passengers Passengers Litter Patients	78.4 80.1 108.2 109.6

DIMENSIONAL DATA

Overall Length - Blades Extended	637.2 inch
Length - M/R Blades Removed	471.9 inch
Maximum Height - T/R Blades Vertical	175.0 inch
Height - T/R Blades Fore and Aft	152.0 inch
Span - Blades Rotating	528.0 inch
Span - Blades Fore and Aft	112.0 inch

Chart 12–2. Chart E — loading data (Sheet 45 of 47)

CHART E
SHEET 17 OF 18
MODEL UH-1B (540)

TYPICAL SERVICE LOADING

The items listed below are typical for the mission indicated. These load items are added to the Basic Weight to determine Operating Weight for the particular mission.

ITEM	ARM	LITTER EVACUATION		PERSONNEL CARRIER		INTERNAL CARGO	
		Weight	Moment 100	Weight	Moment 100	Weight	Moment 100
Pilot	46.7	200	93	200	93	200	93
Medical Attendant	78.4	200	157				
Patients (2)	109.6	500	548				
Passengers (4)	108.2			500	866		
Cargo	99.0					800	792
Litters (2)	109.6	32	35				
Fuel	136.7	1573	2150	1573	2150	1573	2150
Oil - Engine	157.0	28	44	28	44	28	44
Special Equipment	90.0	100	90				
TOTALS		2633	3117	2601	3153	2601	3079

CAUTION

It is possible to exceed CG limits by overloading cabin, by improper placement of cabin load and by carrying partial cabin load. Correct weight and placement of these variables must be determined to obtain satisfactory balance.

Chart 12–2. Chart E — loading data (Sheet 46 of 47)

CHART E
SHEET 18 of 18
MODEL UH-1B (540)

TYPICAL LOADING EXAMPLES

In the examples below, the values for Basic Weight and Moment are assumed to be shown. Normally these values are obtained from Chart C. To arrive at "Minimum Landing Gross Weight" (Operating Weight) add to the Basic Weight those load items pertinent to the mission. Refer to the Center of Gravity Table to determine if loading falls within limits. If loading is satisfactory, then determine "Take-Off Gross Weight" by adding the expendable load items to the "Minimum Landing Gross Weight". Again it is necessary to check the Center of Gravity Table to determine if loading falls within the limits.

ITEM	WEIGHT	MOMENT/100
Basic Helicopter	5080	7040
Pilot	200	93
Oil - Engine	28	44
MINIMUM LANDING GROSS WEIGHT	5308	7177

The minimum Landing Gross Weight and Moment as located on the Center of Gravity Table fall within the recommended cg limits. Therefore the loading is satisfactory for landing.

Minimum Landing Gross Weight	5308	7177
Add: Fuel	1573	2150
Attendant	200	157
Patients (2)	500	548
Litters (2)	32	35
Special Equipment	100	90
TAKEOFF GROSS WEIGHT	7713	10157

Takeoff Gross Weight and Moment as located on the Center of Gravity Table fall within the recommended cg limits. Therefore the loading is satisfactory for take off.

Chart 12-2. Chart E — loading data (Sheet 47 of 47)

Section V — Weight and Balance Clearance Form F

12-22. Weight and Balance Clearance Form F — DD Form 365F. This form is the summary of actual disposition of the load in the helicopter. It records the balance status of the helicopter, step-by-step. It serves as work sheet on which the record weight and balance calculations, and any correctitons that must be made to insure that the helicopter will be within weight and cg limits. A Form F is required for Model UH-1A and Model UH-1B helicopters only when the loading is such as to seriously effect the flying characteristics and safety of the helicopter and in all cases where alternate loading is employed.

Note

> Examples of alternate loading for the UH-1B helicopters would be, loading the baggage compartment and carrying only one crewman and no other load, or when it is suspected that the contemplated load would exceed the maximum gross weight of the helicopter.

12-23. *Use*. Form F is furnished in expendable pads, or as separate sheets, which can be replenished when exhausted. An original and carbon are prepared for each loading as applicable. The original sheets, carrying the signature of responsibility, can be removed and placed in the helicopter "G" files to serve as certificates of proper weight and balance as required by AR 95-16. The duplicate copy should be retained in the helicopter for the duration of the flight. On a cross country flight this form aids the weight and balance technician at refueling bases and stopover stations. There are two versions of this form: "TRANSPORT" and "TACTICAL". These two versions were designed to provide for the respective loading arrangements of two type of helicopters. However, the general use of fulfillment of either version is the same. Specific instructions for filling out both versions of this form applicable to Model UH-1A and Model UH-1B helicopters are given in the following paragraphs.

Note

> The choice of which version to use is the responsibility of the weight and balance technician at the take-off base.

12-24. DD Form 365F — Transport (Special Mission) Helicopters.

a. Insert the necessary identifying information at the top of the form. In the blank spaces of the "Limitation" table, enter the gross weight and cg restrictions obtained from Chapter 7.

b. Reference 1—Enter the helicopter basic figures from the last entry on Chart C — Basic Weight and Balance Record.

Note

> Enter moment/constant valued throughout the form. Obtain these values from Chart E.

c. Reference 2 — Enter the amount and weight of oil.

d. Reference 3 — Enter the number and weight of crew. Use actual crew weight, if available.

e. Reference 4 — Enter the weight of the crew's baggage.

f. Reference 5 — Not applicable.

g. Reference 6 — Enter the weight of emergency equipment, if applicable.

h. Reference 7 — Enter the weight of any extra equipment, if applicable.

i. Reference 8 — Enter the sum of the weights of reference 1 through 7 inclusive to obtain "operating weight".

j. Reference 9 — Enter the number of gallons and weight of "Take-off Fuel". The weight of fuel used in warm-up should not be included.

Note

> List under "Remarks" the fuel tank concerned and the amount of fuel in each taink. If internal fuel is carried, make an appropriate entry to the effect in the space provided.

k. Reference 10 — Not applicable.

l. Reference 11 — Enter the sum of the weights for reference 8 through 10 inclusive to obtain "Total Helicopter Weight".

m. Determine the "Allowable Load" based on take-off and landing by use of the "Limitations" table in the upper left-hand corner of the form as follows:

(1.) Enter the "Allowable Gross Weight" for take-off and landing.

(2.) Enter the "Total Helicopter Weight" (from reference 11). Estimate the fuel to be aboard at time of landing. Enter the sum "Operating Weight" (from reference 8) and "Estimated Landing Fuel Weight".

(3.) Subtract above weights from the respective "Allowable Gross Weights" to obtain the respective "Allowable Loads".

Note

> The smallest of these allowable loads is the "Allowable Load" and represents the maximum amount of weight which may be distributed throughout the helicopter in the various compartments without exceeding the limited gross weights of the helicopter.

n. Reference 12 — Using the same compartment letter designation as shown on Chart E (Helicopter diagram) enter the number and weight of passengers and the weight of cargo (baggage, mail, etc.) Use actual Passenger Weight, if available. Enter the total for each compartment in the weight column.

Note

> The sum of the compartment totals must not exceed the "Allowable Load" determined in the "Limitations Table".

o. Reference 13 — Enter the sum reference 11 and the compartment totals from reference 12 opposite "Take-Off Condition" (uncorrected). At this point, if not already done, calculate the moment/constant for reference 1 through 13 inclusive.

p. Check the weight figure (reference 13) against the "Gross Weight Take-Off" in the "Limitations" table. Check the moment/constant figure opposite reference 13 by means of Chart E to ascertain that the indicated cg is within allowable limits.

q. Reference 14 — If changes in amount or distribution of load are required, indicate necessary adjustments by proper entries in the "Corrections" table in lower left-hand corner of the form, as follows:

(1.) Enter a brief description of the adjustment made in the column marked "Item".

(2.) Add all the weight and moment decreases and insert the totals in the space opposite "Total Weight Removed".

(3.) Add all the weight and moment increases and insert the total in the space opposite "Total Weight Added".

(4.) Substract the smaller from the larger of the two totals and enter the difference (with applicable plus or minus sign) opposite "Net Difference".

(5.) Transfer these "Net Difference" figures to the space opposite reference 14.

r. Reference 15 — Enter the sum of the difference between reference 13 and reference 14. Recheck to see that these figures do not exceed allowable limits.

s. Reference 16 — Determine the take-off cg position by refering to the cg table on Chart E. Enter this figure in the space provided opposite "Take-Off CG".

t. Reference 17 — Estimate the weight of fuel which may be expended before landing. Enter these figures together with moment/constant, in the spaces provided.

Note

> Do not consider reserve fuel as expended when determining "Estimated Landing Condition".

u. Reference 18 — Enter the weight of "Air Supply Load" to be dropped before landing with moment/constant.

v. Reference 19 — Not applicable.

w. Reference 20 — Enter the difference in weights and moment/constant between reference 15 and the sum of reference 17 and reference 18.

x. Reference 21 — By again referring to the cg table on Chart E, determine the estimated landing cg position. Enter this figure opposite "Estimated Landing CG".

Note

> Check the landing cg figure with permissible cg figures in limitation black. The landing cg must be within the range shown.

y. The necessary signatures must appear at the bottom of the form.

12-25. *DD Form 365F — Tactical Helicopters.* Insert the necessary identifying information at the top of the form. In the blank spaces of the "Limitation" table, enter the gross weight and cg restrictions obtained from Chapter 7.

Note

> Enter moment/constant valued from Chart E throughout the form.

a. Reference 1 — Enter the helicopter basic weight and moment/constant. Obtain these figures from the last entry on Chart C — Basic Weight and Balance Record.

b. Reference 2 — Enter the amount and weight of oil.

c. Reference 3 — Using the compartment letter designations as shown on Chart E (helicopter diagram) enter the number and weight of the crew at their "take-off stations". Use actual crew weights if available. Also, enter the weight of baggage, cargo and miscellaneous items. Enter the total of each compartment in the "Weight" column.

d. Reference 4 — Enter the sum of the weights for reference 1 through reference 3 to optain "Operating Weight".

e. Reference 5 — Enter by compartment the number of rounds, caliber and weight of all ammunition.

f. Reference 6 — Enter the size, distribution (forward, aft, external, etc.) and weight of all bombs, torpedos, rockets, etc.

g. Reference 7 — Enter the number of gallons and weight of fuel. In the event auxiliary fuel tanks are to be used, these items and their weight should also be entered as part of reference 7.

h. Reference 8 — Not applicable.

i. Reference 9 — Not applicable.

j. Reference 10 — Enter the sum of the weights for reference 4 through reference 9 opposite "Take-Off Condition" (uncorrected). At this point, if not already done, calculate and enter the moment/constant for reference 1 through 10, inclusive.

k. Check the weight figure opposite reference 10 against the "Gross Weight Take-Off" in the "Limitations" table. Check the moment/constant figure opposite reference 10 by means of Chart E to ascertain that the indicated cg is within allowable limits.

l. Reference 11 — If changes in amount or distribution of load are required, indicate necessary adjustments by proper entries in the "Corrections" table in lower left-hand corner of the form as follows:

(1.) Enter a brief description of the adjustment made in the column marked "Item".

(2.) Add all the weight and moment decreases and insert the totals in the space opposite "Total Weight Removed."

(3.) Add all the weight and moment increases and insert the totals in the space opposite "Total Weight Added".

(4.) Subtract the smaller from the larger of the two totals and enter the difference (with applicable plus or minus sign) opposite "Net Difference".

(5.) Transfer these net difference figures to the spaces opposite reference 11.

m. Reference 12 — Enter the sum of, or the difference between, reference 10 and reference 11. Recheck to ascertain that these figures do not exceed allowable limits.

n. Reference 13 — By referring to the cg table on Chart E determine the take-off cg position. Enter this figure in the space provided opposite "Take-Off CG".

o. Reference 14 — Estimate the weight of ammunition (not including weight of cases and links if retained) fuel, paratroopers, (use actual weight of troops with all equipment, if available), external cargo and any other items which may be expended before landing. Enter figures together with moment/constant in the spaces provided.

Note

Do not consider reserve fuel, as expended when determining "Estimated Landing Condition",

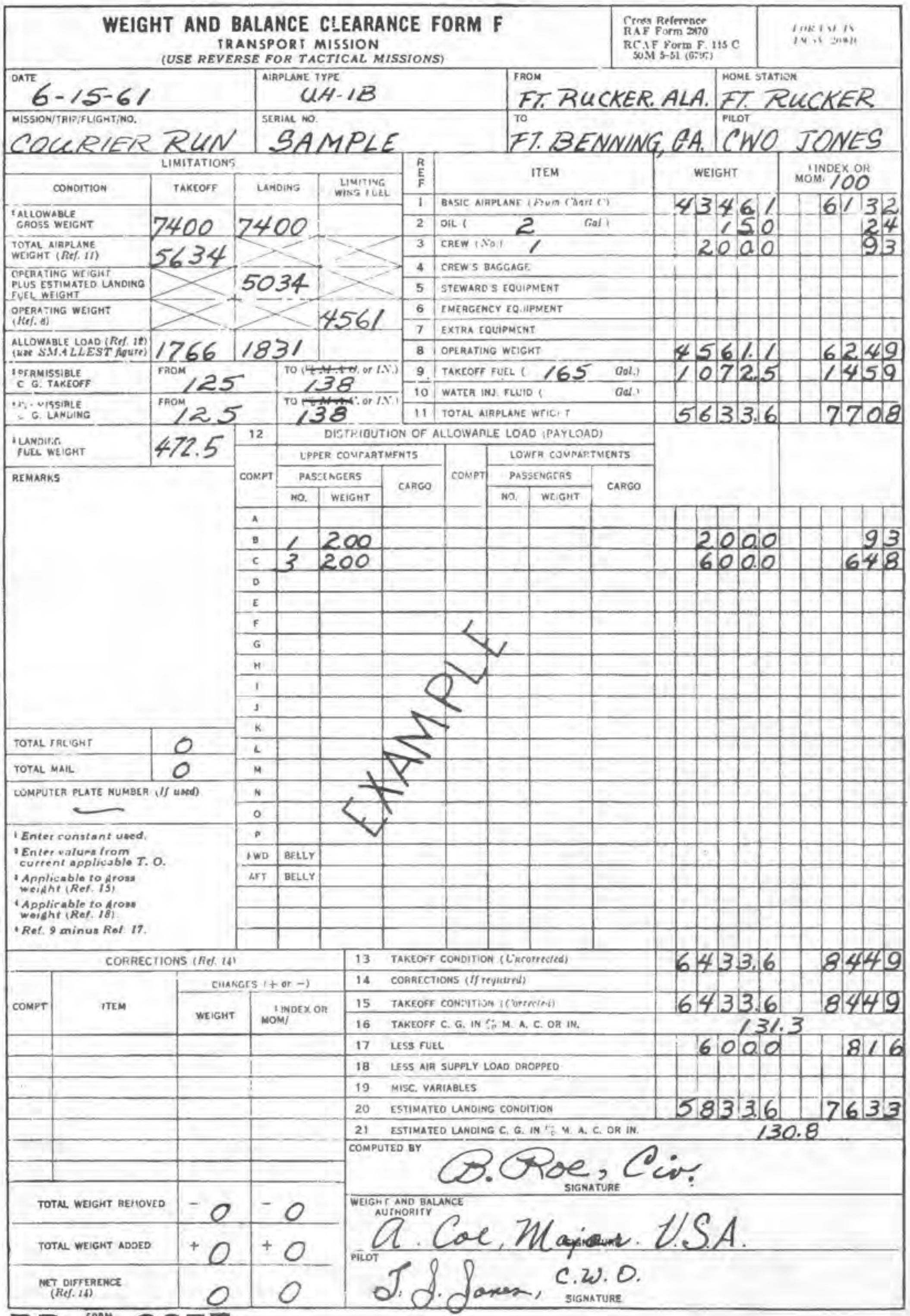
p. Reference 15 — Enter the difference in weights and moment/constant between reference 12 and the total of reference 14.

q. Reference 16 — By again referring to the cg table on Chart E, determine the estimated landing cg position. Enter the figure opposite "Estimated Landing CG".

Note

Check the landing cg figure with permissible cg figures in limitations block. The landing cg must be within the range of the figures shown.

r. The necessary signatures must appear at the bottom of the form.



WEIGHT AND BALANCE CLEARANCE FORM F

TRANSPORT MISSION
(USE REVERSE FOR TACTICAL MISSIONS)

Cross Reference
RAF Form 2870
RCAF Form F. 115 C
50M 5-51 (079C)

DATE 6-15-61	AIRPLANE TYPE UH-1B	FROM FT. RUCKER. ALA.	HOME STATION FT. RUCKER
MISSION/TRIP/FLIGHT/NO. COURIER RUN	SERIAL NO. SAMPLE	TO FT. BENNING, GA.	PILOT CWO JONES

LIMITATIONS

CONDITION	TAKEOFF	LANDING	LIMITING WING FUEL
[1] ALLOWABLE GROSS WEIGHT	7400	7400	
TOTAL AIRPLANE WEIGHT (*Ref. 11*)	5634		
OPERATING WEIGHT PLUS ESTIMATED LANDING FUEL WEIGHT		5034	
OPERATING WEIGHT (*Ref. 8*)			4561
ALLOWABLE LOAD (*Ref. 12*) (*use SMALLEST figure*)	1766	1831	
[2] PERMISSIBLE C. G. TAKEOFF	FROM 125	TO (~~% M.A.C.~~ or IN.) 138	
[3] PERMISSIBLE C. G. LANDING	FROM 125	TO (~~% M.A.C.~~ or IN.) 138	
[4] LANDING FUEL WEIGHT	472.5		

REF	ITEM	WEIGHT	[1] INDEX OR MOM/ 100
1	BASIC AIRPLANE (*From Chart C*)	43461	6132
2	OIL (2 Gal.)	150	24
3	CREW (No.) 1	2000	93
4	CREW'S BAGGAGE		
5	STEWARD'S EQUIPMENT		
6	EMERGENCY EQUIPMENT		
7	EXTRA EQUIPMENT		
8	OPERATING WEIGHT	4561.1	6249
9	TAKEOFF FUEL (165 Gal.)	1072.5	1459
10	WATER INJ. FLUID (Gal.)		
11	TOTAL AIRPLANE WEIGHT	5633.6	7708

12 DISTRIBUTION OF ALLOWABLE LOAD (PAYLOAD)

COMPT	UPPER COMPARTMENTS PASSENGERS NO.	UPPER COMPARTMENTS PASSENGERS WEIGHT	UPPER COMPARTMENTS CARGO	COMPT	LOWER COMPARTMENTS PASSENGERS NO.	LOWER COMPARTMENTS PASSENGERS WEIGHT	LOWER COMPARTMENTS CARGO	WEIGHT	INDEX OR MOM
A									
B	1	200						200.0	93
C	3	200						600.0	648
D									
E									
F									
G									
H									
I									
J									
K									
L									
M									
N									
O									
P									
FWD	BELLY								
AFT	BELLY								

REMARKS

TOTAL FREIGHT	0
TOTAL MAIL	0

COMPUTER PLATE NUMBER (*If used*) —

[1] *Enter constant used.*
[2] *Enter values from current applicable T. O.*
[3] *Applicable to gross weight (Ref. 15)*
[4] *Applicable to gross weight (Ref. 18)*
[5] *Ref. 9 minus Ref. 17.*

EXAMPLE

CORRECTIONS (*Ref. 14*)

COMPT	ITEM	CHANGES (+ or −) WEIGHT	CHANGES (+ or −) [1] INDEX OR MOM/
TOTAL WEIGHT REMOVED		− 0	− 0
TOTAL WEIGHT ADDED		+ 0	+ 0
NET DIFFERENCE (*Ref. 14*)		0	0

REF	ITEM	WEIGHT	INDEX OR MOM
13	TAKEOFF CONDITION (*Uncorrected*)	6433.6	8449
14	CORRECTIONS (*If required*)		
15	TAKEOFF CONDITION (*Corrected*)	6433.6	8449
16	TAKEOFF C. G. IN % M. A. C. OR IN.	131.3	
17	LESS FUEL	6000	816
18	LESS AIR SUPPLY LOAD DROPPED		
19	MISC. VARIABLES		
20	ESTIMATED LANDING CONDITION	58336	7633
21	ESTIMATED LANDING C. G. IN % M. A. C. OR IN.	130.8	

COMPUTED BY B. Roe, Civ.
SIGNATURE

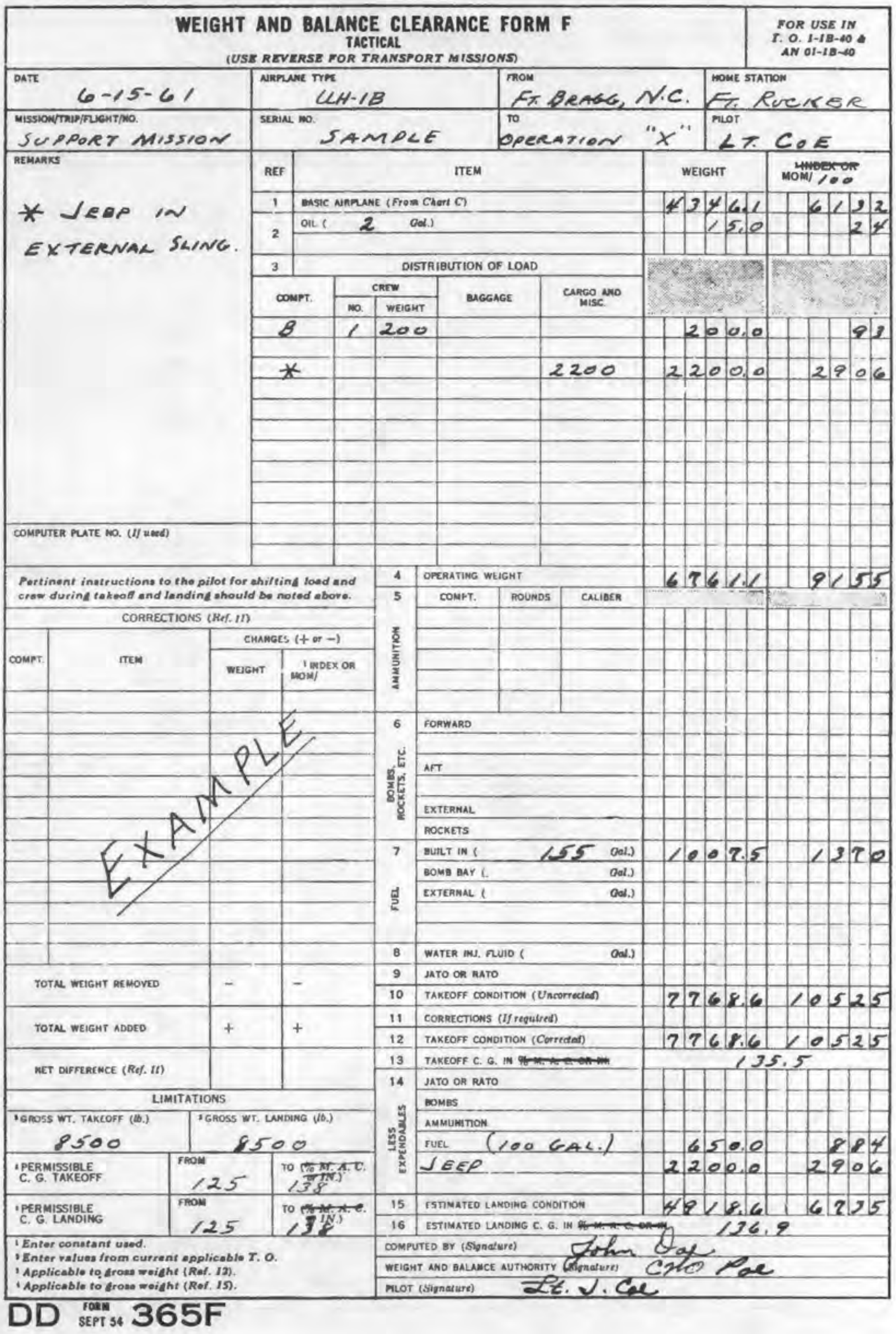
WEIGHT AND BALANCE AUTHORITY A. Coe, Major. U.S.A.

PILOT T. J. Jones, C.W.O.
SIGNATURE

DD FORM 1 SEPT 54 365F

NOTE.—THIS TRANSPORT CLEARANCE FORM HAS RESULTED FROM TRIPARTITE AGREEMENT AND NO FURTHER CHANGES MAY BE MADE TO IT WITHOUT PRIOR CONSIDERATION BY TRIPARTITE AUTHORITIES.

Chart 12–3. Sample DD form 365F – special mission (Sheet 1 of 2)



WEIGHT AND BALANCE CLEARANCE FORM F
TACTICAL
(USE REVERSE FOR TRANSPORT MISSIONS)

FOR USE IN T. O. 1-1B-40 & AN 01-1B-40

DATE 6-15-61	AIRPLANE TYPE UH-1B	FROM FT. BRAGG, N.C.	HOME STATION FT. RUCKER
MISSION/TRIP/FLIGHT/NO. SUPPORT MISSION	SERIAL NO. SAMPLE	TO OPERATION "X"	PILOT LT. COE

REMARKS

* JEEP IN EXTERNAL SLING.

REF	ITEM	WEIGHT	~~INDEX OR~~ MOM/ 100
1	BASIC AIRPLANE *(From Chart C)*	4346.1	6132
2	OIL (2 *Gal.*)	15.0	24
3	DISTRIBUTION OF LOAD		

COMPT.	CREW NO.	CREW WEIGHT	BAGGAGE	CARGO AND MISC.	WEIGHT	MOM/100
8	1	200			200.0	93
*				2200	2200.0	2906

COMPUTER PLATE NO. *(If used)*

Pertinent instructions to the pilot for shifting load and crew during takeoff and landing should be noted above.

CORRECTIONS *(Ref. 11)*

COMPT.	ITEM	CHANGES (+ or −) WEIGHT	CHANGES (+ or −) [1] INDEX OR MOM/
	EXAMPLE		
TOTAL WEIGHT REMOVED		−	−
TOTAL WEIGHT ADDED		+	+
NET DIFFERENCE *(Ref. 11)*			

REF	ITEM	WEIGHT	MOM/100
4	OPERATING WEIGHT	6761.1	9155
5	AMMUNITION — COMPT. / ROUNDS / CALIBER		
6	BOMBS, ROCKETS, ETC. — FORWARD		
	AFT		
	EXTERNAL		
	ROCKETS		
7	FUEL — BUILT IN (155 *Gal.*)	1007.5	1370
	BOMB BAY (*Gal.*)		
	EXTERNAL (*Gal.*)		
8	WATER INJ. FLUID (*Gal.*)		
9	JATO OR RATO		
10	TAKEOFF CONDITION *(Uncorrected)*	7768.6	10525
11	CORRECTIONS *(If required)*		
12	TAKEOFF CONDITION *(Corrected)*	7768.6	10525
13	TAKEOFF C. G. IN ~~% M. A. C. OR IN~~	135.5	
14	LESS EXPENDABLES — JATO OR RATO		
	BOMBS		
	AMMUNITION		
	FUEL (100 GAL.)	650.0	884
	JEEP	2200.0	2906
15	ESTIMATED LANDING CONDITION	4918.6	6775
16	ESTIMATED LANDING C. G. IN ~~% M. A. C. OR IN~~	136.9	

LIMITATIONS

[2] GROSS WT. TAKEOFF *(lb.)* 8500	[2] GROSS WT. LANDING *(lb.)* 8500	
[3] PERMISSIBLE C. G. TAKEOFF	FROM 125	TO ~~(% M. A. C. or~~ IN.) 138
[4] PERMISSIBLE C. G. LANDING	FROM 125	TO ~~(% M. A. C. or~~ IN.) 138

COMPUTED BY *(Signature)* John Doe

WEIGHT AND BALANCE AUTHORITY *(Signature)* CWO Poe

PILOT *(Signature)* Lt. J. Coe

[1] *Enter constant used.*
[2] *Enter values from current applicable T. O.*
[3] *Applicable to gross weight (Ref. 12).*
[4] *Applicable to gross weight (Ref. 15).*

DD FORM SEPT 54 365F

Chart 12–3. Sample DD form 365F – tactical mission (Sheet 2 of 2)

CHAPTER 13

AIRCRAFT LOADING

Section I. Scope

13-1. Introduction. The purpose of this chapter is to provide complete information and instructions, with complementary .illustrations, to accomplish safe loading of the helicopter for the numerous types of missions the helicopter can reasonably be expected to perform.

13-2. A typical loading example is also given and can be used as a guide when loading calculations need to be computed.

Section II. Aircraft Cargo Features

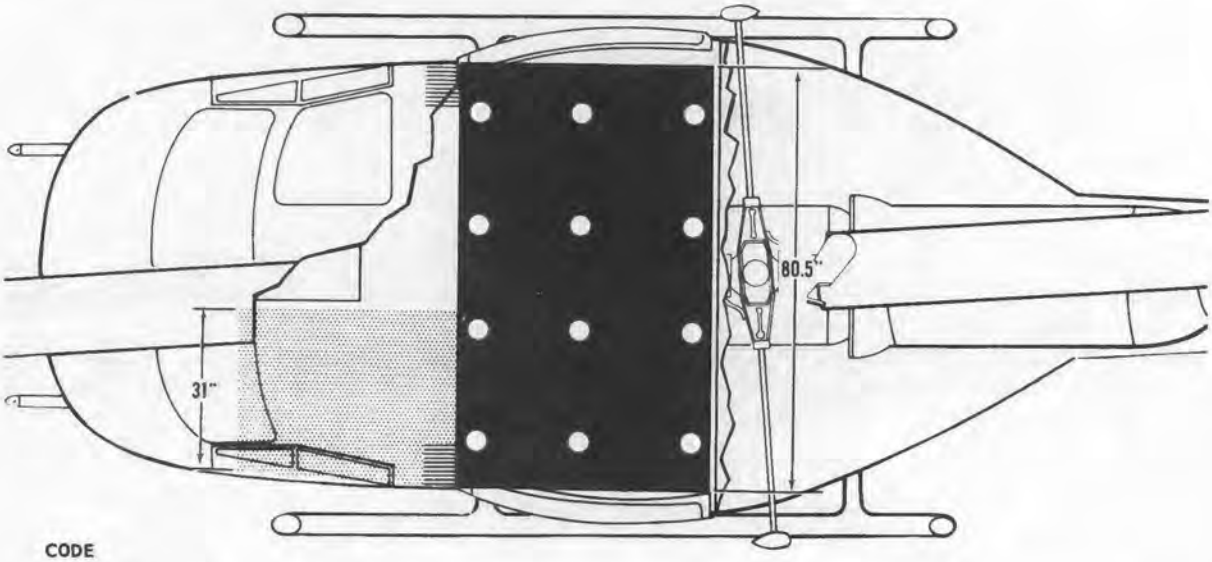
13-3. Cargo Loading — Internal. The Internal Cargo Chart (See chart 7-1) is furnished to provide a simplified method of determining cargo loading data and remain within CG operational limits. High density cargo shall be distributed so as not to exceed a 175 pounds per square foot deck loading limitation. It should be remembered that all cargo shall be secured, to prevent shifting of cargo, which would result in a CG location change and a possible unsafe flight condition.

> ***Note***
>
> Cargo floor loading of 150 pounds per square foot and NOT TO EXCEED 175 per square foot will provide a load factor of 2.0 and 1.72 based on limit loads.

B ***13-4. Cargo Loading — Internal.*** The internal cargo is carried in two areas. The forward area is within the cabin and will accommodate large bulk items and aft area is provided for storage of baggage, loose equipment or items which are not required during flight. (See figure 13-1).

13-5. Forward Cargo Area. The forward cargo area is located aft of the crew stations and contains approximately 140 cubic feet of obstruction free cargo loading space. Access to loading area is provided by full width sliding doors which enclose two sides of the cargo area and provide straight through loading capabilities. The cargo deck is at approximate knee height above ground level; therefore, cargo can be easily loaded without the use of specialized equipment. Hi-density cargo should be distributed over the deck area to maintain a normal 150 pounds per square foot and a maximum of 175 pounds per square foot loading limit. These limits will provide a safety load factor of 2.0 and 1.72, respectively, and are based on limit loads. The down provisions, for security of cargo, are provided by flush mounted standard fittings located in the cargo deck. A rapid simplified method for replacement of cargo, after cargo CG has been determined, has been provided by the Internal Cargo Loading Chart (See chart 7-1). These charts when used will maintain the helicopter within its CG operational limits throughout its entire mission.

13-6. Aft Cargo Area. The aft cargo area contains approximately 10 cubic feet, and is primarily considered as a baggage compartment and a stowage area for loose equipment items. The compartment is located in the forward fuselage section just ahead of the tail boom attachment. Access is gained by a side hinged door on the right side that is the full width of the compartment. Weight of the items to be carried should be distributed so as not to exceed 150 pounds per square foot of deck loading and maximum weight to be carried in the compartment shall not exceed 200 pounds. An Internal Loading Chart (see chart 7-1) provides a simplified method of determining the aft cargo compartment weight allowable vs crew members and forward cargo compartment weight to be carried. The results obtianed from the chart will maintain the helicopter within the CG operational limits throughout the entire mission.



CODE

- ◙ 1. Tie down fittings.
- ■ 2. Cargo area, maximum loading dimensions.
- ░ 3. Optional loading area, copilots seat removed.
- ▥ 4. Interior area above maximum package.
- ▤ 5. Floor obstruction. (Heater outlets)

NOTES:

1. Cargo floor loading vs. G load factor

Lbs. Sq. Ft.	Safety Factor
300	1.0
150	2.0
100	3.0

2. Tie down fittings, strength 1250 lbs. vertical, 500 lbs. horizontal load per fitting.

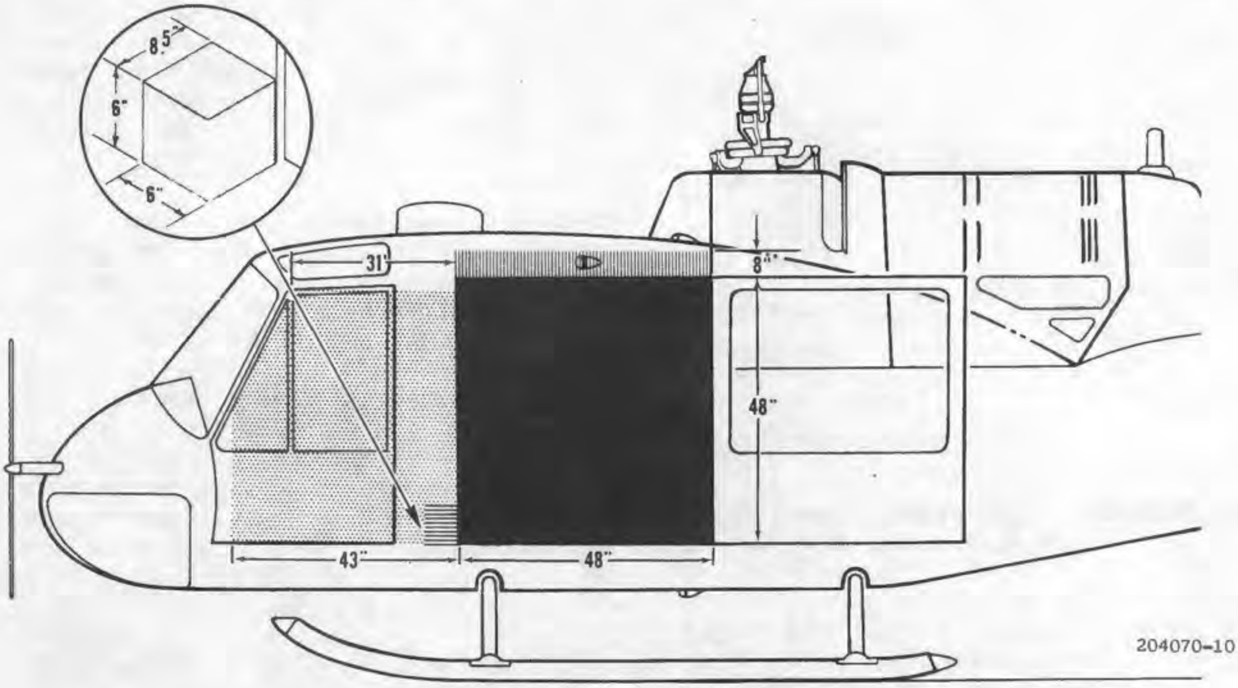
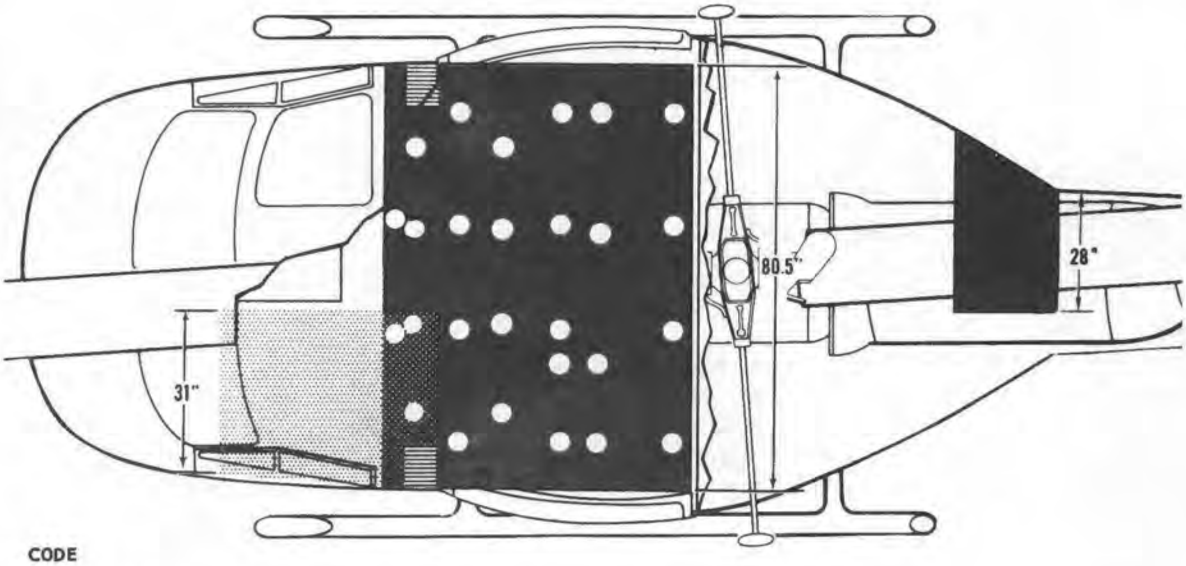


Figure 13-1. Cargo features (UH-1A) (Sheet 1 of 2)



CODE

- ● 1. Tie down fittings.
- ■ 2. Cargo area, maximum loading dimensions.
- ░ 3. Optional loading area, copilots seat removed.
- ▥ 4. Interior area above maximum package.
- ▤ 5. Floor obstruction. (Heater outlets)

NOTES:

1. Cargo floor loading vs. G load factor

Lbs. Sq. Ft.	Safety Factor
300	1.0
150	2.0
100	3.0

2. Tie down fittings, strength 1250 lbs. vertical, 500 lbs. horizontal load per fitting.

Figure 13–1. Cargo features (UH-1B) (Sheet 2 of 2)

13-7. Cargo — Passenger Doors. The cargo-passenger doors are of metal construction with a large, transparent plastic window in the upper section. The doors open by sliding aft and can be opened from either the outside while the helicopter is in flight or on the ground. The doors are full cargo area width and provide an easy means of exit in event of an emergency. If the doors become jammed and cannot be opened, the large transparent window can be kicked out to provide an escape route.

13-8. *Baggage Door.* A baggage door is located on the right side of the fuselage aft of the cabin area. This compartment adds an additional compartment with approximately 10 cubic feet space. The baggage area is enclosed on three inner sides by a net with provisions for tightening.

13-9. Cargo Loading Aids. The cabin cargo area has straight through loading provisions with the loading area approximately two feet above ground level; therefore, special loading aids are not necessary and have not been provided.

13-10. Cargo Tie-Down Equipment. Twelve tie-down fittings, on UH-1A helicopters, and twenty seven tie-down fittings on UH-1B helicopters are located in the cabin floor. "D" rings are an integral part of the UH-1B baggage net and provide a method of securing baggage. Equipment for securing cargo on UH-1A helicopters has not been provided; therefore, standard tie-down equipment should be used and the cargo secured in an acceptable manner. UH-1B helicopters are equipped with a cargo net for securing cargo.

13-11. External Cargo Suspension Unit. External cargo can be carried by means of a short single suspension unit. (See figure 13-2) secured to the primary structure and located close to the helicopter center of gravity. This method of attachment and location has proved to be the most satisfactory for carrying external cargo. Pitching and rolling due to cargo swinging is miniminized, and good stability and control characteristics are maintained under load. A cargo mechanical release pedal is located on the right-hand side of the cabin floor, between the pilot's tail rotor control pedals, while an electrical release switch is located on the cyclic control stick. An automatic release is incorporated when the control panel switch is in ARM position.

Note

> A cargo minimum weight of 125 pounds is required for automatic release action.

13-12. When not in use, the cargo suspension unit need not be removed, nor does it require stowing, as the hook protrudes only slightly below the lower surface of the helicopter. Electric power to the cargo release relay is supplied from the 28 volt dc essential bus. Circuit protection is provided by a circuit breaker on the dc circuit breaker panel.

Note

> The cargo suspension unit is structurally capable of sustaining a 3,000 pound load. The restrictions involved are the gross weight and airspeed limitations of the helicopter.

A ***13-13. Operation — Cargo Suspension Unit.*** Experience has shown that when cargo is attached to the suspension unit, with the cargo release switch positioned in either the AUTO or MANUAL position the cargo hook will latch but will not lock and the electrical release will not function. However, the cargo load may be dropped by actuating the foot pedal mechanical release regardless of the switch position. To insure locking of the cargo hook and proper operation of the electrical release system it is necessary to adhere to the following instructions.

a. Cargo release switch—position to SAFE.

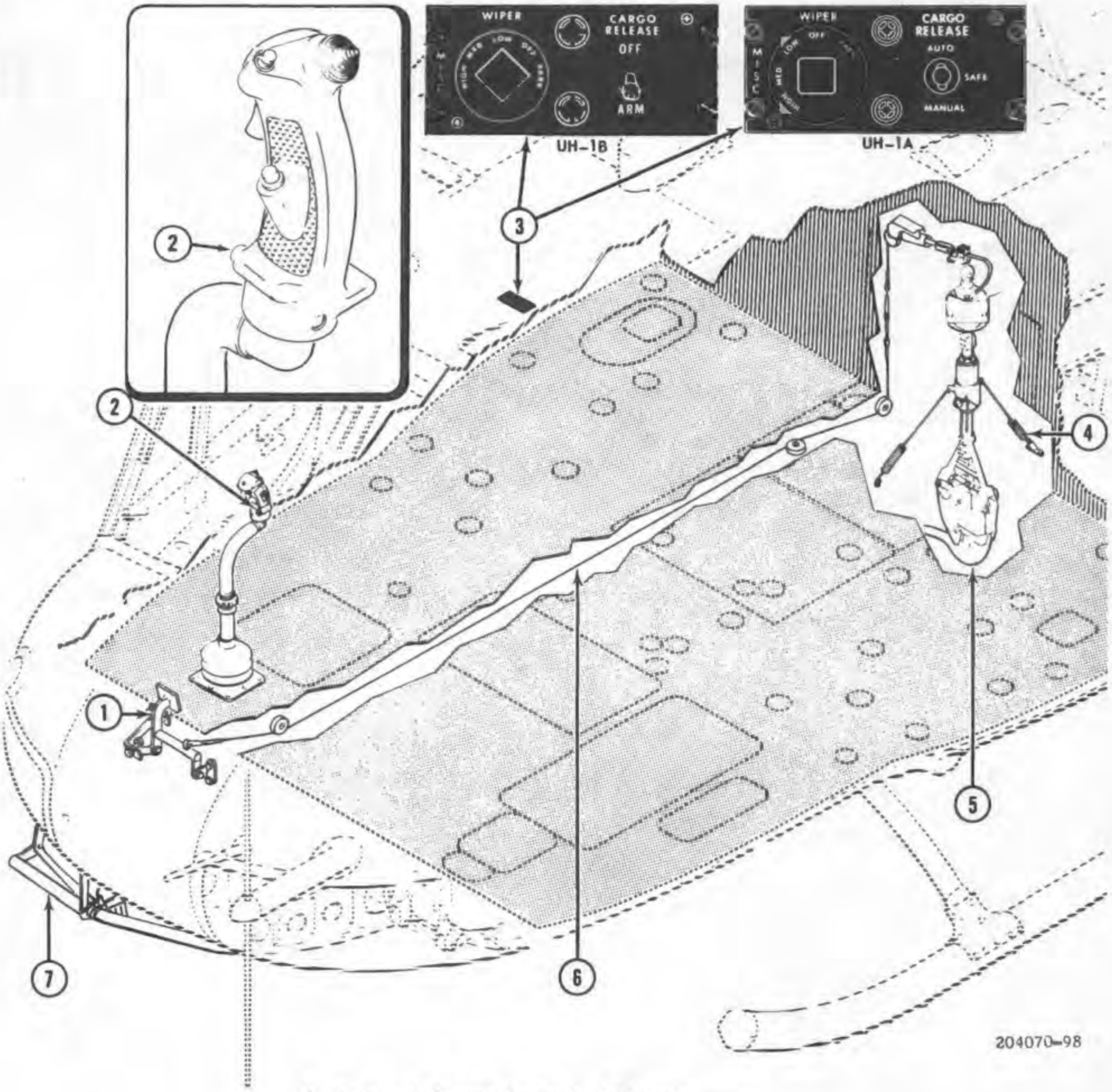
b. External Cargo—ATTACH to the suspension unit.

c. Cargo release switch—POSITION as desired.

Note

> Operation of the helicopter can result in electricity buildup in the cargo suspension unit. This static electricity charge can be dissipated by keying AN/ARC-44 transmitter prior to attaching cargo of any kind to the cargo suspension hook.

B **13-14. *External Cargo Suspension Unit.*** External cargo can be carried by means of a short single suspension unit (See figure 13-3) secured to the primary structure and located close to the helicopter center of gravity. This method of attachment and location has proved to be the most satisfactory for carrying external cargo. Due to spring and cable hook centering devices pitching and rolling due to cargo swinging is almost eliminated, and good



1. External Cargo Mechanical Release
2. External Cargo Electrical Release Switch
3. Cargo Release - OFF-ARM Switch - Miscellaneous Panel
4. External Cargo Suspension Centering Springs (3)
5. External Cargo Suspension Unit
6. Mechanical Release Cable Assembly
B 7. Cargo Rear View Mirror

Figure 13–2. External cargo suspension unit stability and control characteristics are maintained under load. A cargo mechanical release pedal is located on the right-hand side of the cabin floor, between the pilot's tail rotor control pedals, while an electrical release switch is located on the cyclic control stick .

13-15. When not in use, the cargo suspension unit need not be removed, nor does it require stowing, as the hook protrudes only slightly below the lower surface of the helicopter and the unit is centered by spring and cable devices. Electric power to the cargo release relay is supplied from the 28 volt dc essential bus. Circuit protection is provided by a circuit breaker on the dc circuit breaker panel.

Note

The cargo suspension unit is structurally capable of sustaining a 4,000 pound load. The restrictions involved are the gross weight and airspeed limitations of the helicopter.

Note

When external cargo is being carried make certain the cargo mirror is installed. Helicopter performance will vary according to airspeed, range and endurance. Refer to Chapter 14, for performance data.

B **13-16. *Operation — Cargo Suspension Unit.*** Cargo may be attached to the suspension unit with the cargo release switch positioned in either the OFF or ARM position. Cargo can only be released electrically with the switch in ARM position. There is no automatic touchdown release on these helicopters. However, the cargo load may be dropped by actuating the foot pedal mechanical release, regardless of the switch position.

Caution

Helicopters Serial Nos. 61-802, 61,803 and 61-1872 and subsequent are equipped with a non-rotating unit, which maintains the hook in a fixed position, (facing forward) and should be used only with a cargo sling having a swivel attachment ring. A device which may by used for this application is: sling, endless, Nylon Webbing, Type I, 10 inch, Part No. PD101-10.

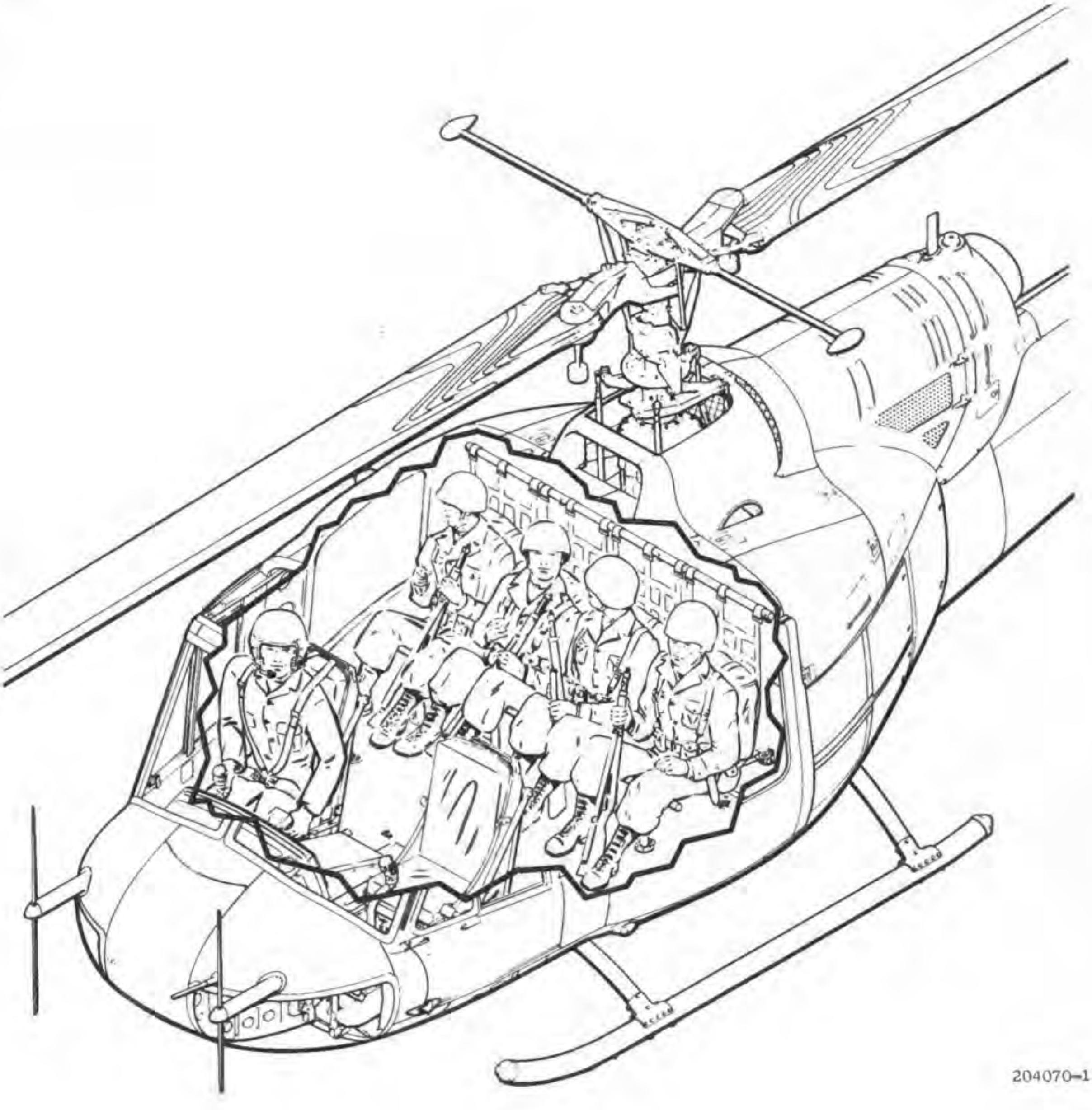


Figure 13–3. Troop seating (UH-1A) (Sheet 1 of 2)

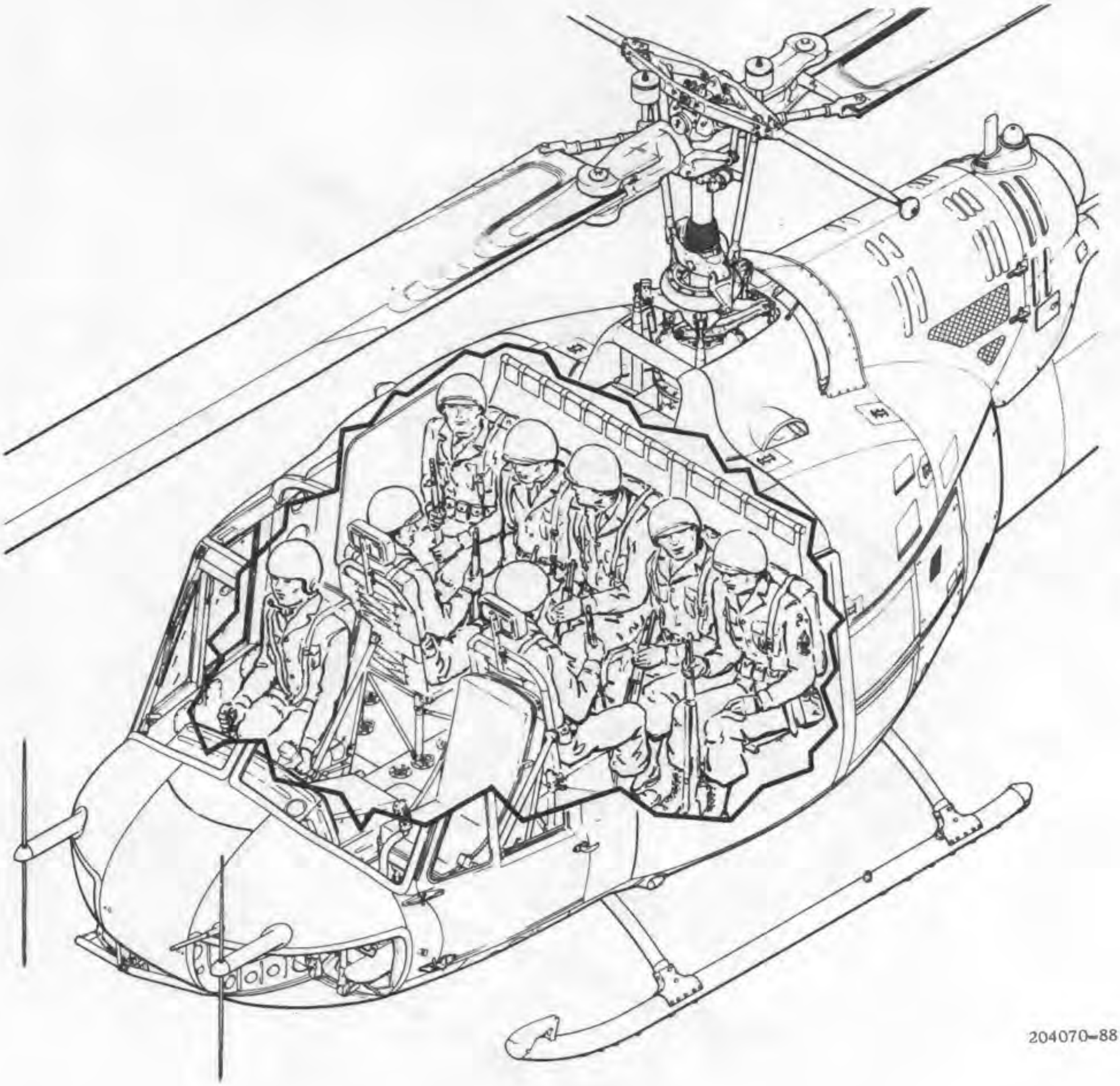


Figure 13-3. Troop seating (UH-1B) (Sheet 2 of 2)

Section III. Preparations of Aircraft and Personnel Cargo For Loading and Unloading

13-17. Personnel Loading and Unloading. Personnel loading and unloading is accomplished through the aft cabin cargo loading doors.

13-18. Troop Seat Installation. Seating accommodations for troops are provided in the cabin. UH-1A helicopters have a standard military type troop seat, located against the cabin aft bulkhead, to accommodate four troops. UH-1B helicopters are equipped with two aft facing single passenger seats, located aft of the pilot and copilot stations; and a two section standard military troop seat is located against the cabin aft bulkhead facing forward. One section seats three, the other section seats two. Each section can be individually stowed and/or removed, thereby offering flexibility for mixed loading arrangements. Troop entrance and exit is accomplished though the aft cabin cargo loading doors.

13-19. Litter Provisions. Provisions for the installation of a folding litter rack adapt the helicopter for, two A three B, litter patients. Litter patients can be loaded from either side of the helicopter through the cargo doors. Passenger safety belts are used to secure litter patients of the litters.

> ***Note***
>
> The cargo fore and aft dimension is reduced approximately five inches when the troop seat and litter rack are stowed and the fittings are installed.

13-20. Cargo — Passenger Doors. The cargo-passenger doors are of metal construction with a large, transparent plastic window in the upper section. The doors open by sliding aft and can be opened from either the outside while the helicopter is in flight or on the ground. The doors are full cargo area width and provide an easy means of exit in event of an emergency. If the doors become jammed and cannot be opened, the large transparent windows can be kicked out to provide an escape route.

13-21. Preparation of General Cargo. The loading crew shall assemble the cargo and baggage to be transported. At time of assembly and prior to loading, the loading crew shall compile data covering weight, dimensions, center of gravity location and contact areas for each item. Heavier packages to be loaded in the cabin cargo area shall be loaded first and placed in the cabin aft section against the bulkhead for cg range purposes. Helicopter floor loading in this area shall not exceed 175 pounds per square foot maximum package size and gross weight limits. Calculation of the allowable load and loading distribution shall be accomplished by using Chapter 12 of this manual to determine the final cg location and remain within the allowable limits for safe operating conditions. A Loading Chart, Chapter 7, is provided, and is located on the right side of the cabin interior panel between the pilot's and cargo-passenger doors.

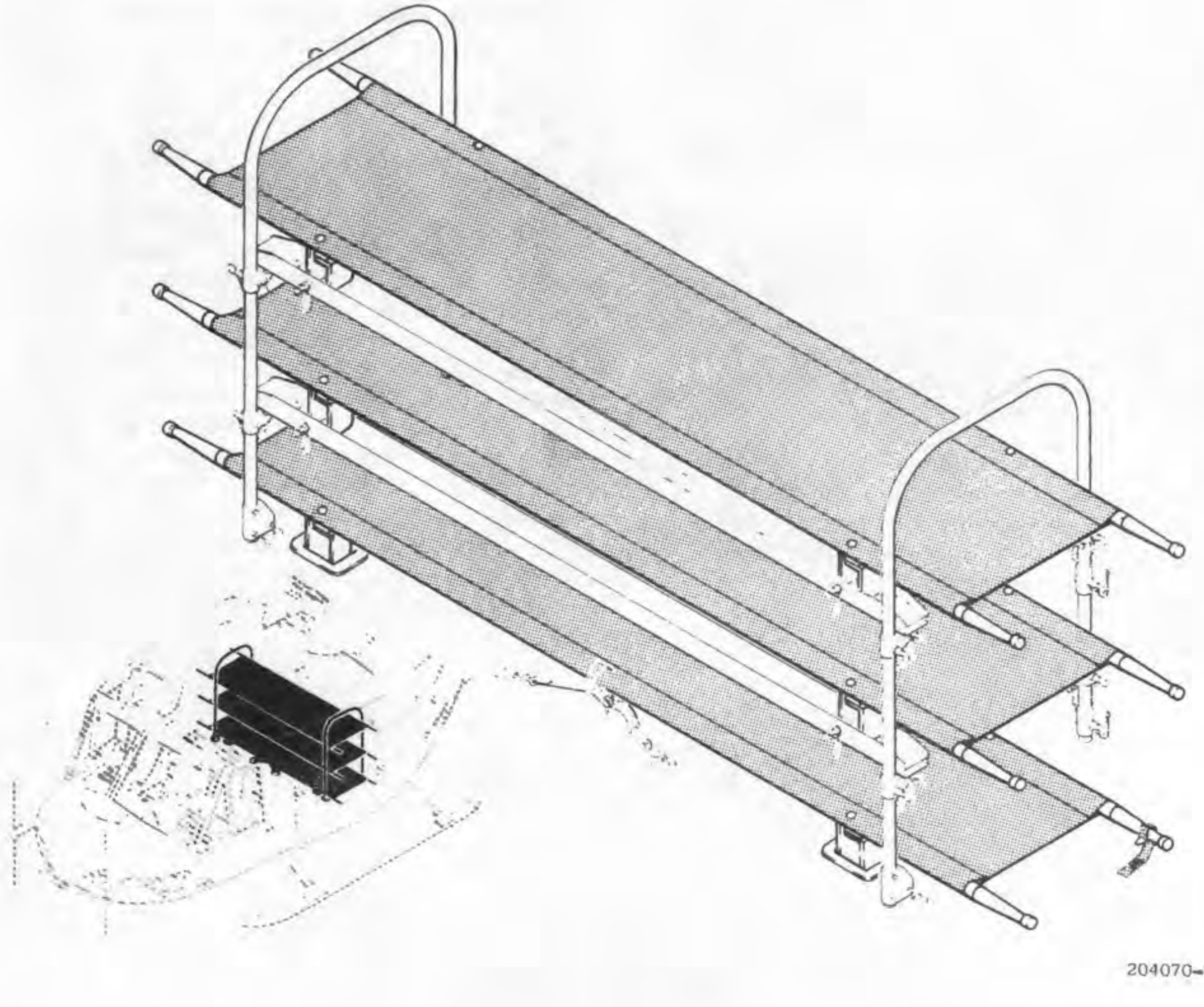


Figure 13–4. Litter provisions

Section IV. General Information for Loading, Security and Unloading Cargo

13-22. Cargo Center of Gravity Planning. The items to be transported, should be assembled for loading after the weight and dimensions have been recorded. Loading time will be gained if the packages are positioned as they are to be located in the helicopter. To assist in determining the location of the various items, the individual weights and total weights must be known (See figure 13-5). When these factors are known, the loading Problem Example can be used as a guide to determine the helicopter station at which the package cg shall be located. The information presented on the Loading Chart will not be affected by fuel quantity as full to empty fuel load has been considered during data computation. Final analysis of helicopter cg location for loading shall be computed from the data presented in Chapter 12, Weight and Balance Data, this manual.

13-23. Computation of Cargo Center of Gravity. The loading data on Chart E in Chapter 12 of this manual will provide information to work a loading problem. From the loading tables weight and moment 100/constants are obtained for all variable load items and are added mathematically to the current basic weight and moment 100/constant obtained from Chart C to arrive at the gross moment. The cg of the loaded helicopter is represented by a moment figure in the center of gravity table. If the helicopter is loaded within the forward and aft cg limits the figure will fall numerically between the limiting moments. The affect on the cg of the usable in flight items of fuel and oil may be checked by subtracting the weights and moments of such items from the take-off gross weight and moment and checking the new moment with the cg table. This check should be made to determine whether or not the cg will remain within limits during the entire flight.

13-24. Loading Procedures. These helicopters are to be loaded with the ease and rotation of unloading in mind, while keeping within limits set by Cargo Loading Charts in Chapter 7 this manual.

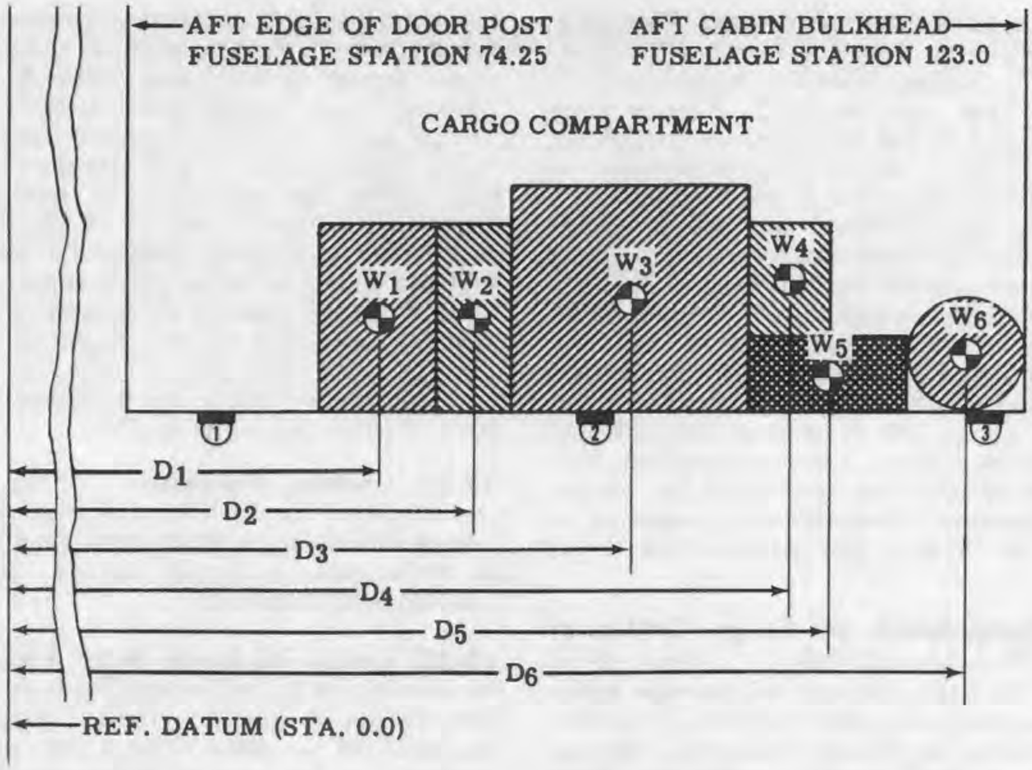
13-25. Cargo Tie Down Net. A latex treated webbing cargo net is supplied to assure the firm control of cargo in flight. Hooks for attachment to tie down fittings and quick adjustment straps are advantageous for ease of loading and unloading cargo.

Section V. Loading and Unloading of Other Than General Cargo

The information normally contained under this heading is not applicable to this helicopter.

Warning

Before transporting atomic weapons the pilot must be familiar with AR 95-55 and AR 385-25.



W = Weight in Pounds
D = Distance in inches from Ref. Datum Line (Sta. 0.0)
⊕ = Center of Gravity of Individual Pieces of Cargo
◓ = Cargo Tie-Down Fittings; No. 1-Sta. 80.5, No. 2-Sta. 100.0, No. 3-Sta. 120.5

Center of Gravity of Entire Cargo

$$\text{C.G.} = \frac{(W_1 \times D_1) + (W_2 \times D_2) + (W_3 \times D_3) + (W_4 \times D_4) + (W_5 \times D_5) + (W_6 \times D_6)}{W_1 + W_2 + W_3 + W_4 + W_5 + W_6}$$

Figure 13–5. Example – loading problem

CHAPTER 14

PERFORMANCE DATA

Section I — Scope

14-1. Purpose. The charts contained in this chapter reflect the necessary data required for pre-flight and in-flight mission planning. The necessary explanatory text for use of the data presented is also contained herein.

14-2. The performance charts are presented in tabular, graphic or profile form. Charts are based of flight test data or calculated data as indicated on the chart. Calculated figures are shown in red.

Section II — Instruction for Chart Use

14-3. Density Altitude Chart. Density altitude is an expression of the density of the air in terms of height above sea level; hence, the less dense the air the higher the density altitude. For standard conditions of temperature and pressure, density altitude is the same as pressure altitude. As temperature increases above standard for any altitude, the density altitude will also increase to values higher than pressure altitude. A high density altitude affects the performance of both the main rotor and the engine. When density altitude is high, less lift is developed by the rotor blades for any given power setting other than at standard conditions. See figure 14-1 which expresses density altitude and temperature. An example of the use of the chart is contained in the chart.

14-4. Psychrometric Chart. The phychrometric chart (see figure 14-3) provides information to determine the specific humidity (pounds of water per pound of dry air), vapor pressure in inches of Hg., dew point temperature, and relative humidity when the dry bulb and wet bulb temperature (either in degrees F or degrees C) are known for a given-pressure altitude. An example of the use of the chart is contained on the chart.

14-5. Airspeed Installation Correction Chart. An airspeed installation chart (see figure 14-4) is provided to supply the correction required to determine calibrated airspeed (CAS). Indicated airspeed (IAS) as read from the instrument and corrected for instrument error, plus or minus installation correction equals calibrated airspeed (CAS). Because of the speed range at which the helicopters operate, compressibility correction is negligible; therefore, it has been intentionally omitted. An approximate true airspeed (TAS) for a standard day can bet obtained from CAS by adding 1-1/2 percent of CAS per 1000 feet density altitude to CAS.

14-6. Engine Operating Limits. Maximum power available for the T53-L-1A, T53-L-5, T53-L-9, T53-L-9A and T53-L-11 engines are given in figure 14-5. These powers are based on the engine manufacturer's specifications and guarantees. Corrections based on flight test are included for installation losses of the engine in the helicopter.

14-7. Performance data given in this manual are based on an engine which can produce specification or rated power. Ordinarily, the engines installed in the helicopters are capable of production more then these powers; therefore, unless engine deterioration has occurred, adequate power should be available, and loadings and ceilings given in this manual should be realized. In the event that deterioration in engine output is supected, the curves in figure 14-5 may be used to make a rough comparison of actual and rated engine performance using the flight instruments available to the pilot. To make the comparison, mentally record pressure altitude and OAT and at the same time apply full power. Now note the torquemeter reading. Enter the curves at the recorded pressure altitude and temperature, and read torque pressure available. The torquemeter reading attained in flight should be at least as great as that shown on the curve. It is emphasized that such comparisons are approximate, and they can result in low engine power indications. This is due to several factors: (1) the high rate of climb when full power is applied, which in turn results in rapidly changing air pressure and temperatures; (2) manufacturing tolerances in the torquemeter and flight instruments; (3) readability of flight instruments; (4) and pilot techniques. In addition, two precautions should be observed by the pilot when making the flight check; (1) Avoid hovering with full power in ground effect, except for take-off and transition, due to the increase in power caused by an engine inlet temperature rise when in ground effect; (2) on some helicopters, more torque may be obtained if engine rpm is allowed to drop below 6600 to 6550 when full power is applied, due to the droop characteristics of the engine.

14-8. If the engine does not appear to be producing specification power and torque, allowable hovering ceilings or loads as given in this manual will be decreased. Conservative rules of thumb in this event are to reduce gross weight 200 pounds for each psi of deficient torque—or reduce hovering ceiling 1000 feet for each psi of deficient torque. These increments may be subtracted directly from the maximum take-off gross weights and ceilings, which the pilots determine from the curves and tables given elsewhere, in the manual. The curves and tables are entered normally at the actual or anticipated air temperatures and pressure altitudes of the flight, then the increments in gross weight or altitude are subtracted.

14-9. Take-Off Distance Chart. The take-off distance chart (see figure 14-6) lists minimum take-off distances for various pressure altitudes, air temperatures and gross weights. Take-off distances are given for maximum performance take-off procedures only, as distinguished from normal take-off procedures described in Chapter 3. Maximum performance take-offs result in the minimum take-off distance. Eight sets of charts are given for the **B** and two sets for the **A**, and one set for the **540** rotor system.

14-10. The first set gives take-off distances utilizing the maximum performance hover and level acceleration technique. Engine speed is maintained at 6400 rpm in UH-1A helicopters and 6600 rpm in UH-1B helicopters. If the helicopter can hover out of ground effect, take-off distances and climb-out airspeeds are given as zero. This procedure requires a vertical lift-off and a vertical climb to an altitude above the obstacle before accelerating into forward flight. If the take-off distance is greater than zero, this means the helicopter cannot hover out of ground effect. In these cases, the helicopter takes off vertically to a skid height of two feet above the ground, accelerates, at two feet, to the climb-out airspeed given in the charts, and climbs over the obstacle at that airspeed. If the climb-out airspeed is greater or letss than the value given in the chart, take-off distances will be increased. If the skid height is greater than two feet prior to obtaining climb-out-airspeed, the take-off distances will be greater. If the helicopter cannot hover two feet off the ground, no take-off distances are shown and the gross weight should be decreased if this technique is to be used.

Caution

Under power limited conditions (2 foot hover and full power available) a large nose down attitude is necessary in the acceleration. In the lift loss area prior to translation, the helicopter must be leveled to avoid ground contact with the forward portion of the skids. If ground contact does occur, take-off distances will be greatly increased in addition possible skid damage.

Note

When the take-off distance is zero, the climb-out airspeed is also zero (vertical climb is possible). The climb-out airspeeds given in the UH-1A charts apply only to those conditions where the take-off distance is other than zero. In the UH-1B charts, the accelerating run column is deleted and the climb-out airspeed is given adjacent to each take-off distance.

B 14-11 The second technique involves hovering with the helicopter light on skids and then increasing airspeed and altitude simultaneously. Engine speed is maintained at 6600 rpm. If the helicopter can hover out of ground effect, take-off distances and climb-out airspeed are given as zero. This procedure requires a vertical lift-off and a vertical climb to an altitude above the obstacle before accelerating into forward flight. If the take-off distance is greater than zero, this means the helicopter cannot hover out of ground effect. In these cases, the helicopter is brought to a hover light on skids. As power is applied and the helicopter leaves the ground, hold constant pitch attitude until airspeed starts to register. When this occurs, fine pitch attitude adjustments will be necessary to obtain the desired airspeed. Once airborne, the pilot should allow airspeed and altitude to increase simultaneously until the obstacle is cleared. The airspeed and altitude should then be increased as soon as possible to avoid operation in the restricted area of the height-velocity diagram. If the climb-out is greater or less than the value given in the chart, take-off distances will be increased. If the helicopter cannot hover light on skids, no take-off distances are shown and the gross weight should be decreased if this technique is to be used.

B 14-12. The third technique involves hovering the helicopter at a 15 foot skid height and then increasing airspeed and altitude simultaneously. Engine speed is maintained at 6600 rpm. This technique is primarily for use when carrying external cargo on the sling. When the helicopter can hover out of ground effect, take-off distances and climb-out airspeeds are given as zero in the charts. For these cases, climb vertically until the sling load will clear the obstacle, then proceed into forward flight. When take-off distances are greater than zero, the take-off procedure is as follows: Apply sufficient power to hover with a skid height of 15 feet. Apply power and allow airspeed and altitude to increase simultaneously until the obstacle is cleared. As power is applied, hold a constant pitch attitude until the airspeed starts to register. When this occurs, fine pitch attitude adjustments will be necessary to obtain the desired airspeed. When the obstacle is cleared, the airspeed and altitude should be increased as soon as possible to avoid operation in the restricted area of the height-velocity diagram. If the climb-out airspeed is greater or less than the value given in the chart, take-off distances will be increased. If the helicopter cannot hover at 15 feet, no take-off distances are shown and the gross weight should be decreased if this technique is to be used.

14-13. The last set of charts, with the red border, gives take-off distances utilizing rpm bleed-off. As in the first set of charts, the take-off distance is given as zero when the helicopter can hover out of ground effect. It is when the helicopter cannot hover out of ground effect that use of the bleed-off technique can reduce take-off distances or permit greater load to be carried by experienced pilots. When take-off distances are greater than zero, the take-off procedure is as follows: Apply sufficient power at 6600 engine rpm to maintain aircraft light on the skids. Increase collective pitch to lift the helicopter off the ground and apply forward cyclic control to start forward movement of the aircraft. Accelerate into forward flight, allowing the engine speed to decrease to a minimum of 6400 rpm. When translational lift is attained, increase collective pitch to decrease engine speed to a minimum of 5800 rpm A, 5900 rpm B. Just prior to obtaining climb-out airspeed given in the chart, rotate the aircraft nose up and climb at that airspeed, maintaining 5900 engine rpm. When clear of obstacle, reduce pitch slightly to regain 6600 engine rpm. If the climb-out airspeed is greater or less than the chart value, take-off distance will be increased. If the helicopter has insufficient power to hover light on the skids, no take-off distances are shown and gross weight should be decreased.

Warning

> The procedure for maximum performance bleed-off take-off requires precise application and timing with respect to rpm control and obtaining climb-out airspeed.

14-14. When take-off distances are greater than zero, the take-off procedure is as follows: Apply sufficient power at 6600 engine rpm to maintain aircraft light on the skids. Increase collective pitch to lift the helicopter off the ground and apply forward cyclic control to start forward movement of the aircraft. Accelerate into forward flight, allowing the engine speed to decrease to a minimum of 6400 rpm. When translational lift is attained, increase collective pitch to decrease engine speed to a minimum of 5800 rpm A, 5900 B. Just prior to obtaining climb-out airspeed given in the chart, rotate the aircraft nose up and climb at that airspeed, maintaining 5900 engine rpm. When clear of obstacle, reduce pitch slightly to regain 6600 engine rpm. If the climb-out airspeed is greater or less than the chart value, take-off distance will be increased. If the helicopter has insufficient power to hover light on the skids, no take-off distances are shown and gross weight should be decreased.

B 14-15. Take-Off Gross Weight Limitation. The take-off gross weight limitation curve (see figure 14-7) is used in determining maximum take-off gross weight as limited by vertical climb performance. Maximum take-off gross weights are given as a function of pressure altitude, outside air temperature and the desired vertical rate of climb. Engine speed is 6600 pm and take-off power is used. The take-off gross weight which, for a given altitude and temperature, results in a 100 foot per minute vertical rate of climb is the overload limit. The gross weight, altitude and temperature which results in a 300 foot per minute rate of climb is the normal limit.

14-16. Hovering Chart. The hovering charts (see figures 14-8 and 14-9) provide information to determine the maximum gross weights at which the helicopter can hover. The first charts are for hovering out-of-ground effect at various pressure altitudes, temperatures, and wind velocities. The last charts are for hovering in-ground effect at a skid height of two feet. Both sets of charts supplement the take-off distance charts. The charts provided for each condition are for operation at 6400 rpm **A**, 6600 rpm **B**. **A** Exceeding the operating conditions shown at 6400 rpm may result in rotor stall and possible loss of control. **B** The UH-1B is not rotor stall limited at any of the conditions shown on the charts.

14-17. Charts for hovering out-of-ground effect are shown for both take-off and normal rated power. The charts for normal rated power should be used if prolonged hovering is to be accomplished. Chart for hovering in-ground effect are shown for take-off power only but for both a normal 2°C inlet temperature and for 10°C inlet temperature rise. For short periods of hovering in-ground effect (less than one minute) the 2° temperature rise chart should be used. For longer periods the 10° temperature chart should be used since for prolonged periods of hovering in-ground effect the inlet temperature rises due to recirculation of the air into the engine inlet.

14-18. The known conditions necessary to use the out-of-ground effect, take-off power chart velocity. This chart contains two graphs, both are pressure altitude, temperature and wind of which are used to determine the operating capabilities of the helicopter. The top graph contains the pressure altitude scale and temperature gradient curves which are used for the initial entrance into the chart for problem solution. The bottom graphs contain a vertical scale for headwind in knots and flow curves, to be followed before the drop to the gross weight scale at the bottom of the graph. The normal rated power and in-ground effect charts are identical except that the wind velocity curves are deleted.

14-19. The following problem and example is for use with the Hovering Out-Of-Ground effect chaft with normal rated power, and UH-1A helicopters; however, the procedure to obtain the gross weight operating limits is applicable for both charts and for UH-1B helicopters.

PROBLEM	CLIMATIC CONDITION
Normal Rated Power	
Pressure Altitude	8000 feet
Temperature	15°C (59°F)
Head Wind	10 knots

14-20. ***Example:*** Enter the upper chart at 8000 feet pressure altitude and move to the right to intersect the 15°C temperature curve. From this point drop vertically to the wind chart. Follow the flow curve on the wind scale to the 10 knot wind line. Drop vertically from the 10 knot point to the weight scale and read 6250 pounds maximum hovering weight for the existing conditions with 6600 engine rpm.

14-21. Climb Chart. The climb chart (see figure 14-10) data includes rate of climb, distance, time and fuel used to climb to altitude. The figures stated are for normal power performance, based upon the use of optimum climbing speed schedules shown. Use of climbing speeds other than shown on the climb chart will result in a reduced rate of climb and increased fuel and time consumed at all altitudes. On warm days, rates of climb will be less than the chart values.

Note

The following example is for use with the Climb Chart for UH-1A helicopters and is typical for the use of UH-1B charts.

14-22. ***Example:*** Determine the time to climb to 6000 feet and the fuel used for a gross weight of 6100 pounds. At the top of the chart, find 6100 pounds gross weight and in the center column locate 6000 feet altitude. By reading horizontally on the chart at this altitude, the following are obtained. The best climbing speed is 55 knots, fuel consumed to climb from sea level is 55.5 pounds, which includes 21.3 pounds required for warm-up and take-off, time required during climb is 3.43 minutes, the distance traveled is 3.34 nautical miles and the rate of climb at 6000 feet is 1534 feet per minute.

14-23. Range Chart. The range chart (see figure 14-11) shows the range capacities for various power conditions and fuel allowance. This chart may be used for inflight and preflight planning. The initial conditions are gross weight, actual pressure altitude of the helicopter and fuel quantity.

Note

$$\text{Ferry Mission Range} = \frac{\text{Range for 1000 lb. Fuel x Fuel Avail.}}{1000}$$

14-24. The chart is divided into four main sections, gross weight, pressure altitude, power settings and range in nautical miles for various fuel quantities as listed above fuel columns. Fuel allowances must be made for various contingencies such as take-off, climb, wind and landing conditions. All data in the range chart is for standard day conditions (i.e., 15°C at sea level). On days when free air temperature is other than standard, range performances will be slightly different from values given.

Note

Cargo mirror should be removed and stowed in the fuselage unless external sling load is being carried. Cargo mirror installation will reduce range by eight percent.

14-25. To use the range chart, refer to the chart for the appropriate cruise condition. Enter the chart at gross weight and altitude, read the approximate fuel consumption and airspeed. Read range under the fuel quantity for the desired flight condition. At any time before or during the flight, the pilot may refer to the chart with actual conditions of weight, altitude and fuel to obtain range remaining.

Note

The following example is for use with the Range Chart for UH-1A helicopters, and is typical for the use of UH-1B charts.

14-26. ***Example:*** The helicopter is to fly at 2000 feet altitude with take-off gross weight of 5300 pounds.

a. It is desired to have 80 pounds of fuel in reserve and from the climb chart (see figure 14-10) it is found that approximately 30.0 pounds of fuel are required for warm-up and climb to 2000 feet altitude from sea level. Adding 80 pounds reserve and 30 pounds for climb and subtracting the total from the total fuel load of 812.5 pounds gives a fuel balance for cruise of 702.5 pounds.

b. Enter the range chart at 5300 pounds, and 2000 feet altitude, and a fuel quantity of 700 pounds.

c. Read 138.7 nautical miles range in a no-wind condition.

14-27. Maximum Endurance Chart. The maximum endurance chart (see figure 14-12) shows the maximum available flight time with various gross weight conditions at sea level and at altitudes. All data in the chart is for standard day conditions (i.e., 15°C at sea level).

Note

The following example is for use with the Maximum Endurance Chart for UH-1A helicopters and is typical for use of UH-1B charts.

14-28. ***Example:*** The helicopter is to fly at 2000 feet altitude with a take-off gross weight of 5800 pounds and a fuel load of 812.5 pounds. It is desired to have 80 pounds of fuel in reserve. From the climb chart (see figure 14-10), it is found that approximately 31.3 pounds of fuel are required for warm-up, take-off and climb to 2000 feet altitude from sea level. Subtracting desired fuel reserve and fuel required for climb from total fuel load gives a fuel balance for cruise of 701.2 pounds.

14-29. Enter the maximum endurance chart at 5800 pounds gross weight, 2000 feet pressure altitude and a fuel quantity of 7000 pounds, read a maximum endurance of 1.71 hours, with an engine rpm of 6400. Under these conditions, the rate of fuel consumption is 411 pounds per hour at 56 knots TAS.

14-30. Hovering Endurance Chart. The hovering endurance chart (see figure 14-13), shows the maximum endurance possible while hovering with various gross weight conditions at sea level and at altitude. All chart data is for standard day conditions; therefore, when the free air temperature is other than standard (i.e., 15°C at sea level) hovering endurance performance will be slightly different from that shown on the chart.

Note

The following example is for use with the Hovering Endurance Chart for UH-1A helictopters and is typical for the use of charts.

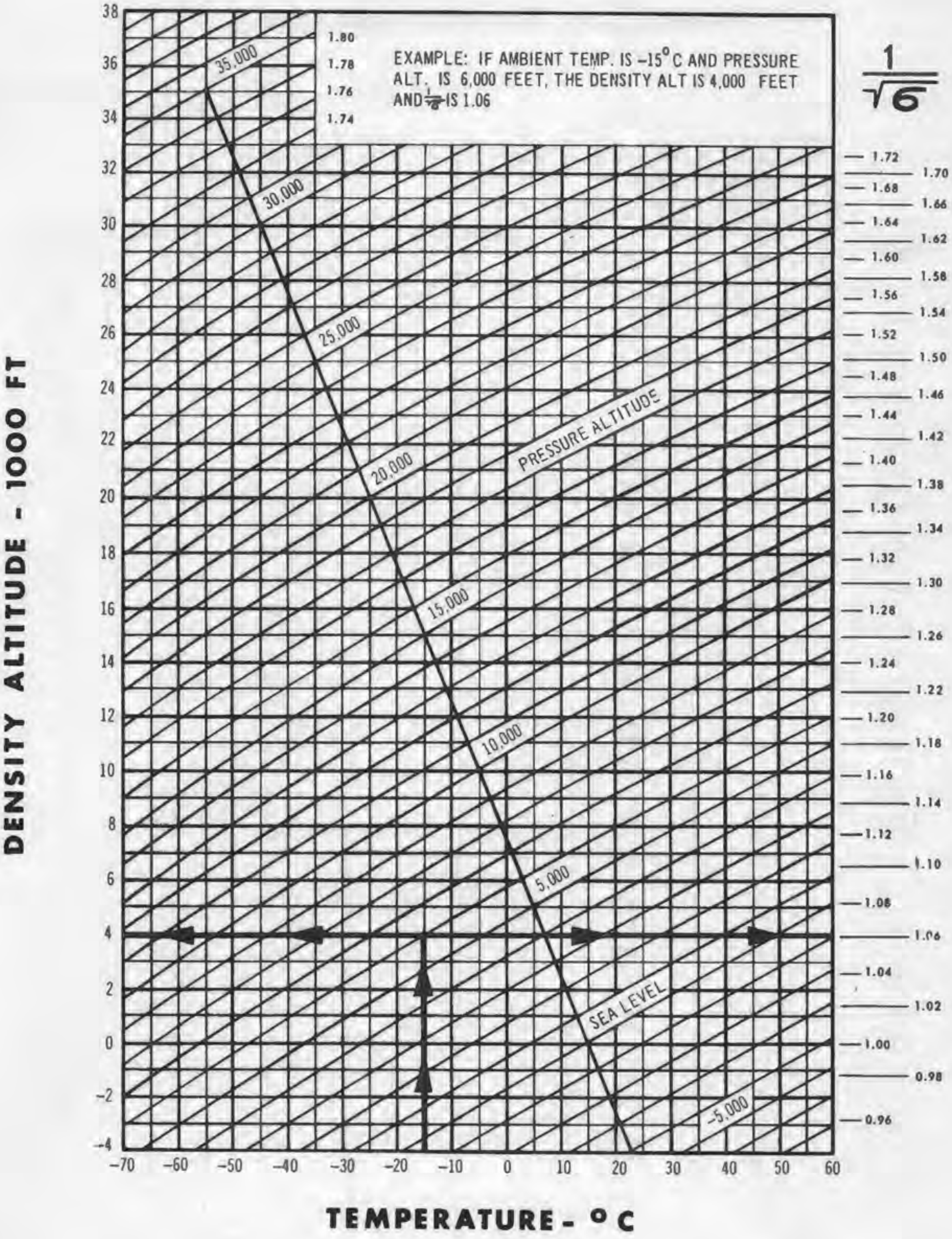
14-31. ***Example:*** The helicopter is to hover at 2000 feet altitude with a take-off gross weight of 5800 pounds with an alloted 600 pounds of fuel to be used. Entering the hovering endurance chart at 5800 pounds gross weight, 2000 feet pressure altitude and a fuel quantity of 600 pounds. Read hovering endurance of 1.10 hours with an engine rpm of 6400. Under these conditions the engine will be using 544 pounds of fuel an hour.

14-32. Landing Distance Chart. Two landing distance charts are furnished. Both sets of charts give minimum possible landing distances. The power-on chart (see figure 14-14) shows minimum landing distances over at 50 foot obstacle with power on. The landing distances are less than those required if the normal operating procedures in Chapter 3 are followed. Whenever the helicopter can hover out-of-ground effect, landing distances are given as zero. Corresponding approach speeds over the 50 foot obstacle are also zero. When the helicopter can hover in-ground effect, landing distance will be other than zero. When the helicopter cannot hover in-ground effect, a ground run distance is included in the distance to clear a 50 foot obstacle. A note is added to the power-on charts that a safer, more normal approach and landing will result if the power-off landing distance in figue 14-15 are used. The power-off chart (see figure 14-15) shows helicopter requirements where autorotational landing technique is used as recommended in Chapter 4. Both charts list landing distances for various pressure altitudes, air temperatures and gross weights. Greater landing distances are required at higher altitudes, on warm, humid days and for heavier gross weights.

Note

> The following example is for use with the Power-On Chart for UH-1A helicopters and is typical for the use of UH-1B helicopters.

14-33. ***Example:*** Power-On landing gross weight 5300 pounds, pressure altitude 12,000 feet and outside air temperature plus 15°C (plus 59°F). Select the 5300 pounds gross weight line at 12,000 feet altitude and move horizontally across chart to the plus 15°C temperature column. Note that the best approach speed is 46 knots, zero ground roll is required and 244 feet distance is necessary to clear a 50-foot obstacle.



EXAMPLE: IF AMBIENT TEMP. IS -15°C AND PRESSURE ALT. IS 6,000 FEET, THE DENSITY ALT IS 4,000 FEET AND $\frac{1}{\sqrt{\sigma}}$ IS 1.06

Chart 14–1. Density altitude

STANDARD ATMOSPHERE TABLE

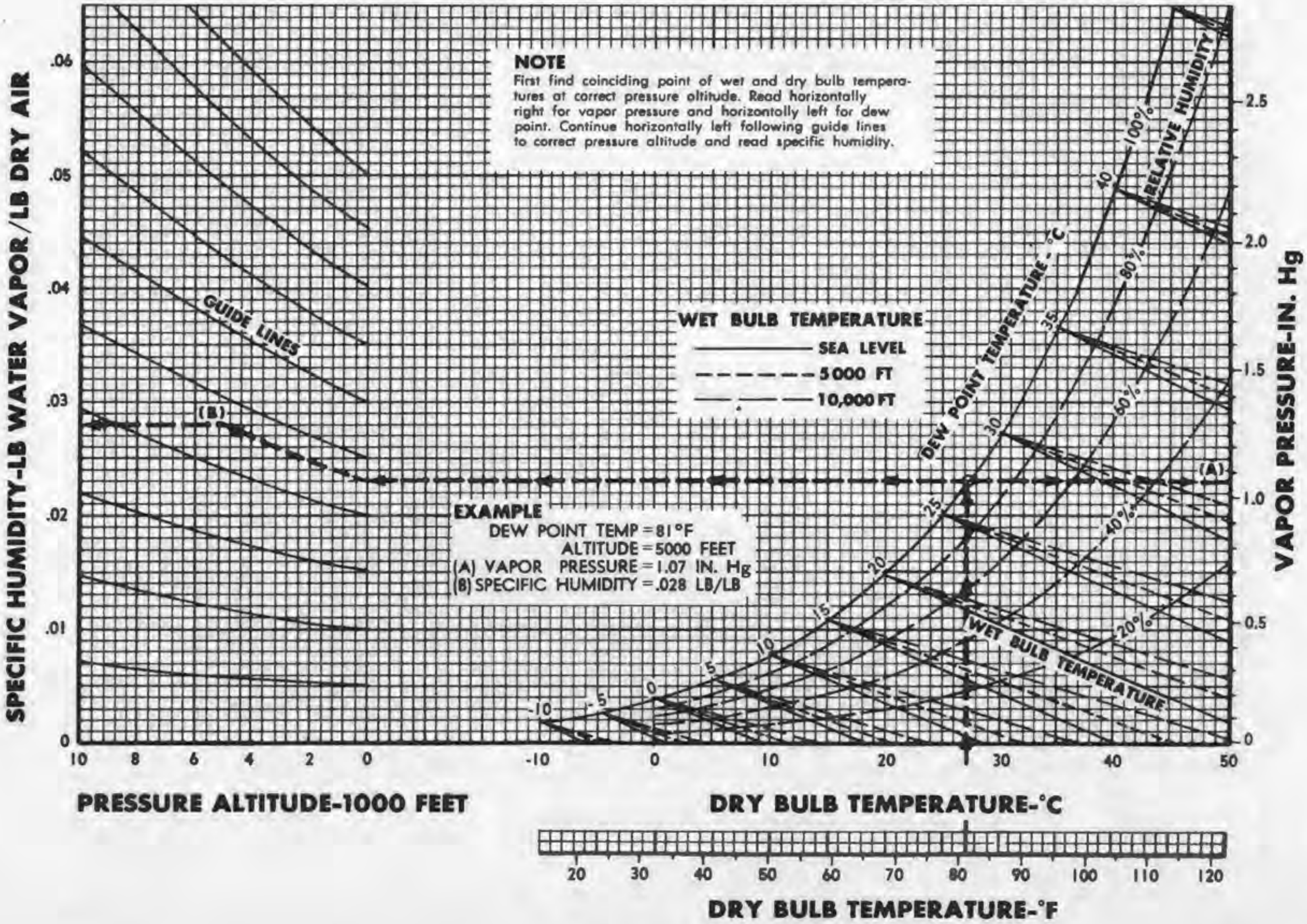
STANDARD S L CONDITIONS:
TEMPERATURE 15°C(59°F)
PRESSURE 29.921 IN. Hg 2116.216 LB/SQ FT
DENSITY .0023769 SLUGS/CU FT
SPEED OF SOUND 1116.89 FT/SEC 661.7 KNOTS

CONVERSION FACTORS:
1 IN. Hg 70.727 LB/SQ FT
1 IN. Hg 0.49116 LB/SQ IN.
1 KNOT 1.151 M.P.H.
1 KNOT 1.688 FT/SEC

ALTITUDE FEET	DENSITY RATIO σ	σ- 1/2 $\frac{1}{\sqrt{\sigma}}$	TEMPERATURE °C	°F	SPEED OF SOUND KNOTS	PRESSURE IN. Hg	PRESSURE RATIO δ
0	1.000	1.0000	15.000	59.000	661.7	29.921	1.0000
1000	.9711	1.0148	13.019	55.434	659.5	28.856	.9644
2000	.9428	1.0299	11.038	51.868	657.2	27.821	.9298
3000	.9151	1.0454	9.056	48.302	654.9	26.817	.8962
4000	.8881	1.0611	7.076	44.735	652.6	25.842	.8637
5000	.8617	1.0773	5.094	41.169	650.3	24.896	.8320
6000	.8359	1.0938	3.113	37.603	648.7	23.978	.8014
7000	.8106	1.1107	1.132	34.037	645.6	23.088	.7716
8000	.7860	1.1279	-0.850	30.471	643.3	22.225	.7428
9000	.7620	1.1456	-2.831	26.905	640.9	21.388	.7148
10,000	.7385	1.1637	-4.812	23.338	638.6	20.577	.6877
11,000	.7155	1.1822	-6.793	19.772	636.2	19.791	.6614
12,000	.6932	1.2011	-8.774	16.206	633.9	19.029	.6360
13,000	.6713	1.2205	-10.756	12.640	631.5	18.292	.6113
14,000	.6500	1.2403	-12.737	9.074	629.0	17.577	.5875
15,000	.6292	1.2606	-14.718	5.508	626.6	16.886	.5643
16,000	.6090	1.2815	-16.699	1.941	624.2	16.216	.5420
17,000	.5892	1.3028	-18.680	-1.625	621.8	15.569	.5203
18,000	.5699	1.3246	-20.662	-5.191	619.4	14.942	.4994
19,000	.5511	1.3470	-22.643	-8.757	617.0	14.336	.4791
20,000	.5328	1.3700	-24.624	-12.323	614.6	13.750	.4595
21,000	.5150	1.3935	-26.605	-15.889	612.1	13.184	.4406
22,000	.4976	1.4176	-28.587	-19.456	609.6	12.636	.4223
23,000	.4806	1.4424	-30.568	-23.022	607.1	12.107	.4046
24,000	.4642	1.4678	-22.549	-26.588	604.6	11.597	.3876
25,000	.4481	1.4938	-34.530	-30.154	602.1	11.103	.3711
26,000	.4325	1.5206	-36.511	-33.720	599.6	10.627	.3552
27,000	.4173	1.5480	-38.492	-37.286	597.1	10.168	.3398
28,000	.4025	1.5762	-40.474	-40.852	594.6	9.725	.3250
29,000	.3881	1.6052	-42.455	-44.419	592.1	9.297	.3107
30,000	.3741	1.6349	-44.436	-47.985	589.5	8.885	.2970
31,000	.3605	1.6654	-46.417	-51.551	586.9	8.488	.2837
32,000	.3473	1.6968	-48.398	-55.117	584.4	8.106	.2709
33,000	.3345	1.7291	-50.379	-58.683	581.8	7.737	.2586
34,000	.3220	1.7623	-52.361	-62.249	579.2	7.382	.2467
35,000	.3099	1.7964	-54.342	-65.816	576.6	7.041	.2353
36,000	.2981	1.8315	-56.323	-69.382	574.0	6.712	.2243
36,089	.2971	1.8347	-56.500	-69.700	573.7	6.683	.2234
37,000	.2843	1.8753				6.397	.2138
38,000	.2710	1.9209				6.097	.2038
39,000	.2583	1.9677				5.811	.1942
40,000	.2462	2.0155				5.538	.1851

Chart 14–2. Standard atmosphere

PSYCHROMETRIC CHART



NOTE
First find coinciding point of wet and dry bulb temperatures at correct pressure altitude. Read horizontally right for vapor pressure and horizontally left for dew point. Continue horizontally left following guide lines to correct pressure altitude and read specific humidity.

EXAMPLE
DEW POINT TEMP = 81°F
ALTITUDE = 5000 FEET
(A) VAPOR PRESSURE = 1.07 IN. Hg
(B) SPECIFIC HUMIDITY = .028 LB/LB

Chart 14–3. Psychrometric

AIRSPEED INSTALLATION CORRECTION TABLE

A

CONFIGURATION CLEAN

ARMY MODEL(S) UH-1A
DATA AS OF: September 1960
DATA BASIS: Addendum I to AFFTC-TR-59-33, UH-1 (H-40) Performance Evaluation, Dated September, 1960

ENGINE: Lycoming T53-L-1A
FUEL GRADE: JP-4
FUEL DENSITY: *6.5 LB/GAL.

Indicated Airspeed	Airspeed Correction Knots	Calibrated Airspeed Knots
20	5.0	25.0
30	4.6	34.6
40	4.1	44.1
50	3.6	53.6
60	3.1	63.1
70	2.6	72.6
80	2.1	82.1
90	1.7	91.7
100	1.2	101.2
110	0.7	110.7
120	0.2	120.2

Chart 14-4. Airspeed installation correction (Sheet 1 of 4)

B-5

AIRSPEED INSTALLATION CORRECTION TABLE

CONFIGURATION CLEAN

ARMY MODEL(S) UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR-62-21 "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

	Indicated Airspeed* (IAS) - Knots	Airspeed Correction Knots	Calibrated Airspeed (CAS) - Knots
Level Flight	20	5	25
	30	5	35
	40	5	45
	50	4	54
	60	4	64
	70	4	74
	80	3	83
	90	2	92
	100	1	101
	110	- 2	108
	120	- 5	115
	130	-10	120
Climb	40	3	43
	50	2	52
	60	1	61
Autorotation	40	11	51
	50	10	60
	60	9	69

Add correction to indicated airspeed* to obtain calibrated airspeed.

* Corrected for instrument error.

Chart 14-4. Airspeed installation correction (Sheet 2 of 4)

B9/11 **B9/11**

AIRSPEED INSTALLATION CORRECTION TABLE

CONFIGURATION CLEAN

ARMY MODEL(S) UH-1B
DATA AS OF: SEPTEMBER 1962
DATA BASIS: FLIGHT TEST (FTC-TDR-62-21 "YUH-1B CATEGORY II PERFORMANCE TESTS")

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

	Indicated Airspeed* (IAS) - Knots	Airspeed Correction Knots	Calibrated Airspeed (CAS) - Knots
Level Flight	20	5	25
	30	5	35
	40	5	45
	50	4	54
	60	4	64
	70	4	74
	80	3	83
	90	2	92
	100	1	101
	110	-2	108
	120	-5	115
	130	-10	120
Climb	40	3	43
	50	2	52
	60	1	61
Autorotation	40	11	51
	50	10	60
	60	9	69

Add correction to indicated airspeed* to obtain calibrated airspeed

*Corrected for Instrument error

Chart 14–4. Airspeed installation correction (Sheet 3 of 4)

AIRSPEED INSTALLATION CORRECTION TABLE 540

CONFIGURATION CLEAN

ARMY MODEL(S) UH-1B (540)
DATA AS OF: JANUARY 1965
DATA BASIS: BELL PERFORMANCE TEST FLIGHTS (BELL NO. 909 FLIGHTS NO. 43-A AND 45-A)

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

	Indicated Airspeed* (IAS)-Kts	Airspeed Correction Kts	Calibrated Airspeed (CAS)-Kts
Level Flight	30	2	32
	40	0	40
	50	-1	49
	60	-2	58
	70	-3	67
	80	-2	78
	90	-2	88
	100	-3	97
	110	-2	108
	120	-2	118
	130	-2	128
	140	-1	139
Climb	40	10	50
	50	7	57
	60	6	66
	70	4	74
Autorotation	40	0	40
	50	-1	49
	60	-1	59
	70	-2	68

Add Correction to Indicated Airspeed* To Obtain Calibrated Airspeed

*Corrected for Instrument Error

Chart 14–4. Airspeed installation correction (Sheet 4 of 4)

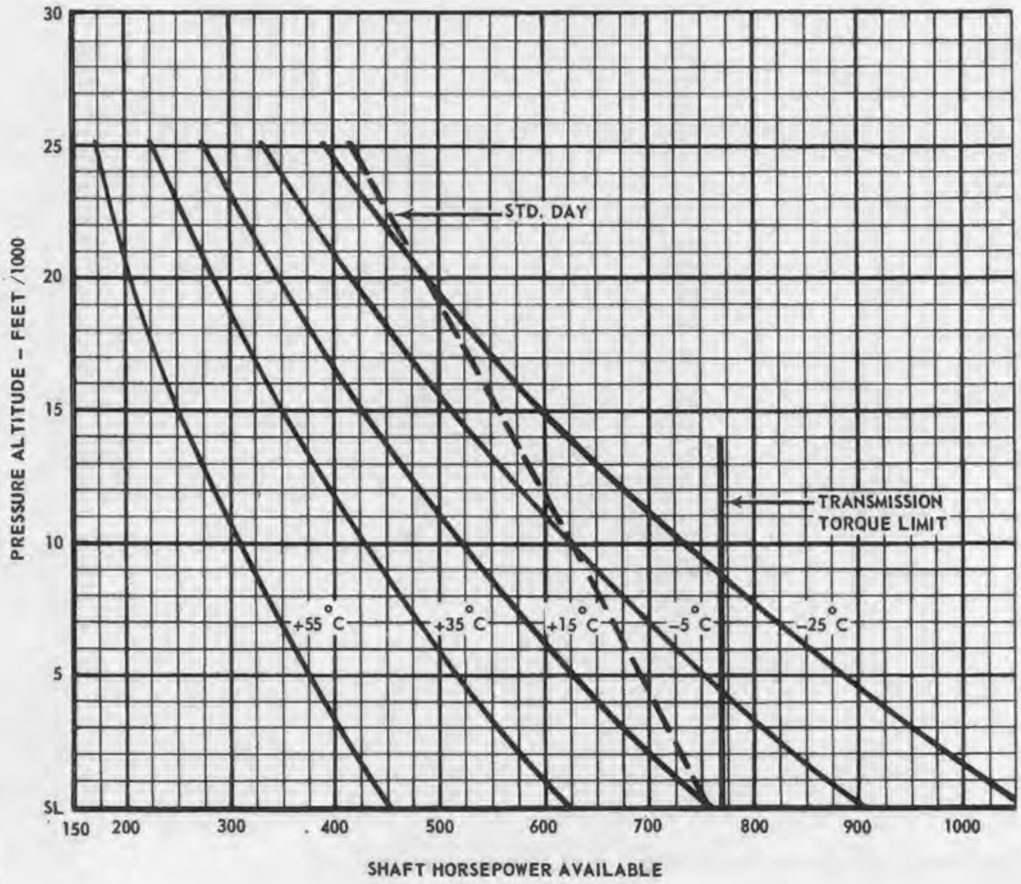
ENGINE OPERATING LIMITS

A

NORMAL RATED POWER

ARMY MODEL(S): UH-1A
DATA AS OF: 1 MARCH 1964
DATA BASIS: FLIGHT TEST

ENGINE: LYCOMING T53-L-1A
ENGINE SPEED: 6400 RPM
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



REMARKS:

Chart 14–5. Engine operating limits (Sheet 1 of 9)

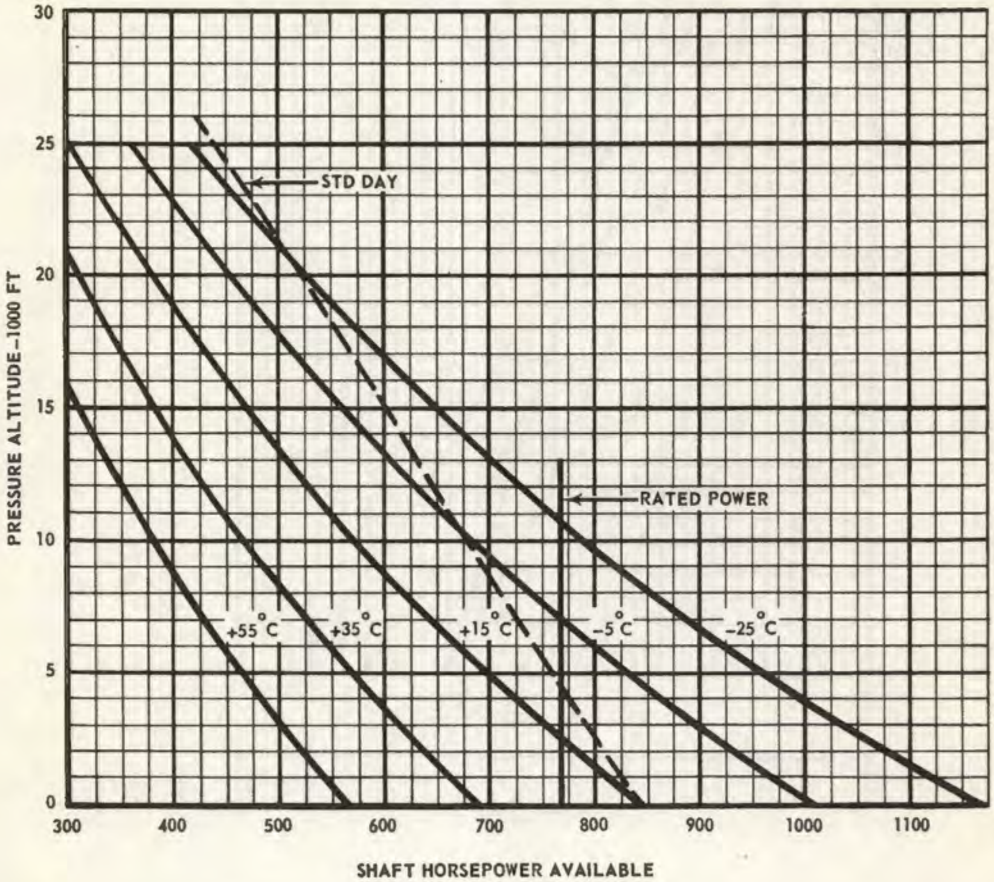
ENGINE OPERATING LIMITS

A

MILITARY RATED POWER

ARMY MODEL(S): UH-1A
DATA AS OF: 1 MARCH, 1964
DATA BASIS: FLIGHT TEST

ENGINE: LYCOMING T53-L-1A
ENGINE SPEED: 6400 RPM
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



REMARKS:

Chart 14–5. Engine operating limits (Sheet 2 of 9)

ENGINE OPERATING LIMITS

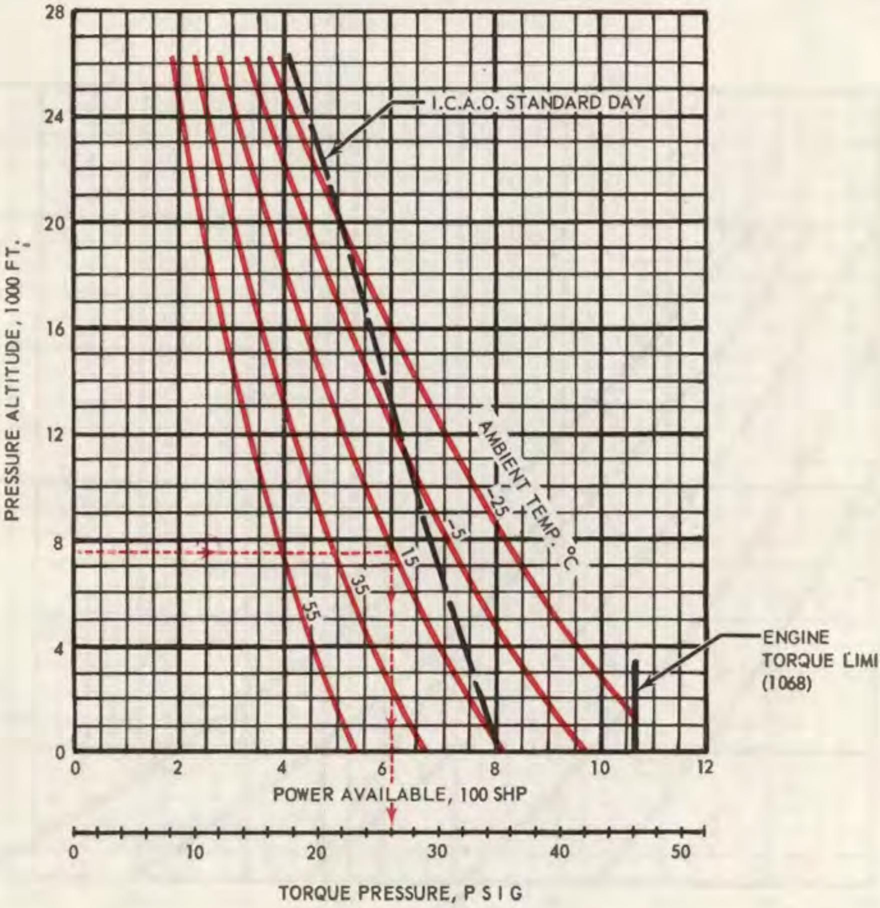
B-5

NORMAL POWER

2°C INLET TEMPERATURE RISE

ARMY MODEL(S): UH-1B
DATA AS OF: September 1962
DATA BASIS: Calculated from Lycoming Engine Specification No. 104.16-B, Dated 10 December 1959

ENGINE: LYCOMING T53-L-5
ENGINE SPEED: 6600 RPM
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lbs/Gal.



REMARKS:

Data does not include ram, and has been corrected for the 2°C inlet temperature rise noted in FTC-TDR-62-21, "YUH-1B Category II Performance Tests". Hovering in ground effect (IGE) other than during transient conditions will reduce power available.

Chart 14–5. Engine operating limits (Sheet 3 of 9)

ENGINE OPERATING LIMITS

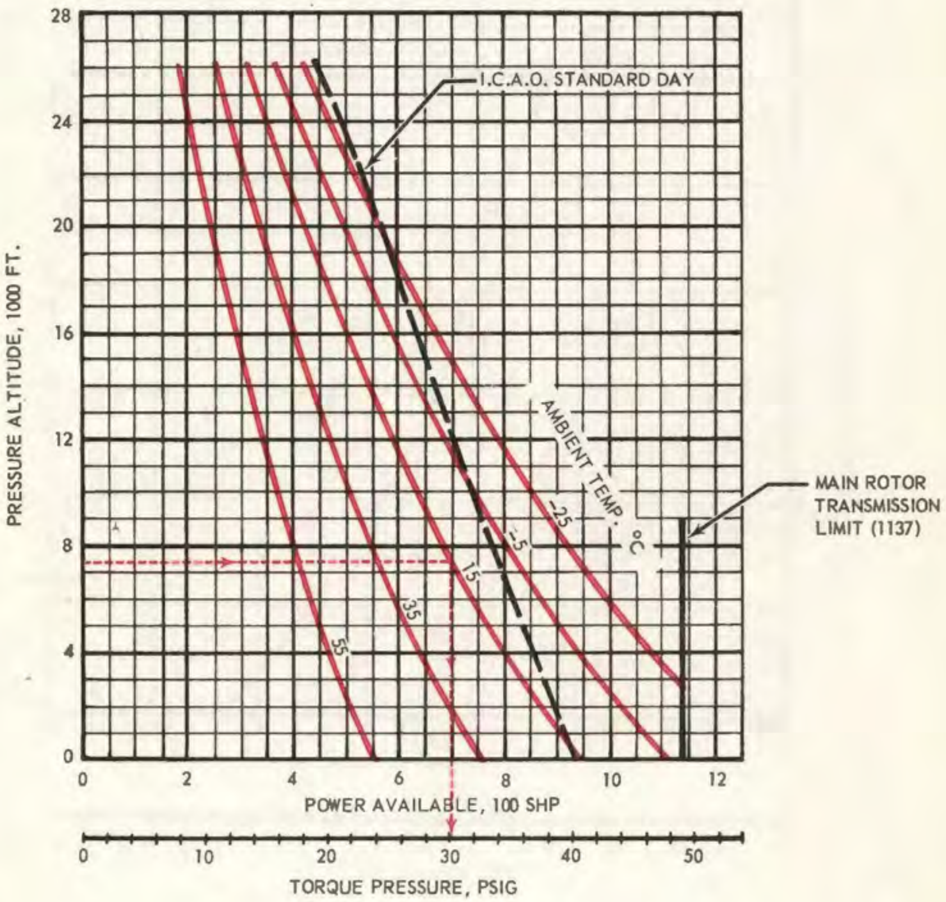
B-5

TAKE-OFF POWER

2°C INLET TEMPERATURE RISE

ARMY MODEL(S): UH-1B
DATA AS OF: September 1962
DATA BASIS: Calculated from Lycoming Engine Specification No. 104.16-B, Dated 10 December 1959

ENGINE: LYCOMING T53-L-5
ENGINE SPEED: 6600 RPM
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lbs/Gal.



REMARKS:

Data does not include ram, and has been corrected for the 2°C inlet temperature rise noted in FTC-TDR-62-21, "YUH-1B category II performance Tests". Hovering in ground effect (IGE) other than during transient conditions will reduce power available.

Chart 14–5. Engine operating limits (Sheet 4 of 9)

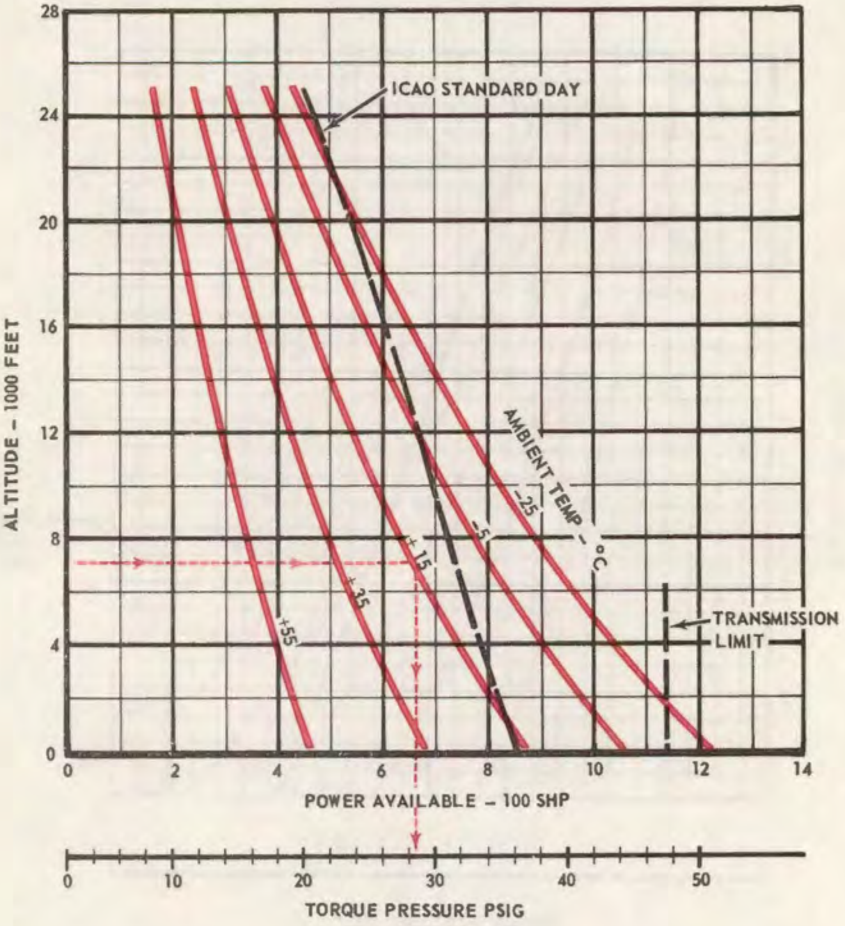
ENGINE OPERATING LIMITS

B-5

TAKE-OFF POWER AVAILABLE
10°C INLET TEMPERATURE RISE

ARMY MODEL(S): UH-1B
DATA AS OF: September 1962
DATA BASIS: Calculated from Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
ENGINE SPEED: 6600 RPM
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lbs/Gal.



REMARKS:

Chart 14–5. Engine operating limits (Sheet 5 of 9)

B9/11

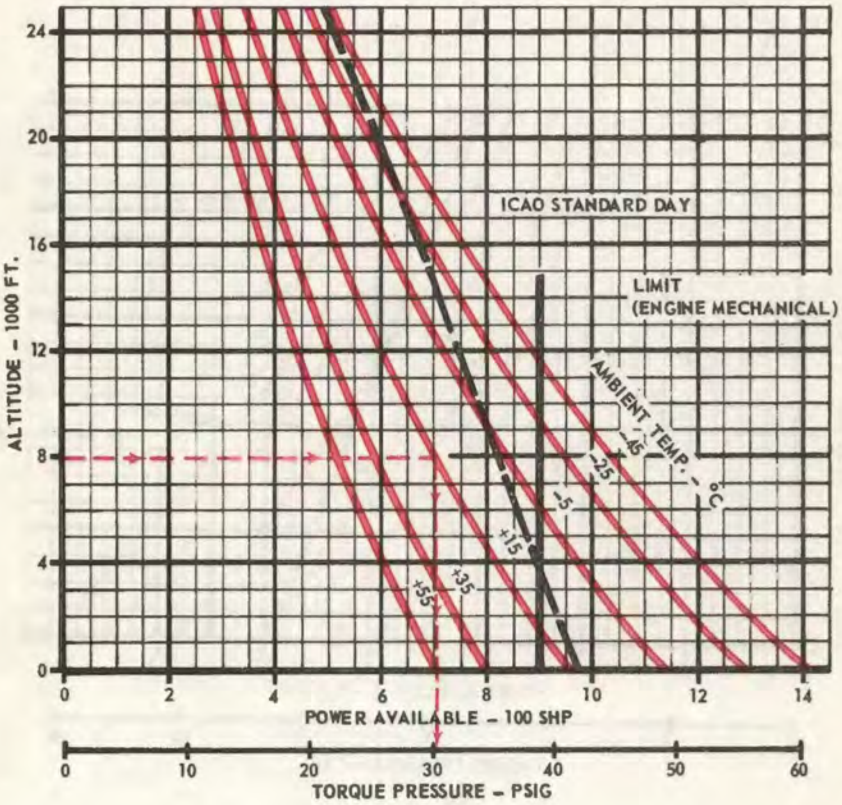
ENGINE OPERATING LIMITS

B9/11

NORMAL POWER AVAILABLE
2°C INLET TEMPERATURE RISE

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER 1962
DATA BASIS: CALCULATED FROM FTC-TDR-62-21 "YUH-1B CATAGORY II PERFORMANCE TESTS" AND LYCOMING ENGINE SPECIFICATION NO. 104.28

ENGINES: T53-L-9/9A/11
ENGINE RPM: 6600
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LBS/GAL.



REMARKS:

Chart 14-5. Engine operating limits (Sheet 6 of 9)

B9/11

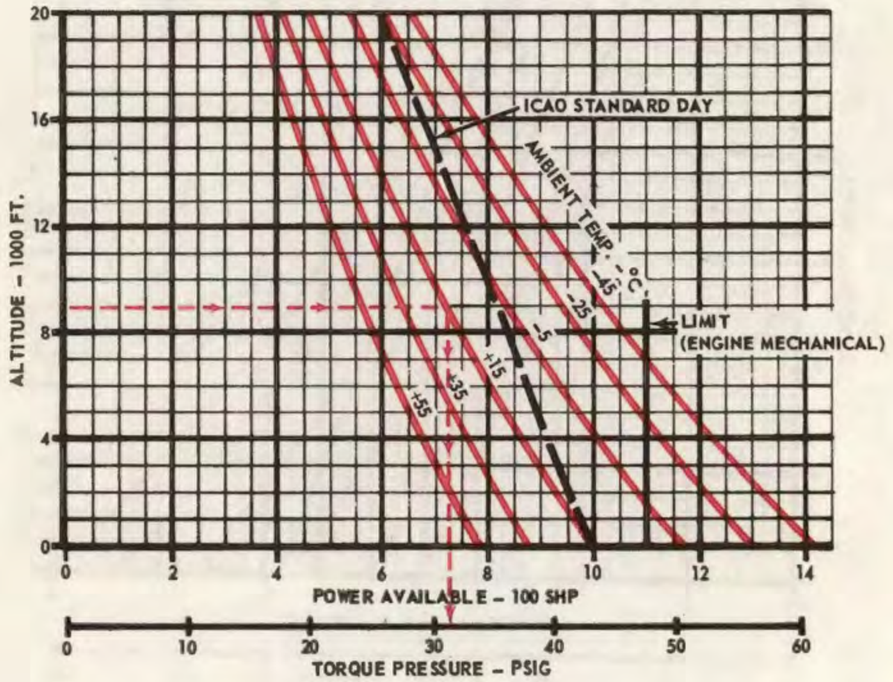
ENGINE OPERATING LIMITS

B9/11

TAKE-OFF POWER AVAILABLE
10°C INLET TEMPERATURE RISE

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER 1962
DATA BASIS: CALCULATED FROM FTC-TDR-62-21 "YUH-1B CATAGORY II PERFORMANCE TESTS" AND LYCOMING ENGINE SPECIFICATION NO. 104.28

ENGINES: T53-L-9/9A/11
ENGINE RPM: 6600
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LBS/GAL.



REMARKS:

Chart 14–5. Engine operating limits (Sheet 7 of 9)

B9/11

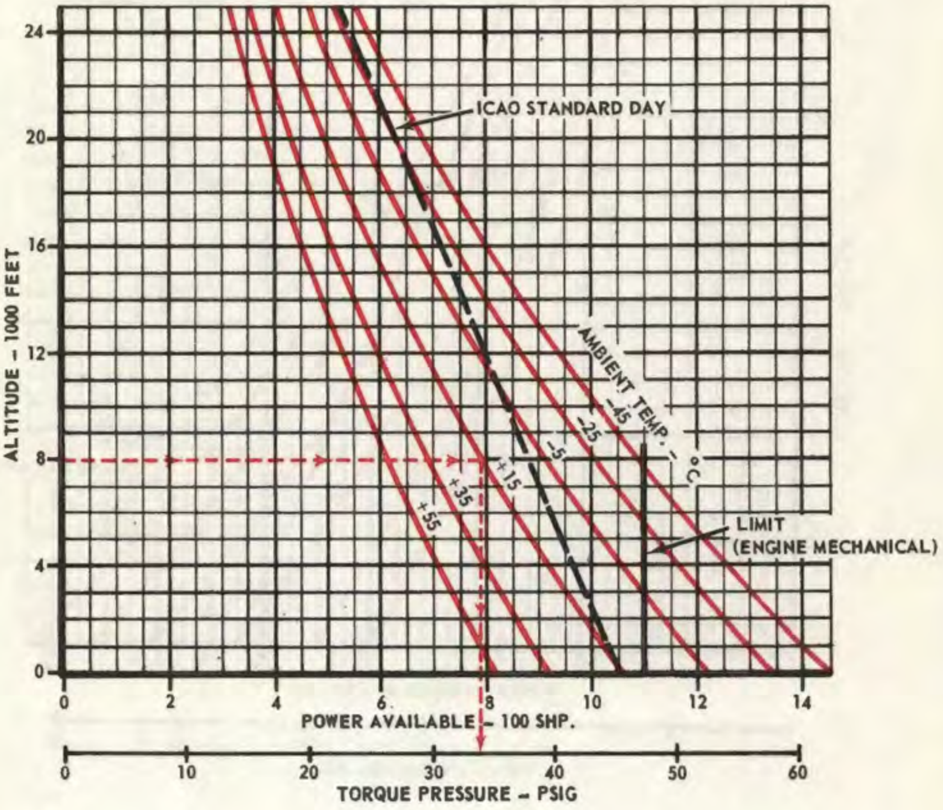
ENGINE OPERATING LIMITS

B9/11

TAKE-OFF POWER AVAILABLE
2°C INLET TEMPERATURE RISE

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER 1962
DATA BASIS: CALCULATED FROM FTC-TDR-62-21 "YHU-1B CATAGORY II PERFORMANCE TESTS" AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINES: T53-L-9/9A/11
ENGINE RPM: 6600
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LBS/GAL.



REMARKS:

Chart 14–5. Engine operating limits (Sheet 8 of 9)

B9/11

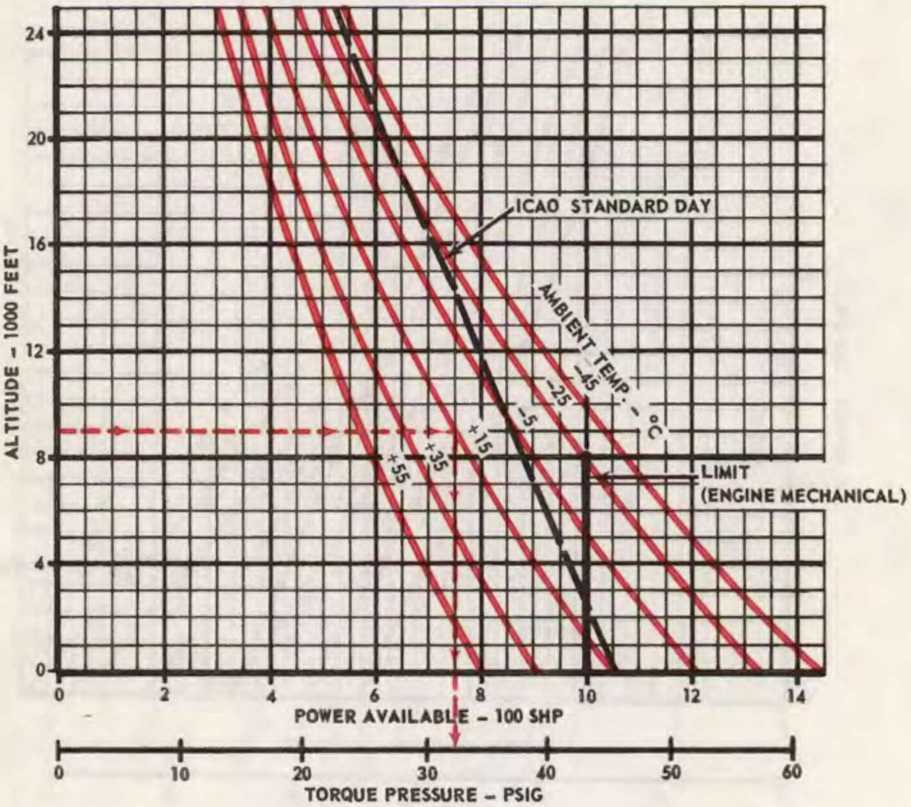
ENGINE OPERATING LIMITS

MILITARY POWER AVAILABLE
2°C INLET TEMPERATURE RISE

B9/11

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER 1962
DATA BASIS: CALCULATED FROM FTC-TDR-62-21 "YUH-1B CATAGORY II PERFORMANCE TESTS" AND LYCOMING ENGINE SPECIFICATION NO. 104.28

ENGINES: T53-L-9/9A/11
ENGINE RPM: 6600
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LBS/GAL.



REMARKS:

Chart 14-5. Engine operating limits (Sheet 9 of 9)

TAKE-OFF DISTANCES — FEET

A

MAXIMUM PERFORMANCE - HOVER TECHNIQUE
FIRM DRY SOD
MAXIMUM POWER - NO WIND
CONFIGURATION: CLEAN
6400 RPM

MODEL(S): UH-1A
DATA AS OF: January 1961
DATA BASIS: AFFTC Phase IV Flight Test of YH-40

ENGINE: Lycoming T53-L-1A
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT LB	CLIMB OUT CAS KTS.	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
			ACCEL-ERATING RUN	CLEAR 50′	ACCEL-ERATING RUN	CLEAR 50′	ACCEL-ERATING RUN	CLEAR 50′	ACCEL-ERATING RUN	CLEAR 50′	ACCEL-ERATING RUN	CLEAR 50′
4300	-	SL	0	0	0	0	0	0	0	0	0	0
	-	2,000	0	0	0	0	0	0	0	0	0	0
	-	4,000	0	0	0	0	0	0	0	0	0	0
	24	6,000	0	0	0	0	0	0	0	0		460
	24	8,000	0	0	0	0	0	0	0	0		710
	22	10,000	0	0	0	0	0	0		370	-	-
	23	12,000	0	0	0	0	0	0		570	-	-
	22	14,000	0	0	0	0		470	-	-	-	-
	-	16,000	0	0	0	0	-	-	-	-	-	-
4800	-	SL	0	0	0	0	0	0	0	0	0	0
	-	2,000	0	0	0	0	0	0	0	0	0	0
	26	4,000	0	0	0	0	0	0	0	0		530
	-	6,000	0	0	0	0	0	0	0	0	-	-
	23	8,000	0	0	0	0	0	0		415	-	-
	-	10,000	0	0	0	0	0	0	-	-	-	-
	-	12,000	0	0	0	0	0	0	-	-	-	-
	23	14,000	0	0	0	0		590	-	-	-	-
	-	16,000	0	0	0	0	-	-	-	-	-	-
5300	-	SL	0	0	0	0	0	0	0	0	0	0
	27	2,000	0	0	0	0	0	0	0	0		585
	-	4,000	0	0	0	0	0	0	0	0	-	-
	25	6,000	0	0	0	0	0	0		470	-	-
	-	8,000	0	0	0	0	0	0	-	-	-	-
	23	10,000	0	0	0	0		385	-	-	-	-
	-	12,000	0	0	0	0	-	-	-	-	-	-
	21	14,000	0	0		370	-	-	-	-	-	-
	-	16,000	0	0	-	-	-	-	-	-	-	-

REMARKS:
1. No take-off distance is shown where 300 ft/min rate of climb is not possible or where hovering in ground effect (Skid height = 2.0 ft) is not possible.
2. No accelerating run distances are shown, since the take-off distances are based on flight test and no accelerating run distances were determined.

Chart 14–6. Take-off distance (Sheet 1 of 42)

TAKE-OFF DISTANCES — FEET

A

MAXIMUM PERFORMANCE - HOVER TECHNIQUE
FIRM DRY SOD
MAXIMUM POWER - NO WIND
CONFIGURATION: CLEAN
6400 RPM

MODEL(S): UH-1A
DATA AS OF: January 1961
DATA BASIS: AFFTC Phase IV
Flight Test of YH-40

ENGINE: Lycoming T53-L-1A
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT LB	CLIMB OUT CAS KTS.	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
			ACCELERATING RUN	CLEAR 50′	ACCELERATING RUN	CLEAR 50′	ACCELERATING RUN	CLEAR 50′	ACCELERATING RUN	CLEAR 50′	ACCELERATING RUN	CLEAR 50′
5800	28	SL	0	0	0	0	0	0	0	0		630
	-	2,000	0	0	0	0	0	0	0	0	-	-
	26	4,000	0	0	0	0	0	0		515	-	-
	-	6,000	0	0	0	0	0	0	-	-	-	-
	24	8,000	0	0	0	0		415	-	-	-	-
	-	10,000	0	0	0	0	-	-	-	-	-	-
	23	12,000	0	0		410	-	-	-	-	-	-
	-	14,000	0	0	-	-	-	-	-	-	-	-
	24	16,000		670	-	-	-	-	-	-	-	-
6100	-	SL	0	0	0	0	0	0	0	0	-	-
	26	2,000	0	0	0	0	0	0		430	-	-
	-	4,000	0	0	0	0	0	0	-	-	-	-
	23	6,000	0	0	0	0		345	-	-	-	-
	26	8,000	0	0	0	0		615	-	-	-	-
	21	10,000	0	0		325	-	-	-	-	-	-
	25	12,000	0	0		760	-	-	-	-	-	-
	24	14,000		460	-	-	-	-	-	-	-	-
6600	28	SL	0	0	0	0	0	0		440	-	-
	-	2,000	0	0	0	0	0	0	-	-	-	-
	24	4,000	0	0	0	0	-	350	-	-	-	-
	27	6,000	0	0	0	0		630	-	-	-	-
	22	8,000	0	0		325	-	-	-	-	-	-
	26	10,000	0	0		760	-	-	-	-	-	-
	25	12,000		460	-	-	-	-	-	-	-	-
	-	14,000	-	-	-	-	-	-	-	-	-	-
	-	16,000	-	-	-	-	-	-	-	-	-	-

REMARKS:
1. No take-off distance is shown where 300 ft/min rate of climb is not possible or where hovering in ground effect (skid height = 2.0 ft) is not possible.
2. No accelerating run distances are shown, since the take-off distances are based on flight test and no accelerating run distances were determined.

Chart 14–6. Take-off distance (Sheet 2 of 42)

TAKE-OFF DISTANCES — FEET

A

MAXIMUM PERFORMANCE - HOVER TECHNIQUE
FIRM DRY SOD
MAXIMUM POWER - NO WIND
CONFIGURATION: CLEAN
6400 RPM

MODEL(S): UH-1A
DATA AS OF: January 1961
DATA BASIS: AFFTC Phase IV
Flight Test of YH-40

ENGINE: Lycoming T53-L-1A
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT LB	CLIMB OUT CAS KTS.	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
			ACCEL-ERATING RUN	CLEAR 50′	ACCEL-ERATING RUN	CLEAR 50′	ACCEL-ERATING RUN	CLEAR 50′	ACCEL-ERATING RUN	CLEAR 50′	ACCEL-ERATING RUN	CLEAR 50′
7200	27	SL	0	0	0	0		370		880	-	-
	27	2,000	0	0		380		390	-	-	-	-
	27	4,000		380		395		710	-	-	-	-
	27	6,000		395		405	-	-	-	-	-	-
	27	8,000		440	-	-	-	-	-	-	-	-
	27	10,000		585	-	-	-	-	-	-	-	-
	-	12,000	-	-	-	-	-	-	-	-	-	-
	-	14,000	-	-	-	-	-	-	-	-	-	-
	-	16,000	-	-	-	-	-	-	-	-	-	-

REMARKS:
1. No take-off distance is shown where 300 ft/min rate of climb is not possible or where hovering in ground effect (skid height = 2.0 ft) is not possible.
2. No accelerating run distances are shown, since the take-off distances are based on flight test and no accelerating run distances were determined.

Chart 14–6. Take-off distance (Sheet 3 of 42)

TAKE-OFF DISTANCES — FEET

A

MAXIMUM PERFORMANCE - BLEED-OFF TECHNIQUE - LIGHT ON SKIDS

TAKE-OFF POWER - ENGINE SPEED MAXIMUM 6600 RPM, MINIMUM 5800

MODEL(S): UH-1A
DATA AS OF: January 1961
DATA BASIS: AFFTC Phase IV
Flight Test of YH-40

Lycoming
ENGINE: T53-L-1A
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT LB	CLIMB OUT CAS KTS.	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
			ACCEL-ERATING RUN	CLEAR 50′	ACCEL-ERATING RUN	CLEAR 50′	ACCEL-ERATING RUN	CLEAR 50′	ACCEL-ERATING RUN	CLEAR 50′	ACCEL-ERATING RUN	CLEAR 50′
4300	-	SL	0	0	0	0	0	0	0	0	0	0
	-	2,000	0	0	0	0	0	0	0	0	0	0
	-	4,000	0	0	0	0	0	0	0	0	0	0
	19	6,000	0	0	0	0	0	0	0	0		375
	28	8,000	0	0	0	0	0	0	0	0		965
	12	10,000	0	0	0	0	0	0		110	-	-
	22	12,000	0	0	0	0	0	0		660	-	-
	18	14,000	0	0	0	0		420		445	-	-
	-	16,000	0	0	0	0	-	-	-	-	-	-
4800	-	SL	0	0	0	0	0	0	0	0	0	0
	-	2,000	0	0	0	0	0	0	0	0	0	0
	24	4,000	0	0	0	0	0	0	0	0		580
	-	6,000	0	0	0	0	0	0	0	0	-	-
	18	8,000	0	0	0	0	0	0		250	-	-
	-	10,000	0	0	0	0	0	0	-	-	-	-
	-	12,000	0	0	0	0	0	0	-	-	-	-
	23	14,000	0	0	0	0		710	-	-	-	-
	-	16,000	0	0	0	0	-	-	-	-	-	-
5300	-	SL	0	0	0	0	0	0	0	0	0	0
	27	2,000	0	0	0	0	0	0	0	0		710
	-	4,000	0	0	0	0	0	0	0	0	-	-
	-	6,000	0	0	0	0	0	0	0	0	-	-
	-	8,000	0	0	0	0	0	0	-	-	-	-
	12	10,000	0	0	0	0	-	120	-	-	-	-
	-	12,000	0	0	0	0	-	-	-	-	-	-
	12	14,000	0	0		110	-	-	-	-	-	-
	-	16,000	0	0	-	-	-	-	-	-	-	-

REMARKS:

1. No take-off distance is shown where 300 ft/min rate of climb is not possible or where hovering in ground effect (skid height = 2.0 ft) is not possible.
2. No accelerating run distances are shown, since the take-off distances are based on flight test and no accelerating run distances were determined.

Chart 14–6. Take-off distance (Sheet 4 of 42)

TAKE-OFF DISTANCES — FEET

A

MAXIMUM PERFORMANCE - BLEED-OFF TECHNIQUE - LIGHT ON SKIDS

TAKE-OFF POWER - ENGINE SPEED MAXIMUM 6600 RPM, MINIMUM 5800

MODEL(S): UH-1A
DATA AS OF: January 1961
DATA BASIS: AFFTC Phase IV
Flight Test of YH-40

ENGINE: Lycoming T53-L-1A
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT LB	CLIMB OUT CAS KTS.	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
			ACCEL-ERATING RUN	CLEAR 50′	ACCEL-ERATING RUN	CLEAR 50′	ACCEL-ERATING RUN	CLEAR 50′	ACCEL-ERATING RUN	CLEAR 50′	ACCEL-ERATING RUN	CLEAR 50′
5800	30	SL	0	0	0	0	0	0	0	0		800
	-	2,000	0	0	0	0	0	0	0	0		-
	23	4,000	0	0	0	0	0	0		530	-	-
	-	6,000	0	0	0	0	0	0	-		-	-
	17	8,000	0	0	0	0		230	-	-	-	-
	-	10,000	0	0	0	0	-	-	-	-	-	-
	16	12,000	0	0		205	-	-	-	-	-	-
	-	14,000	0	0	-	-	-	-	-	-	-	-
	26	16,000		870	-	-	-	-	-	-	-	-
6100	21	SL	0	0	0	0	0	0	0	0	-	-
	20	2,000	0	0	0	0	0	0		275	-	-
	-	4,000	0	0	0	0	0	0	-	-	-	-
	12	6,000	0	0	0	0		80	-		-	-
	28	8,000	0	0	0	0		770	-	-	-	-
	9	10,000	0	0		55	-	-	-	-	-	-
	30	12,000	0	0		1020	-	-	-	-	-	-
	19	14,000		375	-	-	-	-	-	-	-	-
		16,000	-	-	-	-	-	-	-	-	-	-
6600	21	SL	0	0	0	0	0	0		300	-	-
	-	2,000	0	0	0	0	0	0	-		-	-
	12	4,000	0	0	0	0		90	-		-	-
	29	6,000	0	0	0	0		800	-	-	-	-
	10	8,000	0	0		55	-	-	-	-	-	-
	31	10,000	0	0		1020	-	-	-	-	-	-
	20	12,000		375	-	-	-	-	-	-	-	-
	-	14,000	-	-	-	-	-	-	-	-	-	-
	-	16,000	-	-	-	-	-	-	-	-	-	-

REMARKS:
1. No take-off distance is shown where 300 ft/min rate of climb is not possible or where hovering in ground effect (skid height = 2.0 ft) is not possible.
2. No accelerating run distances are shown, since the take-off distances are based on accelerating run distances were determined.

Chart 14–6. Take-off distance (Sheet 5 of 42)

TAKE-OFF DISTANCES — FEET

A

MAXIMUM PERFORMANCE - BLEED-OFF TECHNIQUE - LIGHT ON SKIDS

TAKE-OFF POWER - ENGINE SPEED MAXIMUM 6600 RPM, MINIMUM 5800

MODEL(S): UH-1A
DATA AS OF: January 1961
DATA BASIS: AFFTC Phase IV
Flight Test of YH-40

ENGINE: Lycoming T53-L-1A
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT LB	CLIMB OUT CAS KTS.	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
			ACCEL-ERATING RUN	CLEAR 50′	ACCEL-ERATING RUN	CLEAR 50′	ACCEL-ERATING RUN	CLEAR 50′	ACCEL-ERATING RUN	CLEAR 50′	ACCEL-ERATING RUN	CLEAR 50′
7200	18	SL	0	0	0	0		110	-	-	-	-
	15	2,000	0	0	0	115		120	-	-	-	-
	15	4,000		115		130		970	-	-	-	-
	16	6,000		130		180	-	-	-	-	-	-
	20	8,000		305	-	-	-	-	-	-	-	-
	27	10,000		680	-	-	-	-	-	-	-	-
	-	12,000	-	-	-	-	-	-	-	-	-	-
	-	14,000	-	-	-	-	-	-	-	-	-	-
	-	16,000	-	-	-	-	-	-	-	-	-	-

REMARKS:

1. No take-off distance is shown where 300 ft/min rate of climb is not possible or where hovering in ground effect (skid height = 2.0 ft) is not possible.
2. No accelerating run distances are shown, since the take-off distances are based on flight test and no accelerating run distances were determined.

Chart 14–6. Take-off distance (Sheet 6 of 42)

B-5

TAKE-OFF DISTANCES — FEET

MAXIMUM PERFORMANCE - TWO FEET SKID HEIGHT HOVERING TECHNIQUE

TAKE-OFF POWER - 6600 RPM

ARMY MODEL(S) UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR-62-21, "YUH-1B Catagory II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
5000	SL	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	-	*
	4	0	0	0	0	0	0	0	0	-	*
	6	0	0	0	0	0	0	0	0	-	-
	8	0	0	0	0	0	0	20	350	-	-
	10	0	0	0	0	0	0	22	492	-	-
	12	0	0	0	0	0	0	-	-	-	-
	14	0	0	0	0	20	302	-	-	-	-
	16	0	0	0	0	22	480	-	-	-	-
	18	0	0	20	302	-	-	-	-	-	-
	20	20	246	-	-	-	-	-	-	-	-
5500	SL	0	0	0	0	0	0	0	0	-	*
	2	0	0	0	0	0	0	0	0	-	*
	4	0	0	0	0	0	0	0	0	-	-
	6	0	0	0	0	0	0	20	364	-	-
	8	0	0	0	0	0	0	24	564	-	-
	10	0	0	0	0	0	0	-	-	-	-
	12	0	0	0	0	20	329	-	-	-	-
	14	0	0	0	0	25	604	-	-	-	-
	16	0	0	20	319	-	-	-	-	-	-
	18	20	258	-	-	-	-	-	-	-	-
	20	20	430	-	-	-	-	-	-	-	-

REMARKS:

1. No wind.
2. No take-off distance is shown where hovering in ground effect (skid height = 2 foot) is not possible.

*3. Possible to hover in ground effect, but flight test data indicates take-off distance would exceed 1000 feet.

4. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.
5. Take-off distances will exceed those shown if hovering in ground effect is performed for over one minute immediately prior to take-off.
6. Take-off distance is zero when hovering out of ground effect is possible.

Chart 14–6. Take-off distance (Sheet 7 of 42)

B-5

TAKE-OFF DISTANCES — FEET

MAXIMUM PERFORMANCE - TWO FEET SKID HEIGHT HOVERING TECHNIQUE

TAKE-OFF POWER - 6600 RPM

ARMY MODEL(S) UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR-62-21, "YUH-1B Catagory II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
6000	SL	0	0	0	0	0	0	0	0	-	*
	2	0	0	0	0	0	0	0	0	-	-
	4	0	0	0	0	0	0	20	368	-	-
	6	0	0	0	0	0	0	26	650	-	-
	8	0	0	0	0	0	0	-	-	-	-
	10	0	0	0	0	20	343	-	-	-	-
	12	0	0	20	242	-	-	-	-	-	-
	14	0	0	20	338	-	-	-	-	-	-
	16	20	264	-	-	-	-	-	-	-	-
	18	21	443	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-
6500	SL	0	0	0	0	0	0	0	0	-	-
	2	0	0	0	0	0	0	20	368	-	-
	4	0	0	0	0	0	0	25	602	-	-
	6	0	0	0	0	0	0	-	-	-	-
	8	0	0	0	0	20	357	-	-	-	-
	10	0	0	20	250	-	-	-	-	-	-
	12	0	0	20	343	-	-	-	-	-	-
	14	20	263	-	-	-	-	-	-	-	-
	16	21	438	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-

REMARKS:
1. No wind.
2. No take-off distance is shown where hovering in ground effect (skid height = 2 foot) is not possible.
*3. Possible to hover in ground effect, but flight test data indicates take-off distance would exceed 1000 feet.
4. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.
5. Take-off distances will exceed those shown if hovering in ground effect is performed for over one minute immediately prior to take-off.
6. Take-off distance is zero when hovering out of ground effect is possible.

Chart 14-6. Take-off distance (Sheet 8 of 42)

B-5

TAKE-OFF DISTANCES — FEET

MAXIMUM PERFORMANCE - TWO FEET SKID HEIGHT HOVERING TECHNIQUE

TAKE-OFF POWER - 6600 RPM

ARMY MODEL(S) UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR-62-21, "YUH-1B Catagory II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
7000	SL	0	0	0	0	0	0	20	363	-	-
	2	0	0	0	0	0	0	24	558	-	-
	4	0	0	0	0	0	0	-	-	-	-
	6	0	0	0	0	20	348	-	-	-	-
	8	0	0	20	246	-	-	-	-	-	-
	10	0	0	20	346	-	-	-	-	-	-
	12	20	261	-	-	-	-	-	-	-	-
	14	20	404	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-
7500	SL	0	0	0	0	0	0	23	507	-	-
	2	0	0	0	0	0	0	-	-	-	-
	4	0	0	0	0	20	328	-	-	-	-
	6	0	0	20	239	26	640	-	-	-	-
	8	0	0	20	329	-	-	-	-	-	-
	10	20	253	-	-	-	-	-	-	-	-
	12	20	382	-	-	-	-	-	-	-	-
	14	-	-	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-

REMARKS:

1. No wind.
2. No take-off distance is shown where hovering in ground effect (skid height = 2 foot) is not possible.

*3. Possible to hover in ground effect, but flight test data indicates take-off distance would exceed 1000 feet.

4. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicatea airspeed (IAS) below 20 knots may not be reliable.
5. Take-off distances will exceed those shown if hovering in ground effect is performed for over one minute immediately prior to take-off.
6. Take-off distance is zero when hovering out of ground effect is possible.

Chart 14–6. Take-off distance (Sheet 9 of 42)

B-5

TAKE-OFF DISTANCES — FEET

MAXIMUM PERFORMANCE - TWO FEET SKID HEIGHT HOVERING TECHNIQUE

TAKE-OFF POWER - 6600 RPM

ARMY MODEL(S) UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR-62-21, "YUH-1B Catagory II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
8000	SL	0	0	0	0	0	0	-	-	-	-
	2	0	0	0	0	20	308	-	-	-	-
	4	0	0	0	0	23	500	-	-	-	-
	6	0	0	20	311	-	-	-	-	-	-
	8	20	241	20	360	-	-	-	-	-	-
	10	20	347	-	-	-	-	-	-	-	-
	12	-	-	-	-	-	-	-	-	-	-
	14	-	-	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-
8500	SL	0	0	0	0	20	289	-	-	-	-
	2	0	0	0	0	20	424	-	-	-	-
	4	0	0	20	278	-	-	-	-	-	-
	6	20	223	22	466	-	-	-	-	-	-
	8	20	315	-	-	-	-	-	-	-	-
	10	-	-	-	-	-	-	-	-	-	-
	12	-	-	-	-	-	-	-	-	-	-
	14	-	-	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-

REMARKS:

1. No wind.
2. No take-off distance is shown where hovering in ground effect (skid height = 2 foot) is not possible.
3. Possible to hover in ground effect, but flight test data indicates take-off distance would exceed 1000 feet.
4. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.
5. Take-off distances will exceed those shown if hovering in ground effect is performed for over one minute immediately prior to take-off.
6. Take-off distance is zero when hovering out of ground effect is possible.

Chart 14–6. Take-off distance (Sheet 10 of 42)

B-5

TAKE-OFF DISTANCES — FEET

MAXIMUM PERFORMANCE - LIGHT ON SKIDS TECHNIQUE

TAKE-OFF POWER - 6600 RPM

ARMY MODEL(S) UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR-62-21, "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
5000	SL	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	-	*
	4	0	0	0	0	0	0	0	0	-	*
	6	0	0	0	0	0	0	0	0	-	*
	8	0	0	0	0	0	0	30	465	-	-
	10	0	0	0	0	0	0	30	650	-	-
	12	0	0	0	0	0	0	-	*	-	-
	14	0	0	0	0	20	385	-	-	-	-
	16	0	0	0	0	30	630	-	-	-	-
	18	0	0	20	384	-	-	-	-	-	-
	20	20	239	40	811	-	-	-	-	-	-
5500	SL	0	0	0	0	0	0	0	0	-	*
	2	0	0	0	0	0	0	0	0	-	*
	4	0	0	0	0	0	0	0	0	-	*
	6	0	0	0	0	0	0	30	484	-	-
	8	0	0	0	0	0	0	40	754	-	-
	10	0	0	0	0	0	0	-	*	-	-
	12	0	0	0	0	30	434	-	-	-	-
	14	0	0	0	0	40	805	-	-	-	-
	16	0	0	30	422	-	-	-	-	-	-
	18	20	263	-	*	-	-	-	-	-	-
	20	30	567	-	-	-	-	-	-	-	-

REMARKS:

1. No wind.
2. Take-off distance is zero when hovering out-of-ground effect is possible.
3. No take-off distance is shown where hovering light on skids is not possible.
4. Take-off distance will exceed those shown if hovering in-ground-effect is performed for over one minute immediately prior to take-off.
5. Speed over the 50 foot obstacle is true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.

*Possible to hover light on skids but flight test data indicates take-off distance would exceed 1000 feet.

Chart 14–6. Take-off distance (Sheet 11 of 42)

B-5

TAKE-OFF DISTANCES — FEET

MAXIMUM PERFORMANCE - LIGHT ON SKIDS TECHNIQUE

TAKE-OFF POWER - 6600 RPM

ARMY MODEL(S) UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR-62-21, "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
6000	SL	0	0	0	0	0	0	0	0	-	*
	2	0	0	0	0	0	0	0	0	-	-
	4	0	0	0	0	0	0	30	487	-	-
	6	0	0	0	0	0	0	-	*	-	-
	8	0	0	0	0	0	0	-	*	-	-
	10	0	0	0	0	30	452	-	-	-	-
	12	0	0	20	230	-	*	-	-	-	-
	14	0	0	30	448	-	-	-	-	-	-
	16	20	283	-	*	-	-	-	-	-	-
	18	30	580	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-
6500	SL	0	0	0	0	0	0	0	0	-	-
	2	0	0	0	0	0	0	30	487	-	-
	4	0	0	0	0	0	0	40	805	-	-
	6	0	0	0	0	0	0	-	*	-	-
	8	0	0	0	0	30	472	-	-	-	-
	10	0	0	20	249	-	*	-	-	-	-
	12	0	0	30	454	-	-	-	-	-	-
	14	20	277	-	*	-	-	-	-	-	-
	16	30	575	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-

REMARKS:
1. No wind.
2. Take-off distance is zero when hovering out-of-ground effect is possible.
3. No take-off distance is shown where hovering light on skids is not possible.
4. Take-off distance will exceed those shown if hovering in-ground-effect is performed for over one minute immediately prior to take-off.
5. Speed over the 50 foot obstacle is true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.

* Possible to hover light on skids but flight test data indicates take-off distance would exceed 1000 feet.

Chart 14–6. Take-off distance (Sheet 12 of 42)

B-5

TAKE-OFF DISTANCES — FEET

MAXIMUM PERFORMANCE - LIGHT ON SKIDS TECHNIQUE

TAKE-OFF POWER - 6600 RPM

ARMY MODEL(S) UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR-62-21, "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
7000	SL	0	0	0	0	0	0	30	479	-	-
	2	0	0	0	0	0	0	40	750	-	-
	4	0	0	0	0	0	0	-	*	-	-
	6	0	0	0	0	30	458	-	-	-	-
	8	0	0	20	237	-	*	-	-	-	-
	10	0	0	30	459	-	-	-	-	-	-
	12	20	273	-	*	-	-	-	-	-	-
	14	30	535	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-
7500	SL	0	0	0	0	0	0	30	675	-	-
	2	0	0	0	0	0	0	-	*	-	-
	4	0	0	0	0	30	435	-	-	-	-
	6	0	0	20	226	-	*	-	-	-	-
	8	0	0	30	435	-	-	-	-	-	-
	10	20	255	-	*	-	-	-	-	-	-
	12	30	506	-	-	-	-	-	-	-	-
	14	-	-	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-

REMARKS:

1. No wind.
2. Take-off distance is zero when hovering out-of-ground effect is possible.
3. No take-off distance is shown where hovering light on skids is not possible.
4. Take-off distance will exceed those shown if hovering in-ground-effect is performed for over one minute immediately prior to take-off.
5. Speed over the 50 foot obstacle is true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.

* Possible to hover light on skids but flight test data indicates take-off distance would exceed 1000 feet.

Chart 14–6. Take-off distance (Sheet 13 of 42)

B-5

TAKE-OFF DISTANCES — FEET

MAXIMUM PERFORMANCE - LIGHT ON SKIDS TECHNIQUE

TAKE-OFF POWER - 6600 RPM

ARMY MODEL(S) UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR-62-21, "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
8000	SL	0	0	0	0	0	0	-	*	-	-
	2	0	0	0	0	20	405	-	-	-	-
	4	0	0	0	0	30	665	-	-	-	-
	6	0	0	30	410	-	-	-	-	-	-
	8	20	227	30	478	-	-	-	-	-	-
	10	30	460	-	-	-	-	-	-	-	-
	12	-	*	-	-	-	-	-	-	-	-
	14	-	-	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-
8500	SL	0	0	0	0	20	346	-	-	-	-
	2	0	0	0	0	30	560	-	-	-	-
	4	0	0	20	315	-	*	-	-	-	-
	6	10	110	30	605	-	-	-	-	-	-
	8	30	416	-	-	-	-	-	-	-	-
	10	-	*	-	-	-	-	-	-	-	-
	12	-	-	-	-	-	-	-	-	-	-
	14	-	-	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-

REMARKS:

1. No wind.
2. Take-off distance is zero when hovering out-of-ground effect is possible.
3. No take-off distance is shown where hovering light on skids is not possible.
4. Take-off distance will exceed those shown if hovering in-ground-effect is performed for over one minute immediately prior to take-off.
5. Speed over the 50 foot obstacle is true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.

* Possible to hover light on skids but flight test data indicates take-off distance would exceed 1000 feet.

Chart 14–6. Take-off distance (Sheet 14 of 42)

B-5

TAKE-OFF DISTANCES — FEET

MAXIMUM PERFORMANCE - FIFTEEN FOOT SKID HEIGHT HOVERING TECHNIQUE

TAKE-OFF POWER - 6600 RPM

ARMY MODEL(S) UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-62-21, "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
5000	SL	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	-	-
	4	0	0	0	0	0	0	0	0	-	-
	6	0	0	0	0	0	0	0	0	-	-
	8	0	0	0	0	0	0	20	500	-	-
	10	0	0	0	0	0	0	-	-	-	-
	12	0	0	0	0	0	0	-	-	-	-
	14	0	0	0	0	-	-	-	-	-	-
	16	0	0	0	0	-	-	-	-	-	-
	18	0	0	-	-	-	-	-	-	-	-
	20	20	250	-	-	-	-	-	-	-	-
5500	SL	0	0	0	0	0	0	0	0	-	-
	2	0	0	0	0	0	0	0	0	-	-
	4	0	0	0	0	0	0	0	0	-	-
	6	0	0	0	0	0	0	-	-	-	-
	8	0	0	0	0	0	0	-	-	-	-
	10	0	0	0	0	0	0	-	-	-	-
	12	0	0	0	0	0	0	-	-	-	-
	14	0	0	0	0	-	-	-	-	-	-
	16	0	0	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-

REMARKS:

1. No wind.
2. Take-off distance is zero when hovering out of ground effect is possible.
3. No take-off distance is shown where hovering (15 foot skid height) is not possible.
4. Take-off distance will exceed those shown if hovering in ground effect is performed for over one minute immediately prior to take-off.
5. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.

Chart 14–6. Take-off distance (Sheet 15 of 42)

B-5

TAKE-OFF DISTANCES — FEET

MAXIMUM PERFORMANCE - FIFTEEN FOOT SKID HEIGHT HOVERING TECHNIQUE

TAKE-OFF POWER - 6600 RPM

ARMY MODEL(S) UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-62-21, "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
6000	SL	0	0	0	0	0	0	0	0	-	-
	2	0	0	0	0	0	0	0	0	-	-
	4	0	0	0	0	0	0	-	-	-	-
	6	0	0	0	0	0	0	-	-	-	-
	8	0	0	0	0	0	0	-	-	-	-
	10	0	0	0	0	-	-	-	-	-	-
	12	0	0	20	243	-	-	-	-	-	-
	14	0	0	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-
6500	SL	0	0	0	0	0	0	0	0	-	-
	2	0	0	0	0	0	0	-	-	-	-
	4	0	0	0	0	0	0	-	-	-	-
	6	0	0	0	0	0	0	-	-	-	-
	8	0	0	0	0	-	-	-	-	-	-
	10	0	0	20	260	-	-	-	-	-	-
	12	0	0	-	-	-	-	-	-	-	-
	14	-	-	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-

REMARKS:
1. No wind.
2. Take-off distance is zero when hovering out of ground effect is possible.
3. No take-off distance is shown where hovering (15 foot skid height) is not possible.
4. Take-off distance will exceed those shown if hovering in ground effect is performed for over one minute immediately prior to take-off.
5. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.

Chart 14–6. Take-off distance (Sheet 16 of 42)

B-5

TAKE-OFF DISTANCES — FEET

MAXIMUM PERFORMANCE - FIFTEEN FOOT SKID HEIGHT HOVERING TECHNIQUE

TAKE-OFF POWER - 6600 RPM

ARMY MODEL(S) UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-62-21, "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
7000	SL	0	0	0	0	0	0	-	-	-	-
	2	0	0	0	0	0	0	-	-	-	-
	4	0	0	0	0	0	0	-	-	-	-
	6	0	0	0	0	-	-	-	-	-	-
	8	0	0	20	250	-	-	-	-	-	-
	10	0	0	-	-	-	-	-	-	-	-
	12	-	-	-	-	-	-	-	-	-	-
	14	-	-	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-
7500	SL	0	0	0	0	0	0	-	-	-	-
	2	0	0	0	0	0	0	-	-	-	-
	4	0	0	0	0	-	-	-	-	-	-
	6	0	0	20	240	-	-	-	-	-	-
	8	0	0	-	-	-	-	-	-	-	-
	10	-	-	-	-	-	-	-	-	-	-
	12	-	-	-	-	-	-	-	-	-	-
	14	-	-	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-

REMARKS:
1. No wind.
2. Take-off distance is zero when hovering out of ground effect is possible.
3. No take-off distance is shown where hovering (15 foot skid height) is not possible.
4. Take-off distance will exceed those shown if hovering in ground effect is performed for over one minute immediately prior to take-off.
5. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.

Chart 14–6. Take-off distance (Sheet 17 of 42)

B-5

TAKE-OFF DISTANCES — FEET

MAXIMUM PERFORMANCE - FIFTEEN FOOT SKID HEIGHT HOVERING TECHNIQUE

TAKE-OFF POWER - 6600 RPM

ARMY MODEL(S) UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-62-21, "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
8000	SL	0	0	0	0	0	0	-	-	-	-
	2	0	0	0	0	-	-	-	-	-	-
	4	0	0	0	0	-	-	-	-	-	-
	6	0	0	-	-	-	-	-	-	-	-
	8	20	242	-	-	-	-	-	-	-	-
	10	-	-	-	-	-	-	-	-	-	-
	12	-	-	-	-	-	-	-	-	-	-
	14	-	-	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-
8500	SL	0	0	0	0	20	345	-	-	-	-
	2	0	0	0	0	-	-	-	-	-	-
	4	0	0	-	-	-	-	-	-	-	-
	6	20	210	-	-	-	-	-	-	-	-
	8	-	-	-	-	-	-	-	-	-	-
	10	-	-	-	-	-	-	-	-	-	-
	12	-	-	-	-	-	-	-	-	-	-
	14	-	-	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-

REMARKS:
1. No wind.
2. Take-off distance is zero when hovering out of ground effect is possible.
3. No take-off distance is shown where hovering (15 foot skid height) is not possible.
4. Take-off distance will exceed those shown if hovering in ground effect is performed for over one minute immediately prior to take-off.
5. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.

Chart 14–6. Take-off distance (Sheet 18 of 42)

B-5

TAKE-OFF DISTANCES — FEET

MAXIMUM PERFORMANCE - BLEED-OFF TECHNIQUE - LIGHT ON SKIDS

TAKE-OFF POWER - ENGINE SPEED MAXIMUM 6600 RPM, MINIMUM 5900

ARMY MODEL(S) UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR, "YUH-1B Performance Test Category II") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
5000	SL	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	10	113
	4	0	0	0	0	0	0	0	0	22	245
	6	0	0	0	0	0	0	0	0	40	530
	8	0	0	0	0	0	0	10	55	-	-
	10	0	0	0	0	0	0	10	73	-	-
	12	0	0	0	0	0	0	10	108	-	-
	14	0	0	0	0	10	49	-	-	-	-
	16	0	0	0	0	10	68	-	-	-	-
	18	0	0	10	51	-	-	-	-	-	-
	20	10	45	10	81	-	-	-	-	-	-
5500	SL	0	0	0	0	0	0	0	0	10	117
	2	0	0	0	0	0	0	0	0	27	298
	4	0	0	0	0	0	0	0	0	42	570
	6	0	0	0	0	0	0	10	58	-	-
	8	0	0	0	0	0	0	10	78	-	-
	10	0	0	0	0	0	0	10	122	-	-
	12	0	0	0	0	10	54	-	-	-	-
	14	0	0	0	0	10	80	-	-	-	-
	16	0	0	10	56	-	-	-	-	-	-
	18	10	46	10	92	-	-	-	-	-	-
	20	10	66	-	-	-	-	-	-	-	-

REMARKS:

1. No wind.
2. Take-off distance is zero when hovering out-of-ground effect is possible.
3. No take-off distance is shown where hovering light on skids is not possible.
4. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.
5. Take-off distances will exceed those shown if hovering in ground effect is performed for over one minute immediately prior to take-off.

Chart 14–6. Take-off distance (Sheet 19 of 42)

B-5

TAKE-OFF DISTANCES — FEET

MAXIMUM PERFORMANCE - BLEED-OFF TECHNIQUE - LIGHT ON SKIDS

TAKE-OFF POWER - ENGINE SPEED MAXIMUM 6600 RPM, MINIMUM 5900

ARMY MODEL(S) UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR, "YUH-1B Performance Test Category II") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
6000	SL	0	0	0	0	0	0	0	0	29	334
	2	0	0	0	0	0	0	0	0	-	-
	4	0	0	0	0	0	0	10	58	-	-
	6	0	0	0	0	0	0	10	82	-	-
	8	0	0	0	0	0	0	16	185	-	-
	10	0	0	0	0	10	57	-	-	-	-
	12	0	0	10	45	10	88	-	-	-	-
	14	0	0	10	52	-	-	-	-	-	-
	16	10	45	10	97	-	-	-	-	-	-
	18	10	68	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-
6500	SL	0	0	0	0	0	0	0	0	-	-
	2	0	0	0	0	0	0	10	58	-	-
	4	0	0	0	0	0	0	10	80	-	-
	6	0	0	0	0	0	0	23	257	-	-
	8	0	0	0	0	10	58	-	-	-	-
	10	0	0	10	45	10	89	-	-	-	-
	12	0	0	10	52	-	-	-	-	-	-
	14	10	45	10	98	-	-	-	-	-	-
	16	10	67	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-

REMARKS:
1. No wind.
2. Take-off distance is zero when hovering out-of-ground effect is possible.
3. No take-off distance is shown where hovering light on skids is not possible.
4. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.
5. Take-off distances will exceed those shown if hovering in ground effect is performed for over one minute immediately prior to take-off.

Chart 14-6. Take-off distance (Sheet 20 of 42)

B-5

TAKE-OFF DISTANCES — FEET

MAXIMUM PERFORMANCE - BLEED-OFF TECHNIQUE - LIGHT ON SKIDS

TAKE-OFF POWER - ENGINE SPEED MAXIMUM 6600 RPM, MINIMUM 5900

ARMY MODEL(S) UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR, "YUH-1B Performance Test Category II") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
7000	SL	0	0	0	0	0	0	10	57	-	-
	2	0	0	0	0	0	0	10	78	-	-
	4	0	0	0	0	0	0	15	180	-	-
	6	0	0	0	0	10	57	-	-	-	-
	8	0	0	10	45	10	88	-	-	-	-
	10	0	0	10	52	-	-	-	-	-	-
	12	10	47	10	91	-	-	-	-	-	-
	14	10	60	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-
7500	SL	0	0	0	0	0	0	10	74	-	-
	2	0	0	0	0	0	0	10	122	-	-
	4	0	0	0	0	10	54	-	-	-	-
	6	0	0	10	42	10	83	-	-	-	-
	8	0	0	10	50	-	-	-	-	-	-
	10	10	46	10	91	-	-	-	-	-	-
	12	10	56	-	-	-	-	-	-	-	-
	14	-	-	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-

REMARKS:
1. No wind.
2. Take-off distance is zero when hovering out-of-ground effect is possible.
3. No take-off distance is shown where hovering light on skids is not possible.
4. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.
5. Take-off distances will exceed those shown if hovering in ground effect is performed for over one minute immediately prior to take-off.

Chart 14–6. Take-off distance (Sheet 21 of 42)

B-5

TAKE-OFF DISTANCES — FEET

MAXIMUM PERFORMANCE - BLEED-OFF TECHNIQUE - LIGHT ON SKIDS

TAKE-OFF POWER - ENGINE SPEED MAXIMUM 6600 RPM, MINIMUM 5900

ARMY MODEL(S) UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR, "YUH-1B Performance Test Category II") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
8000	SL	0	0	0	0	0	0	10	108	-	-
	2	0	0	0	0	10	50	-	-	-	-
	4	0	0	0	0	10	73	-	-	-	-
	6	0	0	10	50	-	-	-	-	-	-
	8	10	45	10	57	-	-	-	-	-	-
	10	10	51	-	-	-	-	-	-	-	-
	12	10	118	-	-	-	-	-	-	-	-
	14	-	-	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-
8500	SL	0	0	0	0	10	48	-	-	-	-
	2	0	0	0	0	10	66	-	-	-	-
	4	0	0	10	46	10	127	-	-	-	-
	6	10	44	10	65	-	-	-	-	-	-
	8	10	50	-	-	-	-	-	-	-	-
	10	10	93	-	-	-	-	-	-	-	-
	12	-	-	-	-	-	-	-	-	-	-
	14	-	-	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-

REMARKS:
1. No wind.
2. Take-off distance is zero when hovering out-of-ground effect is possible.
3. No take-off distance is shown where hovering light on skids is not possible.
4. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.
5. Take-off distances will exceed those shown if hovering in ground effect is performed for over one minute immediately prior to take-off.

Chart 14–6. Take-off distance (Sheet 22 of 42)

B9/11 **B9/11**

TAKE-OFF DISTANCES — FEET

MAXIMUM PERFORMANCE - HOVERING TECHNIQUE - TWO FOOT SKID HEIGHT

TAKE-OFF POWER - 6600 ENGINE RPM

ARMY MODEL(S) UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
5000	SL	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0	0	0	0
	10	0	0	0	0	0	0	0	0	20	264
	12	0	0	0	0	0	0	0	0	20	359
	14	0	0	0	0	0	0	20	288	-	-
	16	0	0	0	0	20	229	23	515	-	-
	18	0	0	0	0	20	345	-	-	-	-
	20	0	0	20	264	-	-	-	-	-	-
5500	SL	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0	0	20	282
	10	0	0	0	0	0	0	0	0	20	402
	12	0	0	0	0	0	0	20	318	-	-
	14	0	0	0	0	20	247	26	615	-	-
	16	0	0	0	0	20	371	-	-	-	-
	18	0	0	20	282	-	-	-	-	-	-
	20	20	258	-	-	-	-	-	-	-	-

REMARKS:

1. No wind.
2. Take-off distance is zero when hovering out-of-ground effect is possible.
3. No take-off distance is shown where hovering at 2 foot skid height is not possible.
4. Take-off distance will exceed those shown if hovering in-ground effect is performed for over one minute immediately prior to take-off.
5. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.

Chart 14–6. Take-off distance (Sheet 23 of 42)

B9/11 B9/11

TAKE-OFF DISTANCES — FEET

MAXIMUM PERFORMANCE - HOVERING TECHNIQUE - TWO FOOT SKID HEIGHT

TAKE-OFF POWER - 6600 ENGINE RPM

ARMY MODEL(S) UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
6000	SL	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0	20	300
	8	0	0	0	0	0	0	20	249	21	436
	10	0	0	0	0	0	0	20	335	-	-
	12	0	0	0	0	20	256	-	-	-	-
	14	0	0	0	0	20	403	-	-	-	-
	16	0	0	20	288	-	-	-	-	-	-
	18	20	272	-	-	-	-	-	-	-	-
	20	25	600	-	-	-	-	-	-	-	-
6500	SL	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	20	306
	6	0	0	0	0	0	0	20	259	22	460
	8	0	0	0	0	0	0	20	350	-	-
	10	0	0	0	0	20	256	-	-	-	-
	12	0	0	0	0	20	411	-	-	-	-
	14	0	0	20	285	-	-	-	-	-	-
	16	20	266	-	-	-	-	-	-	-	-
	18	26	615	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-

REMARKS:
1. No wind.
2. Take-off distance is zero when hovering out-of-ground effect is possible.
3. No take-off distance is shown where hovering at 2 foot skid height is not possible.
4. Take-off distance will exceed those shown if hovering in-ground effect is performed for over one minute immediately prior to take-off.
5. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.

Chart 14–6. Take-off distance (Sheet 24 of 42)

B9/11 B9/11

TAKE-OFF DISTANCES — FEET

MAXIMUM PERFORMANCE - HOVERING TECHNIQUE - TWO FOOT SKID HEIGHT

TAKE-OFF POWER - 6600 ENGINE RPM

ARMY MODEL(S) UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
7000	SL	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	20	311
	4	0	0	0	0	0	0	20	258	22	471
	6	0	0	0	0	0	0	20	355	-	-
	8	0	0	0	0	20	256	-	-	-	-
	10	0	0	0	0	20	394	-	-	-	-
	12	0	0	20	276	-	-	-	-	-	-
	14	20	256	26	655	-	-	-	-	-	-
	16	23	513	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-
7500	SL	0	0	0	0	0	0	20	211	20	311
	2	0	0	0	0	0	0	20	252	22	471
	4	0	0	0	0	0	0	20	345	-	-
	6	0	0	0	0	20	256	-	-	-	-
	8	0	0	0	0	20	355	-	-	-	-
	10	0	0	20	267	-	-	-	-	-	-
	12	20	239	22	485	-	-	-	-	-	-
	14	20	426	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-

REMARKS:
1. No wind.
2. Take-off distance is zero when hovering out-of-ground effect is possible.
3. No take-off distance is shown where hovering at 2 foot skid height is not possible.
4. Take-off distance will exceed those shown if hovering in-ground effect is performed for over one minute immediately prior to take-off.
5. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.

Chart 14–6. Take-off distance (Sheet 25 of 42)

B9/11 **B9/11**

TAKE-OFF DISTANCES — FEET

MAXIMUM PERFORMANCE - HOVERING TECHNIQUE - TWO FOOT SKID HEIGHT

TAKE-OFF POWER - 6600 ENGINE RPM

ARMY MODEL(S) UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
8000	SL	0	0	0	0	0	0	20	252	21	426
	2	0	0	0	0	0	0	20	326	-	-
	4	0	0	0	0	0	0	26	655	-	-
	6	0	0	0	0	20	355	-	-	-	-
	8	0	0	20	252	-	-	-	-	-	-
	10	20	226	20	417	-	-	-	-	-	-
	12	20	355	-	-	-	-	-	-	-	-
	14	-	-	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-
8500	SL	0	0	0	0	0	0	20	264	-	-
	2	0	0	0	0	20	235	23	515	-	-
	4	0	0	0	0	20	326	-	-	-	-
	6	0	0	20	241	-	-	-	-	-	-
	8	20	211	20	366	-	-	-	-	-	-
	10	20	315	-	-	-	-	-	-	-	-
	12	-	-	-	-	-	-	-	-	-	-
	14	-	-	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-

REMARKS:

1. No wind.
2. Take-off distance is zero when hovering out-of-ground effect is possible.
3. No take-off distance is shown where hovering at 2 foot skid height is not possible.
4. Take-off distance will exceed those shown if hovering in-ground effect is performed for over one minute immediately prior to take-off.
5. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.

Chart 14–6. Take-off distance (Sheet 26 of 42)

B9/11 **B9/11**

TAKE-OFF DISTANCES — FEET

LIGHT ON SKIDS

TAKE-OFF POWER - 6600 ENGINE RPM

ARMY MODEL(S) UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS : FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
5000	SL	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0	0	0	0
	10	0	0	0	0	0	0	0	0	23	278
	12	0	0	0	0	0	0	0	0	33	477
	14	0	0	0	0	0	0	26	345	-	-
	16	0	0	0	0	10	116	38	680	-	-
	18	0	0	0	0	32	456	-	-	-	-
	20	0	0	23	277	-	-	-	-	-	-
5500	SL	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0	0	25	326
	10	0	0	0	0	0	0	0	0	35	530
	12	0	0	0	0	0	0	30	420	-	-
	14	0	0	0	0	0	0	41	850	-	-
	16	0	0	0	0	21	242	-	-	-	-
	18	0	0	25	327	33	493	-	-	-	-
	20	22	264	-	-	-	-	-	-	-	-

REMARKS:
1. No wind.
2. Take-off distance is zero when hovering out-of-ground effect is possible.
3. No take-off distance is shown where hovering light on skids is not possible.
4. Take-off distance will exceed those shown if hovering in-ground effect is performed for over one minute immediately prior to take-off.
5. Speed over the 50-foot obstacle is in true airspeed because values of indicated airspeed (IAS) below 20 knots may not be reliable.

Chart 14-6. Take-off distance (Sheet 27 of 42)

B9/11 **B9/11**

TAKE-OFF DISTANCES — FEET

LIGHT ON SKIDS

TAKE-OFF POWER - 6600 ENGINE RPM

ARMY MODEL(S) UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
6000	SL	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0	28	375
	8	0	0	0	0	0	0	21	245	36	575
	10	0	0	0	0	0	0	31	445	-	-
	12	0	0	0	0	22	259	-	-	-	-
	14	0	0	0	0	35	532	-	-	-	-
	16	0	0	26	345	-	-	-	-	-	-
	18	24	305	-	-	-	-	-	-	-	-
	20	40	780	-	-	-	-	-	-	-	-
6500	SL	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	29	400
	6	0	0	0	0	0	0	22	264	37	600
	8	0	0	0	0	0	0	32	465	-	-
	10	0	0	0	0	22	259	-	-	-	-
	12	0	0	0	0	35	544	-	-	-	-
	14	0	0	26	335	-	-	-	-	-	-
	16	23	286	-	-	-	-	-	-	-	-
	18	41	850	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-

REMARKS:

1. No wind.
2. Take-off distance is zero when hovering out-of-ground effect is possible.
3. No take-off distance is shown where hovering light on skids is not possible.
4. Take-off distance will exceed those shown if hovering in-ground effect is performed for over one minute immediately prior to take-off.
5. Speed over the 50-foot obstacle is in true airspeed because values of indicated airspeed (IAS) below 20 knots may not be reliable.

Chart 14–6. Take-off distance (Sheet 28 of 42)

B9/11 B9/11

TAKE-OFF DISTANCES — FEET

LIGHT ON SKIDS

TAKE-OFF POWER - 6600 ENGINE RPM

ARMY MODEL(S) UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
7000	SL	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	30	408
	4	0	0	0	0	0	0	22	264	37	617
	6	0	0	0	0	0	0	32	469	-	-
	8	0	0	0	0	22	259	-	-	-	-
	10	0	0	0	0	35	525	-	-	-	-
	12	0	0	24	308	-	-	-	-	-	-
	14	22	259	-	-	-	-	-	-	-	-
	16	38	680	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-
7500	SL	0	0	0	0	0	0	10	90	30	408
	2	0	0	0	0	0	0	22	250	37	617
	4	0	0	0	0	0	0	32	456	-	-
	6	0	0	0	0	22	256	-	-	-	-
	8	0	0	0	0	34	500	-	-	-	-
	10	0	0	23	287	-	-	-	-	-	-
	12	20	225	38	633	-	-	-	-	-	-
	14	36	564	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-

REMARKS:

1. No wind.
2. Take-off distance is zero when hovering out-of-ground effect is possible.
3. No take-off distance is shown where hovering light on skids is not possible.
4. Take-off distance will exceed those shown if hovering in-ground effect is performed for over one minute immediately prior to take-off.
5. Speed over the 50-foot obstacle is in true airspeed because values of indicated airspeed (IAS) below 20 knots may not be reliable.

Chart 14–6. Take-off distance (Sheet 29 of 42)

B9/11 B9/11

TAKE-OFF DISTANCES — FEET

LIGHT ON SKIDS

TAKE-OFF POWER - 6600 ENGINE RPM

ARMY MODEL(S) UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
8000	SL	0	0	0	0	0	0	22	250	36	565
	2	0	0	0	0	0	0	31	432	-	-
	4	0	0	0	0	0	0	-	-	-	-
	6	0	0	0	0	32	470	-	-	-	-
	8	0	0	22	250	-	-	-	-	-	-
	10	10	114	35	550	-	-	-	-	-	-
	12	33	446	-	-	-	-	-	-	-	-
	14	-	-	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-
8500	SL	0	0	0	0	0	0	23	280	-	-
	2	0	0	0	0	20	225	38	680	-	-
	4	0	0	0	0	31	432	-	-	-	-
	6	0	0	20	228	-	-	-	-	-	-
	8	10	90	33	485	-	-	-	-	-	-
	10	30	415	-	-	-	-	-	-	-	-
	12	-	-	-	-	-	-	-	-	-	-
	14	-	-	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-

REMARKS:

1. No wind.
2. Take-off distance is zero when hovering out-of-ground effect is possible.
3. No take-off distance is shown where hovering light on skids is not possible.
4. Take-off distance will exceed those shown if hovering in-ground effect is performed for over one minute immediately prior to take-off.
5. Speed over the 50-foot obstacle is in true airspeed because values of indicated airspeed (IAS) below 20 knots may not be reliable.

Chart 14–6. Take-off distance (Sheet 30 of 42)

B9/11 B9/11

TAKE-OFF DISTANCES — FEET

HOVERING TECHNIQUE - FIFTEEN FOOT SKID HEIGHT

TAKE-OFF POWER - 6600 ENGINE RPM

ARMY MODEL(S) UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
5000	SL	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0	0	0	0
	10	0	0	0	0	0	0	0	0	20	286
	12	0	0	0	0	0	0	0	0	-	-
	14	0	0	0	0	0	0	20	344	-	-
	16	0	0	0	0	20	218	-	-	-	-
	18	0	0	0	0	20	483	-	-	-	-
	20	0	0	20	286	-	-	-	-	-	-
5500	SL	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0	0	20	330
	10	0	0	0	0	0	0	0	0	-	-
	12	0	0	0	0	0	0	20	419	-	-
	14	0	0	0	0	20	253	-	-	-	-
	16	0	0	0	0	-	-	-	-	-	-
	18	0	0	20	328	-	-	-	-	-	-
	20	20	275	-	-	-	-	-	-	-	-

REMARKS:

1. No wind.
2. Take-off distance is zero when hovering out-of-ground effect is possible.
3. No take-off distance is shown where hovering at 15 foot skid height is not possible.
4. Take-off distances will exceed those shown if hovering in-ground effect is performed for over one minute immediately prior to take-off.
5. Speed over the 50 foot obstacle is in true airspeed because values of indicated airspeed (IAS) below 20 knots may not be reliable.

Chart 14-6. Take-off distance (Sheet 31 of 42)

B9/11 **B9/11**

TAKE-OFF DISTANCES — FEET

HOVERING TECHNIQUE - FIFTEEN FOOT SKID HEIGHT

TAKE-OFF POWER - 6600 ENGINE RPM

ARMY MODEL(S) UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
6000	SL	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0	20	371
	8	0	0	0	0	0	0	20	258	-	-
	10	0	0	0	0	0	0	20	461	-	-
	12	0	0	0	0	20	269	-	-	-	-
	14	0	0	0	0	-	-	-	-	-	-
	16	0	0	20	345	-	-	-	-	-	-
	18	20	307	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-
6500	SL	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	20	388
	6	0	0	0	0	0	0	20	275	-	-
	8	0	0	0	0	0	0	20	495	-	-
	10	0	0	0	0	20	269	-	-	-	-
	12	0	0	0	0	-	-	-	-	-	-
	14	0	0	20	337	-	-	-	-	-	-
	16	20	296	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-

REMARKS:
1. No wind.
2. Take-off distance is zero when hovering out-of-ground effect is possible.
3. No take-off distance is shown where hovering at 15 foot skid height is not possible.
4. Take-off distances will exceed those shown if hovering in-ground effect is performed for over one minute immediately prior to take-off.
5. Speed over the 50 foot obstacle is in true airspeed because values of indicated airspeed (IAS) below 20 knots may not be reliable.

Chart 14–6. Take-off distance (Sheet 32 of 42)

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TAKE-OFF DISTANCES — FEET

HOVERING TECHNIQUE - FIFTEEN FOOT SKID HEIGHT

TAKE-OFF POWER - 6600 ENGINE RPM

ARMY MODEL(S) UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
7000	SL	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	20	400
	4	0	0	0	0	0	0	20	275	-	-
	6	0	0	0	0	0	0	20	507	-	-
	8	0	0	0	0	20	269	-	-	-	-
	10	0	0	0	0	-	-	-	-	-	-
	12	0	0	20	314	-	-	-	-	-	-
	14	20	270	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-
7500	SL	0	0	0	0	0	0	10	90	20	400
	2	0	0	0	0	0	0	20	265	-	-
	4	0	0	0	0	0	0	20	484	-	-
	6	0	0	0	0	20	269	-	-	-	-
	8	0	0	0	0	-	-	-	-	-	-
	10	0	0	20	294	-	-	-	-	-	-
	12	20	238	-	-	-	-	-	-	-	-
	14	-	-	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-

REMARKS:

1. No wind.
2. Take-off distance is zero when hovering out-of-ground effect is possible.
3. No take-off distance is shown where hovering at 15 foot skid height is not possible.
4. Take-off distances will exceed those shown if hovering in-ground effect is performed for over one minute immediately prior to take-off.
5. Speed over the 50 foot obstacle is in true airspeed because values of indicated airspeed (IAS) below 20 knots may not be reliable.
   Data for 2°C inlet temperature rise is for use during normal flight and take-off conditions. Data for 10°C inlter temperature rise is for use when hovering for periods longer than one minute in-ground-effect.

Chart 14–6. Take-off distance (Sheet 33 of 42)

B9/11 **B9/11**

TAKE-OFF DISTANCES — FEET

HOVERING TECHNIQUE - FIFTEEN FOOT SKID HEIGHT

TAKE-OFF POWER - 6600 ENGINE RPM

ARMY MODEL(S) UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
8000	SL	0	0	0	0	0	0	20	265	-	-
	2	0	0	0	0	0	0	20	443	-	-
	4	0	0	0	0	0	0	-	-	-	-
	6	0	0	0	0	20	507	-	-	-	-
	8	0	0	20	263	-	-	-	-	-	-
	10	20	215	-	-	-	-	-	-	-	-
	12	20	507	-	-	-	-	-	-	-	-
	14	-	-	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-
8500	SL	0	0	0	0	0	0	20	286	-	-
	2	0	0	0	0	20	231	-	-	-	-
	4	0	0	0	0	20	442	-	-	-	-
	6	0	0	20	242	-	-	-	-	-	-
	8	10	90	-	-	-	-	-	-	-	-
	10	20	410	-	-	-	-	-	-	-	-
	12	-	-	-	-	-	-	-	-	-	-
	14	-	-	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-

REMARKS:
1. No wind.
2. Take-off distance is zero when hovering out-of-ground effect is possible.
3. No take-off distance is shown where hovering at 15 foot skid height is not possible.
4. Take-off distances will exceed those shown if hovering in-ground effect is performed for over one minute immediately prior to take-off.
5. Speed over the 50 foot obstacle is in true airspeed because values of indicated airspeed (IAS) below 20 knots may not be reliable.

Chart 14–6. Take-off distance (Sheet 34 of 42)

B9/11 **B9/11**

TAKE-OFF DISTANCES — FEET

MAXIMUM PERFORMANCE - BLEED-OFF TECHNIQUE - LIGHT ON SKIDS

TAKE-OFF POWER - ENGINE SPEED MAXIMUM 6600 RPM, MINIMUM 5900

ARMY MODEL(S) UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
5000	SL	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0	0	0	0
	10	0	0	0	0	0	0	0	0	10	45
	12	0	0	0	0	0	0	0	0	10	54
	14	0	0	0	0	0	0	10	45	10	102
	16	0	0	0	0	10	44	10	72	40	636
	18	0	0	0	0	10	52	38	508	-	-
	20	0	0	10	45	10	119	-	-	-	-
5500	SL	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0	0	10	45
	10	0	0	0	0	0	0	0	0	10	60
	12	0	0	0	0	0	0	10	49	10	116
	14	0	0	0	0	10	44	10	80	-	-
	16	0	0	0	0	10	55	40	596	-	-
	18	0	0	10	45	24	278	-	-	-	-
	20	10	45	10	89	-	-	-	-	-	-

REMARKS:
1. No wind.
2. Take-off distance is zero when hovering out-of-ground effect is possible.
3. No take-off distance is shown where hovering light on skids is not possible.
4. Take-off distances will exceed those shown if hovering in-ground effect is performed for over one minute immediately prior to take-off.
5. Speed over the 50 foot obstacle is in true airspeed because values of indicated airspeed (IAS) below 20 knots may not be reliable.

Chart 14–6. Take-off distance (Sheet 35 of 42)

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TAKE-OFF DISTANCES — FEET

MAXIMUM PERFORMANCE - BLEED-OFF TECHNIQUE - LIGHT ON SKIDS

TAKE-OFF POWER - ENGINE SPEED MAXIMUM 6600 RPM, MINIMUM 5900

ARMY MODEL(S) UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
6000	SL	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0	10	48
	8	0	0	0	0	0	0	10	44	10	65
	10	0	0	0	0	0	0	10	51	11	130
	12	0	0	0	0	10	45	10	90	-	-
	14	0	0	0	0	10	60	40	626	-	-
	16	0	0	10	45	27	322	-	-	-	-
	18	10	45	10	93	-	-	-	-	-	-
	20	10	80	-	-	-	-	-	-	-	-
6500	SL	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	10	48
	6	0	0	0	0	0	0	10	45	10	65
	8	0	0	0	0	0	0	10	54	13	155
	10	0	0	0	0	10	45	10	97	-	-
	12	0	0	0	0	10	60	40	637	-	-
	14	0	0	10	45	30	350	-	-	-	-
	16	10	45	10	90	-	-	-	-	-	-
	18	10	80	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-

REMARKS:
1. No wind.
2. Take-off distance is zero when hovering out-of-ground effect is possible.
3. No take-off distance is shown where hovering light on skids is not possible.
4. Take-off distances will exceed those shown if hovering in-ground effect is performed for over one minute immediately prior to take-off.
5. Speed over the 50 foot obstacle is in true airspeed because values of indicated airspeed (IAS) below 20 knots may not be reliable.

Chart 14-6. Take-off distance (Sheet 36 of 42)

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TAKE-OFF DISTANCES — FEET

MAXIMUM PERFORMANCE - BLEED-OFF TECHNIQUE - LIGHT ON SKIDS

TAKE-OFF POWER - ENGINE SPEED MAXIMUM 6600 RPM, MINIMUM 5900

ARMY MODEL(S) UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
7000	SL	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	10	49
	4	0	0	0	0	0	0	10	45	10	66
	6	0	0	0	0	0	0	10	54	16	187
	8	0	0	0	0	10	45	10	98	-	-
	10	0	0	0	0	10	59	40	626	-	-
	12	0	0	10	45	28	355	-	-	-	-
	14	10	45	10	82	-	-	-	-	-	-
	16	10	71	-	-	-	-	-	-	-	-
	18	41	635	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-
7500	SL	0	0	0	0	0	0	10	41	10	49
	2	0	0	0	0	0	0	10	44	10	66
	4	0	0	0	0	0	0	10	52	13	150
	6	0	0	0	0	10	45	10	93	-	-
	8	0	0	0	0	10	55	40	605	-	-
	10	0	0	10	45	10	128	-	-	-	-
	12	10	44	10	68	-	-	-	-	-	-
	14	10	63	40	606	-	-	-	-	-	-
	16	38	535	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-

REMARKS:

1. No wind.
2. Take-off distance is zero when hovering out-of-ground effect is possible.
3. No take-off distance is shown where hovering light on skids is not possible.
4. Take-off distances will exceed those shown if hovering in-ground effect is performed for over one minute immediately prior to take-off.
5. Speed over the 50 foot obstacle is in true airspeed because values of indicated airspeed (IAS) below 20 knots may not be reliable.

Chart 14–6. Take-off distance (Sheet 37 of 42)

B9/11 **B9/11**

TAKE-OFF DISTANCES — FEET

MAXIMUM PERFORMANCE - BLEED-OFF TECHNIQUE - LIGHT ON SKIDS

TAKE-OFF POWER - ENGINE SPEED MAXIMUM 6600 RPM, MINIMUM 5900

ARMY MODEL(S) UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
8000	SL	0	0	0	0	0	0	10	44	10	61
	2	0	0	0	0	0	0	10	50	10	122
	4	0	0	0	0	0	0	10	82	-	-
	6	0	0	0	0	10	54	39	561	-	-
	8	0	0	10	45	10	110	-	-	-	-
	10	10	44	10	61	-	-	-	-	-	-
	12	10	54	36	457	-	-	-	-	-	-
	14	28	330	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-
8500	SL	0	0	0	0	0	0	10	45	10	110
	2	0	0	0	0	10	44	10	71	40	626
	4	0	0	0	0	10	50	35	440	-	-
	6	0	0	10	45	10	94	-	-	-	-
	8	10	44	10	55	-	-	-	-	-	-
	10	10	50	16	190	-	-	-	-	-	-
	12	10	108	-	-	-	-	-	-	-	-
	14	-	-	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-	-	-

REMARKS:

1. No wind.
2. Take-off distance is zero when hovering out-of-ground effect is possible.
3. No take-off distance is shown where hovering light on skids is not possible.
4. Take-off distances will exceed those shown if hovering in-ground effect is performed for over one minute immediately prior to take-off.
5. Speed over the 50 foot obstacle is in true airspeed because values of indicated airspeed (IAS) below 20 knots may not be reliable.

Chart 14-6. Take-off distance (Sheet 38 of 42)

TAKE-OFF DISTANCES — FEET

540

MAXIMUM PERFORMANCE - TWO FOOT SKID HEIGHT HOVERING TECHNIQUE

TAKE-OFF POWER - 6600 RPM

ARMY MODEL(S) UH-1B (540)
DATA AS OF: FEBRUARY 1964
DATA BASIS: ANALYTICAL METHOD
"PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
5000	0	0	0	0	0	0	0	0	0	0	0
	2000	0	0	0	0	0	0	0	0	0	0
	4000	0	0	0	0	0	0	0	0	0	0
	6000	0	0	0	0	0	0	0	0	0	0
	8000	0	0	0	0	0	0	0	0	0	0
	10000	0	0	0	0	0	0	0	0	30.0	343.
	12000	0	0	0	0	0	0	0	0	30.0	611.
	14000	0	0	0	0	0	0	30.0	466.		
	16000	0	0	0	0	30.0	343.				
	18000	0	0	0	0	30.0	844.				
	20000	0	0	30.0	468.						
5500	0	0	0	0	0	0	0	0	0	0	0
	2000	0	0	0	0	0	0	0	0	0	0
	4000	0	0	0	0	0	0	0	0	0	0
	6000	0	0	0	0	0	0	0	0	0	0
	8000	0	0	0	0	0	0	0	0	30.0	384.
	10000	0	0	0	0	0	0	30.0	323.	30.0	921.
	12000	0	0	0	0	0	0	30.0	542.		
	14000	0	0	0	0	30.0	373.				
	16000	0	0	0	0						
	18000	0	0	30.0	528.						
	20000	30.0	486.								

REMARKS:
1. No wind.
2. Take-off distance is zero when hovering out-of-ground effect is possible.
3. No take-off distance is shown where hovering at 2 foot skid height is not possible.
4. Take-off distances will exceed those shown if hovering in-ground effect is performed for over one minute immediately prior to take-off.
5. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.

Chart 14–6. Take-off distance (Sheet 39 of 42)

TAKE-OFF DISTANCES — FEET

540

MAXIMUM PERFORMANCE - TWO FOOT SKID HEIGHT HOVERING TECHNIQUE

TAKE-OFF POWER - 6600 RPM

ARMY MODEL(S) UH-1B (540)
DATA AS OF: FEBRUARY 1964
DATA BASIS: ANALYTICAL METHOD
"PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
6000	0	0	0	0	0	0	0	0	0	0	0
	2000	0	0	0	0	0	0	0	0	0	0
	4000	0	0	0	0	0	0	0	0	0	0
	6000	0	0	0	0	0	0	0	0	30.0	418.
	8000	0	0	0	0	0	0	30.0	343.		
	10000	0	0	0	0	0	0	30.0	615.		
	12000	0	0	0	0	30.0	393.				
	14000	0	0	30.0	304.						
	16000	0	0	30.0	561.						
	18000	30.0	503.								
6500	0	0	0	0	0	0	0	0	0	0	0
	2000	0	0	0	0	0	0	0	0	0	0
	4000	0	0	0	0	0	0	0	0	30.0	442.
	6000	0	0	0	0	0	0	30.0	355.		
	8000	0	0	0	0	0	0	30.0	665.		
	10000	0	0	0	0	30.0	403.				
	12000	0	0	30.0	306.						
	14000	0	0	30.0	556.						
	16000	30.0	488.								

REMARKS:

1. No wind.
2. Take-off distance is zero when hovering out-of-ground effect is possible.
3. No take-off distance is shown where hovering at 2 foot skid height is not possible.
4. Take-off distances will exceed those shown if hovering in-ground effect is performed for over one minute immediate prior to take-off.
5. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.

Chart 14–6. Take-off distance (Sheet 40 of 42)

TAKE-OFF DISTANCES — FEET

540

MAXIMUM PERFORMANCE - TWO FOOT SKID HEIGHT HOVERING TECHNIQUE

TAKE-OFF POWER - 6600 RPM

ARMY MODEL(S) UH-1B (540)
DATA AS OF: FEBRUARY 1964
DATA BASIS: ANALYTICAL METHOD "PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
7000	0	0	0	0	0	0	0	0	0	0	0
	2000	0	0	0	0	0	0	0	0	30.0	448.
	4000	0	0	0	0	0	0	30.0	358.		
	6000	0	0	0	0	0	0	30.0	668.		
	8000	0	0	0	0	30.0	402.				
	10000	0	0	30.0	301.						
	12000	0	0	30.0	522.						
	14000	30.0	454.								
7500	0	0	0	0	0	0	0	0	0	30.0	435.
	2000	0	0	0	0	0	0	30.0	352.		
	4000	0	0	0	0	0	0	30.0	627.		
	6000	0	0	0	0	30.0	391.				
	8000	0	0	0	0						
	10000	0	0	30.0	477.						
	12000	30.0	414.								
8000	0	0	0	0	0	0	0	30.0	339.		
	2000	0	0	0	0	0	0	30.	566.		
	4000	0	0	0	0	30.0	372.				
	6000	0	0	0	0						
	8000	0	0	30.0	432.						
	10000	30.0	376.								

REMARKS:

1. No wind.
2. Take-off distance is zero when hovering out-of-ground effect is possible.
3. No take-off distance is shown where hovering at 2 foot skid height is not possible.
4. Take-off distances will exceed those shown if hovering in-ground effect is performed for over one minute immediately prior to take-off.
5. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.

Chart 14–6. Take-off distance (Sheet 41 of 42)

TAKE-OFF DISTANCES — FEET

540

MAXIMUM PERFORMANCE - TWO FOOT SKID HEIGHT HOVERING TECHNIQUE

TAKE-OFF POWER - 6600 RPM

ARMY MODEL(S) UH-1B (540)
DATA AS OF: FEBRUARY 1964
DATA BASIS: ANALYTICAL METHOD
"PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT LB	PRESSURE ALTITUDE 1000 FEET	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'	CLIMB OUT SPEED TAS KNOTS	DISTANCE TO CLEAR 50'
8500	0	0	0	0	0	0	0	30.0	506.		
	2000	0	0	0	0	30.0	347.				
	4000	0	0	0	0	30.0	661.				
	6000	0	0	30.0	390.						
	8000	30.0	341.								
	10000	30.0	789.								
9000	0	0	0	0	0	30.0	319.				
	2000	0	0	0	0	30.0	523.				
	4000	0	0	30.0	352.						
	6000	30.0	309	30.	830.						
	8000	30.0	547.								
9500	0	0	0	30.0	327.	30.	440.				
	2000	30.0	325.	30.0	352.						
	4000	30.0	361.	30.0	560.						
	6000	30.0	445.								

REMARKS:
1. No wind.
2. Take-off distance is zero when hovering out-of-ground effect is possible.
3. No take-off distance is shown where hovering at 2 foot skid height is not possible.
4. Take-off distances will exceed those shown if hovering in-ground effect is performed for over one minute immediately prior to take-off.
5. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.

Chart 14-6. Take-off distance (Sheet 42 of 42)

A

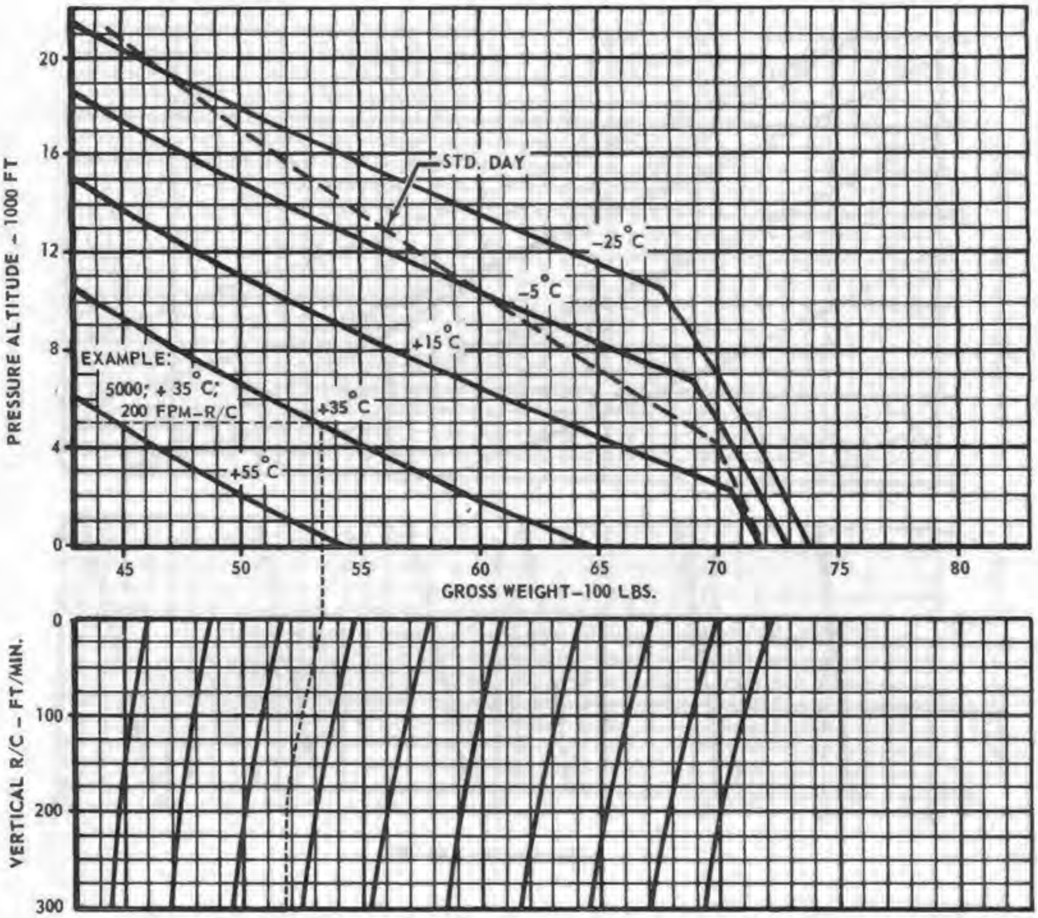
TAKE-OFF GROSS WEIGHT LIMITATIONS

A

OUT-OF-GROUND EFFECT

ARMY MODEL(S): UH-1A
DATA AS OF: 1 MARCH, 1964
DATA BASIS: FLIGHT TEST

ENGINE: LYCOMING T53-L-1A
ENGINE SPEED: 6400 RPM
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



REMARKS:

Chart 14–7. Take-off gross weight limitation (Sheet 1 of 4)

B-5

TAKE-OFF GROSS WEIGHT LIMITATIONS

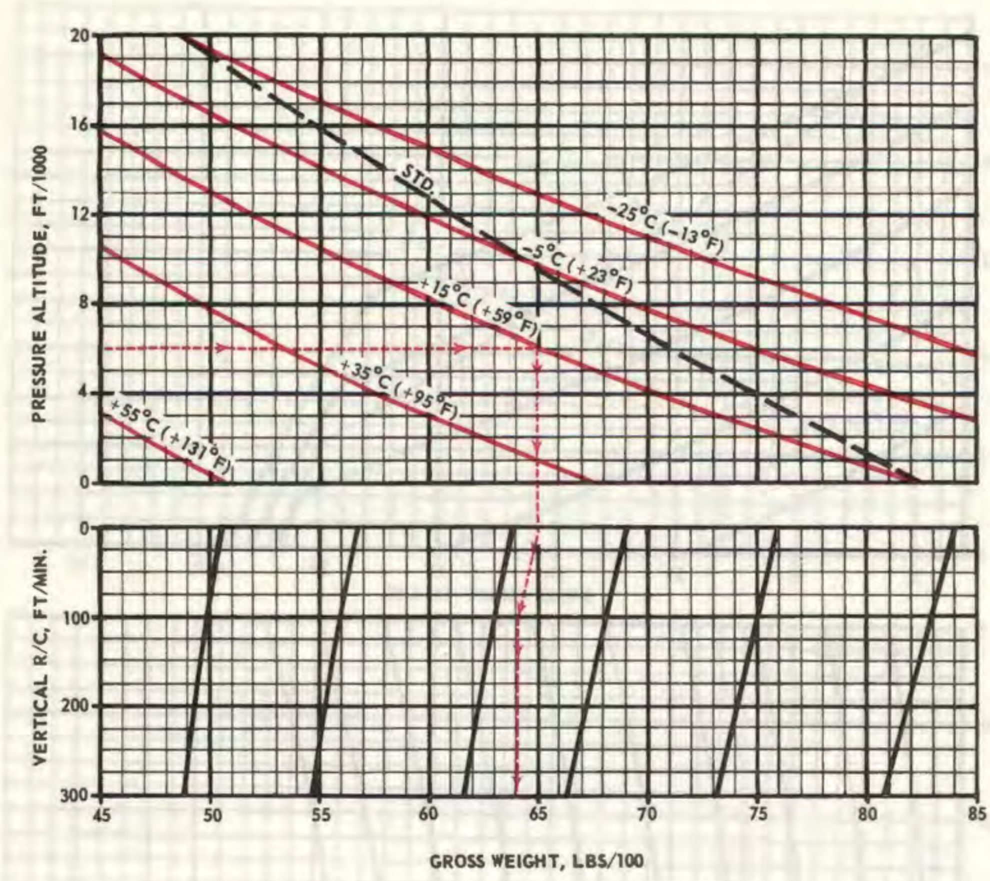
CLEAN CONFIGURATION

MAXIMUM GROSS WEIGHT FOR HOVERING

OUT OF GROUND EFFECT WITH TAKE-OFF POWER

ARMY MODEL(S): UH-1B
DATA AS OF: September 1962
DATA BASIS: Calculated from FTC-TDR-62-21, "YUH-1B Category II Performance Tests", Lycoming Engine Specification No. 104.16-B,

ENGINE: Lycoming T53-L-5
ENGINE SPEED: 6600 RPM
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lbs/Gal.



REMARKS:

1. The graph which is normally used for specific humidity correction has been intentionally omitted as the free shaft turbine engine is not materially affected by humidity changes.
2. Gross weight corrections for vertical rate of climb calculated at +35° C and are slightly conservative when used at lower temperatures.

Chart 14–7. Take-off gross weight limitation (Sheet 2 of 4)

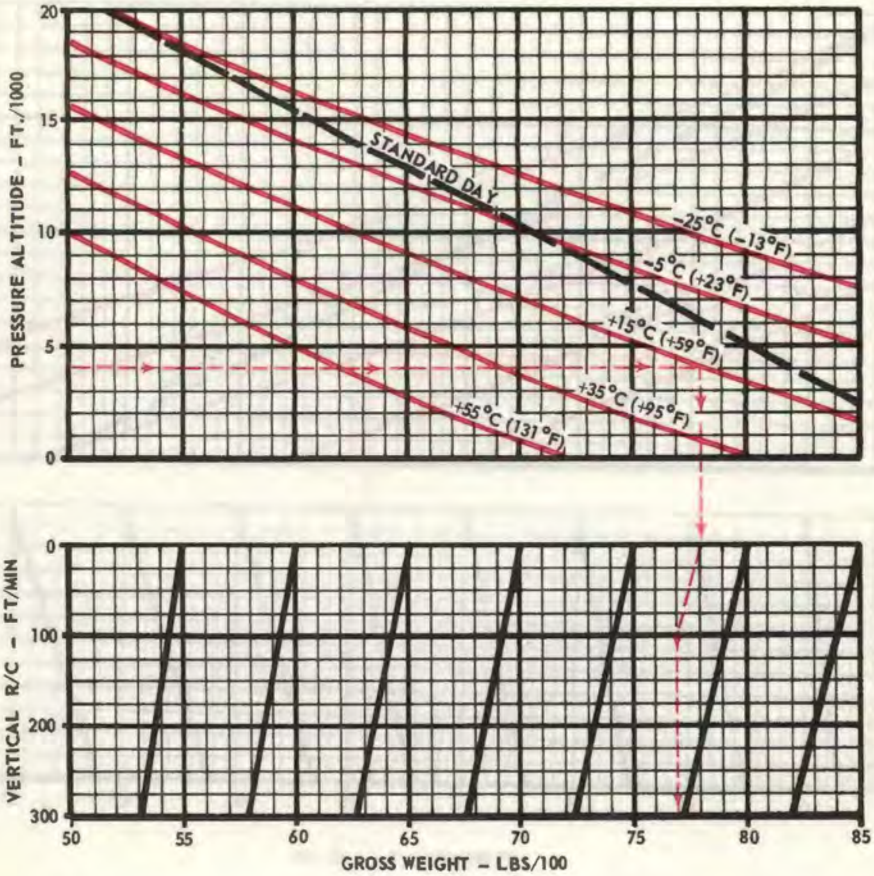
B9/11 **B9/11**

TAKE—OFF GROSS WEIGHT LIMITATION

CLEAN CONFIGURATION
MAXIMUM GROSS WEIGHT FOR HOVERING
OUT OF GROUND EFFECT WITH TAKE-OFF POWER
2°C INLET TEMPERATURE RISE

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER 1962
DATA BASIS: CALCULATED FROM FTC-TDR-62-21 "YUH-1B CATAGORY II PERFORMANCE TESTS" AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINES: T53-L-9/9A/11
ENGINE RPM: 6600
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LBS/GAL.



REMARKS:
1. The graph normally used for specific humidity correction has been intentionally omitted as the free shaft turbine engine is not materially affected by humidity changes.
2. Gross weight corrections for vertical rate of climb calculated at +35°C and are slightly conservative when used at lower temperatures.

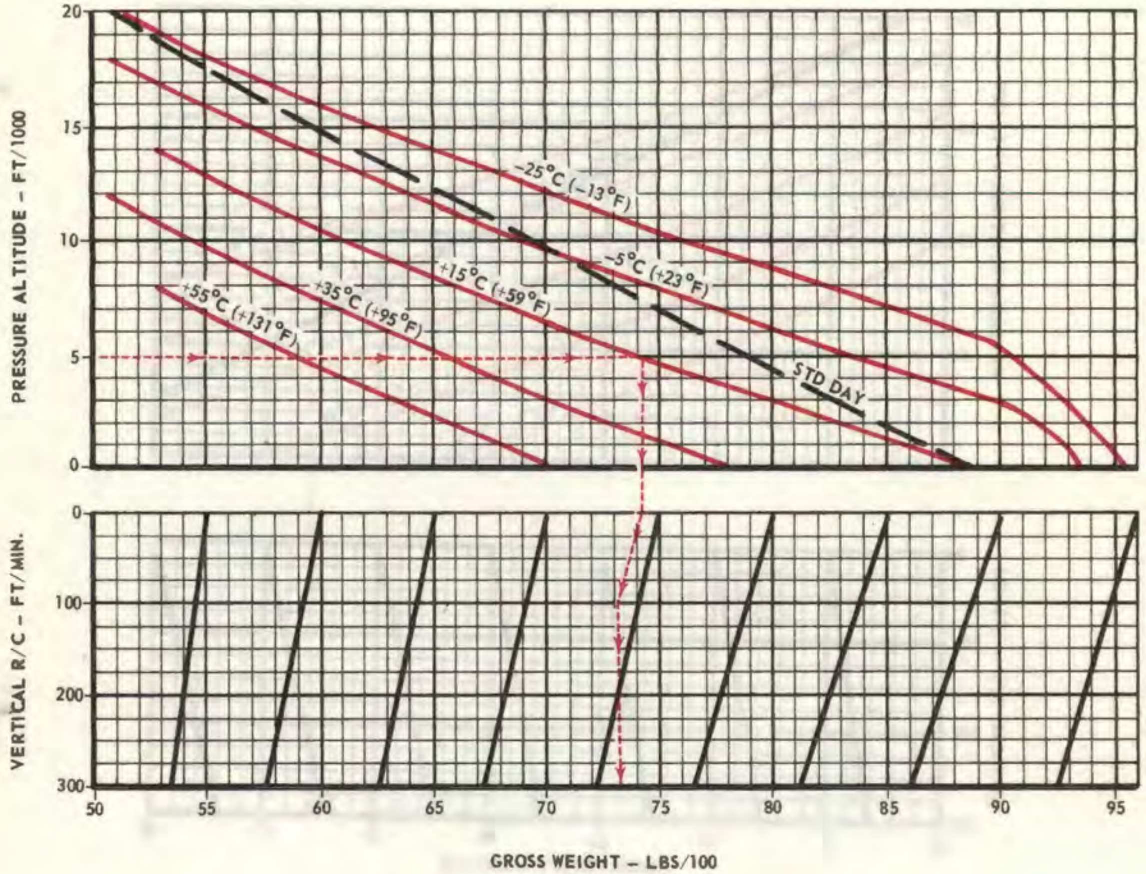
Chart 14–7. Take-off gross weight limitation (Sheet 3 of 4)

TAKE-OFF GROSS WEIGHT LIMITATIONS

CLEAN CONFIGURATION
MAXIMUM GROSS WEIGHT FOR HOVERING
OUT OF GROUND EFFECT WITH TAKE-OFF POWER
6600 RPM 2°C INLET TEMP. RISE

MODEL: UH-1B (540
DATA AS OF: February, 1964
DATA BASIS: Military Potential Test of the Model 540 "Door Hinge" Rotor System

ENGINE: Lycoming T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LBS/GAL



REMARKS: (1) The graph normally used for Specific Humidity Correction has been intentionally omitted as the free shaft turbine is not materially affected by humidity changes.

(2) Gross weight corrections for vertical rate of climb calculated at +35°C and are slightly conservative when used at lower temperatures.

Chart 14–7. Take-off gross weight limitation (Sheet 4 of 4)

HOVERING

A

CLEAN CONFIGURATION
MAXIMUM GROSS WEIGHT FOR HOVERING OUT OF GROUND EFFECT WITH NORMAL RATED POWER

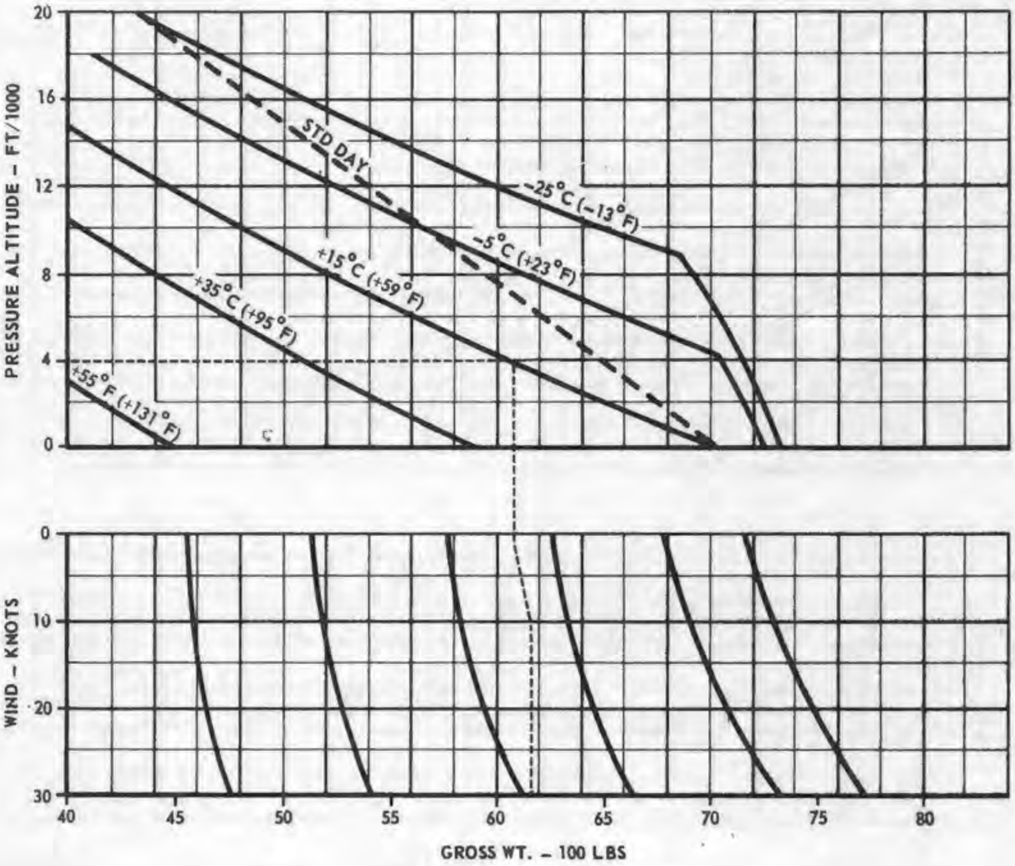
6400 RPM

MODEL(S): UH-1A
DATA AS OF: January 1961
DATA BASIS: AFFTC Phase IV
Flight Test of YH-40

ENGINE:	Lycoming T53-L-1A
FUEL GRADE:	JP-4
FUEL DENSITY:	6.5 LB/GAL

Climatic Condition

Pressure Altitude	4000 feet
Temperature	15°C (59°F)
Headwind	10 knots



REMARKS: (1) The graph which is normally used for Specific Humidity Correction has been intentionally omitted as the free shaft turbine engine is not materially affected by humidity changes.

Chart 14-8. Hovering out-of-ground effect (Sheet 1 of 8)

HOVERING

A

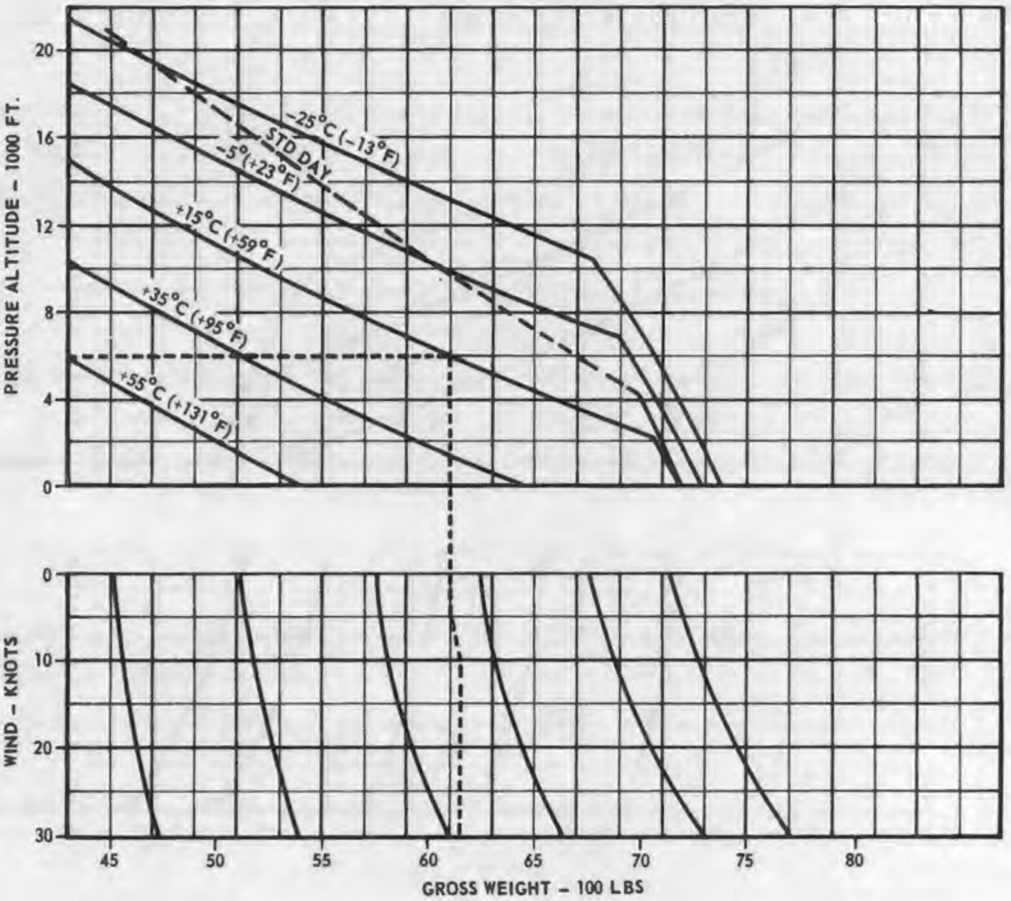
CLEAN CONFIGURATION
MAXIMUM GROSS WEIGHT FOR HOVERING
OUT OF GROUND EFFECT WITH MAXIMUM POWER

MODEL(S): UH-1A
DATA AS OF: January 1961
DATA BASIS: AFFTC Phase IV
Flight Test YH-40

6400 RPM

ENGINE: Lycoming T53-L-1A
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Climatic Condition	
Pressure Altitude	6000 feet
Temperature	15°C (59°F)
Headwind	10 knots



REMARKS: (1) The graph which is normally used for Specific Humidity Correction has been intentionally omitted as the free shaft turbine engine is not materially affected by humidity changes.

Chart 14-8. Hovering out-of-ground effect (Sheet 2 of 8)

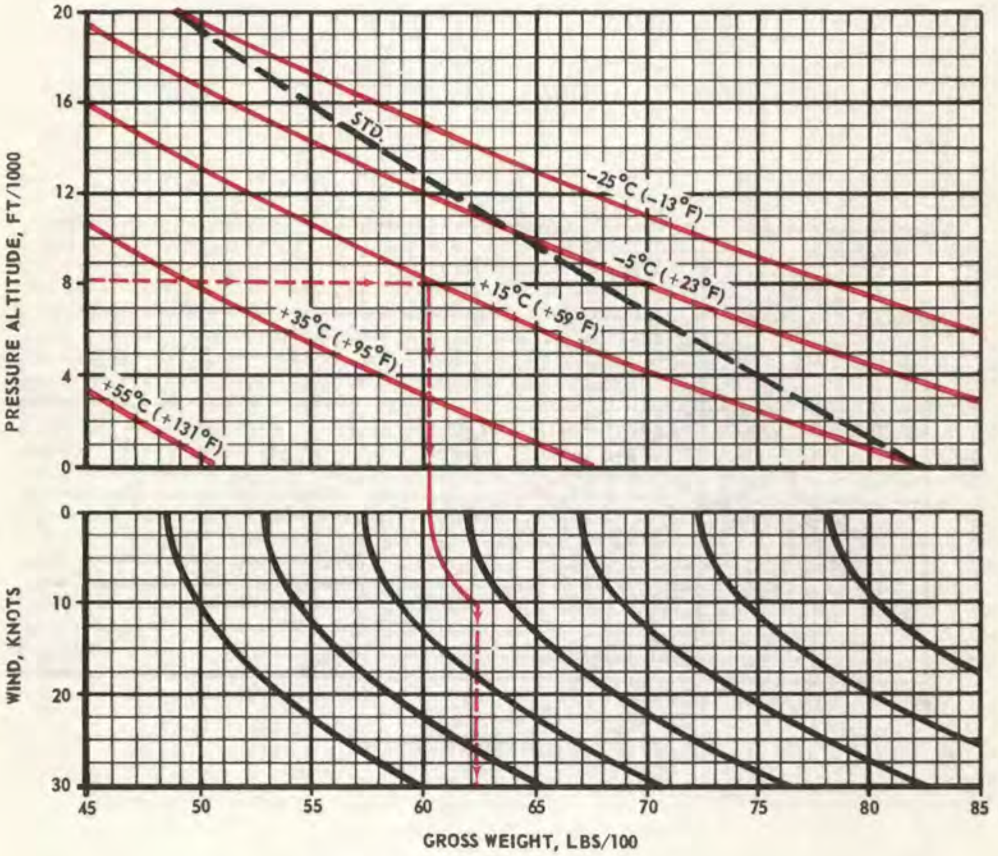
HOVERING

CLEAN CONFIGURATION
MAXIMUM GROSS WEIGHT FOR HOVERING
OUT OF GROUND EFFECT WITH TAKE-OFF POWER

B-5

ARMY MODEL(S): UH-1B
DATA AS OF: September 1962
DATA BASIS: Calculated from FTC-TDR-62-21, "YUH-1B Category II Performance Tests", Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
ENGINE SPEED: 6600 RPM
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lbs/Gal.



REMARKS: 1. The graph which is normally used for specific humidity correction has been intentionally omitted as the free shaft turbine engine is not materially affected by humidity changes.
2. Gross weight corrections for wind calculated at -25°C and are conservative when used at higher temperatures. Conservatism increases with wind velocity.

Chart 14-8. Hovering out-of-ground effect (Sheet 3 of 8)

HOVERING

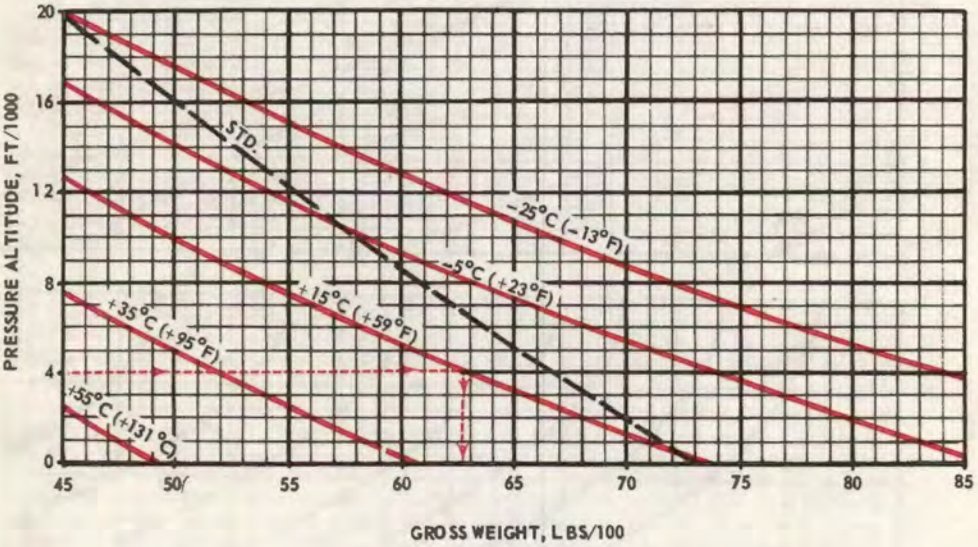
CLEAN CONFIGURATION
MAXIMUM GROSS WEIGHT FOR HOVERING

B-5

OUT OF GROUND EFFECT WITH NORMAL RATED POWER

ARMY MODEL(S): UH-1B
DATA AS OF: September 1962
DATA BASIS: Calculated from FTC-TDR-62-21 "YUH-1B Category II Performance Tests", Lycoming Engine Specification No. 104.16-B,

ENGINE: Lycoming T53-L-5
ENGINE SPEED: 6600 RPM
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lbs/Gal.



REMARKS: The graph which is normally used for specific humidity correction has been intentionally omitted as the free shaft turbine engine is not materially affected by humidity changes.

Chart 14-8. Hovering out-of-ground effect (Sheet 4 of 8)

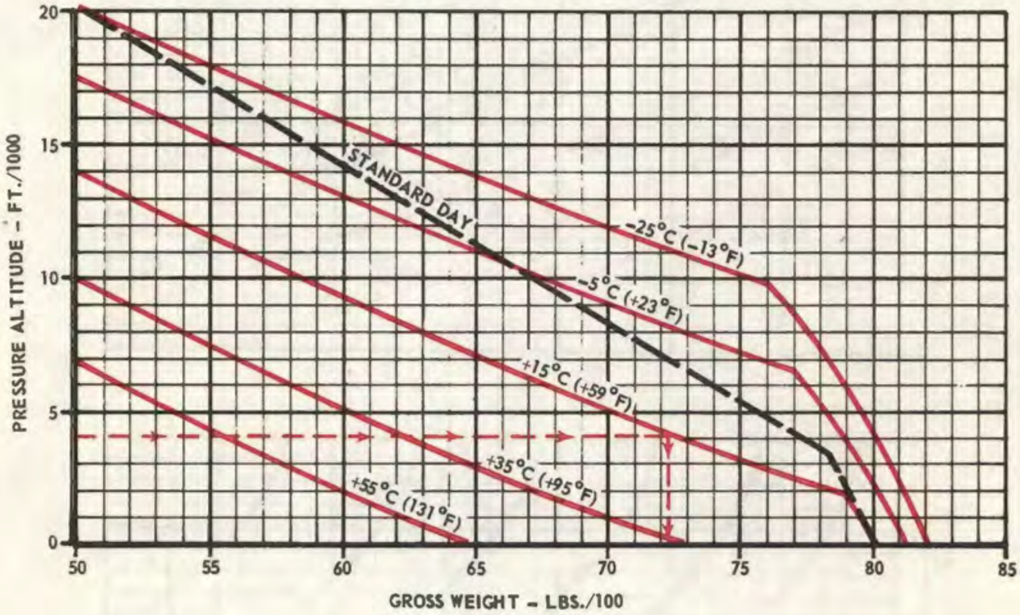
B9/11 **B9/11**

HOVERING

CLEAN CONFIGURATION
MAXIMUM GROSS WEIGHT FOR HOVERING
OUT OF GROUND EFFECT WITH NORMAL RATED POWER
2°C INLET TEMPERATURE RISE

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER 1962
DATA BASIS: CALCULATED FROM FTC-TDR-62-21 "YUH-1B CATAGORY II PERFORMANCE TESTS" AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINES: T53-L-9/9A/11
ENGINE RPM: 6600
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LBS/GAL.



REMARKS: 1. The graph normally used for specific humidity correction has been intentionally omitted as the free shaft turbine engine is not materially affected by humidity changes.

Chart 14-8. Hovering out-of-ground effect (Sheet 5 of 8)

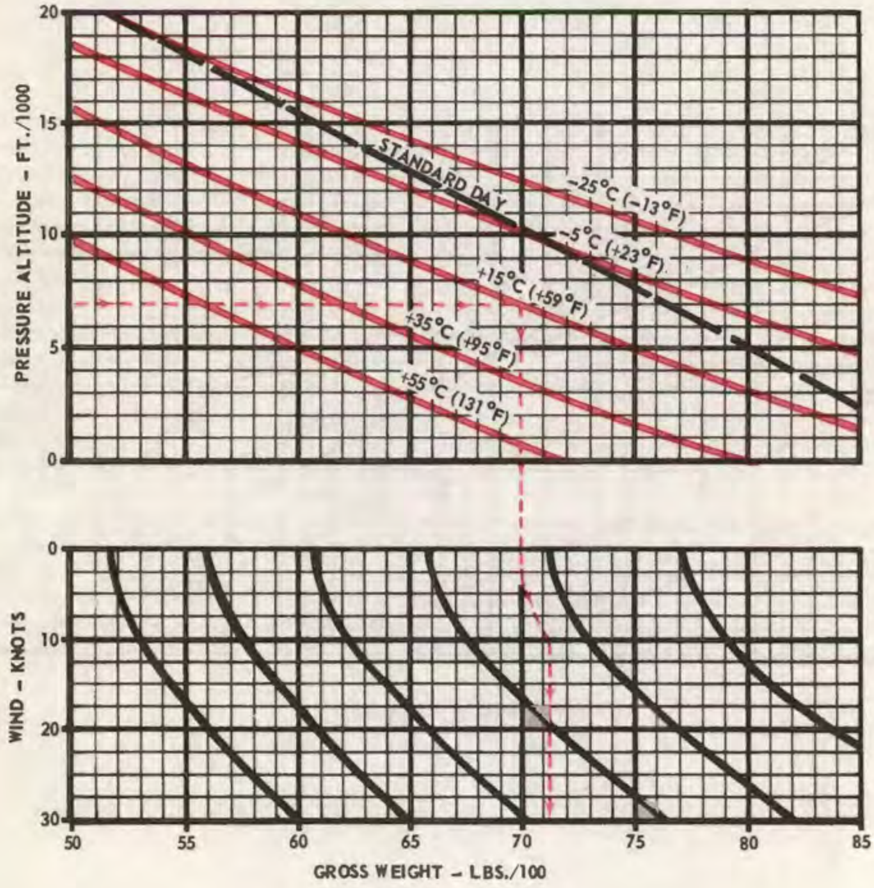
B9/11 B9/11

HOVERING

CLEAN CONFIGURATION
MAXIMUM GROSS WEIGHT FOR HOVERING
OUT OF GROUND EFFECT WITH TAKE-OFF POWER
2°C INLET TEMPERATURE RISE

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER 1962
DATA BASIS: CALCULATED FROM FTC-TDR-62-21 "YUH-1B CATEGORY II, PERFORMANCE TESTS" AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINES: T53-L-9/9A/11
ENGINE RPM: 6600
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LBS/GAL.



REMARKS:

1. The graph which is normally used for specific humidity correction has been intentionally omitted as the free shaft turbine engine is not materially affected by humidity changes.
2. Gross weight corrections for wind calculated a -25°C and are conservative when used at higher temperatures. Conservatism increases with wind velocity.

Chart 14-8. Hovering out-of-ground effect (Sheet 6 of 8)

HOVERING

540

CLEAN CONFIGURATION
MAXIMUM GROSS WEIGHT FOR HOVERING
OUT OF GROUND EFFECT WITH NORMAL RATED POWER
6600 RPM 2°C INLET TEMP. RISE

MODEL: UH-1B (540)
DATA AS OF: February, 1964
DATA BASIS: Military Potential Test of the Model 540 "Door Hinge" Rotor System

ENGINE: Lycoming T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LBS/GAL

REMARKS:

(1) The graph normally used for Specific Humidity Correction has been intentionally omitted as the free shaft turbine is not materially affected by humidity changes.

Chart 14-8. Hovering out-of-ground effect (Sheet 7 of 8)

HOVERING

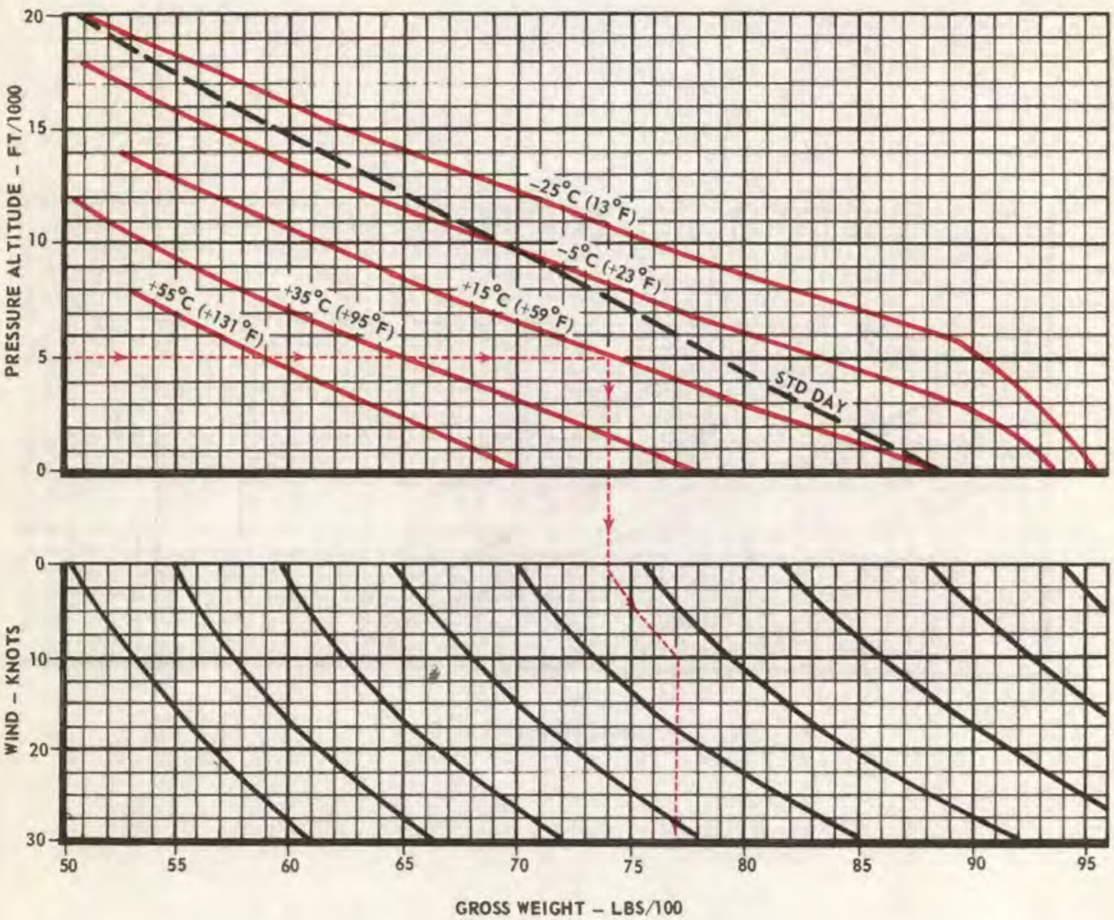
540

CLEAN CONFIGURATION
MAXIMUM GROSS WEIGHT FOR HOVERING
OUT OF GROUND EFFECT WITH TAKE-OFF POWER

6600 RPM 2°C INLET TEMP. RISE

MODEL: UH-1B (540)
DATA AS OF: February, 1964
DATA BASIS: Military Potential Test of the Model 540 "Door Hinge" Rotor System

ENGINE: Lycoming T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LBS/GAL



REMARKS:

(1) The graph normally used for Specific Humidity Correction has been intentionally omitted as the free shaft turbine is not materially affected by humidity changes.

(2) Gross weight corrections for wind calculated at -25°C and are conservative when used at higher temperatures. Conservatism increases with wind velocity.

Chart 14-8. Hovering out-of-ground effect (Sheet 8 of 8)

HOVERING

A

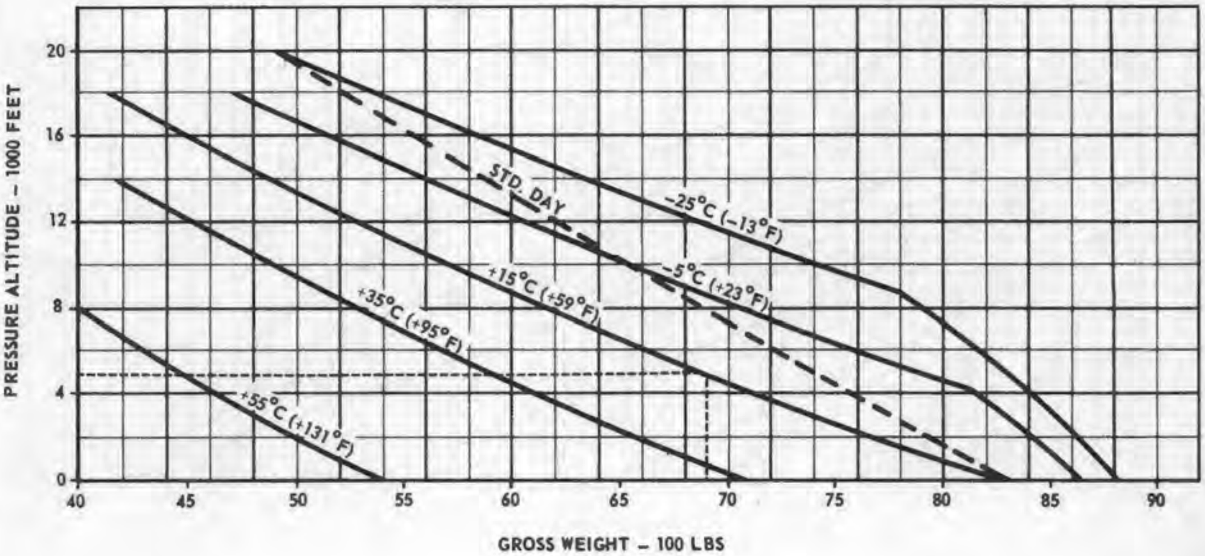
CLEAN CONFIGURATION
MAXIMUM GROSS WEIGHT FOR HOVERING IN GROUND EFFECT WITH NORMAL RATED POWER

(6400 RPM) (Skid Height = 2 Ft.)

MODEL(S): UH-1A
DATA AS OF: January 1961
DATA BASIS: AFFTC Phase IV
Flight Test YH-40

ENGINE: Lycoming T53-L-1A
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Climatic Condition
Pressure Altitude 5000 feet
Temperature 15°C (59°F)
Headwind 10 knots



REMARKS: (1) The graph which is normally used for Specific Humidity Correction has been intentionally omitted as the free shaft turbine engine is not materially affected by humidity changes

Chart 14-9. Hovering in-ground effect (Sheet 1 of 8)

HOVERING

CLEAN CONFIGURATION
MAXIMUM GROSS WEIGHT FOR HOVERING IN GROUND EFFECT WITH MAXIMUM RATED POWER

A

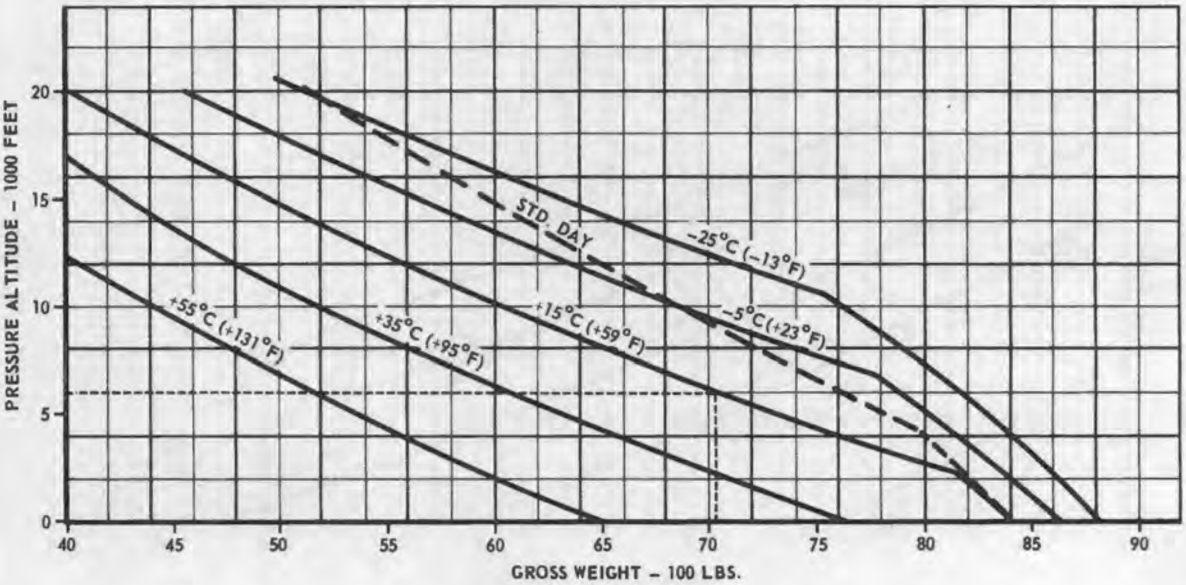
(6400 RPM) (Skid Height = 2 Ft.)

MODEL(S): UH-1A
DATA AS OF: January 1961
DATA BASIS: AFFTC Phase IV
Flight Test YH-40

ENGINE: Lycoming T53-L-1A
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Climatic Condition

Pressure Altitude	6000 feet
Temperature	15°C (59°F)
Headwind	10 knots



REMARKS: (1) The graph which is normally used for Specific Humidity Correction has been intentionally omitted as the free shaft turbine engine is not materially affected by humidity changes.

Chart 14-9. Hovering in-ground effect (Sheet 2 of 8)

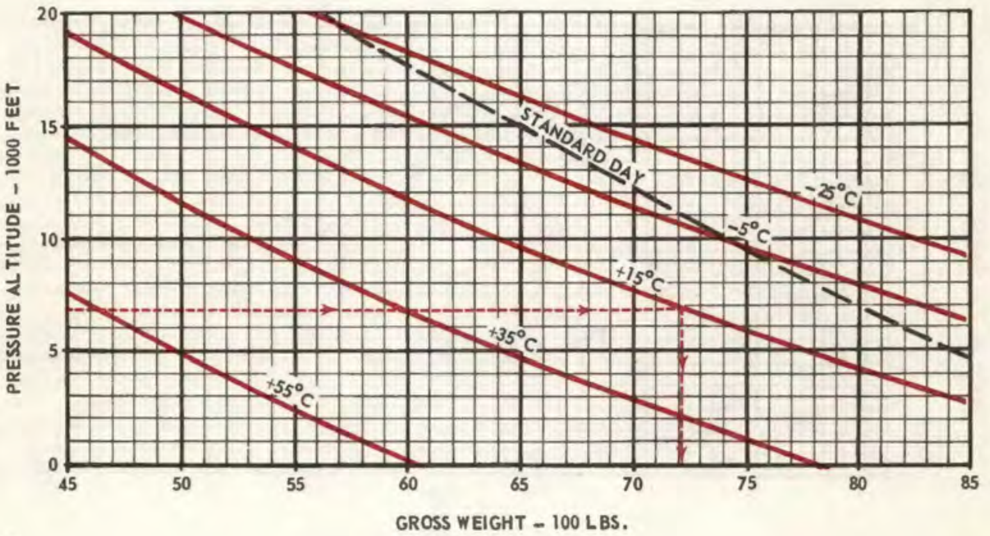
HOVERING

CLEAN CONFIGURATION
MAXIMUM GROSS WEIGHT FOR HOVERING
IN GROUND EFFECT WITH TAKE-OFF POWER
2°C INLET TEMPERATURE RISE

B-5

ARMY MODEL(S): UH-1B
DATA AS OF: September 1962
DATA BASIS: Calculated from FTC-TDR-62-21, "YUH-1B Category II Performance Tests" and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
ENGINE SPEED: 6600 RPM
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lbs/Gal.



REMARKS: The graph which is normally used for specific humidity correction has been intentionally omitted as the free shaft turbine engine is not materially affected by humidity changes

Prolonged hovering in ground effect (IGE) will reduce hover ceiling

Chart 14-9. Hovering in-ground effect (Sheet 3 of 8)

HOVERING

B-5

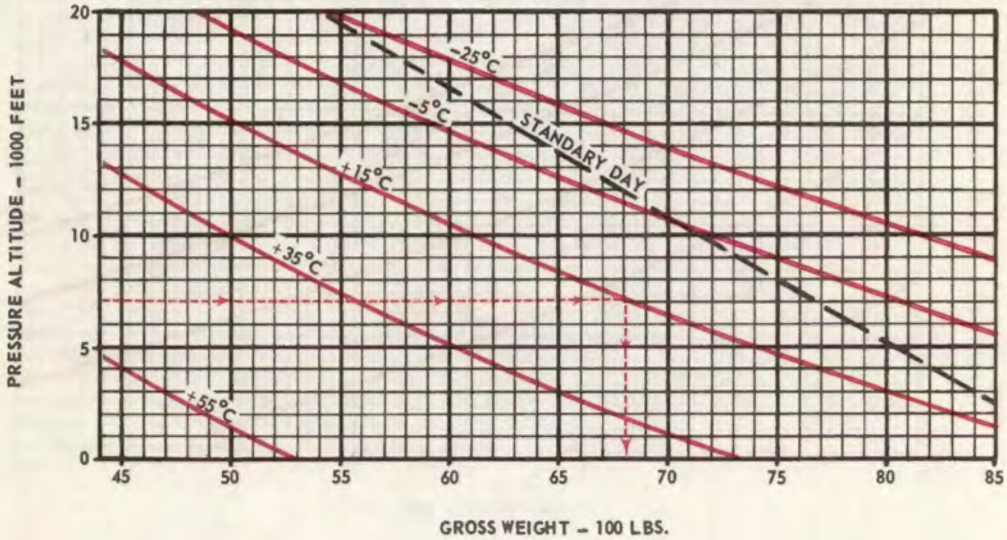
CLEAN CONFIGURATION

MAXIMUM GROSS WEIGHT FOR HOVERING

IN GROUND EFFECT WITH TAKE-OFF POWER
. 10°C INLET TEMPERATURE RISE

MODEL: UH-1B
DATA AS OF: September 1962
DATA BASIS: Calculated from FTC-TDR-62-21 "YUH-1B Category II Performance Tests" and Lycoming engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
ENGINE SPEED: 6600 RPM
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.



REMARKS: In Ground Effect Performance For Periods Of Hovering Longer Than One Minute.

The graph which is normally used for specific humidity correction has been intentionally omitted as the free shaft turbine engine is not materially affected by humidity changes.

These data calculated for an inlet temperature rise of 10°C.

Chart 14-9. Hovering in-ground effect (Sheet 4 of 8)

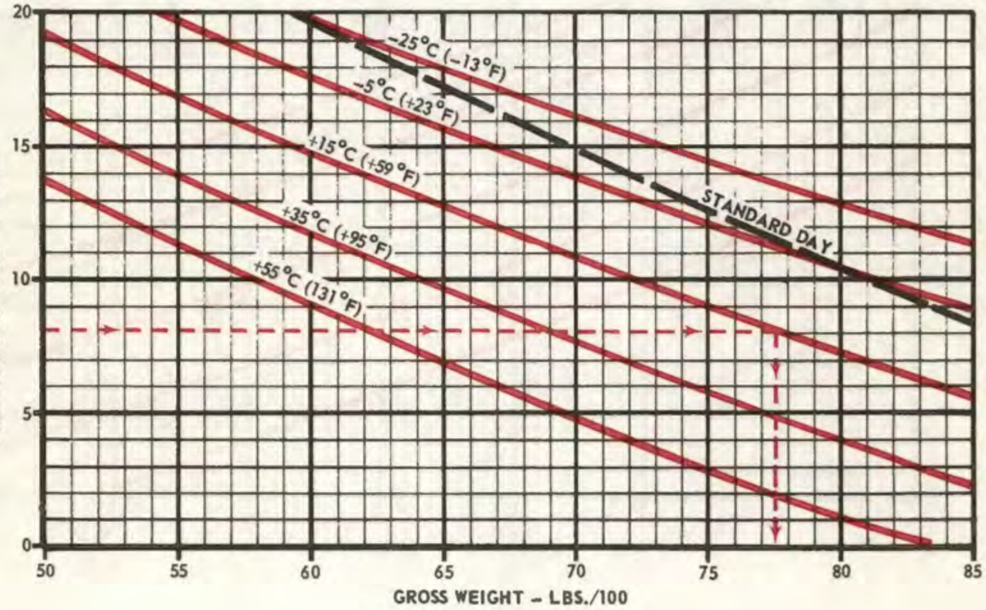
B9/11 B9/11

HOVERING

CLEAN CONFIGURATION
MAXIMUM GROSS WEIGHT FOR HOVERING IN GROUND EFFECT WITH TAKE-OFF POWER
2°C INLET TEMPERATURE RISE
2 FT. SKID HEIGHT

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER 1962
DATA BASIS: CALCULATED FROM FTC-TDR-62-21 "YUH-1B CATAGORY II PERFORMANCE TESTS" AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINES: T53-L-9/9A/11
ENGINE RPM: 6600
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LBS/GAL.



REMARKS: 1. The graph normally used for specific humidity correction has been intentionally omitted as the free shaft turbine is not materially affected by humidity changes.
2. Prolonged hovering in ground effect will reduce hover ceiling.

Chart 14-9. Hovering in-ground effect (Sheet 5 of 8)

B9/11 B9/11

HOVERING

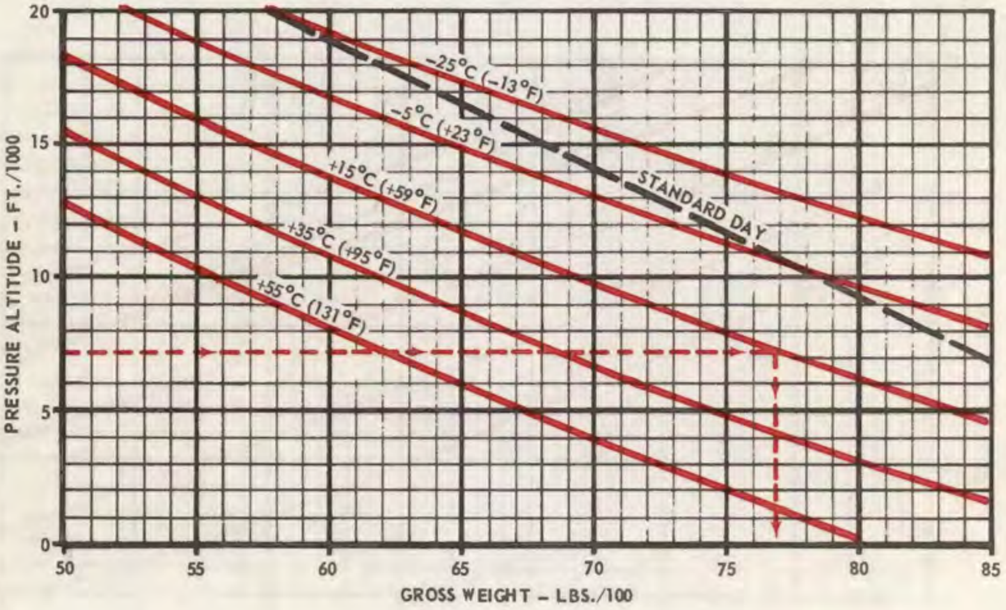
CLEAN CONFIGURATION
MAXIMUM GROSS WEIGHT FOR HOVERING IN GROUND EFFECT WITH TAKE-OFF POWER

10°C INLET TEMPERATURE RISE
2 FT. SKID HEIGHT

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER 1962
DATA BASIS: CALCULATED FROM FTC-TDR-62-21 "YUH-1B CATAGORY II PERFORMANCE TESTS" AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINES: T53-L-9/9A/11
ENGINE RPM: 6600
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LBS/GAL.

IN GROUND EFFECT PERFORMANCE FOR PERIODS OF HOVERING LONGER THAN ONE MINUTE



REMARKS: 1. The graph normally used for specific humidity correction has been intentionally omitted as the free shaft turbine is not materially affected by humidity changes.

2. These data calculated for an inlet termperature rise of 10°C.

Chart 14-9. Hovering in-ground effect (Sheet 6 of 8)

HOVERING

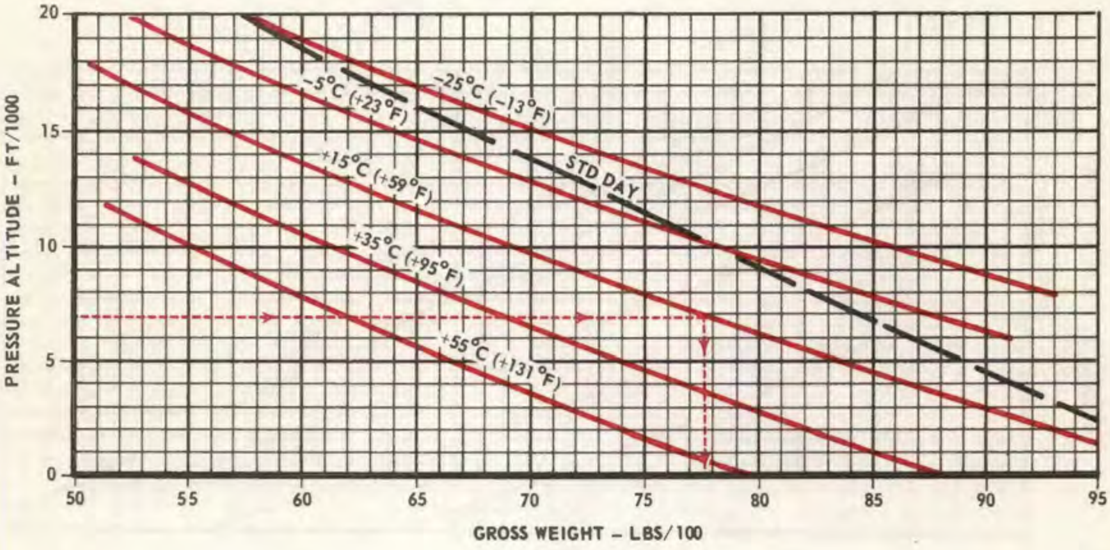
540

CLEAN CONFIGURATION
MAXIMUM GROSS WEIGHT FOR HOVERING IN GROUND EFFECT WITH TAKE-OFF POWER

6600 RPM 2 FT SKID HEIGHT
2°C INLET TEMP. RISE

MODEL: UH-1B (540)
DATA AS OF: February, 1964
DATA BASIS: Military Potential Test of the Model 540 "Door Hinge" Rotor System

ENGINE: Lycoming T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LBS/GAL



REMARKS: (1) The graph normally used for Specific Humidity Correction has been intentionally omitted as the free shaft turbine is not materially affected by humidity changes.

(2) Prolonged hovering in ground effect will reduce hover ceiling.

Chart 14-9. Hovering in-ground effect (Sheet 7 of 8)

HOVERING

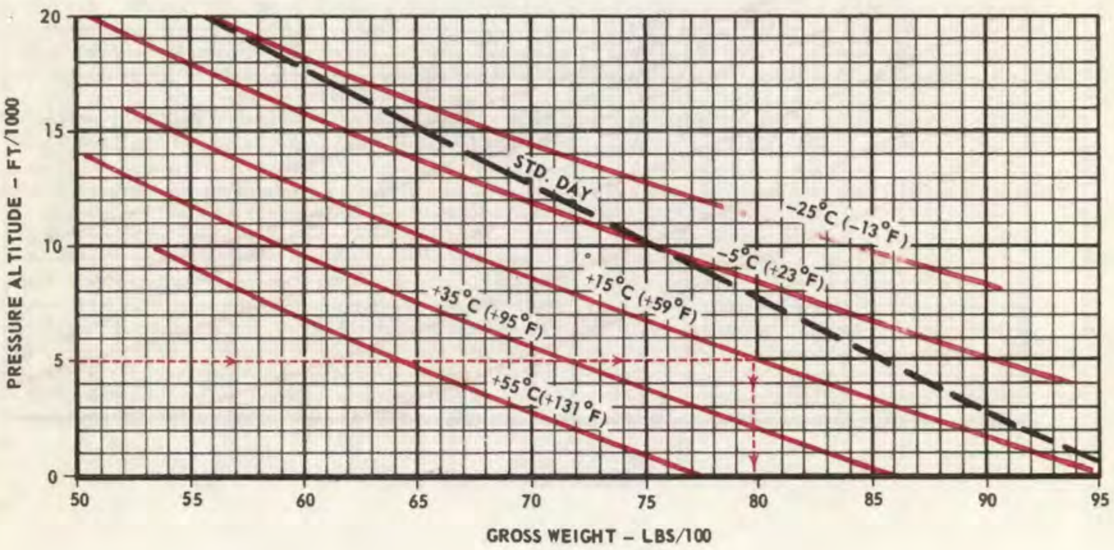
CLEAN CONFIGURATION
MAXIMUM GROSS WEIGHT FOR HOVERING IN GROUND EFFECT WITH TAKE-OFF POWER

6600 RPM 2 FT SKID HEIGHT
10°C INLET TEMP. RISE

MODEL: UH-1B (540)
DATA AS OF: February, 1964
DATA BASIS: Military Po
Model 540 "Door Hinge" Roto

ENGINE: Lycoming T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LBS/GAL

IN GROUND EFFECT PERFORMANCE
FOR PERIODS OF HOVERING
LONGER THAN ONE MINUTE



REMARKS:

(1) The graph normally used for Specific Humidity Correction has been intentionally omitted as the free shaft turbine is not materially affected by humidity changes.

(2) These data calculated for an inlet temperature rise of 10°C.

Chart 14-9. Hovering in-ground effect (Sheet 8 of 8)

CLIMB CHART FOR NORMAL POWER A

STANDARD DAY

6400 RPM

ARMY MODEL(S): UH-1A
DATA AS OF: February 1961
DATA BASIS: AFFTC Phase IV
Flight Test of YH-40

ENGINE: LYCOMING T53-L-1A
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

CONFIGURATION: CLEAN
WEIGHT: 7200 LBS

CONFIGURATION: CLEAN
WEIGHT: 6600 LBS

APPROXIMATE				M. P. IN. Hg	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	M. P. IN. Hg	APPROXIMATE			
RATE OF CLIMB FT/MIN	FROM SEA LEVEL								FROM SEA LEVEL			RATE OF CLIMB FT/MIN
	DIST. N.MI.	TIME MIN.	FUEL LBS.						FUEL LBS.	TIME MIN.	DIST. N.MI.	
1349	0	0	21.3	-	60	SL	58	-	21.3	0	0	1670
1184	1.56	1.57	37.7	-	57	2,000	58	-	34.4	1.25	1.23	1530
936	3.38	3.44	56.4	-	56	4,000	56	-	48.1	2.62	2.59	1382
516	5.78	6.04	81.1	-	48	6,000	53	-	62.9	4.17	4.11	1170
						8,000	49	-	80.3	6.11	5.95	806
						10,000	42	-	112.3	9.68	9.07	198
						12,000						
						14,000						
						16,000						
						18,000						

CONFIGURATION: CLEAN
WEIGHT: 6100 LBS

CONFIGURATION: CLEAN
WEIGHT: 5800 LBS

APPROXIMATE				M. P. IN. Hg	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	M. P. IN. Hg	APPROXIMATE			
RATE OF CLIMB FT/MIN	FROM SEA LEVEL								FROM SEA LEVEL			RATE OF CLIMB FT/MIN
	DIST. N.MI.	TIME MIN.	FUEL LBS.						FUEL LBS.	TIME MIN.	DIST. N.MI.	
1948	0	0	21.3	-	56	SL	55	-	21.3	0	0	2130
1831	1.00	1.05	32.3	-	56	2,000	55	-	31.3	.96	.89	2002
1689	2.11	2.19	43.7	-	56	4,000	55	-	41.6	1.99	1.87	1884
1534	3.34	3.43	55.5	-	55	6,000	54	-	52.0	3.09	2.95	1731
1329	4.71	4.82	68.0	-	52	8,000	53	-	63.0	4.31	4.16	1552
998	6.33	6.50	82.2	-	48	10,000	50	-	74.7	5.69	5.52	1326
448	8.72	9.17	103.4	-	43	12,000	46	-	88.3	7.40	7.14	958
						14,000	40	-	109.6	10.25	9.64	338
						16,000						
						18,000						
						20,000						

REMARKS: (1) Fuel for warm-up and take-off = 21.3 Lbs
(2) Spec. Fuel Flow increased 5%

Chart 14-10. Climb (Sheet 1 of 13)

CLIMB CHART FOR NORMAL POWER A

STANDARD DAY

ARMY MODEL(S): UH-1A
DATA AS OF: February 1961
DATA BASIS: AFFTC Phase IV Flight Test of YH-40

6400 RPM

ENGINE: Lycoming T53-L-1A
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

CONFIGURATION: CLEAN
WEIGHT: 5300 LBS

CONFIGURATION: CLEAN
WEIGHT: 4800 LBS

APPROXIMATE				M. P. IN. Hg	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	M. P. IN. Hg	APPROXIMATE			
RATE OF CLIMB FT/MIN	FROM SEA LEVEL								FROM SEA LEVEL			RATE OF CLIMB FT/MIN
	DIST. N.MI.	TIME MIN.	FUEL LBS.						FUEL LBS.	TIME MIN.	DIST. N.MI.	
2465	0	0	21.3	-	53	SL	51	-	21.3	0	0	2865
2342	.74	.83	30.0	-	52	2,000	50	-	28.7	.71	.61	2729
2208	1.54	1.71	38.8	-	51	4,000	50	-	36.2	1.46	1.27	2599
2073	2.41	2.64	47.6	-	52	6,000	50	-	43.7	2.25	1.98	2450
1916	3.38	3.64	56.6	-	52	8,000	50	-	51.2	3.09	2.76	2308
1737	4.46	4.73	65.8	-	51	10,000	50	-	58.8	3.99	3.62	2141
1524	5.67	5.95	75.5	-	49	12,000	49	-	66.5	4.96	4.57	1955
1216	7.06	7.38	86.2	-	46	14,000	48	-	74.6	6.04	5.68	1745
667	8.92	9.42	100.5	-	41	16,000	46	-	83.2	7.27	6.85	1466

CONFIGURATION: CLEAN
WEIGHT:

CONFIGURATION: CLEAN
WEIGHT: 4800 LBS (Cont)

APPROXIMATE				M. P. IN. Hg	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	M. P. IN. Hg	APPROXIMATE			
RATE OF CLIMB FT/MIN	FROM SEA LEVEL								FROM SEA LEVEL			RATE OF CLIMB FT/MIN
	DIST. N.MI.	TIME MIN.	FUEL LBS.						FUEL LBS.	TIME MIN.	DIST. N.MI.	
						18,000	42	-	93.5	8.82	8.80	1027
						20,000	35	-	110.8	11.61	11.05	200

REMARKS: (1) Fuel for warm-up and take-off = 21.3 Lbs.
(2) Spec. Fuel flow increased 5%

Chart 14-10. Climb (Sheet 2 of 13)

CLIMB CHART FOR NORMAL POWER A

STANDARD DAY

ARMY MODEL(S): UH-1A
DATA AS OF: February 1961
DATA BASIS: AFFTC Phase IV
Flight Test of YH-40

6400 RPM

ENGINE: Lycoming T53-L-1A
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

CONFIGURATION: CLEAN
WEIGHT: 4300 LBS

CONFIGURATION: CLEAN
WEIGHT:

APPROXIMATE				M. P. IN. Hg	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	M. P. IN. Hg	APPROXIMATE			
RATE OF CLIMB FT/MIN	FROM SEA LEVEL								FROM SEA LEVEL			RATE OF CLIMB FT/MIN
	DIST. N.MI.	TIME MIN.	FUEL LBS.						FUEL LBS.	TIME MIN.	DIST. N.MI.	
3329	0	0	21.3	-	49	SL						
3205	.50	.61	27.7	-	49	2,000						
3060	1.04	1.25	34.1	-	49	4,000						
2922	1.62	1.92	40.5	-	48	6,000						
2756	2.26	2.63	46.1	-	47	8,000						
2576	2.94	3.38	53.2	-	47	10,000						
2411	3.68	4.18	59.6	-	47	12,000						
2217	4.52	5.05	66.1	-	47	14,000						
1982	5.50	6.00	73.3	-	47	16,000						

CONFIGURATION: CLEAN
WEIGHT: 4300 LBS (Cont)

CONFIGURATION: CLEAN
WEIGHT:

APPROXIMATE				M. P. IN. Hg	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	M. P. IN. Hg	APPROXIMATE			
RATE OF CLIMB FT/MIN	FROM SEA LEVEL								FROM SEA LEVEL			RATE OF CLIMB FT/MIN
	DIST. N.MI.	TIME MIN.	FUEL LBS.						FUEL LBS.	TIME MIN.	DIST. N.MI.	
1741	6.55	7.07	81.8	-	45	18,000						
1402	7.75	8.34	93.3	-	42	20,000						
870	9.26	10.05	113.8	-	37	22,000						

REMARKS: (1) Fuel for warm-up and take-off = 21.3 Lbs
(2) Spec. Fuel flow increased 5%

Chart 14-10. Climb (Sheet 3 of 13)

B-5

CLIMB CHART FOR NORMAL POWER

STANDARD DAY

ENGINE SPEED - 6600 RPM

ARMY MODEL(S): UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR-62-21 "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

CONFIGURATION: CLEAN
WEIGHT 5000

CONFIGURATION: CLEAN
WEIGHT: 5500

APPROXIMATE				TORQUE PRESS	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	TORQUE PRESS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL								FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL						FUEL	TIME	DIST.	
F.P.M.	N. MI.	MIN.	LBS	PSIG				PSIG	LBS	MIN.	N. MI.	F.P.M.
2637	0.0	0.0	20.6	34.9	53.4	SL	54.4	34.9	20.6	0.0	0.0	2272
2487	0.6	0.8	28.5	33.5	52.5	2,000	53.5	33.5	29.8	0.9	0.8	2131
2320	1.3	1.6	36.5	32.1	51.6	4,000	52.6	32.1	39.1	1.9	1.6	1974
2155	2.0	2.5	44.6	30.7	50.7	6,000	51.8	30.7	48.7	2.9	2.5	1820
1994	2.9	3.5	52.8	29.3	49.8	8,000	51.0	29.3	58.5	4.1	3.6	1672
1846	3.8	4.5	61.3	28.1	49.0	10,000	50.2	28.1	68.6	5.3	4.7	1538
1703	4.8	5.6	69.9	26.9	48.2	12,000	49.4	26.9	79.0	6.7	6.0	1409
1560	6.0	6.9	78.9	25.8	47.5	14,000	48.6	25.8	89.9	8.2	7.5	1275

CONFIGURATION: CLEAN
WEIGHT: 5000 (Cont)

CONFIGURATION: CLEAN
WEIGHT: 5500 (Cont)

APPROXIMATE				TORQUE PRESS	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	TORQUE PRESS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL								FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL						FUEL	TIME	DIST.	
F.P.M.	N. MI.	MIN.	LBS	PSIG				PSIG	LBS	MIN.	N. MI.	F.P.M.
1416	7.3	8.2	88.1	24.6	46.7	16,000	47.7	24.6	101.3	9.8	9.1	1130
1258	8.7	9.7	97.8	23.3	45.9	18,000	46.5	23.3	113.7	11.8	11.1	951
1072	10.5	11.4	108.2	22.0	44.9	20,000	45.0	22.0	128.3	14.2	13.5	715
839	12.6	13.5	120.3	20.7	43.5	22,000	43.0	20.7	152.2	18.4	17.7	389
481	15.6	16.5	136.3	19.3	41.8	24,000	-	-	-	-	-	-

REMARKS: 1. Fuel used for warm-up and take-off = 20.6 lbs.
2. Engine Specification fuel flow increased 5% per MIL-M-7700A.

Chart 14-10. Climb (Sheet 4 of 13)

B-5

CLIMB CHART FOR NORMAL POWER

STANDARD DAY

ENGINE SPEED - 6600 RPM

ARMY MODEL(S): UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR-62-21 "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

CONFIGURATION: CLEAN
WEIGHT: 6000

CONFIGURATION: CLEAN
WEIGHT: 6500

APPROXIMATE				TORQUE PRESS	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	TORQUE PRESS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL								FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL						FUEL	TIME	DIST.	
F.P.M.	N. MI.	MIN.	LBS	PSIG				PSIG	LBS	MIN.	N. MI.	F.P.M.
1962	0.0	0.0	20.6	34.9	55.4	SL	56.5	34.9	20.6	0.0	0.0	1693
1828	0.9	1.1	31.3	33.5	54.6	2,000	55.6	33.5	33.0	1.2	1.1	1568
1681	1.9	2.2	42.2	32.1	53.7	4,000	54.8	32.1	45.7	2.6	2.4	1433
1540	3.1	3.4	53.4	30.7	52.9	6,000	54.0	30.7	59.0	4.0	3.7	1303
1404	4.4	4.8	65.1	29.3	52.1	8,000	53.2	29.3	72.8	5.6	5.3	1177
1281	5.8	6.3	77.2	28.1	51.3	10,000	52.3	28.1	87.4	7.4	7.1	1055
1157	7.4	7.9	89.8	26.9	50.5	12,000	51.2	26.9	103.0	9.5	9.1	917
1015	9.3	9.8	103.2	25.8	49.5	14,000	49.8	25.8	120.4	11.9	11.6	742

CONFIGURATION: CLEAN
WEIGHT: 6000 (Cont)

CONFIGURATION: CLEAN
WEIGHT: 6500 (Cont)

APPROXIMATE				TORQUE PRESS	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	TORQUE PRESS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL								FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL						FUEL	TIME	DIST.	
F.P.M.	N. MI.	MIN.	LBS	PSIG				PSIG	LBS	MIN.	N. MI.	F.P.M.
840	11.4	11.9	117.9	24.6	48.2	16,000	48.0	24.6	142.7	15.1	14.9	577
659	14.2	14.7	135.8	23.3	46.5	18,000						

REMARKS:

1. Fuel used for warm-up and take-off = 20.6 lbs.
2. Engine Specification fuel flow increased 5% per MIL-M-7700A.

Chart 14-10. Climb (Sheet 5 of 13)

CLIMB CHART FOR NORMAL POWER

B-5

STANDARD DAY

ENGINE SPEED - 6600 RPM

ARMY MODEL(S): UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR-62-21 "YUH-B Category II Performance Test" and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

CONFIGURATION: CLEAN
WEIGHT: 7000

CONFIGURATION: CLEAN
WEIGHT: 7500

APPROXIMATE				TORQUE PRESS	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	TORQUE PRESS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL								FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL						FUEL	TIME	DIST.	
F.P.M.	N. MI.	MIN.	LBS	PSIG				PSIG	LBS	MIN.	N. MI.	F.P.M.
1462	0.0	0.0	20.6	34.9	57.5	SL	58.5	34.9	20.6	0.0	0.0	1261
1346	1.3	1.4	35.0	33.5	56.7	2,000	57.7	33.5	37.3	1.7	1.6	1153
1221	2.8	3.0	49.9	32.1	55.9	4,000	56.8	32.1	54.8	3.5	3.4	1034
1098	4.5	4.7	65.5	30.7	55.0	6,000	55.8	30.7	73.5	5.5	5.4	908
971	6.4	6.6	82.1	29.3	54.1	8,000	54.6	29.3	93.9	7.9	7.9	765
833	8.7	8.9	100.1	28.1	52.9	10,000	53.0	28.1	117.9	10.9	10.9	591
660	11.4	11.5	120.7	26.9	51.4	12,000	51.0	26.9	152.1	15.3	15.4	290
370	15.3	15.4	148.6	25.8	49.5	14,000	-	-	-	-	-	-

CONFIGURATION: CLEAN
WEIGHT: 8000

CONFIGURATION: CLEAN
WEIGHT: 8500

APPROXIMATE				TORQUE PRESS	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	TORQUE PRESS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL								FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL						FUEL	TIME	DIST.	
F.P.M.	N. MI.	MIN.	LBS	PSIG				PSIG	LBS	MIN.	N. MI.	F.P.M.
1086	0.0	0.0	20.6	34.9	59.5	SL	60.4	34.9	20.6	0.0	0.0	928
982	1.9	1.9	40.1	33.5	58.6	2,000	59.3	33.5	43.7	2.3	2.3	819
859	4.1	4.1	60.9	32.1	57.6	4,000	58.0	32.1	69.1	5.0	5.0	680
716	6.7	6.6	83.9	30.7	56.3	6,000	56.4	30.7	99.7	8.3	8.5	506
538	9.9	9.8	111.2	29.3	54.7	8,000	54.4	29.3	146.8	13.8	14.0	210
230	15.0	14.9	152.1	28.1	52.7	10,000	-	-	-	-	-	-

REMARKS:
1. Fuel used for warm-up and take-off = 20.6 lbs.
2. Engine Specification fuel flow increased 5% per MIL-M-7700A.

Chart 14-10. Climb (Sheet 6 of 13)

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CLIMB CHART FOR NORMAL POWER
STANDARD DAY

ARMY MODEL(S): UH-1B
ENGINE SPEED-6600 RPM
ENGINE(S): LYCOMING T53-L-9/9A/11
DATA AS OF: SEPTEMBER 1962
FUEL GRADE: JP-4
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28
FUEL DENSITY: 6.5 LB/GAL.

CONFIGURATION: CLEAN
WEIGHT: 5000 LBS

CONFIGURATION: CLEAN
WEIGHT: 5500 LBS

APPROXIMATE				TORQUE PRESS	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	TORQUE PRESS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL								FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL						FUEL	TIME	DIST.	
F.P.M.	N. MI.	MIN.	LBS	PSIG				PSIG	LBS	MIN.	N. MI.	F.P.M.
3117	0.0	0.0	22.5	38.9	53.4	SL	54.4	38.9	22.5	0.0	0.0	2708
3125	0.5	0.6	29.7	38.9	52.5	2,000	53.5	38.9	30.8	0.7	0.6	2711
3089	0.9	1.3	36.8	38.5	51.6	4,000	52.6	38.5	39.0	1.5	1.2	2673
2903	1.5	2.0	44.0	36.9	50.7	6,000	51.8	36.9	47.3	2.3	1.8	2500
2717	2.0	2.7	51.2	35.4	49.8	8,000	51.0	35.4	55.8	3.1	2.6	2329
2530	2.7	3.4	58.6	33.9	49.0	10,000	50.2	33.9	64.4	4.0	3.3	2159
2341	3.4	4.2	66.1	32.3	48.2	12,000	49.4	32.3	73.1	4.9	4.2	1988
2147	4.2	5.1	73.7	30.7	47.5	14,000	48.6	30.7	82.1	6.0	5.2	1809

CONFIGURATION: CLEAN
WEIGHT: 5000 LBS (Cont)

CONFIGURATION: CLEAN
WEIGHT: 5500 LBS (Cont)

APPROXIMATE				TORQUE PRESS	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	TORQUE PRESS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL								FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL						FUEL	TIME	DIST.	
F.P.M.	N. MI.	MIN.	LBS	PSIG				PSIG	LBS	MIN.	N. MI.	F.P.M.
1945	5.1	6.1	81.6	29.0	46.7	16,000	47.7	29.0	91.5	7.2	6.4	1611
1732	6.2	7.2	89.8	27.3	45.9	18,000	46.5	27.3	101.6	8.5	7.7	1382
1496	7.4	8.4	98.6	25.6	44.9	20,000	45.0	25.6	113.1	10.1	9.3	1100
1221	8.8	9.9	108.4	23.9	43.5	22,000	43.0	23.9	129.1	12.5	11.7	604
810	10.8	11.8	120.3	22.3	41.8	24,000	-	-	-	-	-	-

REMARKS:
1. Fuel used for warm-up and take-off = 22.5 lbs.
2. Engine specification fuel flow increases 5% per MIL-M-7700A

Chart 14-10. Climb (Sheet 7 of 13)

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CLIMB CHART FOR NORMAL POWER

STANDARD DAY

ARMY MODEL(S): UH-1B
ENGINE SPEED-6600 RPM
ENGINE(S): LYCOMING T53-L-9/9A/11
DATA AS OF: SEPTEMBER 1962
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

CONFIGURATION: CLEAN
WEIGHT: 6000 LBS

CONFIGURATION: CLEAN
WEIGHT: 6500 LBS

APPROXIMATE				TORQUE PRESS	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	TORQUE PRESS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL								FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL						FUEL	TIME	DIST.	
F.P.M.	N. MI.	MIN.	LBS	PSIG				PSIG	LBS	MIN.	N. MI.	F.P.M.
2361	0.0	0.0	22.5	38.9	55.4	SL	56.5	38.9	22.5	0.0	0.0	2062
2360	0.7	0.8	32.0	38.9	54.6	2,000	55.6	38.9	33.4	1.0	0.9	2059
2322	1.4	1.7	41.5	38.5	53.7	4,000	54.8	38.5	44.2	1.9	1.7	2024
2162	2.2	2.6	51.0	36.9	52.9	6,000	54.0	36.9	55.2	3.0	2.7	1878
2006	3.1	3.6	60.8	35.4	52.1	8,000	53.2	35.4	66.5	4.1	3.7	1733
1851	4.1	4.6	70.8	33.9	51.3	10,000	52.3	33.9	78.2	5.3	4.9	1581
1688	5.2	5.7	81.1	32.3	50.5	12,000	51.2	32.3	90.4	6.6	6.2	1408
1504	6.4	7.0	91.8	30.7	49.5	14,000	49.8	30.7	103.5	8.2	7.8	1193

CONFIGURATION: CLEAN
WEIGHT: 6000 LBS (Cont)

CONFIGURATION: CLEAN
WEIGHT: 6500 LBS (Cont)

APPROXIMATE				TORQUE PRESS	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	TORQUE PRESS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL								FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL						FUEL	TIME	DIST.	
F.P.M.	N. MI.	MIN.	LBS	PSIG				PSIG	LBS	MIN.	N. MI.	F.P.M.
1282	7.8	8.4	103.4	29.0	48.2	16,000	48.0	29.0	118.7	10.1	9.7	915
1000	9.6	10.2	116.6	27.3	46.5	18,000	45.7	27.3	152.6	14.4	14.1	110
340	12.8	13.3	138.8	25.6	44.3	20,000	-	-	-	-	-	-

REMARKS:
1. Fuel used for warm-up and take-off = 22.5 lbs.
2. Engine specification fuel flow increases 5% per MIL-M-7700A

Chart 14-10. Climb (Sheet 8 of 13)

B9/11 B9/11

CLIMB CHART FOR NORMAL POWER

STANDARD DAY

ARMY MODEL(S): UH-1B
ENGINE SPEED - 6600 RPM
ENGINE(S): LYCOMING T53-L-9/9A/11
DATA AS OF: SEPTEMBER 1962
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

CONFIGURATION: CLEAN
WEIGHT: 7000 LBS

CONFIGURATION: CLEAN
WEIGHT: 7500 LBS

APPROXIMATE				TORQUE PRESS	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	TORQUE PRESS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL								FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL						FUEL	TIME	DIST.	
F.P.M.	N. MI.	MIN.	LBS	PSIG				PSIG	LBS	MIN.	N. MI.	F.P.M.
1804	0.0	0.0	22.5	38.9	57.5	SL	58.5	38.9	22.5	0.0	0.0	1581
1802	1.0	1.1	34.9	38.9	56.7	2,000	57.7	38.9	36.7	1.3	1.2	1579
1770	2.1	2.2	47.3	38.5	55.9	4,000	56.8	38.5	50.8	2.5	2.4	1546
1632	3.2	3.4	60.0	36.9	55.0	6,000	55.8	36.9	65.4	3.9	3.8	1406
1487	4.4	4.7	73.1	35.4	54.1	8,000	54.6	35.4	80.8	5.4	5.3	1246
1321	5.9	6.1	86.8	33.9	52.9	10,000	53.0	33.9	97.6	7.1	7.0	1047
1115	7.5	7.7	101.7	32.3	51.4	12,000	51.0	32.3	118.5	9.5	9.4	730
800	9.8	9.8	119.7	30.7	49.5	14,000	-	-	-	-	-	-

CONFIGURATION: CLEAN
WEIGHT: 8000 LBS

CONFIGURATION: CLEAN
WEIGHT: 8500 LBS

APPROXIMATE				TORQUE PRESS	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	TORQUE PRESS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL								FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL						FUEL	TIME	DIST.	
F.P.M.	N. MI.	MIN.	LBS	PSIG				PSIG	LBS	MIN.	N. MI.	F.P.M.
1386	0.0	0.0	22.5	38.9	59.5	SL	60.4	38.9	22.5	0.0	0.0	1210
1381	1.4	1.4	38.7	38.9	58.6	2,000	59.3	38.9	41.1	1.7	1.7	1195
1339	2.8	2.9	54.9	38.5	57.6	4,000	58.0	38.5	60.1	3.4	3.4	1132
1183	4.4	4.5	72.0	36.9	56.3	6,000	56.4	36.9	80.7	5.3	5.3	945
990	6.3	6.3	90.7	35.4	54.7	8,000	54.4	35.4	106.8	7.8	7.9	643
670	8.8	8.8	114.3	33.9	52.7	10,000	-	-	-	-	-	-

REMARKS:

1. Fuel used for warm-up and take-off = 22.5 lbs.
2. Engine specification fuel flow increases 5% per MIL-M-7700A

Chart 14-10. Climb (Sheet 9 of 13)

CLIMB CHART FOR NORMAL POWER 540

STANDARD DAY

ARMY MODEL(S): UH-1B (540)
ENGINE SPEED - 6600 RPM
DATA AS OF: FEBRUARY 1964
DATA BASIS: MILITARY POTENTIAL TEST OF THE MODEL 540 "DOOR HINGE" ROTOR SYSTEM "PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

CONFIGURATION: CLEAN
WEIGHT: 5000 LBS

CONFIGURATION: CLEAN
WEIGHT: 5500 LBS

APPROXIMATE				TORQUE PRESS	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	TORQUE PRESS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL								FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL						FUEL	TIME	DIST.	
F.P.M.	N. MI.	MIN.	LBS	PSIG				PSIG	LBS	MIN.	N. MI.	F.P.M.
2748	0	0	23	38.9	48	SL	51	38.9	23	0	0	2388
2785	0.5	0.7	31	38.9	48	2,000	51	38.9	32	0.8	0.6	2427
2824	1.0	1.4	39	38.9	49	4,000	51	38.9	41	1.6	1.3	2467
2688	1.5	2.2	46	37.4	49	6,000	51	37.4	50	2.5	2.0	2344
2520	2.2	2.9	54	35.7	49	8,000	51	35.7	59	3.4	2.9	2190
2349	2.8	3.8	62	33.9	49	10,000	51	33.9	68	4.3	3.6	2031
2183	3.6	4.6	70	32.2	49	12,000	51	32.2	78	5.3	4.6	1875
2014	4.5	5.6	78	30.6	49	14,000	50	30.6	87	6.4	5.7	1714

CONFIGURATION: CLEAN
WEIGHT: 5000 LBS (Cont)

CONFIGURATION: CLEAN
WEIGHT: 5500 LBS (Cont)

APPROXIMATE				TORQUE PRESS	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	TORQUE PRESS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL								FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL						FUEL	TIME	DIST.	
F.P.M.	N. MI.	MIN.	LBS	PSIG				PSIG	LBS	MIN.	N. MI.	F.P.M.
1839	5.5	6.6	87	28.9	48	16,000	49	28.9	97	7.7	6.9	1549
1660	6.7	7.8	95	27.3	47	18,000	48	27.3	107	9.0	8.3	1378
1476	8.0	9.0	104	25.6	46	20,000	47	25.6	118	10.6	10.0	1195
1266	9.5	10.5	114	23.8	45	22,000	46	23.8	130	12.4	11.9	967
1042	11.3	12.2	125	22.2	44	24,000	44	22.2	146	14.9	14.5	667
788	13.6	14.4	137	20.7	42	26,000	42	20.7	172	19.5	19.4	202
444	17.1	17.7	155	19.7	40	28,000						

REMARKS:
1. Fuel used for warm up and take-off = 23.0 lbs.
2. Engine specification fuel flow increases 5% per MIL-M-7700A.

Chart 14-10. Climb (Sheet 10 of 13)

CLIMB CHART FOR NORMAL POWER 540

STANDARD DAY

ARMY MODEL(S): UH-1B (540) ENGINE SPEED - 6600 RPM
DATA AS OF: FEBRUARY 1964
DATA BASIS: MILITARY POTENTIAL TEST OF THE MODEL 540 "DOOR HINGE" ROTOR SYSTEM "PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

CONFIGURATION: CLEAN
WEIGHT: 6000 LBS

CONFIGURATION: CLEAN
WEIGHT: 6500 LBS

APPROXIMATE				TORQUE PRESS	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	TORQUE PRESS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL								FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL						FUEL	TIME	DIST.	
F.P.M.	N. MI.	MIN.	LBS	PSIG				PSIG	LBS	MIN.	N. MI.	F.P.M.
2095	0	0	23	38.9	54	SL	56	38.9	23	0	0	1849
2133	0.8	0.9	33	38.9	54	2,000	56	38.9	35	1.1	1.0	1884
2169	1.6	1.9	43	38.9	54	4,000	56	38.9	46	2.1	1.9	1914
2055	2.4	2.8	54	37.4	54	6,000	55	37.4	58	3.2	2.9	1804
1910	3.4	3.8	64	35.7	53	8,000	55	35.7	70	4.4	4.1	1665
1758	4.4	4.9	75	33.9	53	10,000	54	33.9	82	5.6	5.3	1520
1609	5.6	6.1	86	32.2	52	12,000	53	32.2	95	7.0	6.7	1377
1456	7.0	7.4	97	30.6	51	14,000	52	30.6	108	8.5	8.3	1226

CONFIGURATION: CLEAN
WEIGHT: 6000 LBS (Cont)

CONFIGURATION: CLEAN
WEIGHT: 6500 LBS (Cont)

APPROXIMATE				TORQUE PRESS	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	TORQUE PRESS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL								FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL						FUEL	TIME	DIST.	
F.P.M.	N. MI.	MIN.	LBS	PSIG				PSIG	LBS	MIN.	N. MI.	F.P.M.
1296	8.5	8.9	108	28.9	50	16,000	50	28.9	122	10.3	10.2	1058
1121	10.2	10.5	121	27.3	49	18,000	49	27.3	137	12.4	12.4	844
907	12.3	12.5	135	25.6	47	20,000	47	25.6	158	15.3	15.5	523
584	15.1	15.2	153	23.8	45	22,000						

REMARKS:
1. Fuel used for warm up and take-off = 23.0 lbs.
2. Engine specification fuel flow increases 5% per MIL-M-7700A.

Chart 14-10. Climb (Sheet 11 of 13)

CLIMB CHART FOR NORMAL POWER 540

STANDARD DAY

ARMY MODEL(S): UH-1B (540)
DATA AS OF: FEBRUARY 1964
DATA BASIS: MILITARY POTENTIAL TEST OF THE MODEL 540 "DOOR HINGE" ROTOR SYSTEM "PRELIMINARY DATA"

ENGINE SPEED - 6600 RPM

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

CONFIGURATION: CLEAN
WEIGHT: 7000 LBS

CONFIGURATION: CLEAN
WEIGHT: 7500 LBS

APPROXIMATE				TORQUE PRESS	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	TORQUE PRESS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL								FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL						FUEL	TIME	DIST.	
F.P.M.	N. MI.	MIN.	LBS	PSIG				PSIG	LBS	MIN.	N. MI.	F.P.M.
1637	0	0	23	38.9	58	SL	60	38.9	23	0	0	1450
1666	1.1	1.2	36	38.9	58	2,000	59	38.9	38	1.4	1.3	1474
1691	2.3	2.4	49	38.9	57	4,000	58	38.9	53	2.7	2.7	1492
1584	3.5	3.6	63	37.4	57	6,000	58	37.4	68	4.1	4.1	1387
1450	4.8	4.9	76	35.7	56	8,000	56	35.7	84	5.6	5.6	1257
1309	6.3	6.4	90	33.9	55	10,000	55	33.9	100	7.3	7.4	1116
1166	8.0	8.0	105	32.2	53	12,000	54	32.2	117	9.2	9.4	960
1005	9.9	9.9	121	30.6	52	14,000	52	30.6	137	11.6	11.9	755

CONFIGURATION: CLEAN
WEIGHT: 7000 LBS (Cont)

CONFIGURATION: CLEAN
WEIGHT: 7500 LBS (Cont)

APPROXIMATE				TORQUE PRESS	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	TORQUE PRESS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL								FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL						FUEL	TIME	DIST.	
F.P.M.	N. MI.	MIN.	LBS	PSIG				PSIG	LBS	MIN.	N. MI.	F.P.M.
794	12.4	12.1	138	28.9	50	16,000	50	28.9	164	14.9	15.5	432
467	15.7	15.2	162	27.3	48	18,000						

REMARKS:
1. Fuel used for warm up and take-off = 23.0 lbs.
2. Engine specification fuel flow increases 5% per MIL-M-7700A.

Chart 14-10. Climb (Sheet 12 of 13)

CLIMB CHART FOR NORMAL POWER 540

STANDARD DAY

ARMY MODEL(S): UH-1B (540)
DATA AS OF: FEBRUARY 1964
DATA BASIS: MILITARY POTENTIAL TEST OF THE MODEL 540
"DOOR HINGE" ROTOR SYSTEM
"PRELIMINARY DATA"

ENGINE SPEED - 6600 RPM

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

CONFIGURATION: CLEAN
WEIGHT: 8000 LBS

CONFIGURATION: CLEAN
WEIGHT: 8500 LBS

APPROXIMATE				TORQUE PRESS	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	TORQUE PRESS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL								FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL						FUEL	TIME	DIST.	
F.P.M.	N. MI.	MIN.	LBS	PSIG				PSIG	LBS	MIN.	N. MI.	F.P.M.
1282	0	0	23	38.9	61	SL	62	38.9	23	0	0	1130
1300	1.6	1.5	40	38.9	60	2,000	61	38.9	42	1.8	1.8	1143
1313	3.1	3.1	57	38.9	59	4,000	60	38.9	62	3.5	3.6	1150
1210	4.8	4.7	74	37.4	58	6,000	59	37.4	81	5.3	5.5	1044
1078	6.6	6.4	92	35.7	57	8,000	57	35.7	103	7.4	7.7	900
925	8.7	8.4	112	33.9	55	10,000	55	33.9	127	9.9	10.4	708
727	11.3	10.8	134	32.2	54	12,000	53	32.2	159	13.4	14.2	414
416	15.0	14.3	163	30.6	52	14,000						

CONFIGURATION: CLEAN
WEIGHT: 9000 LBS

CONFIGURATION: CLEAN
WEIGHT: 9500 LBS

APPROXIMATE				TORQUE PRESS	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	TORQUE PRESS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL								FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL						FUEL	TIME	DIST.	
F.P.M.	N. MI.	MIN.	LBS	PSIG				PSIG	LBS	MIN.	N. MI.	F.P.M.
991	0	0	23	38.9	63	SL	64	38.9	23	0	0	863
998	2.1	2.0	45	38.9	62	2,000	62	38.9	48	2.3	2.4	863
997	4.2	4.0	67	38.9	60	4,000	61	38.9	75	4.7	4.9	846
879	6.5	6.1	91	37.4	59	6,000	59	37.4	103	7.3	7.7	697
701	9.2	8.7	117	35.7	57	8,000	57	35.7	139	10.7	11.4	446
424	13.0	12.2	151	33.9	55	10,000						

REMARKS: 1. Fuel used for warm up and take-off = 23.0 lbs.
2. Engine specification fuel flow increases 5% per MIL-M-7700A.

Chart 14-10. Climb (Sheet 13 of 13)

A

RANGE CHART

STANDARD DAY

A

CRUISE CONDITION-LONG RANGE AND MAXIMUM CONTINUOUS

MODEL(S): UH-1A
DATA AS OF: January 1961
DATA BASIS: AFFTC Phase IV Flight Test of YH-40

ENGINE: Lycoming T53-L-1A
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS						RANGE — Nautical Airmiles								
		ENGINE SPEED	TORQUE PRESS	MIX-TURE	APPROXIMATE			812.5 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL	50 LBS FUEL
					TOTAL	SPEED/KNTS.										
POUNDS	FEET	RPM	PSI		LB/HR	TAS(3)	CAS									
4300	SL	6400	26.0	-	533	105	105	160.1	137.9	118.2	98.5	78.8	59.1	39.4	19.7	10.0
	2,000		24.6	-	520	105	102	164.1	141.4	121.2	101.0	80.8	60.6	40.2	20.1	10.1
	4,000		22.8	-	488	105	99	174.8	150.6	129.1	107.6	86.1	64.5	43.0	21.5	10.8
	6,000		22.1	-	457	105	96	186.7	160.8	137.9	114.9	91.9	68.9	46.0	23.0	11.5
	8,000		21.0	-	429	105	93	198.9	171.4	146.9	122.4	97.9	73.4	49.0	24.5	12.2
	10,000		20.0	-	402	105	90	212.2	182.8	156.7	130.6	104.5	78.4	52.2	26.1	13.1
	12,000		19.5	-	377	105	87	226.3	195.0	167.1	139.3	111.4	83.6	55.7	27.9	13.9
	14,000		18.1	-	350	*103.	83	240.3	207.0	177.5	147.9	118.3	88.7	59.2	29.6	14.8
	16,000	6400														
4800	SL	6400	26.4	-	551	105	105	154.8	133.4	114.3	95.3	76.2	57.2	38.1	19.1	9.5
	2,000		25.0	-	523	105	102	163.4	140.5	120.4	100.4	80.3	60.2	40.1	20.1	10.0
	4,000		23.2	-	493	105	99	173.0	149.0	127.8	106.5	85.2	63.9	42.6	21.3	10.7
	6,000		22.6	-	463	105	96	184.3	158.8	136.1	113.4	90.7	68.0	45.4	22.7	11.3
	8,000		21.9	-	441	105	93	193.5	166.7	142.9	119.1	95.3	71.4	47.6	23.8	11.9
	10,000		21.5	-	420	105	90	203.1	175.0	150.0	125.0	100.0	75.0	50.0	25.0	12.5
	12,000		20.0	-	378	*98.2	82	211.1	181.9	155.9	129.9	103.9	77.9	52.0	26.0	13.0
	14,000		17.0	-	336	89.3	72	215.9	186.0	159.4	132.9	106.3	79.7	53.1	26.6	13.3
	16,000	6400														
5300	SL	6400	26.6	-	556	105	105	153.4	132.2	113.3	94.4	75.5	56.6	37.8	18.9	9.4
	2,000		25.5	-	530	105	102	161.0	138.7	118.9	99.1	79.3	59.4	39.6	19.8	9.9
	4,000		24.5	-	503	105	99	169.6	146.1	125.2	104.4	83.5	62.6	41.7	20.9	10.4
	6,000		23.8	-	482	105	96	177.0	152.5	130.7	108.9	87.1	65.4	43.6	21.8	10.9
	8,000		22.1	-	446	*101	90	184.0	158.5	135.9	113.2	90.6	67.9	45.3	22.6	11.3
	10,000		20.7	-	416	95.5	82	186.5	160.7	137.7	114.8	91.8	68.9	45.9	23.0	11.5
	12,000		19.1	-	369	84.1	70	185.1	159.5	136.7	113.9	91.1	68.3	45.6	22.8	11.4
	14,000		16.0	-	329	70.3	57	173.6	149.6	128.2	106.8	85.5	64.1	42.7	21.4	10.7
	16,000	6400														

REMARKS: (1) Fuel Flow Increased by 5%.

(2) $\text{Range} = \dfrac{\text{Fuel Available X True Airspeed}}{\text{Fuel Flow}}$

(3) Structural, Vibration or Power Limited Speeds. *Long Range Cruise Speed.

Chart 14-11. Range (Sheet 1 of 35)

RANGE CHART

A

STANDARD DAY

CRUISE CONDITION-LONG RANGE AND MAXIMUM CONTINUOUS

MODEL(S): UH-1A
DATA AS OF: January 1961
DATA BASIS: AFFTC Phase IV Flight
Test of YH-40

ENGINE: Lycoming T53-L-1A
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS						RANGE — Nautical Airmiles								
		ENGINE SPEED	TORQUE PRESS	MIXTURE	APPROXIMATE			812.5 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL	50 LBS FUEL
					TOTAL	SPEED/KNTS.										
POUNDS	FEET	RPM	PSI		LB/HR	TAS(3)	CAS									
5800	SL	6400	27.2	-	563	105	105	151.5	130.5	111.9	93.2	74.6	55.9	37.3	18.6	9.3
	2,000		26.5	-	540	105	102	158.0	136.1	116.7	97.2	77.8	58.3	38.9	19.4	9.7
	4,000		26.1	-	523	105	99	163.1	140.5	120.4	100.4	80.3	60.2	40.1	20.1	10.0
	6,000		24.5	-	491	100.6	92	166.5	143.4	123.0	102.5	82.0	61.5	41.0	20.5	10.3
	8,000		21.5	-	432	90.2	80	169.6	146.1	125.2	104.4	83.5	62.6	41.7	20.9	10.4
	10,000		19.4	-	397	78.5	67	160.7	138.4	118.7	98.9	79.1	59.3	39.6	19.8	10.0
	12,000		18.2	-	353	65.0	54	149.6	128.9	110.5	92.1	73.6	55.2	36.8	18.4	9.2
	14,000															
	16,000	6400														
6100	SL	6400	23.0	-	511	93	93	147.9	127.4	109.2	91.0	72.8	54.6	36.4	18.2	9.1
	2,000		21.5	-	492	93	90	153.6	132.3	113.4	94.5	75.6	56.7	37.8	18.9	9.5
	4,000		22.8	-	477	93	88	158.4	136.5	117.0	97.5	78.0	58.5	39.0	19.0	9.8
	6,000		24.5	-	480	93	85	157.4	135.6	116.2	96.9	77.5	58.1	38.7	18.8	9.7
	8,000		20.8	-	426	80.7	72	153.9	132.6	113.6	94.7	75.8	56.8	37.9	18.9	9.5
	10,000		19.4	-	394	68.3	59	140.8	121.3	104.0	86.6	69.3	52.0	34.7	17.4	8.7
	12,000															
	14,000															
	16,000	6400														
6600	SL	6400	19.1	-	474	77.5	77.5	132.8	114.4	98.1	81.7	65.4	49.0	32.7	16.4	8.2
	2,000		19.5	-	457	77.5	75.0	137.8	118.7	101.8	84.8	67.8	50.9	33.9	17.0	8.5
	4,000		20.1	-	449	77.5	73	140.2	120.8	103.5	86.3	69.0	51.8	34.5	17.3	8.6
	6,000		22 2	-	460	77.5	71	136.9	117.9	101.1	84.2	67.4	50.5	33.7	16.8	8.4
	8,000		20.8	-	425	64.8	57	123.9	106.7	91.5	76.2	61.0	45.7	30.5	15.3	7.6
	10,000		22.4	-	428	48.9	42	92.8	80.0	68.5	57.1	45.7	34.3	22.8	11.4	5.7
	12,000															
	14,000															
	16,000	6400														

REMARKS: (1) Fuel Flow Increased by 5%.

(2) $\text{Range} = \dfrac{\text{Fuel Available X True Airspeed}}{\text{Fuel Flow}}$

(3) Structural, Vibration or Power Limited Speeds. * Long Range Cruise Speed

Chart 14-11. Range (Sheet 2 of 35)

RANGE CHART

STANDARD DAY

A

CRUISE CONDITION-LONG RANGE AND MAXIMUM CONTINUOUS

MODEL(S): UH-1A
DATA AS OF: January 1961
DATA BASIS: AFFTC Phase IV Flight Test of YH-40

ENGINE: Lycoming T53-L-1A
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS						RANGE — Nautical Airmiles								
		ENGINE SPEED	TORQUE PRESS	MIX-TURE	APPROXIMATE			812.5 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL	50 LBS FUEL
					TOTAL	SPEED/KNTS.										
POUNDS	FEET	RPM	PSI		LB/HR	TAS(3)	CAS									
7200	SL	6400	19.6	-	476	68.5	68.5	116.9	100.7	86.3	71.9	57.6	43.2	28.8	14.4	7.2
	2,000		20.4	-	469	68.5	67	118.7	102.3	87.7	73.0	58.4	43.8	29.2	14.6	7.3
	4,000		22.0	-	472	68.5	65	117.9	101.6	87.1	72.6	58.0	43.5	29.0	14.5	7.3
	6,000		22.6	-	455	56.9	52	101.4	87.5	75.0	62.5	50.0	37.5	25.0	12.5	6.3
	8,000			-												
	10,000															
	12,000															
	14,000															
	16,000	6400														

REMARKS: (1) Fuel Flow Increased by 5%

(2) Range = $\frac{\text{Fuel Available X True Airspeed}}{\text{Fuel Flow}}$

(3) Structural, Vibration or Power Limited Speeds. * Long Range Cruise Speed

Chart 14-11. Range (Sheet 3 of 35)

B-5

RANGE CHART

STANDARD DAY

CLEAN CONFIGURATION - LONG RANGE

ARMY MODEL(S): UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR-62-21 "YUH-1B Category II Performance Tests") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					RANGE — Nautical Airmiles										
		ENGINE SPEED	APPROXIMATE TORQUE PRESS	APPROXIMATE FUEL FLOW	SPEED/KNOTS		1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
5000	SL	6600	24.2	480	105	105	234	218	196	174	152	131	109	87	65	44	22
	2,000	↑	24.2	467	107	104	245	228	205	183	160	137	114	91	68	46	23
	4,000		23.5	446	107	101	258	241	217	193	168	144	120	96	72	48	24
	6,000		23.4	431	109	100	272	254	228	203	178	152	127	101	76	51	25
	8,000		22.4	407	109	97	288	268	241	215	188	161	134	107	81	54	27
	10,000		20.8	378	107	92	303	282	254	226	197	169	141	113	85	56	28
	12,000		18.5	337	101	84	321	300	270	240	210	180	150	120	90	60	30
	14,000		16.4	303	95	76	335	312	281	250	218	187	156	125	94	62	31
	16,000		14.9	275	88	68	342	319	287	255	223	191	159	128	96	64	32
	18,000	↓	13.8	253	81	61	341	318	286	255	223	191	159	127	95	64	32
	20,000	6600	13.3	238	73	53	327	305	275	244	214	183	153	122	92	61	31
5500	SL	6600	25.2	493	105	105	229	213	192	170	149	128	107	85	64	43	21
	2,000	↑	25.4	482	108	105	240	223	201	179	156	134	112	89	67	45	22
	4,000		24.8	462	109	102	252	235	212	188	165	141	118	94	71	47	24
	6,000		24.3	443	110	100	265	247	223	198	173	148	124	99	74	49	25
	8,000		23.7	423	110	97	279	260	234	208	182	156	130	104	78	52	26
	10,000		21.9	391	107	92	293	273	246	218	191	164	136	109	82	55	27
	12,000		19.5	349	101	84	310	289	260	231	202	174	145	116	87	58	29
	14,000		17.6	316	95	76	321	299	269	239	209	179	149	120	90	60	30
	16,000		16.2	291	88	68	324	302	272	242	211	181	151	121	91	60	30
	18,000	↓	15.4	272	81	61	318	296	267	237	207	178	148	119	89	59	30
	20,000	6600	15.5	265	73	53	295	275	247	220	192	165	137	110	82	55	27

REMARKS:
1. Engine Specification Fuel Flow Increased 5% per MIL-M-7700A
2. Range = $\frac{\text{(Fuel Available x TAS)}}{\text{(Fuel Flow)}}$
3. Cargo Mirror Installation Will Reduce Range 8%.
4. Test Data Shows that a Continuous use of ANTI-ICE Bleed will Reduce Range 4 1/2% up to 10,000 Foot and 14% at 15,000 Foot.

Chart 14-11. Range (Sheet 4 of 35)

B-5

RANGE CHART

STANDARD DAY

CLEAN CONFIGURATION - LONG RANGE

ARMY MODEL(S): UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR-62-21, "YUH-1B Category II Performance Tests") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					RANGE — Nautical Airmiles										
		ENGINE SPEED	APPROXIMATE		SPEED/KNOTS		1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
			TORQUE PRESS	FUEL FLOW													
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
6000	SL	6600	26.3	507	106	106	224	209	188	167	146	125	104	83	63	42	21
	2,000	↑	26.7	497	109	106	234	218	197	175	153	131	109	87	66	44	22
	4,000		26.1	477	109	103	246	229	206	183	160	137	114	92	67	46	23
	6,000		25.3	455	109	100	258	240	216	192	168	144	120	96	72	48	24
	8,000		24.7	436	110	97	270	252	227	201	176	151	126	101	76	50	25
	10,000		23.0	405	106	92	283	264	237	211	184	158	132	105	79	53	26
	12,000		20.9	365	101	84	297	276	249	221	193	166	138	111	83	55	28
	14,000		19.2	335	95	76	303	282	254	226	197	169	141	113	85	56	28
	16,000		18.2	314	88	68	300	279	251	223	196	168	140	112	84	56	28
	18,000	↓	18.2	305	81	61	283	264	238	211	185	158	132	106	79	53	26
	20,000	6600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6500	SL	6600	27.5	523	107	107	219	204	183	163	143	122	102	82	61	41	20
	2,000	↑	27.9	514	109	106	228	212	191	170	149	128	106	85	64	43	21
	4,000		27.2	492	110	103	239	222	200	178	156	133	111	89	67	44	22
	6,000		26.2	466	109	101	250	233	210	187	163	140	117	93	70	47	23
	8,000		25.6	448	109	97	260	243	219	194	170	146	121	97	73	49	24
	10,000		24.6	425	106	92	269	251	226	201	176	151	126	100	75	50	25
	12,000		22.9	391	101	84	278	259	233	207	181	155	129	103	78	52	26
	14,000		21.8	367	95	76	276	258	232	206	180	155	129	103	77	52	26
	16,000		21.6	357	88	68	263	245	221	196	172	147	123	98	74	49	25
	18,000	↓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20,000	6600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

REMARKS:
1. Engine Specification Fuel Flow Increased 5% per MIL-M-7700A
2. $\text{Range} = \frac{(\underline{\text{Fuel Available x TAS}}).}{(\text{Fuel Flow})}$
3. Cargo Mirror Installation will Reduce Range 8%.
4. Test Data Shows that a Continuous use of ANTI-ICE Bleed will Reduce Range 4 1/2% up to 10,000 Foot and 14% at 15,000 Foot.

Chart 14-11. Range (Sheet 5 of 35)

B-5

RANGE CHART

STANDARD DAY

CLEAN CONFIGURATION - LONG RANGE

ARMY MODEL(S): UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR-62-21, "YUH-1B Category II Performance Tests") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lbs/Gal.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					RANGE — Nautical Airmiles										
		ENGINE SPEED	APPROXIMATE		SPEED KNOTS		1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
			TORQUE PRESS	FUEL FLOW													
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
7000	SL	6600	29.0	542	107	107	213	198	178	159	139	119	99	79	59	40	20
	2,000	↑	29.1	529	110	106	222	207	186	165	145	124	103	83	62	41	21
	4,000		28.2	505	109	103	232	217	195	173	152	130	108	87	65	43	22
	6,000		27.1	479	108	99	241	225	203	180	158	135	113	90	68	45	23
	8,000		26.0	453	106	94	250	233	210	186	163	140	116	93	70	47	23
	10,000		24.0	423	100	86	254	237	213	189	166	142	118	95	71	47	24
	12,000		23.5	400	94	78	253	236	212	189	165	141	118	94	71	47	24
	14,000		23.6	392	88	71	239	223	201	178	156	134	112	89	67	45	22
	16,000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	18,000	↓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20,000	6600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7500	SL	6600	30.2	558	108	108	207	193	174	154	135	116	97	77	58	39	19
	2,000	↑	29.5	534	108	105	217	202	182	162	142	121	101	81	61	40	20
	4,000		28.4	508	107	100	225	210	189	168	147	126	105	84	63	42	21
	6,000		26.8	475	103	94	235	217	195	173	152	130	108	87	65	43	22
	8,000		25.4	445	98	87	237	221	199	176	154	132	110	88	66	44	22
	10,000		24.8	428	93	80	232	216	194	173	151	130	108	86	65	43	22
	12,000		25.1	421	86	72	219	204	184	163	143	123	102	82	61	41	20
	14,000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	16,000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	18,000	↓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20,000	6600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

REMARKS:

1. Engine Specification Fuel Flow Increased 5% per MIL-M-7700A
2. Range = $\frac{\text{(Fuel Available x TAS)}}{\text{(Fuel Flow)}}$
3. Cargo Mirror Installation will Reduce Range 8%.
4. Test Data Shows that a Continuous use of ANTI-ICE Bleed will Reduce Range 4 1/2% up to 10,000 Foot and 14% at 15,000 Foot.

Chart 14-11. Range (Sheet 6 of 35)

B-5

RANGE CHART

STANDARD DAY

CLEAN CONFIGURATION - LONG RANGE

ARMY MODEL(S): UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR-62-21, "YUH-1B Category II Performance Tests") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					RANGE — Nautical Airmiles										
		ENGINE SPEED	APPROXIMATE TORQUE PRESS	APPROXIMATE FUEL FLOW	SPEED/KNOTS		1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
8000	SL	6600	28.5	535	102	102	204	190	171	152	133	114	95	76	57	38	19
	2,000	↑	28.1	516	102	99	211	197	177	157	138	118	98	79	59	39	20
	4,000		27.3	494	100	94	217	202	182	162	141	121	101	81	61	40	20
	6,000		26.2	467	96	88	220	205	185	164	144	123	103	82	62	41	21
	8,000		26.0	453	91	81	215	201	181	161	141	120	100	80	60	40	20
	10,000		26.6	452	85	73	202	188	169	150	132	113	94	75	56	38	19
	12,000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	14,000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	16,000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	18,000	↓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20,000	6600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8500	SL	6600	27.4	521	95	95	196	183	164	146	128	110	91	73	55	37	18
	2,000	↑	27.3	505	95	92	202	188	169	150	132	113	94	75	56	38	19
	4,000		26.9	488	93	88	205	191	172	153	134	114	95	76	57	38	19
	6,000		27.0	477	89	82	200	187	168	149	131	112	93	75	56	37	19
	8,000		27.9	479	84	75	188	175	158	140	123	105	88	70	53	35	18
	10,000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	12,000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	14,000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	16,000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	18,000	↓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20,000	6600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

REMARKS:
1. Engine Specification Fuel Flow Increased 5% per MIL-M-7700A
2. Range = $\frac{\text{(Fuel Available x TAS)}}{\text{(Fuel Flow)}}$
3. Cargo Mirror Installation will Reduce Range 8%.
4. Test Data Shows that a Continuous use of ANTI-ICE Bleed will Reduce Range 4 1/2% up to 10,000 Foot and 14% at 15,000 Foot.

Chart 14-11. Range (Sheet 7 of 35)

RANGE CHART

540

STANDARD DAY

LONG RANGE CRUISE SPEED

ARMY MODEL(S): UH-1B (540)
DATA AS OF: FEBRUARY 1964
DATA BASIS: MILITARY POTENTIAL TEST OF THE MODEL 540
"DOOR HINGE" ROTOR SYSTEM
"PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					RANGE — Nautical Airmiles										
		ENGINE SPEED	TORQUE PRESS	APPROXIMATE			1573 LBS FUEL	1400 LBS FUEL	1300 LBS FUEL	1200 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL
				FUEL FLOW	SPEED/KNTS.												
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
5000	0	6600	32.8	591	115.5	115.5	307	273	254	234	195	176	156	137	117	98	78
	2000	↑	30.6	553	114.4	111.1	325	289	269	248	207	186	165	145	124	103	83
	4000		28.6	516	113.4	106.9	346	308	286	264	220	198	176	154	132	110	88
	6000		27.6	490	114.1	104.3	366	326	302	279	233	209	186	163	140	116	93
	8000		25.9	458	113.3	100.4	389	346	322	297	247	223	198	173	148	124	99
	10000		25.0	435	114.1	98.0	412	367	341	314	262	236	210	183	157	131	105
	12000		23.8	410	113.8	94.8	437	389	361	333	278	250	222	194	167	139	111
	14000		23.1	390	114.2	92.0	461	410	381	351	293	264	234	205	176	146	117
	16000		21.9	368	113.1	88.2	483	430	399	368	307	276	246	215	184	154	123
	18000	↓	21.1	352	112.2	84.7	501	446	414	382	318	286	255	223	191	159	127
	20000	6600	20.2	335	109.8	80.1	516	459	426	394	328	295	262	230	197	164	131
5500	0	6600	32.8	591	114.6	114.6	305	272	252	233	194	175	155	136	116	97	78
	2000	↑	30.7	554	113.5	110.2	322	287	266	246	205	184	164	143	123	102	82
	4000		29.2	523	113.4	106.9	341	303	282	260	217	195	173	152	130	108	87
	6000		28.1	497	114.0	104.2	361	321	298	275	229	206	183	160	138	115	92
	8000		26.4	464	112.9	100.1	383	341	316	292	243	219	195	170	146	122	97
	10000		25.9	447	114.4	98.3	403	359	333	307	256	231	205	179	154	128	102
	12000		24.8	422	113.9	94.8	424	378	351	324	270	243	216	189	162	135	108
	14000		23.6	397	112.5	90.7	446	397	368	340	283	255	227	198	170	142	113
	16000		22.7	379	111.2	86.8	462	411	382	352	294	264	235	206	176	147	117
	18000	↓	21.8	363	108.9	82.2	472	420	390	360	300	270	240	210	180	150	120
	20000	6600	21.3	350	106.1	77.4	477	425	394	364	303	273	243	212	182	152	121

REMARKS:

1. Engine specification fuel flow increased 5% per MIL-M-7700A.
2. Range = $\frac{\text{Fuel Available x TAS}}{\text{Fuel Flow}}$
3. Cargo mirror installation will reduce range 8%.
4. Test data show that a continuous use of anti-ice bleed will reduce range 4 1/2 up to 10,000 feet and 14% at 15,000 feet.

Chart 14-11. Range (Sheet 8 of 35)

RANGE CHART

540

STANDARD DAY

LONG RANGE - CRUISE SPEED

ARMY MODEL(S): UH-1B (540)
DATA AS OF: FEBRUARY 1964
DATA BASIS: MILITARY POTENTIAL TEST OF THE MODEL 540 "DOOR HINGE ROTOR SYSTEM "PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					RANGE — Nautical Airmiles										
		ENGINE SPEED	TORQUE PRESS	APPROXIMATE			1573 LBS FUEL	1400 LBS FUEL	1300 LBS FUEL	1200 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL
				FUEL FLOW	SPEED/KNTS.												
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
6000	0	6600	33.4	599	114.9	114.9	302	268	249	230	192	173	153	134	115	96	77
	2000	↑	31.3	562	113.7	110.4	318	283	263	243	202	182	162	142	121	101	81
	4000		30.2	537	114.4	107.8	335	298	277	256	213	192	170	149	128	106	85
	6000		28.6	504	113.7	103.9	355	316	293	271	226	203	181	158	135	113	90
	8000		27.4	477	113.3	100.4	374	333	309	285	238	214	190	166	143	119	95
	10000		26.6	455	113.5	97.5	393	349	324	300	250	225	200	175	150	125	100
	12000		25.7	434	113.0	94.0	409	364	338	312	260	234	208	182	156	130	104
	14000		24.8	412	111.4	89.8	425	378	351	324	270	243	216	189	162	135	108
	16000		23.9	393	106.9	85.0	435	387	359	331	276	249	221	193	166	138	110
	18000	↓	23.0	379	105.2	79.4	437	389	361	334	278	250	222	195	167	139	111
	20000	6600	22.9	373	103.3	75.3	435	387	359	332	276	249	221	194	166	138	111
6500	0	6600	34.8	607	114.9	114.9	298	265	246	227	189	170	152	133	114	95	76
	2000	↑	31.8	569	113.5	110.2	314	279	259	239	200	180	160	140	120	100	80
	4000		30.8	544	114.1	107.5	330	293	273	252	210	189	168	147	126	106	84
	6000		29.3	512	113.1	103.4	347	309	287	265	221	199	177	155	132	110	88
	8000		28.0	485	112.1	99.4	364	324	301	278	231	208	185	162	139	116	93
	10000		27.5	467	112.6	96.7	379	337	313	289	241	217	193	169	145	120	96
	12000		26.7	446	110.9	92.3	391	348	328	292	249	224	199	174	149	124	99
	14000		25.7	424	108.2	87.2	401	357	332	306	255	230	204	179	153	128	102
	16000	↓	25.4	414	106.3	82.9	404	359	333	308	257	231	205	180	154	128	103
	18000	6600	25.1	408	103.1	77.8	397	354	328	303	253	227	202	177	152	126	101

REMARKS:

1. Engine specification fuel flow increased 5% per MIL-M-7700A.
2. $\text{Range} = \frac{\text{Fuel Available x TAS}}{\text{Fuel Flow}}$
3. Cargo mirror installation will reduce range 8%.
4. Test data show that a continuous use of anti-ice bleed will reduce range 4 1/2 up to 10,000 feet and 14% at 15,000 feet.

Chart 14-11. Range (Sheet 9 of 35)

RANGE CHART

540

STANDARD DAY

LONG RANGE - CRUISE SPEED

ARMY MODEL(S): UH-1B (540)
DATA AS OF: FEBRUARY 1964
DATA BASIS: MILITARY POTENTIAL TEST OF MODEL 540
"DOOR HINGE" ROTOR SYSTEM
"PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					RANGE — Nautical Airmiles										
		ENGINE SPEED	TORQUE PRESS	APPROXIMATE			1573 LBS FUEL	1400 LBS FUEL	1300 LBS FUEL	1200 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL
				FUEL FLOW	SPEED/KNTS.												
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
7000	0	6600	34.6	614	114.8	114.8	294	262	248	224	187	168	150	131	112	93	75
	2000	↑	32.5	527	113.3	110.0	309	275	255	235	096	077	057	037	008	98	78
	4000		31.6	553	113.4	106.9	323	287	267	246	205	185	164	144	123	103	82
	6000		30.3	526	112.8	103.1	337	300	279	257	214	193	171	150	129	107	86
	8000		29.0	498	111.3	98.7	351	313	290	268	223	201	179	156	134	112	89
	10000		28.5	480	110.5	94.9	362	322	299	276	230	207	184	161	138	115	92
	12000		27.6	459	107.8	89.7	369	329	205	282	235	211	188	164	141	117	94
	14000	↓	27.3	446	105.9	85.3	374	332	309	285	237	214	190	166	142	119	95
	16000	6600	27.6	443	103.6	80.8	368	328	304	281	234	211	187	164	140	117	94
7500	0	6600	35.3	623	114.5	114.5	289	257	239	221	184	165	147	129	110	92	74
	2000	↑	33.7	593	113.7	110.4	301	268	249	230	192	172	153	134	115	96	77
	4000		32.1	562	112.2	105.7	314	280	260	240	200	180	160	140	120	100	80
	6000		30.9	535	111.0	101.5	327	291	270	249	208	187	166	145	125	104	83
	8000		30.0	512	109.3	96.9	336	299	276	256	214	192	171	150	128	107	85
	10000		29.5	494	107.5	92.4	342	305	283	261	218	196	174	152	131	109	87
	12000	↓	28.9	476	104.8	87.2	346	308	286	264	220	198	176	154	132	110	88
	14000	6600	29.1	472	102.5	82.6	342	304	283	261	217	196	174	152	130	109	87

REMARKS:

1. Engine specification fuel flow increased 5% per MIL-M-7700A.
2. $\text{Range} = \dfrac{\text{Fuel Available x TAS}}{\text{Fuel Flow}}$
3. Cargo mirror installation will reduce range 8%.
4. Test data show that a continuous use of anti-ice bleed will reduce range 4 1/2 up to 10,000 feet and 14% at 15,000 feet.

Figure 2-11. Range Chart (Sheet 10 of 27)

Chart 14-11. Range (Sheet 10 of 35)

RANGE CHART

540

STANDARD DAY

LONG RANGE - CRUISE SPEED

ARMY MODEL(S): UH-1B (540)
DATA AS OF: FEBRUARY 1964
DATA BASIS: MILITARY POTENTIAL TEST OF THE MODEL 540 "DOOR HINGE" ROTOR SYSTEM "PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					RANGE — Nautical Airmiles										
		ENGINE SPEED	TORQUE PRESS	APPROXIMATE			1573 LBS FUEL	1400 LBS FUEL	1300 LBS FUEL	1200 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL
				FUEL FLOW	SPEED/KNTS.												
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
8000	0	6600	35.9	632	113.9	113.9	284	252	234	216	180	162	144	126	108	90	72
	2000	↑	34.3	602	112.4	109.1	294	261	243	224	187	168	149	131	112	98	75
	4000	|	32.7	571	110.5	104.1	305	271	252	232	194	174	155	136	116	97	77
	6000	|	31.5	548	108.3	99.0	314	279	259	239	199	180	160	140	120	100	80
	8000	|	31.1	527	106.7	94.5	318	283	263	243	202	182	162	142	121	101	81
	10000	↓	30.9	514	104.9	90.1	321	286	265	245	204	184	163	143	122	102	82
	12000	6600	30.7	504	101.8	84.7	317	283	262	242	202	182	161	141	121	101	81
8500	0	6600	36.5	640	112.6	112.6	277	246	229	211	176	158	141	128	106	88	70
	2000	↑	34.9	610	110.7	107.5	285	254	236	218	181	163	145	127	109	91	73
	4000	|	33.3	580	108.0	101.8	293	261	242	224	186	168	149	130	112	93	75
	6000	|	32.6	559	105.8	96.7	298	265	246	227	189	170	151	133	114	95	76
	8000	↓	32.5	549	104.4	92.5	299	266	247	228	190	171	152	133	114	95	76
	10000	6600	32.4	537	101.4	87.1	297	264	245	226	189	170	151	132	113	94	75
9000	0	6600	37.1	649	111.0	111.0	269	240	223	205	171	254	137	120	103	86	68
	2000	↑	35.5	619	108.4	105.2	275	245	228	210	175	158	140	123	105	88	70
	4000	|	34.4	596	105.7	99.6	279	248	231	213	177	160	142	124	106	89	71
	6000	↓	34.1	582	103.8	94.9	281	250	232	214	178	161	143	125	107	89	71
	8000	6600	34.1	578	101.4	89.9	278	248	230	212	177	159	141	124	106	88	71
9500	0	6600	37.7	657	108.8	108.8	260	232	215	199	166	149	132	116	99	83	66
	2000	↑	36.6	636	106.3	103.2	263	234	217	201	167	150	134	117	100	84	67
	4000	↓	35.5	612	103.1	97.1	265	236	219	202	168	152	135	118	101	84	67
	6000	6600	35.8	609	101,6	92.9	262	234	217	200	167	150	133	117	100	83	67

REMARKS:

1. Engine specification fuel flow increased 5% per MIL-M-7700A.
2. $\text{Range} = \frac{\text{Fuel Available x TAS}}{\text{Fuel Flow}}$
3. Cargo mirror installation will reduce range 8%.
4. Test data show that a continuous use of anti-ice bleed will reduce range 4 1/2 up to 10,000 feet and 14% at 15,000 feet.

Chart 14-11. Range (Sheet 11 of 35)

B-5

RANGE CHART

STANDARD DAY

MAXIMUM SPEED - CLEAN CONFIGURATION

ARMY MODEL(S): UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR-62-21 "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					RANGE — Nautical Airmiles										
		ENGINE SPEED	APPROXIMATE TORQUE PRESS	APPROXIMATE FUEL FLOW	SPEED/KNOTS		1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
POUNDS	FEET	RPM	PSIG	LB/HR	TAS*	CAS											
5000	SL	6600	32.5	589	120	120	219	204	183	163	143	122	102	81	61	41	20
	2000	↑	31.1	555	120	117	224	216	194	173	151	130	108	86	65	43	22
	4000		29.1	517	119	112	247	230	207	184	161	138	115	92	69	46	23
	6000		26.3	468	116	106	266	248	223	198	173	149	124	99	74	50	25
	8000		23.4	419	112	99	286	266	240	213	186	160	133	107	80	53	27
	10000		20.8	378	107	92	303	282	254	226	197	169	141	113	85	56	28
	12000		18.5	337	101	84	321	300	270	240	210	180	150	120	90	60	30
	14000		16.4	303	95	76	335	312	281	250	218	187	156	125	94	62	31
	16000		14.9	275	88	68	342	319	287	255	223	191	159	128	96	64	32
	18000	↓	13.8	253	81	61	341	318	286	255	223	191	159	127	95	64	32
	20000	6600	13.3	238	73	53	327	305	275	244	214	183	153	122	92	61	31
5500	SL	6600	33.2	598	120	120	215	201	181	161	140	120	100	80	60	40	20
	2000	↑	31.8	565	120	117	228	213	191	170	149	128	106	85	64	43	21
	4000		29.8	526	119	112	242	226	203	181	158	136	113	90	68	45	23
	6000		27.1	479	116	106	260	242	218	194	169	145	121	97	73	48	24
	8000		24.5	432	112	99	277	258	232	207	181	155	129	103	77	52	26
	10000		21.9	391	107	92	293	273	246	218	191	164	136	109	82	55	27
	12000		19.5	349	101	84	310	289	260	231	202	174	145	116	87	58	29
	14000		17.6	316	95	76	321	299	269	239	209	179	149	120	90	60	30
	16000		16.2	291	88	68	324	302	272	242	211	181	151	121	91	60	30
	18000	↓	15.4	272	81	61	318	296	267	237	207	178	148	119	89	59	30
	20000	6600	15.5	265	73	53	295	275	247	220	192	165	137	110	82	55	27

REMARKS:

1. Engine Specification Fuel Flow Increased 5% per MIL-M-7700A.
2. Range = $\frac{\text{(Fuel Available x TAS)}}{\text{(Fuel Flow)}}$

*3. Limited by VNE or NRP

4. Cargo Mirror Installation will Reduce Range 8%.
5. Test Data Shows that a Continuous use of ANTI-ICE Bleed, will Reduce Range 4 1/2% up to 10,000 Foot and 14% at 15,000 Foot.

Chart 14-11. Range (Sheet 12 of 35)

RANGE CHART

B-5

STANDARD DAY

MAXIMUM SPEED - CLEAN CONFIGURATION

ARMY MODEL(S): UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR-62-21 "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					RANGE — Nautical Airmiles										
		ENGINE SPEED	APPROXIMATE		SPEED/KNOTS		1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
			TORQUE PRESS	FUEL FLOW													
POUNDS	FEET	RPM	PSIG	LB/HR	TAS*	CAS											
6000	SL	6600	33.9	607	120	120	212	198	180	158	138	119	99	79	59	40	20
	2000	↑	32.4	574	120	117	224	209	188	167	146	126	105	84	63	42	21
	4000		30.7	539	119	112	237	221	199	176	154	132	110	88	66	44	22
	6000		28.2	494	116	106	252	235	211	188	164	141	117	94	70	47	23
	8000		25.5	447	112	99	268	250	225	200	175	150	125	100	75	50	25
	10000		23.0	405	106	92	283	264	237	211	184	158	132	105	79	53	26
	12000		20.9	365	101	84	297	276	249	221	193	166	138	111	83	55	28
	14000		19.2	335	95	76	303	282	254	226	197	169	141	113	85	56	28
	16000		18.2	314	88	68	300	273	251	223	196	168	140	112	84	56	28
	18000	↓	18.2	305	81	61	283	264	238	211	185	158	132	106	79	53	26
	20000	6600															
6500	SL	6600	34.6	617	120	120	215	195	175	156	136	117	97	78	58	39	19
	2000	↑	33.5	588	120	117	219	204	184	163	143	122	102	82	61	41	20
	4000		31.8	555	119	112	230	214	193	171	150	129	107	86	64	43	21
	6000		29.3	509	116	106	244	228	205	182	159	137	114	91	68	46	23
	8000		26.8	465	112	99	258	240	216	192	168	144	120	96	72	48	24
	10000		24.6	425	106	92	269	251	226	201	176	151	126	100	75	50	25
	12000		22.9	391	101	84	278	259	233	207	181	155	129	103	78	52	26
	14000		21.8	367	95	76	276	258	232	206	180	155	129	103	77	52	26
	16000		21.6	357	88	68	263	245	221	196	172	147	123	98	74	49	25
	18000	↓															
	20000	6600															

REMARKS:
1. Engine Specification Fuel Flow Increased 5% per MIL-M-7700A.
2. Range = $\frac{(\text{Fuel Available x TAS})}{(\text{Fuel Flow})}$
* 3. Limited by VNE or NRP
4. Cargo Mirror Installation will Reduce Range 8%.
5. Test Data Shows that a Continuous use of ANTI-ICE Bleed will Reduce Range 4 1/2% up to 10,000 Foot and 14% at 15,000 Foot.

Chart 14-11. Range (Sheet 13 of 35)

RANGE CHART

B-5

STANDARD DAY

MAXIMUM SPEED - CLEAN CONFIGURATION

ARMY MODEL(S): UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR-62-21 "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/Gal.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					RANGE — Nautical Airmiles										
		ENGINE SPEED	APPROXIMATE TORQUE PRESS	APPROXIMATE FUEL FLOW	SPEED/KNOTS		1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
POUNDS	FEET	RPM	PSIG	LB/HR	TAS*	CAS											
7000	SL	6600	32.6	590	115	115	208	194	175	155	136	116	97	78	58	39	19
	2000	↑	31.6	563	115	111	218	204	183	163	142	122	102	81	61	41	20
	4000		30.1	530	113	107	229	214	192	171	150	128	107	85	64	43	21
	6000		28.0	491	110	100	240	224	201	179	157	134	112	89	67	45	22
	8000		26.0	453	106	94	250	233	211	186	163	140	116	93	70	47	23
	10000		24.4	423	100	86	254	237	213	189	166	142	118	95	71	47	24
	12000		23.5	400	94	78	253	236	212	189	165	141	118	94	71	47	24
	14000		23.6	392	88	71	239	223	201	178	156	134	112	89	67	45	22
	16000																
	18000	↓															
	20000	6600															
7500	SL	6600	30.3	560	108	108	207	193	174	154	135	116	97	77	58	39	19
	2000	↑	29.5	534	108	105	217	202	182	162	142	121	101	81	61	40	20
	4000		28.4	508	107	100	225	210	189	168	147	126	105	84	63	42	21
	6000		26.8	475	103	94	232	217	195	173	152	130	108	87	65	43	22
	8000		25.4	445	98	87	237	221	199	176	154	132	110	88	66	44	22
	10000		24.8	428	93	80	232	216	194	173	151	130	108	86	65	43	22
	12000		25.1	421	86	72	219	204	184	163	143	123	102	82	61	41	20
	14000																
	16000																
	18000	↓															
	20000	6600															

REMARKS:
1. Engine Specification Fuel Flow Increased 5% per MIL-M-7700A.
2. Range = $\frac{\text{(Fuel Available x TAS)}}{\text{(Fuel Flow)}}$
*3. Limited by VNE or NRP
4. Cargo Mirror Installation will Reduce Range 8%.
5. Test Data Shows that a Continuous use of ANTI-ICE Bleed will Reduce Range 4 1/2% up to 10,000 Foot and 14% at 15,000 Foot.

Chart 14-11. Range (Sheet 14 of 35)

RANGE CHART

STANDARD DAY

B-5

MAXIMUM SPEED - CLEAN CONFIGURATION

ARMY MODEL(S): UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR-62-21 "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					RANGE — Nautical Airmiles										
		ENGINE SPEED	APPROXIMATE TORQUE PRESS	APPROXIMATE FUEL FLOW	SPEED/KNOTS		1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
POUNDS	FEET	RPM	PSIG	LB/HR	TAS*	CAS											
8000	SL	6600	28.5	535	102	102	204	190	171	152	133	114	95	76	57	38	19
	2000	↑	28.1	516	102	99	211	197	177	157	138	118	98	79	59	39	20
	4000		27.3	494	100	94	217	202	182	162	141	121	101	81	61	40	20
	6000		26.2	467	96	88	220	205	185	164	144	123	103	82	62	41	21
	8000		26.0	453	91	81	215	201	181	161	141	120	100	80	60	40	20
	10000		26.6	452	85	73	202	188	169	150	132	113	94	75	56	38	19
	12000																
	14000																
	16000																
	18000	↓															
	20000	6600															
8500	SL	6600	27.4	521	95	95	196	183	164	146	128	110	91	73	55	37	18
	2000	↑	27.3	505	95	92	202	188	169	150	132	113	94	75	56	38	19
	4000		26.9	488	93	88	205	191	172	153	134	114	95	76	57	38	19
	6000		27.0	477	89	82	200	187	168	149	131	112	93	75	56	37	19
	8000		27.9	479	84	75	188	175	158	140	123	105	88	70	53	35	18
	10000																
	12000																
	14000																
	16000																
	18000	↓															
	20000	6600															

REMARKS: 1. Engine Specification Fuel Flow Increased 5% per MIL-M-7700A.

2. Range = $\frac{\text{(Fuel Available x TAS)}}{\text{(Fuel Flow)}}$

*3. Limited by VNE or NRP

4. Cargo Mirror Installation will Reduce Range 8%.

5. Test Data Shows that a Continuous use of ANTI-ICE Bleed will Reduce Range 4 1/2% up to 10,000 Foot and 14% at 15,000 Foot.

Chart 14-11. Range (Sheet 15 of 35)

B9/11 **B9/11**

RANGE CHART

STANDARD DAY

CLEAN CONFIGURATION - LONG RANGE

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					RANGE — Nautical Airmiles										
		ENGINE SPEED	APPROX.		SPEED/KNTS		1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
			TORQUE PRESS	FUEL FLOW													
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
5000	SL	6600	28.2	534	112	112	226	210	189	168	147	126	105	84	63	42	21
	2000	↑	26.4	503	111	108	237	221	198	176	154	132	110	88	66	44	22
	4000		25.1	475	111	105	251	234	210	184	161	138	117	92	69	46	23
	6000		24.1	448	111	101	266	248	223	200	175	150	124	100	75	50	25
	8000		23.3	424	111	98	282	262	236	208	182	156	131	104	78	52	26
	10000		21.7	390	106	91	292	272	245	216	189	162	136	108	81	54	27
	12000		18.1	344	101	84	312	291	262	232	203	174	145	116	87	58	29
	14000		15.3	314	95	76	326	303	273	240	210	180	152	120	90	60	30
	16000		14.9	286	87	68	328	305	275	240	210	180	152	120	90	60	30
	18000	↓	13.6	264	80	60	326	303	273	240	210	180	152	120	90	60	30
	20000	6600	13.1	254	73	53	310	288	269	232	203	174	144	116	87	58	29
5500	SL	6600	29.3	551	113	113	220	205	185	160	140	120	102	80	60	40	20
	2000	↑	27.0	515	112	109	234	218	196	176	154	132	109	88	66	44	22
	4000		26.7	491	112	106	245	228	205	184	161	138	114	92	69	46	23
	6000		25.4	464	112	102	260	242	218	192	168	144	121	96	72	48	24
	8000		24.6	441	112	99	273	254	228	200	175	150	127	100	75	50	25
	10000		23.8	396	106	91	288	268	242	216	189	161	134	108	81	54	27
	12000		19.6	360	101	84	302	281	253	224	196	168	140	112	84	56	28
	14000		17.5	328	95	76	312	290	261	232	203	174	145	116	87	58	29
	16000		16.1	300	87	68	312	290	261	232	203	174	145	116	87	58	29
	18000	↓	15.3	282	80	60	304	283	255	224	196	168	142	112	84	56	28
	20000	6600	14.5	281	73	53	279	260	234	208	182	144	130	104	72	52	26

REMARKS:

1. Engine Specification fuel flow increased 5% per MIL-M-7700A.
2. $\text{Range} = \dfrac{\text{Fuel Available x TAS}}{\text{Fuel Flow}}$
3. Cargo mirror installation will reduce range 8%.
4. Test data show that a continuous use of anti-ice bleed will reduce range 4 1/2% up to 10,000 feet and 14% at 15,000 feet.

Chart 14-11. Range (Sheet 16 of 35)

B-5

RANGE CHART

STANDARD DAY

CLEAN CONFIGURATION - LONG RANGE

ARMY MODEL(S): UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR-62-21, "YUH-1B Category II Performance Tests") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					RANGE — Nautical Airmiles										
		ENGINE SPEED	APPROXIMATE		SPEED/KNOTS		1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
			TORQUE PRESS	FUEL FLOW													
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
6000	SL	6600	26.3	507	106	106	224	209	188	167	146	125	104	83	63	42	21
	2,000	↑	26.7	497	109	106	234	218	197	175	153	131	109	87	66	44	22
	4,000		26.1	477	109	103	246	229	206	183	160	137	114	92	67	46	23
	6,000		25.3	455	109	100	258	240	216	192	168	144	120	96	72	48	24
	8,000		24.7	436	110	97	270	252	227	201	176	151	126	101	76	50	25
	10,000		23.0	405	106	92	283	264	237	211	184	158	132	105	79	53	26
	12,000		20.9	365	101	84	297	276	249	221	193	166	138	111	83	55	28
	14,000		19.2	335	95	76	303	282	254	226	197	169	141	113	85	56	28
	16,000		18.2	314	88	68	300	279	251	223	196	168	140	112	84	56	28
	18,000	↓	18.2	305	81	61	283	264	238	211	185	158	132	106	79	53	26
	20,000	6600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6500	SL	6600	27.5	523	107	107	219	204	183	163	143	122	102	82	61	41	20
	2,000	↑	27.9	514	109	106	228	212	191	170	149	128	106	85	64	43	21
	4,000		27.2	492	110	103	239	222	200	178	156	133	111	89	67	44	22
	6,000		26.2	466	109	101	250	233	210	187	163	140	117	93	70	47	23
	8,000		25.6	448	109	97	260	243	219	194	170	146	121	97	73	49	24
	10,000		24.6	425	106	92	269	251	226	201	176	151	126	100	75	50	25
	12,000		22.9	391	101	84	278	259	233	207	181	155	129	103	78	52	26
	14,000		21.8	367	95	76	276	258	232	206	180	155	129	103	77	52	26
	16,000		21.6	357	88	68	263	245	221	196	172	147	123	98	74	49	25
	18,000	↓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20,000	6600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

REMARKS:

1. Engine Specification Fuel Flow Increased 5% per MIL-M-7700A
2. Range = $\frac{\text{(Fuel Available x TAS).}}{\text{(Fuel Flow)}}$
3. Cargo Mirror Installation will Reduce Range 8%.
4. Test Data Shows that a Continuous use of ANTI-ICE Bleed will Reduce Range 4 1/2% up to 10,000 Foot and 14% at 15,000 Foot.

Chart 14-11. Range (Sheet 17 of 35)

B9/11 B9/11

RANGE CHART

STANDARD DAY

CLEAN CONFIGURATION - LONG RANGE

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					RANGE — Nautical Airmiles										
		ENGINE SPEED	APPROX.		SPEED/KNTS		1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
			TORQUE PRESS	FUEL FLOW													
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
7000	SL	6600	32.0	580	113	113	210	195	176	156	137	117	98	78	59	39	20
	2000		30.1	550	112	109	219	204	184	163	143	122	102	82	61	41	20
	4000		29.6	529	112	106	228	212	191	168	147	126	106	84	63	42	21
	6000		28.4	502	111	101	237	221	198	176	154	132	110	88	66	44	22
	8000		25.8	456	105	93	247	230	207	184	161	138	115	92	69	46	23
	10000		24.2	425	100	86	253	235	212	192	168	144	118	96	72	48	24
	12000		23.3	405	94	78	250	232	209	184	161	138	116	92	69	46	23
	14000		23.3	395	87	70	236	220	198	176	154	132	110	88	66	44	22
	16000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	18000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20000	6600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7500	SL	6600	30.5	564	108	108	205	192	173	152	133	114	96	76	57	38	19
	2000		29.5	540	108	105	215	200	180	160	140	120	100	80	60	40	20
	4000		28.0	510	106	100	223	207	187	166	145	124	104	83	62	42	21
	6000		26.5	476	102	93	230	214	193	171	150	128	107	86	64	43	21
	8000		25.1	441	96	85	233	217	195	176	154	132	108	88	66	44	22
	10000		24.7	430	92	79	230	214	193	168	147	126	107	84	63	42	21
	12000		24.7	425	85	71	215	200	180	160	140	120	100	80	60	40	20
	14000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	16000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	18000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20000	6600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

REMARKS:

1. Engine Specification fuel flow increased 5% per MIL-M-7700A.
2. Range = $\frac{\text{Fuel Available x TAS}}{\text{Fuel Flow}}$
3. Cargo mirror installation will reduce range 8%.
4. Test data show that a continuous use of anti-ice bleed will reduce range 4 1/2% up to 10,000 feet and 14% at 15,000 feet.

Chart 14-11. Range (Sheet 18 of 35)

B9/11 **B9/11**

RANGE CHART

STANDARD DAY

CLEAN CONFIGURATION - LONG RANGE

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					RANGE — Nautical Airmiles										
		ENGINE SPEED	APPROX.		SPEED/KNTS		1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
			TORQUE PRESS	FUEL FLOW													
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
8000	SL	6600	29.0	545	102	102	201	187	168	152	133	114	94	76	57	38	19
	2000	↑	27.0	515	101	98	211	196	176	156	137	117	98	78	59	39	20
	4000		27.1	503	100	94	214	199	179	160	140	120	100	80	60	40	20
	6000		26.4	475	96	88	217	202	182	162	141	121	101	81	61	40	20
	8000		26.2	460	91	81	213	198	178	158	139	119	99	79	59	40	20
	10000		26.4	456	85	73	200	186	167	152	133	114	83	76	57	38	19
	12000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	14000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	16000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	18000	↓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20000	6600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8500	SL	6600	27.2	528	95	95	193	180	162	144	126	108	90	72	54	36	18
	2000	↑	27.0	514	95	92	199	185	167	148	129	111	92	74	55	37	18
	4000		26.9	497	93	88	201	187	168	152	133	114	94	76	57	38	19
	6000		26.8	479	88	81	198	184	166	144	126	108	92	72	54	36	18
	8000		28.0	486	84	75	186	173	156	138	119	102	86	68	51	34	17
	10000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	12000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	14000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	16000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	18000	↓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20000	6600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

REMARKS:

1. Engine Specification fuel flow increased 5% per MIL-M-7700A.
2. Range = $\frac{\text{Fuel Available x TAS}}{\text{Fuel Flow}}$
3. Cargo mirror installation will reduce range 8%.
4. Test data show that a continuous use of anti-ice bleed will reduce range 4 1/2% up to 10,000 feet and 14% at 15,000 feet.

Chart 14-11. Range (Sheet 19 of 35)

B9/11 B9/11

RANGE CHART

STANDARD DAY

CLEAN CONFIGURATION - MAXIMUM SPEED

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					RANGE — Nautical Airmiles										
		ENGINE SPEED	APPROX.		SPEED/KNTS		1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
			TORQUE PRESS	FUEL FLOW													
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
5000	SL	6600	32.9	590	120	120	219	204	183	160	140	120	102	80	60	40	20
	2000	↑	30.1	550	120	117	231	215	194	172	151	129	108	86	65	43	22
	4000		29.0	525	119	112	238	222	199	176	154	132	111	88	66	44	22
	6000		26.4	475	116	106	262	244	220	188	168	144	122	94	72	48	24
	8000		23.3	424	111	98	282	262	236	208	182	156	131	104	78	52	26
	10000		21.7	390	106	91	292	272	245	216	189	162	136	108	81	54	27
	12000		18.1	344	101	84	312	291	262	232	203	174	145	116	87	58	29
	14000		15.3	314	95	76	326	303	273	240	210	180	152	120	90	60	30
	16000		14.9	286	87	68	328	305	275	240	210	180	152	120	90	60	30
	18000	↓	13.6	264	80	60	326	303	273	240	210	180	152	120	90	60	30
	20000	6600	13.1	254	73	53	310	288	269	232	203	174	144	116	87	58	29
5500	SL	6600	33.6	595	120	120	216	201	180	160	140	120	100	80	60	40	20
	2000	↑	32.0	570	120	117	226	211	190	168	147	126	106	84	63	42	21
	4000		29.5	531	119	112	240	224	201	176	154	132	112	88	66	44	22
	6000		28.4	500	116	106	257	239	215	192	168	144	120	96	72	48	24
	8000		24.6	441	112	99	273	254	228	200	175	150	127	100	75	50	25
	10000		23.8	396	106	91	288	268	242	216	189	161	134	108	81	54	27
	12000		19.6	360	101	84	302	281	253	224	196	168	140	112	84	56	28
	14000		17.5	328	95	76	312	290	261	232	203	174	145	116	87	58	29
	16000		16.1	300	87	68	312	290	261	232	203	174	145	116	87	58	29
	18000	↓	15.3	282	80	60	304	283	255	224	196	168	142	112	84	56	28
	20000	6600	15.5	281	73	53	279	260	234	208	182	144	130	104	72	52	26

REMARKS:

1. Engine Specification fuel flow increased 5% per MIL-M-7700A.
2. Range = $\frac{\text{Fuel Available x TAS}}{\text{Fuel Flow}}$
3. Cargo mirror installation will reduce range 8%.
4. Test data show that a continuous use of anti-ice bleed will reduce range 4 1/2% up to 10,000 feet and 14% at 15,000 feet.

Chart 14-11. Range (Sheet 20 of 35)

B9/11 **B9/11**

RANGE CHART

STANDARD DAY

CLEAN CONFIGURATION - MAXIMUM SPEED

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					RANGE – Nautical Airmiles										
		ENGINE SPEED	APPROX.		SPEED/KNTS		1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
			TORQUE PRESS	FUEL FLOW													
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
6000	SL	6600	34.0	605	120	120	212	198	180	160	140	120	99	80	60	40	20
	2000	↑	32.4	578	120	117	223	208	187	168	147	126	104	84	63	42	21
	4000		30.6	545	119	112	235	219	197	176	154	132	210	88	66	44	22
	6000		28.5	500	116	106	249	232	209	184	161	138	216	92	69	46	23
	8000		25.9	455	112	99	264	246	222	200	175	150	123	100	75	50	25
	10000		22.9	408	106	91	280	260	234	208	182	156	130	104	78	52	26
	12000		20.7	374	101	84	290	270	243	216	189	162	135	108	81	54	27
	14000		19.0	346	95	76	295	275	248	224	196	168	137	112	84	56	28
	16000		18.2	322	87	68	290	270	243	216	189	162	135	108	81	54	27
	18000	↓	18.0	314	80	60	274	255	230	208	182	156	128	104	78	52	26
	20000	6600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6500	SL	6600	34.6	615	120	120	209	195	176	156	136	117	98	78	59	39	20
	2000	↑	33.5	591	120	117	218	203	182	164	142	122	102	82	61	41	20
	4000		31.0	550	117	110	229	213	191	172	147	126	106	86	63	43	21
	6000		29.4	515	116	106	232	225	202	180	154	132	113	90	66	45	22
	8000		26.4	462	110	97	256	238	214	192	168	144	119	96	72	48	24
	10000		24.7	428	106	91	266	248	224	200	175	150	124	100	75	50	25
	12000		22.3	394	101	84	273	254	229	204	178	152	127	102	76	51	25
	14000		21.5	376	95	76	272	253	228	204	178	152	127	102	76	51	25
	16000		21.2	363	87	68	258	240	216	192	168	144	120	96	72	48	24
	18000	↓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20000	6600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

REMARKS:

1. Engine Specification fuel flow increased 5% per MIL-M-7700A.
2. Range = $\frac{\text{Fuel Available x TAS}}{\text{Fuel Flow}}$
3. Cargo mirror installation will reduce range 8%.
4. Test data show that a continuous use of anti-ice bleed will reduce range 4 1/2% up to 10,000 feet and 14% at 15,000 feet.

Chart 14-11. Range (Sheet 21 of 35)

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RANGE CHART

STANDARD DAY

CLEAN CONFIGURATION - MAXIMUM SPEED

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					RANGE — Nautical Airmiles										
		ENGINE SPEED	APPROX.		SPEED/KNTS		1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
			TORQUE PRESS	FUEL FLOW													
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
7000	SL	6600	34.6	594	115	115	208	194	176	156	136	117	97	78	59	39	19
	2000	↑	32.0	570	115	112	217	202	182	164	140	120	101	81	61	40	20
	4000		29.6	529	112	106	228	212	191	168	147	126	106	84	63	42	21
	6000		28.4	502	111	101	237	221	198	176	154	132	110	88	66	44	22
	8000		25.8	456	105	93	247	230	207	184	161	138	115	92	69	46	23
	10000		24.2	425	100	86	253	235	212	192	168	144	118	96	72	48	24
	12000		23.3	405	94	78	250	232	209	184	161	138	116	92	69	46	23
	14000		23.3	395	87	70	236	220	198	176	154	132	110	88	66	44	22
	16000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	18000	↓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20000	6600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7500	SL	6600	30.5	564	108	108	205	192	173	152	133	114	96	76	57	38	19
	2000	↑	29.5	540	108	105	215	200	180	160	140	120	100	80	60	40	20
	4000		28.0	510	106	100	223	207	187	166	145	124	104	83	62	42	21
	6000		26.5	476	102	93	230	214	193	171	150	128	107	86	64	43	21
	8000		25.1	441	96	85	233	217	195	176	154	132	108	88	66	44	22
	10000		24.7	430	92	79	230	214	193	168	147	126	107	84	63	42	21
	12000		24.7	425	85	71	215	200	180	160	140	120	100	80	60	40	20
	14000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	16000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	18000	↓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20000	6600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

REMARKS:

1. Engine Specification fuel flow increased 5% per MIL-M-7700A.
2. Range = $\frac{\text{Fuel Available x TAS}}{\text{Fuel Flow}}$
3. Cargo mirror installation will reduce range 8%.
4. Test data show that a continuous use of anti-ice bleed will reduce range 4 1/2% up to 10,000 feet and 14% at 15,000 feet.

Chart 14-11. Range (Sheet 22 of 35)

B9/11 **B9/11**

RANGE CHART

STANDARD DAY

CLEAN CONFIGURATION - MAXIMUM SPEED

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					RANGE — Nautical Airmiles										
		ENGINE SPEED	APPROX.		SPEED/KNTS		1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
			TORQUE PRESS	FUEL FLOW													
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
8000	SL	6600	29.0	545	102	102	201	187	168	152	133	114	94	76	57	38	19
	2000	↑	27.0	515	101	98	211	196	176	156	137	117	98	78	59	39	20
	4000		27.1	503	100	94	214	199	179	160	140	120	100	80	60	40	20
	6000		26.4	475	96	88	217	202	182	162	141	121	101	81	61	40	20
	8000		26.2	460	91	81	213	198	178	158	139	119	99	79	59	40	20
	10000		26.4	456	85	73	200	186	167	157	133	114	83	76	57	38	19
	12000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	14000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	16000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	18000	↓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20000	6600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8500	SL	6600	27.2	528	95	95	193	180	162	144	126	108	90	72	54	36	18
	2000	↑	27.0	514	95	92	199	185	167	148	129	111	92	74	55	37	18
	4000		26.9	497	93	88	201	187	168	152	133	114	94	76	57	38	19
	6000		26.8	479	88	80	198	184	166	144	126	108	92	72	54	36	18
	8000		28.0	486	84	75	186	173	156	138	119	102	86	68	51	34	17
	10000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	12000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	14000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	16000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	18000	↓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20000	6600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

REMARKS:

1. Engine Specification fuel flow increased 5% per MIL-M-7700A.
2. Range = $\frac{\text{Fuel Available x TAS}}{\text{Fuel Flow}}$
3. Cargo mirror installation will reduce range 8%.
4. Test data show that a continuous use of anti-ice bleed will reduce range 4 1/2% up to 10,000 feet and 14% at 15,000 feet.

Chart 14-11. Range (Sheet 23 of 35)

RANGE CHART

540

STANDARD DAY

MAXIMUM SPEED

ARMY MODEL(S): UH-1B (540)
DATA AS OF: FEBRUARY 1964
DATA BASIS: MILITARY POTENTIAL TEST OF THE MODEL 540 "DOOR HINGE" ROTOR SYSTEM "PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					RANGE — Nautical Airmiles										
		ENGINE SPEED	TORQUE PRESS	APPROXIMATE			1573 LBS FUEL	1400 LBS FUEL	1300 LBS FUEL	1200 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL
				FUEL FLOW	SPEED/KNTS.												
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
5000	0	6600	38.9	675	125.5	125.5	292	260	241	223	186	167	149	130	111	93	74
	2000	↑	38.9	670	128.4	124.7	301	268	249	230	192	172	153	134	115	96	77
	4000		38.9	666	131.4	123.8	310	276	256	237	197	176	158	138	118	99	79
	6000		37.4	637	132.1	120.7	326	290	270	249	207	187	166	145	124	104	83
	8000		35.7	601	132.3	117.3	346	308	286	264	220	198	176	154	132	110	88
	10000		33.9	562	132.1	113.5	369	329	305	282	235	211	188	164	141	117	94
	12000		32.2	528	131.8	109.7	393	350	325	300	250	225	200	175	150	125	100
	14000		30.6	494	131.2	105.7	418	372	346	319	266	239	213	186	160	133	106
	16000		28.9	463	130.1	101.5	442	394	365	337	281	253	225	197	169	141	112
	18000	↓	27.8	440	128.2	96.7	459	408	379	350	292	262	233	204	175	146	117
	20000	6600	25.6	413	124.8	91.1	475	423	393	362	302	272	242	211	181	151	121
5500	0	6600	38.9	675	124.6	124.6	291	259	240	222	185	166	148	129	111	92	74
	2000	↑	38.9	670	127.5	123.8	299	266	247	228	190	171	152	133	114	95	76
	4000		38.9	666	130.4	122.9	308	274	254	235	196	176	157	137	117	98	78
	6000		37.4	637	131.0	119.7	323	288	267	247	206	185	164	144	123	103	82
	8000		35.6	600	130.9	116.0	343	305	283	262	218	196	174	153	131	109	87
	10000		33.9	562	130.4	112.1	365	325	302	278	232	209	186	162	139	116	93
	12000		32.2	528	129.9	108.1	387	344	320	295	246	221	197	172	148	123	98
	14000		30.6	494	128.5	103.6	409	364	338	312	260	234	208	182	156	130	104
	16000		28.9	463	126.2	98.5	429	382	355	327	273	246	218	191	164	136	109
	18000	↓	27.2	439	122.9	92.7	440	392	364	336	280	252	224	196	168	140	112
	20000	6600	25.8	413	118.1	86.2	450	400	372	343	286	257	229	200	172	143	114

REMARKS:

1. Engine specification fuel flow increased 5% per MIL-M-7700A.
2. Range = $\frac{\text{Fuel available x TAS}}{\text{Fuel Flow}}$
3. Cargo mirror installation will reduce range 8%.
4. Test data show that a continuous use of anti-ice bleed will reduce range 4 1/2 up to 10,000 feet and 14% at 15,000 feet.

Chart 14-11. Range (Sheet 24 of 35)

RANGE CHART

540

STANDARD DAY

MAXIMUM SPEED

ARMY MODEL(S): UH-1B (540)
DATA AS OF: FEBRUARY 1964
DATA BASIS: MILITARY POTENTIAL TEST OF THE MODEL 540 "DOOR HINGE" ROTOR SYSTEM "PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					RANGE — Nautical Airmiles										
		ENGINE SPEED	TORQUE PRESS	APPROXIMATE FUEL FLOW	APPROXIMATE SPEED/KNTS.		1573 LBS FUEL	1400 LBS FUEL	1300 LBS FUEL	1200 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
6000	0	6600	38.9	676	123.9	123.9	288	257	238	220	183	165	147	128	110	92	73
	2000	↑	38.9	671	126.7	123.0	297	264	246	227	189	170	151	132	113	94	76
	4000		38.9	667	129.4	121.9	305	272	252	233	194	175	155	136	116	97	78
	6000		37.4	637	129.7	118.6	320	285	265	244	204	183	163	143	122	102	81
	8000		35.7	600	129.3	114.6	339	301	280	258	215	194	172	151	129	108	86
	10000		33.9	563	128.5	110.4	359	320	297	274	228	205	183	160	137	114	91
	12000		32.3	528	127.0	105.7	378	336	312	288	240	216	192	168	144	120	96
	14000		30.6	494	124.4	100.3	396	353	328	302	252	227	202	176	151	126	101
	16000		28.9	463	120.9	94.4	411	366	340	314	261	235	209	183	157	131	105
	18000	↓	27.8	440	116.2	87.7	416	370	344	317	264	238	211	185	159	132	106
	20000	6600	25.6	413	110.3	80.5	420	373	347	320	267	240	213	187	160	133	107
6500	0	6600	38.9	675	122.9	122.9	286	255	237	218	182	164	146	127	109	91	73
	2000	↑	38.9	670	125.5	121.8	295	262	244	225	187	169	150	131	112	94	75
	4000		38.9	666	128.1	120.7	302	269	250	231	192	173	154	135	115	96	77
	6000		37.4	636	128.1	117.1	316	281	261	241	201	181	161	141	121	100	80
	8000		35.6	600	127.1	112.7	333	296	275	254	212	191	169	148	127	106	85
	10000		33.9	583	125.6	107.9	351	312	290	268	223	201	179	156	134	112	89
	12000		32.3	528	122.9	102.3	366	326	302	279	233	209	186	163	140	116	93
	14000		30.6	494	119.2	96.1	380	338	314	290	241	217	193	169	145	121	97
	16000	↓	28.9	462	114.3	89.1	389	346	321	297	247	222	198	173	148	124	99
	18000	6600	27.2	439	108.1	81.6	387	345	320	295	246	222	197	172	148	123	98

REMARKS:

1. Engine specification fuel flow increased 5% per MIL-M-7700A.
2. Range = $\frac{\text{Fuel available x TAS}}{\text{Fuel Flow}}$
3. Cargo mirror installation will reduce range 8%.
4. Test data show that a continuous use of anti-ice bleed will reduce range 4 1/2 up to 10,000 feet and 14% at 15,000 feet.

Chart 14-11. Range (Sheet 25 of 35)

RANGE CHART

540

STANDARD DAY

MAXIMUM SPEED

ARMY MODEL(S): UH-1B (540)
DATA AS OF: FEBRUARY 1964
DATA BASIS: MILITARY POTENTIAL TEST OF THE MODEL 540 "DOOR HINGE" ROTOR SYSTEM "PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					RANGE — Nautical Airmiles										
		ENGINE SPEED	TORQUE PRESS	APPROXIMATE			1573 LBS FUEL	1400 LBS FUEL	1300 LBS FUEL	1200 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL
				FUEL FLOW	SPEED/KNTS.												
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
7000	0	6600	38.9	675	121.8	121.8	284	253	235	217	181	162	144	126	111	92	74
	2000	↑	38.9	671	124.3	120.7	292	259	241	222	185	167	148	130	115	96	77
	4000		38.9	666	126.4	119.2	299	266	247	228	190	171	152	133	119	99	80
	6000		37.4	637	125.8	115.0	311	277	257	237	198	178	158	138	125	104	83
	8000		35.7	600	124.3	110.2	326	290	269	248	207	186	166	145	130	109	87
	10000		33.9	563	121.5	104.4	340	302	281	259	216	194	173	151	135	112	90
	12000		32.3	528	117.8	98.1	351	312	290	268	223	201	178	156	138	115	92
	14000	↓	30.5	493	112.9	91.0	360	320	297	274	229	206	183	160	140	117	94
	16000	6600	28.9	463	106.6	83.1	362	323	300	277	230	207	184	161	139	116	93
7500	0	6600	38.9	675	120.5	120.5	281	250	232	214	179	161	143	125	107	89	71
	2000	↑	38.9	670	122.7	119.1	288	256	238	220	183	165	146	128	110	91	73
	4000		38.9	666	124.2	117.0	293	261	243	224	187	168	149	131	112	93	75
	6000		37.4	637	123.0	112.4	304	270	251	232	193	174	155	135	116	97	77
	8000		35.6	600	120.3	106.6	316	281	261	241	201	181	160	140	120	100	80
	10000		33.9	562	116.5	100.1	326	290	269	249	207	186	166	145	124	104	83
	12000	↓	32.2	528	111.8	93.0	333	296	275	254	212	191	169	148	127	106	85
	14000	6600	30.5	493	105.5	85.0	336	299	278	257	214	192	171	150	128	107	86

REMARKS:

1. Engine specification fuel flow increased 5% per MIL-M-7700A.
2. Range = $\frac{\text{Fuel available x TAS}}{\text{Fuel Flow}}$
3. Cargo mirror installation will reduce range 8%.
4. Test data show that a continuous use of anti-ice bleed will reduce range 4 1/2 up to 10,000 feet and 14% at 15,000 feet.

Chart 14-11. Range (Sheet 26 of 35)

RANGE CHART

540

STANDARD DAY

MAXIMUM SPEED

ARMY MODEL(S): UH-1B (540)
DATA AS OF: FEBRUARY 1964
DATA BASIS: MILITARY POTENTIAL TEST OF THE MODEL 540 "DOOR HINGE" ROTOR SYSTEM "PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					RANGE — Nautical Airmiles										
		ENGINE SPEED	TORQUE PRESS	APPROXIMATE			1573 LBS FUEL	1400 LBS FUEL	1300 LBS FUEL	1200 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL
				FUEL FLOW	SPEED/KNTS.												
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
8000	0	6600	38.9	675	118.9	118.9	277	247	229	211	176	159	141	123	106	88	70
	2000	↑	38.9	670	120.4	116.9	283	252	234	216	180	162	144	126	108	90	72
	4000		38.9	666	121.5	114.5	287	255	237	219	182	164	146	128	109	91	73
	6000		37.4	637	119.3	109.1	295	262	244	225	187	169	150	131	112	94	75
	8000		35.7	601	115.7	102.5	303	270	250	231	193	173	154	135	116	96	77
	10000	↓	33.9	563	110.9	95.3	310	276	256	237	197	177	158	138	118	99	79
	12000	6600	32.2	528	104.8	87.2	312	278	258	238	199	179	159	139	119	99	79
8500	0	6600	38.9	675	116.6	116.6	272	242	225	207	173	156	138	121	104	86	69
	2000	↑	38.9	670	117.7	114.3	276	246	228	211	176	158	141	123	105	88	70
	4000		38.9	667	118.0	111.2	279	248	230	212	177	159	142	123	106	89	71
	6000		37.4	637	114.8	104.9	284	252	234	216	180	162	144	126	108	90	72
	8000	↓	35.7	601	110.4	97.8	289	257	239	220	184	165	147	129	110	92	73
	10000	6600	33.9	563	104.4	89.7	292	260	241	223	186	167	148	130	111	93	74
9000	0	6600	38.9	675	114.0	114.0	266	237	220	203	169	152	135	118	101	85	68
	2000	↑	38.9	670	114.4	111.0	268	239	222	205	171	154	137	119	102	85	68
	4000		38.9	666	113.7	107.2	269	239	222	205	171	154	137	119	102	85	68
	6000	↓	37.4	637	109.8	100.4	271	242	224	207	173	155	138	121	104	86	69
	8000	6600	35.7	600	104.4	92.5	274	243	226	209	174	156	139	122	104	87	70
9500	0	6600	38.9	675	110.8	110.8	258	230	213	197	164	148	131	115	99	82	66
	2000	↑	38.9	670	110.3	107.1	259	230	214	198	165	148	132	115	99	82	66
	4000	↓	38.9	666	109.1	102.8	258	229	218	197	164	147	131	115	98	82	66
	6000	6600	37.4	637	104.6	95.6	258	230	213	197	164	148	131	115	99	82	66

REMARKS:

1. Engine specification fuel flow increased 5% per MIL-M-7700A.
2. Range = $\frac{\text{Fuel available x TAS}}{\text{Fuel Flow}}$
3. Cargo mirror installation will reduce range 8%.
4. Test data show that a continuous use of anti-ice bleed will reduce range 4 1/2 up to 10,000 feet and 14% at 15,000 feet.

Chart 14-11. Range (Sheet 27 of 35)

RANGE CHART
STANDARD DAY

ENGINE SPEED 6600 RPM
LONG RANGE - CRUISE SPEED
XM-5 ARMAMENT KIT

Model(s): UH-1B
Data as of: April 1965
DATA BASIS: Flight Test (FTC-TDR-62-21 "YUH-1B Category II Performance Test") and Lycoming Engine Spec. No. 104.28

Engine(s): Lycoming T53-L-11
Fuel Grade: JP-4
Fuel Density: 6.5 LB/GAL.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS				RANGE - Nautical Airmiles													
		TORQUE PRESS	APPROXIMATE			1800 LBS FUEL	1600 LBS FUEL	1400 LBS FUEL	1200 LBS FUEL	1000 LBS FUEL	800 LBS FUEL	600 LBS FUEL	400 LBS FUEL	200 LBS FUEL	LBS FUEL	LBS FUEL	LBS FUEL	LBS FUEL	LBS FUEL
			FUEL FLOW	SPEED/KNTS															
POUNDS	FEET	PSI	LB/HR	TAS	CAS														
5000	SL	24.4	496	100	100	363	323	282	242	202	161	121	81	40					
	2000	23.5	471	100	97	383	340	298	255	213	170	128	85	43					
	4000	22.6	447	100	94	403	359	314	269	224	179	134	90	45					
	6000	21.7	422	100	91	426	379	332	284	237	190	142	95	47					
	8000	21.0	398	100	89	452	401	351	301	251	201	151	100	50					
	10000	20.3	379	100	85	474	421	368	316	263	211	158	105	53					
	12000	19.7	361	100	83	498	443	387	332	277	221	166	111	55					
	14000	17.6	326	95	76	523	464	406	348	290	232	174	116	58					
	16000	15.7	295	88	68	534	475	415	356	297	237	178	119	59					
	18000	14.4	273	81	61	530	471	412	353	294	235	177	118	59					
	20000	13.8	258	73	53	507	451	395	338	282	225	169	113	56					
5500	SL	25.3	505	100	100	357	317	277	238	198	158	119	79	40					
	2000	24.4	480	100	97	375	334	292	250	208	167	125	83	42					
	4000	23.5	456	100	94	395	351	307	263	219	176	132	88	44					
	6000	22.7	432	100	91	416	370	324	278	231	185	139	93	46					
	8000	22.0	410	100	89	438	390	341	292	244	195	146	97	49					
	10000	21.3	391	100	86	459	408	357	306	255	204	153	102	51					
	12000	20.8	374	100	83	482	428	375	321	268	214	161	107	54					
	14000	18.9	339	95	76	501	446	390	334	278	223	167	111	56					
	16000	17.1	311	88	68	507	451	394	338	282	225	169	113	56					
	18000	16.1	292	81	61	496	441	386	331	276	221	165	110	55					
	20000	16.0	284	78	53	460	409	357	306	255	204	153	102	51					

REMARKS:

(1) Engine Spec. Fuel Flow Increased 5% per MIL-M-7700A

(2) Range $= \frac{\text{Fuel Available x TAS}}{\text{Fuel Flow}} =$ (Fuel Available) (Specific Range)

(3) Range not shown above 20,000 Feet or Cruise Ceiling

Chart 14-11. Range (Sheet 28 of 35)

RANGE CHART

STANDARD DAY

ENGINE SPEED 6600 RPM
LONG RANGE - CRUISE SPEED
XM-5 ARMAMENT KIT

Model(s): UH-1B
Data as of: April 1965
DATA BASIS: Flight Test (FTC-TDR-62-21 "YUH-1B Category II Performance Test") and Lycoming Engine Spec. No. 104.28

Engine(s): Lycoming T53-L-11
Fuel Grade: JP-4
Fuel Density: 6.5 LB/GAL.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS				RANGE - Nautical Airmiles													
		TORQUE PRESS	APPROXIMATE			1800 LBS FUEL	1600 LBS FUEL	1400 LBS FUEL	1200 LBS FUEL	1000 LBS FUEL	800 LBS FUEL	600 LBS FUEL	400 LBS FUEL	200 LBS FUEL	LBS FUEL	LBS FUEL	LBS FUEL	LBS FUEL	LBS FUEL
			FUEL FLOW	SPEED/KNTS															
POUNDS	FEET	PSI	LB/HR	TAS	CAS														
6000	SL	26.1	515	100	100	350	311	272	233	194	156	117	78	39					
	2000	25.2	490	100	97	368	327	286	245	204	164	123	82	41					
	4000	24.5	467	100	94	386	343	300	257	214	171	129	86	43					
	6000	23.7	444	100	91	405	360	315	270	225	180	135	90	45					
	8000	23.0	423	100	84	425	378	331	284	236	189	142	95	47					
	10000	22.4	404	100	86	445	395	346	296	247	198	148	99	49					
	12000	22.1	390	100	83	462	411	359	308	257	205	154	103	51					
	14000	20.4	358	95	76	475	422	369	317	264	211	158	106	53					
	16000	19.1	334	88	68	471	419	366	314	262	209	157	105	52					
	18000	19.0	325	81	61	445	396	346	297	247	198	148	99	49					
	20000	20.1	334	72	53	391	347	304	260	217	174	130	87	43					
6500	SL	27.1	524	100	100	344	305	267	229	191	153	115	76	38					
	2000	26.3	501	100	97	359	320	280	240	200	160	120	80	40					
	4000	25.5	479	100	94	376	334	292	251	209	167	125	84	42					
	6000	24.8	456	100	91	394	350	306	263	219	175	131	88	44					
	8000	24.2	437	100	89	412	366	320	274	229	183	137	91	46					
	10000	23.8	421	100	86	427	380	332	285	237	190	142	95	47					
	12000	24.0	413	100	83	436	387	339	291	242	194	145	97	48					
	14000	23.0	390	95	76	437	388	340	291	243	194	146	97	49					
	16000	22.7	379	88	68	416	370	323	277	231	184	139	92	46					
	18000	24.1	394	81	61	368	327	286	245	204	163	123	82	41					

REMARKS:

(1) Engine Spec. Fuel Flow Increased 5% per MIL-M-7700A

(2) $\text{Range} = \dfrac{\text{Fuel Available x TAS}}{\text{Fuel Flow}}$ = (Fuel Available) (Specific Range)

(3) Range not shown above 20,000 Feet or Cruise Ceiling

Chart 14-11. Range (Sheet 29 of 35)

RANGE CHART
STANDARD DAY

ENGINE SPEED 6600 RPM
LONG RANGE - CRUISE SPEED
XM-5 ARMAMENT KIT

Model(s): UH-1B
Data as of: April 1965
DATA BASIS: Flight Test (FTC-TDR-62-21 "YUH-1B Category II Performance Test") and Lycoming Engine Spec. No. 104.28

Engine(s): Lycoming T53-L-11
Fuel Grade: JP-4
Fuel Density: 6.5 LB/GAL.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS				RANGE - Nautical Airmiles													
		TORQUE PRESS	APPROXIMATE			1800 LBS FUEL	1600 LBS FUEL	1400 LBS FUEL	1200 LBS FUEL	1000 LBS FUEL	800 LBS FUEL	600 LBS FUEL	400 LBS FUEL	200 LBS FUEL	LBS FUEL	LBS FUEL	LBS FUEL	LBS FUEL	LBS FUEL
			FUEL FLOW	SPEED/KNTS															
POUNDS	FEET	PSI	LB/HR	TAS	CAS														
7000	SL	28.1	536	100	100	336	299	261	224	187	149	112	75	37					
	2000	27.3	513	100	97	351	312	273	234	195	156	117	78	39					
	4000	26.5	491	100	94	366	326	285	244	204	163	122	81	41					
	6000	26.0	471	100	91	382	339	297	254	212	170	127	85	42					
	8000	25.7	455	100	89	395	351	307	263	219	176	132	88	44					
	10000	25.9	446	100	86	403	358	314	269	224	179	134	90	45					
	12000	24.9	423	94	78	400	356	311	267	222	178	133	89	44					
	14000	24.9	413	88	71	381	339	296	254	212	169	127	85	42					
	16000	26.3	426	80	62	338	300	263	225	188	150	113	75	38					
7500	SL	29.1	548	100	100	329	292	256	219	183	146	110	73	37					
	2000	28.4	526	100	97	343	305	267	229	190	152	114	76	38					
	4000	27.9	507	100	94	355	316	276	237	197	158	118	79	39					
	6000	27.6	490	100	91	367	326	285	245	204	163	122	82	41					
	8000	27.0	472	98	87	374	333	291	249	208	166	125	83	42					
	10000	26.2	451	93	80	370	329	288	247	206	164	123	82	41					
	12000	26.4	443	86	72	349	311	272	233	194	155	116	78	39					
	14000	28.1	457	79	64	311	276	242	207	173	138	104	69	35					

REMARKS:

(1) Engine Spec. Fuel Flow Increased 5% per MIL-M-7700A

(2) $\text{Range} = \dfrac{\text{Fuel Available x TAS}}{\text{Fuel Flow}} = \text{(Fuel Available) (Specific Range)}$

(3) Range not shown above 20,000 Feet or Cruise Ceiling

Chart 14-11. Range (Sheet 30 of 35)

RANGE CHART

STANDARD DAY

ENGINE SPEED 6600 RPM
LONG RANGE - CRUISE SPEED
XM-5 ARMAMENT KIT

Model(s): UH-1B
Data as of: April 1965
DATA BASIS: Flight Test (FTC-TDR-62-21 "YUH-1B Category II Performance Test") and Lycoming Engine Spec. No. 104.28

Engine(s): Lycoming T53-L-11
Fuel Grade: JP-4
Fuel Density: 6.5 LB/GAL.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS				RANGE - Nautical Airmiles													
		TORQUE PRESS	APPROXIMATE			1800 LBS FUEL	1600 LBS FUEL	1400 LBS FUEL	1200 LBS FUEL	1000 LBS FUEL	800 LBS FUEL	600 LBS FUEL	400 LBS FUEL	200 LBS FUEL	LBS FUEL	LBS FUEL	LBS FUEL	LBS FUEL	LBS FUEL
			FUEL FLOW	SPEED/KNTS															
POUNDS	FEET	PSI	LB/HR	TAS	CAS														
8000	SL	30.2	560	100	100	322	286	250	214	179	143	107	71	36					
	2000	29.7	542	100	97	332	296	259	222	185	148	111	74	37					
	4000	29.4	526	100	94	342	304	266	228	190	152	114	76	38					
	6000	27.9	494	96	88	349	310	272	233	194	155	116	78	39					
	8000	27.4	478	91	81	343	305	267	229	191	152	114	76	38					
	10000	27.9	472	85	73	324	288	252	216	180	144	108	72	36					
	12000	29.8	490	78	65	287	255	223	191	160	128	96	64	32					
8500	SL	29.3	550	95	95	311	276	242	207	173	138	104	69	35					
	2000	29.1	535	95	92	320	284	249	213	178	142	107	71	36					
	4000	28.6	516	93	88	326	290	253	217	181	145	109	72	36					
	6000	28.5	502	89	82	320	284	249	213	178	142	107	71	36					
	8000	29.2	501	84	74	302	268	235	201	168	134	101	67	34					
	10000	31.3	520	78	67	269	239	209	179	149	119	90	60	30					

REMARKS:

(1) Engine Spec. Fuel Flow Increased 5% per MIL-M-7700A

(2) Range = $\frac{\text{Fuel Available x TAS}}{\text{Fuel Flow}}$ = (Fuel Available) (Specific Range)

(3) Range not shown above 20,000 Feet or Cruise Ceiling

Chart 14-11. Range (Sheet 31 of 35)

RANGE CHART
STANDARD DAY

ENGINE SPEED 6600 RPM
LONG RANGE - CRUISE SPEED
EXTERNAL STORES ON UNIVERSAL MOUNT

Model(s): UH-1B
Data as of: April 1965
DATA BASIS: Flight Test (FTC-TDR-62-21 "YUH-1B Category II Performance Test") and Lycoming Engine Spec. No. 104.28

Engine(s): Lycoming T53-L-11
Fuel Grade: JP-4
Fuel Density: 6.5 LB/GAL.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS				RANGE - Nautical Airmiles													
		TORQUE PRESS	APPROXIMATE			1800 LBS FUEL	1600 LBS FUEL	1400 LBS FUEL	1200 LBS FUEL	1000 LBS FUEL	800 LBS FUEL	600 LBS FUEL	400 LBS FUEL	200 LBS FUEL	LBS FUEL	LBS FUEL	LBS FUEL	LBS FUEL	LBS FUEL
			FUEL FLOW	SPEED/KNTS															
POUNDS	FEET	PSI	LB/HR	TAS	CAS														
5000	SL	28.0	535	100	100	336	299	262	224	187	150	112	75	37					
	2000	26.9	509	100	97	354	315	275	236	197	157	118	79	39					
	4000	25.8	483	100	94	373	332	290	249	207	166	124	83	41					
	6000	24.7	456	100	91	394	350	307	263	219	175	131	88	44					
	8000	23.8	432	100	89	417	370	324	278	232	185	139	93	46					
	10000	22.9	410	100	86	438	390	341	292	244	195	146	97	49					
	12000	22.2	390	100	83	461	410	358	307	256	205	154	102	51					
	14000	19.6	348	95	76	489	434	380	326	271	217	163	109	54					
	16000	17.2	312	88	68	506	449	393	337	281	225	169	112	56					
	18000	15.5	286	81	61	507	451	394	338	282	225	169	113	56					
	20000	14.5	266	73	53	490	436	381	327	272	218	163	109	54					
5500	SL	28.9	545	100	100	331	294	257	220	184	147	110	73	37					
	2000	27.8	519	100	97	347	309	270	232	193	154	116	77	39					
	4000	26.7	493	100	94	365	325	284	244	203	162	122	81	41					
	6000	25.6	467	100	91	385	342	300	257	214	171	128	86	43					
	8000	24.8	444	100	89	405	360	315	270	225	180	135	90	45					
	10000	24.0	423	100	86	424	378	331	284	236	189	142	95	47					
	12000	23.3	403	100	83	446	397	347	297	248	198	149	99	50					
	14000	20.8	363	95	76	469	417	365	313	261	208	156	104	52					
	16000	18.6	328	88	68	481	427	374	320	267	214	160	107	53					
	18000	17.1	304	81	61	476	423	370	318	265	212	159	106	53					
	20000	16.7	293	73	53	446	397	347	298	248	198	149	99	50					

REMARKS:

(1) Engine Spec. Fuel Flow Increased 5% per MIL-M-7700A

(2) Range = $\frac{\text{Fuel Available x TAS}}{\text{Fuel Flow}}$ = (Fuel Available) (Specific Range)

(3) Tange not shown above 20,000 Feet or Cruise Ceiling

Chart 14-11. Range (Sheet 32 of 35)

RANGE CHART

STANDARD DAY

ENGINE SPEED 6600 RPM
LONG RANGE - CRUISE SPEED
EXTERNAL STORES ON UNIVERSAL MOUNT

Model(s): UH-1B
Data as of: April 1965
DATA BASIS: Flight Test (FTC-TDR-62-21 "YUH-1B Category II Performance Test") and Lycoming Engine Spec. No. 104.28

Engine(s): Lycoming T53-L-11
Fuel Grade: JP-4
Fuel Density: 6.5 LB/GAL.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS				RANGE - Nautical Airmiles													
		TORQUE PRESS	APPROXIMATE FUEL FLOW	APPROXIMATE SPEED/KNTS		1800 LBS FUEL	1600 LBS FUEL	1400 LBS FUEL	1200 LBS FUEL	1000 LBS FUEL	800 LBS FUEL	600 LBS FUEL	400 LBS FUEL	200 LBS FUEL	LBS FUEL	LBS FUEL	LBS FUEL	LBS FUEL	LBS FUEL
POUNDS	FEET	PSI	LB/HR	TAS	CAS														
6000	SL	29.7	555	100	100	325	289	253	216	180	144	108	72	36					
	2000	28.6	529	100	97	341	303	265	227	189	151	114	76	38					
	4000	27.7	504	100	94	357	317	278	238	198	159	119	79	40					
	6000	26.7	480	100	91	375	333	292	250	208	167	125	83	42					
	8000	25.9	457	100	89	393	350	306	262	218	175	131	87	44					
	10000	25.1	436	100	86	412	366	321	275	229	183	137	92	46					
	12000	24.6	420	100	83	428	381	333	286	238	190	143	95	48					
	14000	22.4	382	95	76	445	396	346	297	247	198	148	99	49					
	16000	20.6	352	86	68	447	398	348	298	248	199	149	99	50					
	18000	20.0	339	81	61	428	380	333	285	238	190	143	95	48					
	20000	20.9	344	73	53	379	337	295	253	211	169	126	84	42					
6500	SL	30.6	565	100	100	319	283	248	213	177	142	106	71	35					
	2000	29.6	541	100	97	333	296	259	222	185	148	111	74	37					
	4000	28.7	517	100	94	348	309	271	232	193	155	116	77	39					
	6000	27.8	493	100	91	365	324	284	243	203	162	122	81	41					
	8000	27.0	472	100	89	381	338	296	254	212	169	127	85	42					
	10000	26.5	454	100	86	396	352	308	264	220	176	132	88	44					
	12000	26.5	444	100	83	405	360	315	270	225	180	135	90	45					
	14000	25.0	415	95	76	410	365	319	274	228	182	137	91	46					
	16000	24.2	398	88	68	396	352	308	264	220	176	132	88	44					
	18000	25.2	409	81	61	354	315	276	236	197	157	118	79	39					

REMARKS:

(1) Engine Spec. Fuel Flow Increased 5% per MIL-M-7700A

(2) Range = $\frac{\text{Fuel Available x TAS}}{\text{Fuel Flow}}$ = (Fuel Available) (Specific Range)

(3) Range not shown above 20,000 Feet or Cruise Ceiling

Chart 14-11. Range (Sheet 33 of 35)

RANGE CHART

STANDARD DAY

ENGINE SPEED 6600 RPM
LONG RANGE - CRUISE SPEED
EXTERNAL STORES ON UNIVERSAL MOUNT

Model(s): UH-1B
Data as of: April 1965
DATA BASIS: Flight Test (FTC-TDR-62-21 "YUH-1B Category II Performance Test") and Lycoming Engine Spec. No. 104.28

Engine(s): Lycoming T53-L-11
Fuel Grade: JP-4
Fuel Density: 6.5 LB/GAL.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS				RANGE - Nautical Airmiles													
		TORQUE PRESS	APPROXIMATE FUEL FLOW	APPROXIMATE SPEED/KNTS		1800 LBS FUEL	1600 LBS FUEL	1400 LBS FUEL	1200 LBS FUEL	1000 LBS FUEL	800 LBS FUEL	600 LBS FUEL	400 LBS FUEL	200 LBS FUEL	LBS FUEL	LBS FUEL	LBS FUEL	LBS FUEL	LBS FUEL
POUNDS	FEET	PSI	LB/HR	TAS	CAS														
7000	SL	31.7	577	100	100	312	277	243	208	173	139	104	69	35					
	2000	30.7	554	100	97	325	289	253	217	181	144	108	72	36					
	4000	29.8	531	100	94	339	302	264	226	189	151	113	75	38					
	6000	29.0	509	100	91	353	314	275	236	196	157	118	79	39					
	8000	28.5	492	100	89	366	325	285	244	203	163	122	81	41					
	10000	28.3	477	99	85	375	333	291	250	208	167	125	83	42					
	12000	27.0	450	94	78	376	335	293	251	209	167	125	84	42					
	14000	26.4	434	88	71	363	323	282	242	202	161	121	81	40					
	16000	27.4	442	80	62	326	290	254	217	181	145	109	72	36					
7500	SL	32.7	590	100	100	305	271	237	203	170	136	102	68	34					
	2000	31.8	568	100	97	317	282	247	211	176	141	106	70	35					
	4000	31.1	548	100	94	329	292	256	219	183	146	110	73	37					
	6000	30.5	530	100	91	340	302	264	226	189	151	113	75	38					
	8000	29.7	508	98	87	348	309	271	232	193	155	116	77	39					
	10000	28.4	478	93	80	349	310	271	232	194	155	116	77	39					
	12000	28.0	464	86	72	333	296	259	222	185	148	111	74	37					
	14000	29.3	474	79	64	300	266	233	200	166	133	100	67	33					

REMARKS:

(1) Engine Spec. Fuel Flow Increased 5% per MIL-M-7700A

(2) Range $= \frac{\text{Fuel Available x TAS}}{\text{Fuel Flow}} =$ (Fuel Available) (Specific Range)

(3) Range not shown above 20,000 Feet or Cruise Ceiling

Chart 14-11. Range (Sheet 34 of 35)

RANGE CHART
STANDARD DAY

ENGINE SPEED 6600 RPM
LONG RANGE - CRUISE SPEED
EXTERNAL STORES ON UNIVERSAL MOUNT

Model(s): UH-1B
Data as of: April 1965
DATA BASIS: Flight Test (FTC-TDR-62-21 "YUH-1B Category II Performance Test") and Lycoming Engine Spec. No. 104.28

Engine(s): Lycoming T53-L-11
Fuel Grade: JP-4
Fuel Density: 6.5 LB/GAL.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS				RANGE - Nautical Airmiles													
		TORQUE PRESS	APPROXIMATE			1800 LBS FUEL	1600 LBS FUEL	1400 LBS FUEL	1200 LBS FUEL	1000 LBS FUEL	800 LBS FUEL	600 LBS FUEL	400 LBS FUEL	200 LBS FUEL	LBS FUEL	LBS FUEL	LBS FUEL	LBS FUEL	LBS FUEL
			FUEL FLOW	SPEED/KNTS															
POUNDS	FEET	PSI	LB/HR	TAS	CAS														
8000	SL	33.8	603	100	100	299	265	232	199	166	133	100	66	33					
	2000	33.1	586	100	97	308	273	239	205	171	137	103	68	34					
	4000	32.5	568	100	94	316	281	246	211	176	141	105	70	35					
	6000	30.6	530	96	88	326	290	254	217	181	145	109	72	36					
	8000	29.6	506	91	81	324	288	252	216	180	144	108	72	36					
	10000	29.6	495	85	73	309	275	241	206	172	137	103	69	34					
	12000	31.0	508	78	65	277	246	215	185	154	123	92	62	31					
8500	SL	32.4	586	95	95	292	259	227	195	162	130	97	65	32					
	2000	32.0	571	95	92	299	266	233	200	166	133	100	67	33					
	4000	31.2	549	93	88	306	272	238	204	170	136	102	68	34					
	6000	30.6	530	89	82	303	269	235	202	168	135	101	67	34					
	8000	30.9	525	84	74	288	256	224	192	160	128	96	64	32					
	10000	32.5	540	78	67	259	230	201	173	144	115	86	58	29					

REMARKS:

(1) Engine Spec. Fuel Flow Increased 5% per MIL-M-7700A

(2) Range = $\frac{\text{Fuel Available x TAS}}{\text{Fuel Flow}}$ = (Fuel Available) (Specific Range)

(3) Range not shown above 20,000 Feet or Cruise Ceiling

Chart 14-11. Range (Sheet 35 of 35)

MAXIMUM ENDURANCE

A

STANDARD DAY

ARMY MODEL(S): UH-1A
DATA AS OF: January 1961
DATA BASIS: AFFTC Phase IV
Flight Test of YH-40

ENGINE: Lycoming T53-L-1A
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS						ENDURANCE — Hours								
		ENGINE SPEED	MAN. PRESS.	MIX-TURE	APPROXIMATE			812.5 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL	50 LBS FUEL
					TOTAL	SPEED/KNTS.										
POUNDS	FEET	RPM	IN HG		LB/HR	TAS	CAS									
4300	SL	6400			386	49.0	49	2.10	1.81	1.55	1.29	1.03	.78	.52	.26	.13
	2,000	↑			372	50.0	49	2.18	1.88	1.61	1.34	1.07	.80	.54	.27	.13
	4,000	│			346	51.2	48	2.35	2.02	1.74	1.45	1.16	.87	.58	.29	.14
	6,000	│			332	52.5	48	2.45	2.11	1.81	1.51	1.21	.90	.60	.30	.15
	8,000	│			316	53.7	48	2.57	2.21	1.90	1.58	1.27	.95	.63	.32	.16
	10,000	│			299	55.3	48	2.72	2.34	2.01	1.67	1.34	1.00	.67	.33	.17
	12,000	│			279	56.8	47	2.91	2.51	2.15	1.79	1.43	1.07	.72	.36	.18
	14,000	↓			263	58.6	47	3.09	2.66	2.28	1.90	1.52	1.14	.76	.38	.19
	16,000	6400														
4800	SL	6400			400	51.0	51	2.03	1.75	1.50	1.25	1.00	.75	.50	.25	.12
	2,000	↑			383	52.2	51	2.12	1.83	1.57	1.30	1.04	.78	.52	.26	.13
	4,000	│			367	53.5	50	2.21	1.90	1.63	1.36	1.09	.82	.54	.27	.14
	6,000	│			352	55.0	50	2.31	1.99	1.71	1.42	1.14	.85	.57	.28	.14
	8,000	│			336	56.4	50	2.42	2.08	1.79	1.49	1.19	.89	.60	.30	.15
	10,000	│			312	58.0	50	2.60	2.24	1.92	1.60	1.28	.96	.64	.32	.16
	12,000	│			293	59.7	50	2.77	2.39	2.05	1.70	1.36	1.02	.68	.34	.17
	14,000	↓			284	59.8	48	2.86	2.46	2.11	1.76	1.41	1.06	.70	.35	.18
	16,000	6400														
5300	SL	6400			415	53.0	53	1.96	1.69	1.45	1.21	.96	.72	.48	.24	.12
	2,000	↑			399	54.2	53	2.04	1.76	1.51	1.26	1.00	.75	.50	.25	.13
	4,000	│			379	55.8	53	2.14	1.84	1.58	1.32	1.05	.79	.53	.26	.13
	6,000	│			361	57.4	52	2.25	1.94	1.66	1.38	1.11	.83	.55	.28	.14
	8,000	│			347	59.0	52	2.34	2.02	1.73	1.44	1.15	.86	.58	.29	.14
	10,000	│			335	59.9	51	2.43	2.09	1.79	1.50	1.20	.90	.60	.30	.15
	12,000	│			314	59.4	49	2.59	2.23	1.91	1.59	1.28	.96	.64	.32	.16
	14,000	↓			314	57.0	46	2.59	2.23	1.91	1.59	1.28	.96	.64	.32	.16
	16,000	6400														

REMARKS:

(1) Fuel Flow X 1.05
(2) M.P. & Mixture omitted for turbine engines.

Chart 14-12. Maximum endurance (Sheet 1 of 16)

MAXIMUM ENDURANCE

STANDARD DAY

A

ARMY MODEL(S): UH-1A
DATA AS OF: January 1961
DATA BASIS: AFFTC Phase IV
Flight Test of YH-40

Lycoming
ENGINE: T53-L-1A
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS						ENDURANCE — Hours								
		ENGINE SPEED	MAN. PRESS.	MIX-TURE	APPROXIMATE			812.5 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL	50 LBS FUEL
					TOTAL	SPEED/KNTS.										
POUNDS	FEET	RPM	IN. HG		LB/HR	TAS	CAS									
5800	SL	6400			427	55.0	55	1.90	1.64	1.40	1.17	.94	.70	.47	.23	.12
	2,000	↑			411	56.7	55	1.98	1.71	1.46	1.22	.97	.73	.49	.24	.12
	4,000				387	58.2	55	2.10	1.81	1.55	1.29	1.03	.78	.52	.26	.13
	6,000				374	59.7	55	2.17	1.87	1.60	1.34	1.07	.80	.53	.27	.13
	8,000				362	59.7	53	2.24	1.93	1.65	1.38	1.10	.83	.55	.28	.14
	10,000				355	58.5	50	2.29	1.97	1.69	1.41	1.13	.85	.56	.28	.14
	12,000				352	55.8	46	2.31	1.99	1.71	1.42	1.14	.85	.57	.28	.14
	14,000	↓														
	16,000	6400														
6100	SL	6400			436	56.3	56	1.86	1.60	1.37	1.14	.92	.69	.46	.23	.11
	2,000	↑			418	57.8	56	1.94	1.67	1.43	1.19	.96	.72	.48	.24	.12
	4,000				407	59.5	56	2.00	1.72	1.48	1.23	.98	.74	.49	.25	.12
	6,000				395	60.0	55	2.06	1.77	1.52	1.27	1.01	.76	.51	.25	.13
	8,000				377	58.4	52	2.16	1.86	1.60	1.33	1.06	.80	.53	.27	.13
	10,000				378	56.4	48	2.15	1.85	1.59	1.32	1.06	.79	.53	.26	.13
	12,000															
	14,000	↓														
	16,000	6400														
6600	SL	6400			449	58.5	59	1.81	1.56	1.34	1.11	.89	.67	.45	.22	.111
	2,000	↑			434	59.8	58	1.87	1.61	1.38	1.15	.92	.69	.46	.23	.115
	4,000				420	59.8	56	1.93	1.66	1.43	1.19	.95	.71	.48	.24	.119
	6,000				415	58.2	53	1.96	1.69	1.45	1.21	.96	.72	.48	.24	.12
	8,000				419	55.6	49	1.94	1.67	1.43	1.19	.96	.72	.48	.24	.12
	10,000				424	52.0	43	1.92	1.65	1.42	1.18	.94	.71	.47	.24	.12
	12,000															
	14,000	↓														
	16,000	6400														

REMARKS: (1) Fuel Flow X 1.05
(2) M.P. & Mixture omitted for turbine engine.

Chart 14-12. Maximum endurance (Sheet 2 of 16)

MAXIMUM ENDURANCE

A

STANDARD DAY

ARMY MODEL(S): UH-1A
DATA AS OF: January 1961
DATA BASIS: AFFTC Phase IV
Flight Test of YH-40

ENGINE: Lycoming T53-L-1A
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS						ENDURANCE — Hours								
		ENGINE SPEED	MAN. PRESS.	MIX-TURE	APPROXIMATE			812.5 LBS	700 LBS	600 LBS	500 LBS	400 LBS	300 LBS	200 LBS	100 LBS	50 LBS
					TOTAL	SPEED/KNTS.										
POUNDS	FEET	RPM	IN. HG		LB/HR	TAS	CAS	FUEL	FUEL	FUEL	FUEL	FUEL	FUEL	FUEL	FUEL	FUEL
7200	SL	6400			472	60.0	60	1.72	1.48	1.27	1.06	.85	.64	.42	.21	.106
	2,000				459	59.4	58	1.77	1.52	1.31	1.09	.87	.65	.44	.22	.109
	4,000				458	57.2	54	1.77	1.52	1.31	1.09	.87	.65	.44	.22	.109
	6,000				455	54.0	49	1.78	1.54	1.32	1.10	.88	.66	.44	.22	.110
	8,000															
	10,000															
	12,000															
	14,000															
	16,000	6400														

REMARKS: (1) Fuel Flow X 1.05
(2) M.P. & Mixture omitted for turbine engines.

Chart 14-12. Maximum endurance (Sheet 3 of 16)

B-5

MAXIMUM ENDURANCE

STANDARD DAY

CLEAN CONFIGURATION 2 - 6600 RPM

ARMY MODEL(S): UH-1B
DATA AS OF: September, 1962
DATA BASIS: Flight Test (FTC-TDR-62-21 "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					ENDURANCE — Hours										
		ENGINE SPEED	TORQUE PRESS	APPROXIMATE			1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
				FUEL FLOW	SPEED/KNTS.												
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
5000	SL	6600	12.7	353.9	53.4	53.4	3.0	2.8	2.5	2.3	2.0	1.7	1.4	1.1	0.8	0.6	0.3
	2000	↑	12.7	338.6	54.0	52.5	3.2	3.0	2.7	2.4	2.1	1.8	1.5	1.2	0.9	0.6	0.3
	4000		12.6	323.6	54.7	51.6	3.3	3.1	2.8	2.5	2.2	1.9	1.5	1.2	0.9	0.6	0.3
	6000		12.6	309.7	55.4	50.7	3.5	3.2	2.9	2.6	2.3	1.9	1.6	1.3	1.0	0.6	0.3
	8000		12.6	296.5	56.2	49.8	3.6	3.4	3.0	2.7	2.4	2.0	1.7	1.3	1.0	0.7	0.3
	10000		12.6	282.2	57.0	49.0	3.8	3.5	3.2	2.8	2.5	2.1	1.8	1.4	1.1	0.7	0.4
	12000		12.6	271.8	57.9	48.2	3.9	3.7	3.3	2.9	2.6	2.2	1.8	1.5	1.1	0.7	0.4
	14000		12.7	261.2	58.9	47.5	4.1	3.8	3.4	3.1	2.7	2.3	1.9	1.5	1.1	0.8	0.4
	16000		12.7	250.7	59.9	46.7	4.3	4.0	3.6	3.2	2.8	2.4	2.0	1.6	1.2	0.8	0.4
	18000	↓	12.8	241.5	60.8	45.9	4.4	4.1	3.7	3.3	2.9	2.5	2.1	1.7	1.2	0.8	0.4
	20000	6600	13.0	235.3	61.5	44.9	4.6	4.2	3.8	3.4	3.0	2.5	2.1	1.7	1.3	0.8	0.4
5500	SL	6600	13.9	364.1	54.4	54.4	2.9	2.7	2.5	2.2	1.9	1.6	1.4	1.1	0.8	0.5	0.3
	2000	↑	13.9	351.4	55.1	53.5	3.1	2.8	2.6	2.3	2.0	1.7	1.4	1.1	0.9	0.6	0.3
	4000		13.9	337.6	55.8	52.6	3.2	3.0	2.7	2.4	2.1	1.8	1.5	1.2	0.9	0.6	0.3
	6000		13.9	324.4	56.6	51.8	3.3	3.1	2.8	2.5	2.2	1.8	1.5	1.2	0.9	0.6	0.3
	8000		13.9	311.3	57.5	51.0	3.4	3.2	2.9	2.6	2.2	1.9	1.6	1.3	1.0	0.6	0.3
	10000		13.9	296.7	58.4	50.2	3.6	3.4	3.0	2.7	2.4	2.0	1.7	1.3	1.0	0.7	0.3
	12000		13.9	286.3	59.4	49.4	3.7	3.5	3.1	2.8	2.4	2.1	1.7	1.4	1.0	0.7	0.3
	14000		14.0	275.8	60.3	48.6	3.9	3.6	3.3	2.9	2.5	2.2	1.8	1.5	1.1	0.7	0.4
	16000		14.1	266.9	61.1	47.7	4.0	3.7	3.4	3.0	2.6	2.2	1.9	1.5	1.1	0.7	0.4
	18000	↓	14.5	261.8	61.6	46.5	4.1	3.8	3.4	3.1	2.7	2.3	1.9	1.5	1.1	0.8	0.4
	20000	6600	15.4	263.1	61.7	45.0	4.1	3.8	3.4	3.0	2.7	2.3	1.9	1.5	1.1	0.8	0.4

REMARKS:
1. Engine specification fuel flow increased 5% per MIL-M-7700A.
2. Cargo mirror installation will reduce endurance 3%.
3. Endurance data not shown where power required exceeds normal rated power available.

Chart 14-12. Maximum endurance (Sheet 4 of 16)

MAXIMUM ENDURANCE

B-5

STANDARD DAY

CLEAN CONFIGURATION 2 - 6600 RPM

ARMY MODEL(S): UH-1B
DATA AS OF: September, 1962
DATA BASIS: Flight Test (FTC-TDR-62-21 "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					ENDURANCE — Hours										
		ENGINE SPEED	TORQUE PRESS	APPROXIMATE			1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
				FUEL FLOW	SPEED/KNTS.												
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
6000	SL	6600	15.1	376.4	55.4	55.4	2.9	2.7	2.4	2.1	1.9	1.6	1.3	1.1	0.8	0.5	0.3
	2000	↑	15.1	365.2	56.2	54.6	2.9	2.7	2.5	2.2	1.9	1.6	1.4	1.1	0.8	0.5	0.3
	4000		15.1	352.1	57.0	53.7	3.0	2.8	2.6	2.3	2.0	1.7	1.4	1.1	0.9	0.6	0.3
	6000		15.2	338.8	57.9	52.9	3.2	3.0	2.7	2.4	2.1	1.8	1.5	1.2	0.9	0.6	0.3
	8000		15.2	325.7	58.8	52.1	3.3	3.1	2.8	2.5	2.1	1.8	1.5	1.2	0.9	0.6	0.3
	10000		15.2	311.5	59.7	51.3	3.4	3.2	2.9	2.6	2.2	1.9	1.6	1.3	1.0	0.6	0.3
	12000		15.3	301.4	60.6	50.5	3.6	3.3	3.0	2.7	2.3	2.0	1.7	1.3	1.0	0.7	0.3
	14000		15.5	292.9	61.3	49.5	3.7	3.4	3.1	2.7	2.4	2.0	1.7	1.4	1.0	0.7	0.3
	16000	↓	16.1	289.1	61.7	48.2	3.7	3.5	3.1	2.8	2.4	2.1	1.7	1.4	1.0	0.7	0.3
	18000	6600	17.2	293.7	61.6	46.5	3.7	3.4	3.1	2.7	2.4	2.0	1.7	1.4	1.0	0.7	0.3
6500	SL	6600	16.4	390.2	56.5	56.5	2.8	2.6	2.3	2.1	1.8	1.5	1.3	1.0	0.8	0.5	0.3
	2000	↑	16.4	379.5	57.3	55.6	2.8	2.6	2.4	2.1	1.8	1.6	1.3	1.1	0.8	0.5	0.3
	4000		16.4	366.4	58.2	54.8	2.9	2.7	2.5	2.2	1.9	1.6	1.4	1.1	0.8	0.5	0.3
	6000		16.5	352.8	59.1	54.0	3.0	2.8	2.6	2.3	2.0	1.7	1.4	1.1	0.9	0.6	0.3
	8000		16.5	339.9	60.0	53.2	3.2	2.9	2.6	2.4	2.1	1.8	1.5	1.2	0.9	0.6	0.3
	10000		16.6	327.8	60.8	52.3	3.3	3.1	2.7	2.4	2.1	1.8	1.5	1.2	0.9	0.6	0.3
	12000		16.9	319.8	61.5	51.2	3.4	3.1	2.8	2.5	2.2	1.9	1.6	1.3	0.9	0.6	0.3
	14000	↓	17.7	316.9	61.7	49.8	3.4	3.2	2.8	2.5	2.2	1.9	1.6	1.3	0.9	0.6	0.3
	16000	6600	19.0	323.6	61.4	48.0	3.3	3.1	2.8	2.5	2.2	1.9	1.5	1.2	0.9	0.6	0.3

REMARKS:
1. Engine specification fuel flow increased 5% per MIL-M-7700A.
2. Cargo mirror installation will reduce endurance 3%.
3. Endurance data not shown where power required exceeds normal rated power available.

Chart 14-12. Maximum endurance (Sheet 5 of 16)

MAXIMUM ENDURANCE

B-5

STANDARD DAY

CLEAN CONFIGURATION 2 - 6600 RPM

ARMY MODEL(S): UH-1B
DATA AS OF: September, 1962
DATA BASIS: Flight Test (FTC-TDR-62-21 "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					ENDURANCE — Hours										
		ENGINE SPEED	TORQUE PRESS	APPROXIMATE			1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
				FUEL FLOW	SPEED/KNTS.												
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
7000	SL	6600	17.7	404.6	57.5	57.5	2.7	2.5	2.2	2.0	1.7	1.5	1.2	1.0	0.7	0.5	0.2
	2000	↑	17.7	393.8	58.4	56.7	2.7	2.5	2.3	2.0	1.8	1.5	1.3	1.0	0.8	0.5	0.3
	4000		17.7	380.4	59.3	55.9	2.8	2.6	2.4	2.1	1.8	1.6	1.3	1.1	0.8	0.5	0.3
	6000		17.8	366.9	60.2	55.0	2.9	2.7	2.5	2.2	1.9	1.6	1.4	1.1	0.8	0.5	0.3
	8000		17.9	355.4	61.0	54.1	3.0	2.8	2.5	2.3	2.0	1.7	1.4	1.1	0.8	0.6	0.3
	10000		18.3	348.2	61.5	52.9	3.1	2.9	2.6	2.3	2.0	1.7	1.4	1.1	0.9	0.6	0.3
	12000	↓	19.2	345.5	61.7	51.4	3.1	2.9	2.6	2.3	2.0	1.7	1.4	1.2	0.9	0.6	0.3
	14000	6600	20.8	354.0	61.4	49.5	3.0	2.8	2.5	2.3	2.0	1.7	1.4	1.1	0.8	0.6	0.3
7500	SL	6600	19.0	419.2	58.5	58.5	2.6	2.4	2.1	1.9	1.7	1.4	1.2	1.0	0.7	0.5	0.2
	2000	↑	19.0	408.0	59.4	57.7	2.6	2.5	2.2	2.0	1.7	1.5	1.2	1.0	0.7	0.5	0.2
	4000		19.1	394.9	60.3	56.8	2.7	2.5	2.3	2.0	1.8	1.5	1.3	1.0	0.8	0.5	0.3
	6000		19.2	382.8	61.1	55.8	2.8	2.6	2.4	2.1	1.8	1.6	1.3	1.0	0.8	0.5	0.3
	8000		19.7	375.0	61.6	54.6	2.9	2.7	2.4	2.1	1.9	1.6	1.3	1.1	0.8	0.5	0.3
	10000	↓	20.7	376.5	61.7	53.0	2.8	2.7	2.4	2.1	1.9	1.6	1.3	1.1	0.8	0.5	0.3
	12000	6600	22.4	384.2	61.3	51.0	2.8	2.6	2.3	2.1	1.8	1.6	1.3	1.0	0.8	0.5	0.3
8000	SL	6600	20.3	434.0	59.5	59.5	2.5	2.3	2.1	1.8	1.6	1.4	1.2	0.9	0.7	0.5	0.2
	2000	↑	20.3	422.7	60.4	58.6	2.5	2.4	2.1	1.9	1.7	1.4	1.2	0.9	0.7	0.5	0.2
	4000		20.5	411.2	61.1	57.6	2.6	2.4	2.2	1.9	1.7	1.5	1.2	1.0	0.7	0.5	0.2
	6000		21.1	403.0	61.6	56.3	2.7	2.5	2.2	2.0	1.7	1.5	1.2	1.0	0.7	0.5	0.2
	8000	↓	22.1	402.9	61.7	54.7	2.7	2.5	2.2	2.0	1.7	1.5	1.2	1.0	0.7	0.5	0.2
	10000	6600	23.9	417.1	61.3	52.7	2.6	2.4	2.2	1.9	1.7	1.4	1.2	1.0	0.7	0.5	0.2

REMARKS:
1. Engine specification fuel flow increased 5% per MIL-M-7700A.
2. Cargo mirror installation will reduce endurance 3%.
3. Endurance data not shown where power required exceeds normal rated power available.

Chart 14-12. Maximum endurance (Sheet 6 of 16)

MAXIMUM ENDURANCE

B-5

STANDARD DAY

CLEAN CONFIGURATION 2 - 6600 RPM

ARMY MODEL(S): UH-1B
DATA AS OF: September, 1962
DATA BASIS: Flight Test (FTC-TDR-62-21 "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					ENDURANCE — Hours										
		ENGINE SPEED	TORQUE PRESS	APPROXIMATE			1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
				FUEL FLOW	SPEED/KNTS.												
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
8500	SL	6600	21.6	449.5	60.4	60.4	2.4	2.2	2.0	1.8	1.6	1.3	1.1	0.9	0.7	0.4	0.2
	2000	↑	21.8	439.5	61.1	59.3	2.4	2.3	2.0	1.8	1.6	1.4	1.1	0.9	0.7	0.5	0.2
	4000		22.4	432.0	61.6	58.0	2.5	2.3	2.1	1.9	1.6	1.4	1.2	0.9	0.7	0.5	0.2
	6000	↓	23.5	431.5	61.7	56.4	2.5	2.3	2.1	1.9	1.6	1.4	1.2	0.9	0.7	0.5	0.2
	8000	6600	25.4	444.4	61.3	54.4	2.4	2.3	2.0	1.8	1.6	1.4	1.1	0.9	0.7	0.5	0.2

REMARKS: 1. Engine specification fuel flow increased 5% per MIL-M-7700A.
2. Cargo mirror installation will reduce endurance 3%.
3. Endurance data not shown where power required exceeds normal rated power available.

Chart 14-12. Maximum endurance (Sheet 7 of 16)

B9/11 B9/11

MAXIMUM ENDURANCE

STANDARD DAY

CLEAN CONFIGURATION 2
6600 RPM

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					ENDURANCE — Hours										
		ENGINE SPEED	APPROX.														
			TORQUE PRESS	FUEL FLOW	SPEED/KNTS		1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
5000	SL	6600	12.7	376.5	53.4	53.4	2.8	2.7	2.4	2.1	1.9	1.6	1.3	1.1	0.8	0.5	0.3
	2,000	↑	12.7	359.3	54.0	52.5	3.0	2.8	2.5	2.2	1.9	1.7	1.4	1.1	0.8	0.6	0.3
	4,000		12.6	342.3	54.7	51.6	3.1	2.9	2.6	2.3	2.0	1.8	1.5	1.2	0.9	0.6	0.3
	6,000		12.6	325.5	55.4	50.7	3.3	3.1	2.8	2.5	2.2	1.8	1.5	1.2	0.9	0.6	0.3
	8,000		12.6	310.0	56.2	49.8	3.5	3.2	2.9	2.6	2.3	1.9	1.6	1.3	1.0	0.6	0.3
	10,000		12.6	296.3	57.0	49.0	3.6	3.4	3.0	2.7	2.4	2.0	1.7	1.3	1.0	0.7	0.3
	12,000		12.6	284.7	57.9	48.2	3.8	3.5	3.2	2.8	2.5	2.1	1.8	1.4	1.1	0.7	0.4
	14,000		12.7	273.0	58.9	47.5	3.9	3.7	3.3	2.9	2.6	2.2	1.8	1.5	1.1	0.7	0.4
	16,000		12.7	261.9	59.9	46.7	4.1	3.8	3.4	3.1	2.7	2.3	1.9	1.5	1.1	0.8	0.4
	18,000	↓	12.8	254.0	60.8	45.9	4.2	3.9	3.5	3.1	2.8	2.4	2.0	1.6	1.2	0.8	0.4
	20,000	6600	13.0	248.4	61.5	44.9	4.3	4.0	3.6	3.2	2.8	2.4	2.0	1.6	1.2	0.8	0.4
5500	SL	6600	13.9	388.1	54.4	54.4	2.8	2.6	2.3	2.1	1.8	1.5	1.3	1.0	0.8	0.5	0.3
	2,000	↑	13.9	370.0	55.1	53.5	2.9	2.7	2.4	2.2	1.9	1.6	1.4	1.1	0.8	0.5	0.3
	4,000		13.9	354.0	55.8	52.6	3.0	2.8	2.5	2.3	2.0	1.7	1.4	1.1	0.8	0.6	0.3
	6,000		13.9	338.3	56.6	51.8	3.2	3.0	2.7	2.4	2.1	1.8	1.5	1.2	0.9	0.6	0.3
	8,000		13.9	323.3	57.5	51.0	3.3	3.1	2.8	2.5	2.2	1.9	1.5	1.2	0.9	0.6	0.3
	10,000		13.9	309.7	58.4	50.2	3.5	3.2	2.9	2.6	2.3	1.9	1.6	1.3	1.0	0.6	0.3
	12,000		13.9	297.9	59.4	49.4	3.6	3.4	3.0	2.7	2.3	2.0	1.7	1.3	1.0	0.7	0.3
	14,000		14.0	286.3	60.3	48.6	3.7	3.5	3.1	2.8	2.4	2.1	1.7	1.4	1.0	0.7	0.3
	16,000		14.1	277.6	61.1	47.7	3.9	3.6	3.2	2.9	2.5	2.2	1.8	1.4	1.1	0.7	0.4
	18,000	↓	14.5	274.3	61.6	46.5	3.9	3.6	3.3	2.9	2.6	2.2	1.8	1.5	1.1	0.7	0.4
	20,000	6600	15.4	276.9	61.7	45.0	3.9	3.6	3.3	2.9	2.5	2.2	1.8	1.4	1.1	0.7	0.4

REMARKS:
1. Engine Specification Fuel Flow increased 5% per MIL-M-7700A
2. Cargo mirror installation will reduce endurance 3%.
3. Enourance data not shown where power required exceeds normal rated power available

Chart 14-12. Maximum endurance (Sheet 8 of 16)

B9/11 **B9/11**

MAXIMUM ENDURANCE

STANDARD DAY

CLEAN CONFIGURATION 2
6600 RPM

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					ENDURANCE — Hours										
		ENGINE SPEED	APPROX.		SPEED/KNTS		1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
			TORQUE PRESS	FUEL FLOW													
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
6000	SL	6600	15.1	400.3	55.4	55.4	2.7	2.5	2.2	2.0	1.7	1.5	1.2	1.0	0.7	0.5	0.2
	2,000	↑	15.1	382.3	56.2	54.6	2.8	2.6	2.4	2.1	1.8	1.6	1.3	1.0	0.8	0.5	0.3
	4,000		15.1	367.1	57.0	53.7	2.9	2.7	2.5	2.2	1.9	1.6	1.4	1.1	0.8	0.5	0.3
	6,000		15.2	351.3	57.9	52.9	3.1	2.8	2.6	2.3	2.0	1.7	1.4	1.1	0.9	0.6	0.3
	8,000		15.2	336.3	58.8	52.1	3.2	3.0	2.7	2.4	2.1	1.8	1.5	1.2	0.9	0.6	0.3
	10,000		15.2	323.4	59.7	51.3	3.3	3.1	2.8	2.5	2.2	1.9	1.5	1.2	0.9	0.6	0.3
	12,000		15.3	311.2	60.6	50.5	3.4	3.2	2.9	2.6	2.2	1.9	1.6	1.3	1.0	0.6	0.3
	14,000		15.5	302.5	61.3	49.5	3.5	3.3	3.0	2.6	2.3	2.0	1.7	1.3	1.0	0.7	0.3
	16,000		16.1	299.1	61.7	48.2	3.6	3.3	3.0	2.7	2.3	2.0	1.7	1.3	1.0	0.7	0.3
	18,000	↓	17.2	304.7	61.6	46.5	3.5	3.3	3.0	2.6	2.3	2.0	1.6	1.3	1.0	0.7	0.3
	20,000	6600	19.1	320.1	60.7	44.3	3.4	3.1	2.8	2.5	2.2	1.9	1.6	1.2	0.9	0.6	0.3
6500	SL	6600	16.4	412.9	56.5	56.5	2.6	2.4	2.2	1.9	1.7	1.5	1.2	1.0	0.7	0.5	0.2
	2,000	↑	16.4	395.5	57.3	55.6	2.7	2.5	2.3	2.0	1.8	1.5	1.3	1.0	0.8	0.5	0.3
	4,000		16.4	380.4	58.2	54.8	2.8	2.6	2.4	2.1	1.8	1.6	1.3	1.1	0.8	0.5	0.3
	6,000		16.5	364.4	59.1	54.0	2.9	2.7	2.5	2.2	1.9	1.6	1.4	1.1	0.8	0.5	0.3
	8,000		16.5	349.6	60.0	53.2	3.1	2.9	2.6	2.3	2.0	1.7	1.4	1.1	0.9	0.6	0.3
	10,000		16.6	338.4	60.8	52.3	3.2	3.0	2.7	2.4	2.1	1.8	1.5	1.2	0.9	0.6	0.3
	12,000		16.9	328.8	61.5	51.2	3.3	3.0	2.7	2.4	2.1	1.8	1.5	1.2	0.9	0.6	0.3
	14,000	↓	17.7	325.8	61.7	49.8	3.3	3.1	2.8	2.5	2.1	1.8	1.5	1.2	0.9	0.6	0.3
	16,000	6600	19.0	332.8	61.4	48.0	3.2	3.0	2.7	2.4	2.1	1.8	1.5	1.2	0.9	0.6	0.3

REMARKS:

1. Engine Specification Fuel Flow increased 5% per MIL-M-7700A
2. Cargo mirror installation will reduce endurance 3%.
3. Endurance data not shown where power required exceeds normal rated power available.

Chart 14-12. Maximum endurance (Sheet 9 of 16)

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MAXIMUM ENDURANCE

STANDARD DAY

CLEAN CONFIGURATION 2
6600 RPM

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					ENDURANCE — Hours										
		ENGINE SPEED	APPROX.		SPEED/KNTS		1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
			TORQUE PRESS	FUEL FLOW													
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
7000	SL	6600	17.7	425.9	57.5	57.5	2.5	2.3	.2.1	1.9	1.6	1.4	1.2	0.9	0.7	0.5	0.2
	2,000	↑	17.7	409.0	58.4	56.7	2.6	2.4	2.2	2.0	1.7	1.5	1.2	1.0	0.7	0.5	0.2
	4,000		17.7	393.7	59.3	55.9	2.7	2.5	2.3	2.0	1.8	1.5	1.3	1.0	0.8	0.5	0.3
	6,000		17.8	378.1	60.2	55.0	2.8	2.6	2.4	2.1	1.9	1.6	1.3	1.1	0.8	0.5	0.3
	8,000		17.9	364.6	61.0	54.1	2.9	2.7	2.5	2.2	1.9	1.6	1.4	1.1	0.8	0.5	0.3
	10,000		18.3	357.4	61.5	52.9	3.0	2.8	2.5	2.2	2.0	1.7	1.4	1.1	0.8	0.6	0.3
	12,000	↓	19.2	354.1	61.7	51.4	3.0	2.8	2.5	2.3	2.0	1.7	1.4	1.1	0.8	0.6	0.3
	14,000	6600	20.8	361.9	61.4	49.5	3.0	2.8	2.5	2.2	1.9	1.7	1.4	1.1	0.8	0.6	0.3
7500	SL	6600	19.0	439.0	58.5	58.5	2.4	2.3	2.1	1.8	1.6	1.4	1.1	0.9	0.7	0.5	0.2
	2,000	↑	19.0	422.6	59.4	57.7	2.5	2.4	2.1	1.9	1.7	1.4	1.2	0.9	0.7	0.5	0.2
	4,000		19.1	407.6	60.3	56.8	2.6	2.5	2.2	2.0	1.7	1.5	1.2	1.0	0.7	0.5	0.2
	6,000		19.2	393.9	61.1	55.8	2.7	2.5	2.3	2.0	1.8	1.5	1.3	1.0	0.8	0.5	0.3
	8,000		19.7	384.1	61.6	54.6	2.8	2.6	2.3	2.1	1.8	1.6	1.3	1.0	0.8	0.5	0.3
	10,000	↓	20.7	383.9	61.7	53.0	2.8	2.6	2.3	2.1	1.8	1.6	1.3	1.0	0.8	0.5	0.3
	12,000	6600	22.4	391.8	61.3	51.0	2.7	2.6	2.3	2.0	1.8	1.5	1.3	1.0	0.8	0.5	0.3
8000	SL	6600	20.3	452.3	59.5	59.5	2.4	2.2	2.0	1.8	1.5	1.3	1.1	0.9	0.7	0.4	0.2
	2,000	↑	20.3	436.7	60.4	58.6	2.5	2.3	2.1	1.8	1.6	1.4	1.1	0.9	0.7	0.5	0.2
	4,000		20.5	423.5	61.1	57.6	2.5	2.4	2.1	1.9	1.7	1.4	1.2	0.9	0.7	0.5	0.2
	6,000		21.1	413.9	61.6	56.3	2.6	2.4	2.2	1.9	1.7	1.4	1.2	1.0	0.7	0.5	0.2
	8,000	↓	22.1	411.7	61.7	54.7	2.6	2.4	2.2	1.9	1.7	1.5	1.2	1.0	0.7	0.5	0.2
	10,000	6600	23.9	422.0	61.3	52.7	2.5	2.4	2.1	1.9	1.7	1.4	1.2	0.9	0.7	0.5	0.2

REMARKS:
1. Engine Specification Fuel Flow increased 5% per MIL-M-7700A
2. Cargo mirror installation will reduce endurance 3%.
3. Endurance data not shown where power required exceeds normal rated power available.

Chart 14-12. Maximum endurance (Sheet 10 of 16)

B9/11 **B9/11**

MAXIMUM ENDURANCE

STANDARD DAY

CLEAN CONFIGURATION 2
6600 RPM

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					ENDURANCE — Hours										
		ENGINE SPEED	APPROX. TORQUE PRESS	APPROX. FUEL FLOW	SPEED/KNTS		1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
8500	SL	6600	21.6	466.3	60.4	60.4	2.3	2.1	1.9	1.7	1.5	1.3	1.1	0.9	0.6	0.4	0.2
	2,000	↑	21.8	452.7	61.1	59.3	2.4	2.2	2.0	1.8	1.5	1.3	1.1	0.9	0.7	0.4	0.2
	4,000	|	22.4	443.6	61.6	58.0	2.4	2.3	2.0	1.8	1.6	1.4	1.1	0.9	0.7	0.5	0.2
	6,000	↓	23.5	441.2	61.7	56.4	2.4	2.3	2.0	1.8	1.6	1.4	1.1	0.9	0.7	0.5	0.2
	8,000	6600	25.4	451.3	61.3	54.4	2.4	2.2	2.0	1.8	1.6	1.3	1.1	0.9	0.7	0.4	0.2

REMARKS:
1. Engine Specification Fuel Flow increased 5% per MIL-M-7700A
2. Cargo mirror installation will reduce endurance 3%.
3. Endurance data not shown where power required exceeds normal rated power available.

Chart 14-12. Maximum endurance (Sheet 11 of 16)

MAXIMUM ENDURANCE

540

STANDARD DAY

6600 RPM

ARMY MODEL(S): UH-1B (540)
DATA AS OF: FEBRUARY 1964
DATA BASIS: MILITARY POTENTIAL TEST OF MODEL 540
"DOOR HINGE" ROTOR SYSTEM
"PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					ENDURANCE — Hours										
		ENGINE SPEED	APPROX. TORQUE PRESS	APPROX. FUEL FLOW	SPEED/KNTS		1573 LBS FUEL	1400 LBS FUEL	1300 LBS FUEL	1200 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
5000	0	6600	15.8	407.3	48.2	48.2	3.9	3.4	3.2	2.9	2.5	2.2	2.0	1.7	1.5	1.2	1.0
	2000	↑	15.5	386.2	49.9	48.4	4.1	3.6	3.4	3.1	2.6	2.3	2.1	1.8	1.6	1.3	1.0
	4000		15.2	367.1	51.7	48.7	4.3	3.8	3.5	3.3	2.7	2.5	2.2	1.9	1.6	1.4	1.1
	6000		14.8	348.0	53.5	48.9	4.5	4.0	3.7	3.4	2.9	2.6	2.3	2.0	1.7	1.4	1.1
	8000		14.5	329.3	55.3	49.0	4.8	4.3	3.9	3.6	3.0	2.7	2.4	2.1	1.8	1.5	1.2
	10000		14.2	312.5	57.0	49.0	5.0	4.5	4.2	3.8	3.2	2.9	2.6	2.2	1.9	1.6	1.3
	12000		13.9	297.5	58.7	48.9	5.3	4.7	4.4	4.0	3.4	3.0	2.7	2.4	2.0	1.7	1.3
	14000		13.7	283.1	60.2	48.5	5.6	4.9	4.6	4.2	3.5	3.2	2.8	2.5	2.1	1.8	1.4
	16000		13.5	270.4	61.5	48.0	5.8	5.2	4.8	4.4	3.7	3.3	3.0	2.6	2.2	1.8	1.5
	18000	↓	13.3	260.6	62.6	47.3	6.0	5.4	5.0	4.6	3.8	3.5	3.1	2.7	2.3	1.9	1.5
	20000	6600	13.2	251.3	63.5	46.3	6.3	5.6	5.2	4.8	4.0	3.6	3.2	2.8	2.4	2.0	1.6
5500	0	6600	16.8	417.4	51.0	51.0	3.8	3.4	3.1	2.9	2.4	2.2	1.9	1.7	1.4	1.2	1.0
	2000	↑	16.5	396.1	52.7	51.2	4.0	3.5	3.3	3.0	2.5	2.3	2.0	1.8	1.5	1.3	1.0
	4000		16.1	376.6	54.5	51.3	4.2	3.7	3.5	3.2	2.7	2.4	2.1	1.9	1.6	1.3	1.1
	6000		15.8	357.3	56.2	51.4	4.4	3.9	3.6	3.4	2.8	2.5	2.2	2.0	1.7	1.4	1.1
	8000		15.4	338.7	57.9	51.4	4.6	4.1	3.8	3.5	3.0	2.7	2.4	2.1	1.8	1.5	1.2
	10000		15.2	322.7	59.5	51.1	4.9	4.3	4.0	3.7	3.1	2.8	2.5	2.2	1.9	1.5	1.2
	12000		14.9	308.1	60.9	50.7	5.1	4.5	4.2	3.9	3.2	2.9	2.6	2.3	1.9	1.6	1.3
	14000		14.7	294.1	62.1	50.0	5.3	4.8	4.4	4.1	3.4	3.1	2.7	2.4	2.0	1.7	1.4
	16000		14.6	282.7	63.0	49.2	5.6	5.0	4.6	4.2	3.5	3.2	2.8	2.5	2.1	1.8	1.4
	18000	↓	14.5	274.5	63.7	48.1	5.7	5.1	4.7	4.4	3.6	3.3	2.9	2.5	2.2	1.8	1.5
	20000	6600	14.6	267.7	64.2	46.9	5.9	5.2	4.9	4.5	3.7	3.4	3.0	2.6	2.2	1.9	1.5

REMARKS:
1. Engine specification fuel flow increased 5% per MIL-M-7700A
2. Cargo mirror installation will reduce endurance 3%.
3. Endurance data not shown where power required exceeds normal rated power available.

Chart 14-12. Maximum endurance (Sheet 12 of 16)

MAXIMUM ENDURANCE

540

STANDARD DAY

6600 RPM

ARMY MODEL(S): UH-1B (540)
DATA AS OF: FEBRUARY 1964
DATA BASIS: MILITARY POTENTIAL TEST OF MODEL 540
"DOOR HINGE" ROTOR SYSTEM
"PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					ENDURANCE — Hours										
		ENGINE SPEED	TORQUE PRESS	APPROXIMATE			1573 LBS FUEL	1400 LBS FUEL	1300 LBS FUEL	1200 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL
				FUEL FLOW	SPEED/KNTS.												
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
6000	0	6600	17.8	426.9	53.5	53.5	3.7	3.3	3.0	2.8	2.3	2.1	1.9	1.6	1.4	1.2	0.9
	2000	↑	17.4	405.7	55.3	53.7	3.9	3.5	3.2	3.0	2.5	2.2	2.0	1.7	1.5	1.2	1.0
	4000		17.0	386.1	57.0	53.7	4.1	3.6	3.4	3.1	2.6	2.3	2.1	1.8	1.6	1.3	1.0
	6000		16.7	367.0	58.6	53.6	4.3	3.8	3.5	3.3	2.7	2.5	2.2	1.9	1.6	1.6	1.1
	8000		16.4	348.8	60.1	53.2	4.5	4.0	3.7	3.4	2.9	2.6	2.3	2.0	1.7	1.4	1.1
	10000		16.2	333.9	61.3	52.7	4.7	4.2	3.9	3.6	3.0	2.7	2.4	2.1	1.8	1.5	1.2
	12000		16.0	319.9	62.4	52.0	4.9	4.4	4.1	3.8	3.1	2.8	2.5	2.2	1.9	1.6	1.3
	14000		15.9	306.5	63.3	51.0	5.1	4.6	4.2	3.9	3.3	2.9	2.6	2.3	2.0	1.6	1.3
	16000		15.9	296.5	63.9	49.9	5.3	4.7	4.4	4.0	3.4	3.0	2.7	2.4	2.0	1.7	1.3
	18000	↓	16.0	290.8	64.3	48.6	5.4	4.8	4.5	4.1	3.4	3.1	2.8	2.4	2.1	1.7	1.4
	20000	6600	16.5	289.7	64.5	47.1	5.4	4.8	4.5	4.1	3.5	3.1	2.8	2.4	2.1	1.7	1.4
6500	0	6600	18.7	436.2	55.9	55.9	3.6	3.2	3.0	2.8	2.3	2.1	1.8	1.6	1.4	1.1	0.9
	2000	↑	18.3	415.5	57.5	55.9	3.8	3.4	3.1	2.9	2.4	2.2	1.9	1.7	1.4	1.2	1.0
	4000		18.0	398.2	59.1	55.7	4.0	3.5	3.3	3.0	2.5	2.3	2.0	1.6	1.5	1.3	1.0
	6000		17.7	377.5	60.5	55.3	4.2	3.7	3.4	3.2	2.6	2.4	2.1	1.9	1.6	1.3	1.1
	8000		17.5	359.8	61.7	54.7	4.4	3.9	3.6	3.3	2.8	2.5	2.2	1.9	1.7	1.4	1.1
	10000		17.3	348.1	62.7	53.8	4.5	4.0	3.8	3.5	2.9	2.6	2.3	2.0	1.7	1.4	1.2
	12000		17.2	332.8	63.5	52.8	4.7	4.2	3.9	3.6	3.0	2.7	2.4	2.1	1.8	1.5	1.2
	14000		17.2	326.5	64.0	51.6	4.9	4.4	4.1	3.7	3.1	2.8	2.5	2.2	1.9	1.6	1.2
	16000		17.4	318.5	64.4	50.2	5.0	4.5	4.1	3.8	3.2	2.9	2.6	2.2	1.9	1.6	1.3
	18000	↓	18.0	314.6	64.5	48.7	5.0	4.4	4.1	3.8	3.2	2.9	2.5	2.2	1.9	1.6	1.3
	20000	6600	19.9	331.4	64.0	46.7	4.7	4.2	3.9	3.6	3.0	2.7	2.4	2.1	1.8	1.5	1.2

REMARKS:
1. Engine specification fuel flow increased 5% per MIL-M-7700A.
2. Cargo mirror installation will reduce endurance 3%.
3. Endurance data not shown where power required exceeds normal rated power available.

Chart 14-12. Maximum endurance (Sheet 13 of 16)

MAXIMUM ENDURANCE

540

STANDARD DAY

6600 RPM

ARMY MODEL(S): UH-1B (540)
DATA AS OF: FEBRUARY 1964
DATA BASIS: MILITARY POTENTIAL TEST OF MODEL 540
"DOOR HINGE" ROTOR SYSTEM
"PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					ENDURANCE — Hours										
		ENGINE SPEED	TORQUE PRESS	APPROXIMATE			1573 LBS FUEL	1400 LBS FUEL	1300 LBS FUEL	1200 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL
				FUEL FLOW	SPEED/KNTS.												
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
7000	0	6600	19.6	445.8	57.9	57.9	3.5	3.1	2.9	2.7	2.2	2.0	1.8	1.6	1.3	1.1	0.9
	2000	↑	19.3	425.7	59.4	57.7	3.7	3.3	3.1	2.8	2.3	2.1	1.9	1.6	1.4	1.2	0.9
	4000		19.0	407.1	60.7	57.2	3.9	3.4	3.2	2.9	2.5	2.2	2.0	1.7	1.5	1.2	1.0
	6000		18.8	389.0	61.9	56.6	4.0	3.6	3.3	3.1	2.6	2.3	2.1	1.8	1.5	1.3	1.0
	8000		18.6	372.0	62.8	55.7	4.2	3.8	3.5	3.2	2.7	2.4	2.2	1.9	1.6	1.3	1.1
	10000		18.5	359.4	63.6	54.6	4.4	3.9	3.6	3.3	2.8	2.5	2.2	1.9	1.7	1.4	1.1
	12000		18.5	347.5	64.1	53.4	4.5	4.0	3.7	3.5	2.9	2.6	2.3	2.0	1.7	1.4	1.2
	14000		18.8	338.4	64.4	51.9	4.6	4.1	3.8	3.5	3.0	2.7	2.4	2.1	1.8	1.5	1.2
	16000	↓	19.6	339.6	64.5	50.3	4.6	4.1	3.8	3.5	2.9	2.7	2.4	2.1	1.8	1.5	1.2
	18000	6600	21.8	361.8	64.0	48.3	4.3	3.9	3.6	3.3	2.8	2.5	2.2	1.9	1.7	1.4	1.1
7500	0	6600	20.6	455.9	59.6	59.6	3.5	3.1	2.9	2.6	2.2	2.0	1.8	1.5	1.3	1.1	0.9
	2000	↑	20.3	436.7	60.9	59.2	3.6	3.2	3.0	2.7	2.3	2.1	1.6	1.8	1.4	1.1	0.9
	4000		20.1	418.8	62.0	58.4	3.8	3.3	3.1	2.9	2.4	2.1	1.9	1.7	1.4	1.2	1.0
	6000		19.9	401.5	62.9	57.5	3.9	3.5	3.2	3.0	2.5	2.2	2.0	1.7	1.5	1.2	1.0
	8000		19.8	385.4	63.6	56.4	4.1	3.6	3.4	3.1	2.6	2.3	2.1	1.8	1.6	1.3	1.0
	10000		19.9	374.4	64.1	55.1	4.2	3.7	3.5	3.2	2.7	2.4	2.1	1.9	1.6	1.3	1.1
	12000		20.1	366.0	64.4	53.6	4.3	3.8	3.6	3.3	2.7	2.5	2.2	1.9	1.6	1.4	1.1
	14000	↓	21.1	365.5	64.4	51.9	4.3	3.8	3.6	3.3	2.7	2.5	2.2	1.9	1.6	1.4	1.1
	16000	6600	23.5	388.2	63.9	49.9	4.1	3.6	3.3	3.1	2.6	2.3	2.1	1.8	1.5	1.3	1.0

REMARKS:
1. Engine specification fuel flow increased 5% per MIL-M-7700A.
2. Cargo mirror installation will reduce endurance 3%.
3. Endurance data not shown where power required exceeds normal rated power available.

Chart 14-12. Maximum endurance (Sheet 14 of 16)

MAXIMUM ENDURANCE

540

STANDARD DAY

6600 RPM

ARMY MODEL(S): UH-1B (540)
DATA AS OF: FEBRUARY 1964
DATA BASIS: MILITARY POTENTIAL TEST OF MODEL 540
"DOOR HINGE" ROTOR SYSTEM
"PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					ENDURANCE – Hours										
		ENGINE SPEED	APPROX.		SPEED/KNTS		1573 LBS FUEL	1400 LBS FUEL	1300 LBS FUEL	1200 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL
			TORQUE PRESS	FUEL FLOW													
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
8000	0	6600	21.7	466.8	61.0	61.0	3.4	3.0	2.8	2.6	2.1	1.9	1.7	1.5	1.3	1.1	0.9
	2000	↑	21.4	448.3	62.1	60.3	3.5	3.1	2.9	2.7	2.2	2.0	1.8	1.6	1.3	1.1	0.9
	4000		21.3	431.3	63.0	59.3	3.6	3.2	3.0	2.8	2.3	2.1	1.9	1.6	1.4	1.2	0.9
	6000		21.2	415.0	63.7	58.2	3.8	3.4	3.1	2.9	2.4	2.2	1.9	1.7	1.4	1.2	1.0
	8000		21.2	400.7	64.1	56.9	3.9	3.5	3.2	3.0	2.5	2.2	2.0	1.7	1.5	1.2	1.0
	10000		21.5	393.1	64.4	55.4	4.0	3.6	3.3	3.1	2.5	2.3	2.0	1.8	1.5	1.3	1.0
	12000	↓	22.5	393.1	64.4	55.4	4.0	3.6	3.3	3.1	2.5	2.3	2.0	1.8	1.5	1.3	1.0
	14000	6600	25.0	414.4	63.9	51.5	3.8	3.4	3.1	2.9	2.4	2.2	1.9	1.7	1.4	1.2	1.0
8500	0	6600	22.8	478.3	62.1	62.1	3.3	2.9	2.7	2.5	2.1	1.9	1.7	1.5	1.3	1.0	0.8
	2000	↑	22.6	460.7	63.0	61.2	3.4	3.0	2.8	2.6	2.2	2.0	1.7	1.5	1.3	1.1	0.9
	4000		22.5	444.8	63.7	60.0	3.5	3.1	2.9	2.7	2.2	2.0	1.8	1.6	1.3	1.1	0.9
	6000		22.5	430.3	64.1	58.6	3.7	3.3	3.0	2.8	2.3	2.1	1.9	1.6	1.4	1.2	0.9
	8000		22.8	420.0	64.4	57.1	3.7	3.3	3.1	2.9	2.4	2.1	1.9	1.7	1.4	1.2	1.0
	10000	↓	23.8	420.4	64.4	55.4	3.7	3.3	3.1	2.9	2.4	2.1	1.9	1.7	1.4	1.2	1.0
	12000	6600	26.3	441.8	64.0	53.3	3.6	3.2	2.9	2.7	2.3	2.0	1.8	1.6	1.4	1.1	0.9

REMARKS:

1. Engine specification fuel flow increased 5% per MIL-M-7700A.
2. Cargo mirror installation will reduce endurance 3%.
3. Endurance data not shown where power required exceeds normal rated power available.

Chart 14-12. Maximum endurance (Sheet 15 of 16)

MAXIMUM ENDURANCE

540

STANDARD DAY

6600 RPM

ARMY MODEL(S): UH-1B (540)
DATA AS OF: FEBRUARY 1965
DATA BASIS: MILITARY POTENTIAL TEST OF MODEL 540
"DOOR HINGE" ROTOR SYSTEM
"PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					ENDURANCE — Hours										
		ENGINE SPEED	APPROX. TORQUE PRESS	APPROX. FUEL FLOW	SPEED/KNTS		1573 LBS FUEL	1400 LBS FUEL	1300 LBS FUEL	1200 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
9000	0	6600	23.9	490.6	63.0	63.0	3.2	2.9	2.6	2.4	2.0	1.8	1.6	1.4	1.2	1.0	0.8
	2000	↑	23.8	473.9	63.6	61.8	3.3	3.0	2.7	2.5	2.1	1.9	1.7	1.5	1.3	1.1	0.8
	4000		23.8	459.8	64.1	60.4	3.4	3.0	2.8	2.6	2.2	2.0	1.7	1.5	1.3	1.1	0.9
	6000		24.1	448.9	64.4	58.9	3.5	3.1	2.9	2.7	2.2	2.0	1.8	1.6	1.3	1.1	0.9
	8000	↓	25.1	447.4	64.5	57.1	3.5	3.1	2.9	2.7	2.2	2.0	1.8	1.6	1.3	1.1	0.9
	10000	6600	27.5	466.7	64.1	55.0	3.4	3.0	2.8	2.6	2.1	1.9	1.7	1.5	1.3	1.1	0.9
9500	0	6600	25.1	503.7	63.6	63.6	3.1	2.8	2.6	2.4	2.0	1.8	1.6	1.4	1.2	1.0	0.8
	2000	↑	25.1	486.5	64.1	62.2	3.2	2.9	2.7	2.5	2.0	1.8	1.6	1.4	1.2	1.0	0.8
	4000		25.6	477.8	64.4	60.7	3.3	2.9	2.7	2.5	2.1	1.9	1.7	1.5	1.3	1.0	0.8
	6000		26.3	474.7	64.5	58.9	3.3	2.9	2.7	2.5	2.1	1.9	1.7	1.5	1.3	1.1	0.8
	8000	↓	28.5	492.1	64.2	56.9	3.2	2.8	2.6	2.4	2.0	1.8	1.6	1.4	1.2	1.0	0.8
	10000	6600	33.1	559.6	63.0	54.1	2.8	2.5	2.3	2.1	1.8	1.6	1.4	1.3	1.1	0.9	0.7

REMARKS: 1. Engine specification fuel flow increased 5% per MIL-M-7700A.
2. Cargo mirror installation will reduce endurance 3%.
3. Endurance data not shown where power required exceeds normal rated power available.

Chart 14-12. Maximum endurance (Sheet 16 of 16)

HOVERING ENDURANCE

A

STANDARD DAY

MODEL(S): UH-1A
DATA AS OF: January 1961
DATA BASIS: AFFTC Phase IV
Flight Test of YH-40

ENGINE: Lycoming T53-L-1A
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS						ENDURANCE – Hours								
		ENGINE SPEED	MAN. PRESS.	MIX-TURE	APPROXIMATE			812.5 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL	50 LBS FUEL
					TOTAL	SPEED/KNTS.										
POUNDS	FEET	RPM	IN. HG		LB/HR	TAS	CAS									
4300	SL	6400			461	0	0	1.76	1.52	1.30	1.08	.87	.65	.43	.22	.11
	2,000				448	0	0	1.81	1.56	1.34	1.11	.89	.67	.45	.22	.11
	4,000				434	0	0	1.87	1.61	1.38	1.15	.92	.69	.46	.23	.12
	6,000				420	0	0	1.93	1.66	1.43	1.19	.95	.71	.48	.24	.12
	8,000				405	0	0	2.01	1.73	1.48	1.24	.99	.74	.49	.25	.12
	10,000				395	0	0	2.06	1.77	1.52	1.27	1.01	.76	.51	.25	.13
	12,000				379	0	0	2.14	1.84	1.58	1.32	1.05	.79	.53	.26	.13
	14,000				369	0	0	2.20	1.90	1.62	1.35	1.08	.81	.54	.27	.14
	16,000	6400														
4800	SL	6400			489	0	0	1.66	1.43	1.23	1.02	.82	.61	.41	.20	.10
	2,000				478	0	0	1.70	1.46	1.26	1.05	.84	.63	.42	.21	.11
	4,000				465	0	0	1.75	1.51	1.29	1.08	.86	.65	.43	.22	.11
	6,000				452	0	0	1.80	1.55	1.33	1.11	.89	.66	.44	.23	.11
	8,000				441	0	0	1.84	1.59	1.36	1.13	.91	.68	.45	.23	.11
	10,000				432	0	0	1.88	1.62	1.39	1.16	.93	.69	.46	.24	.12
	12,000				421	0	0	1.93	1.66	1.43	1.19	.95	.71	.48	.24	.12
	14,000	6400			408	0	0	1.99	1.71	1.47	1.23	.98	.72	.49	.24	.12
5300	SL	6400			521	0	0	1.56	1.34	1.15	.96	.77	.58	.38	.19	.10
	2,000				509	0	0	1.60	1.38	1.18	.98	.79	.59	.39	.20	.10
	4,000				499	0	0	1.63	1.40	1.20	1.00	.80	.60	.40	.20	.10
	6,000				489	0	0	1.66	1.43	1.23	1.02	.82	.61	.41	.20	.10
	8,000				479	0	0	1.70	1.46	1.26	1.05	.84	.63	.42	.21	.11
	10,000				467	0	0	1.74	1.50	1.28	1.07	.86	.64	.43	.21	.11
	12,000				460	0	0	1.77	1.52	1.31	1.09	.87	.65	.44	.22	.11
	14,000				438	12	10	1.86	1.60	1.37	1.14	.92	.69	.46	.23	.11
	16,000	6400														

REMARKS:
(1) Fuel Flow X 1.05
(2) Normal Rated Power
(3) M.P. & Mixture omitted for turbine engine.

Chart 14-13. Hovering endurance (Sheet 1 of 14)

HOVERING ENDURANCE

A

STANDARD DAY

MODEL(S): UH-1A
DATA AS OF: January 1961
DATA BASIS: AFFTC Phase IV
Flight Test of YH-40

ENGINE: Lycoming T53-L-1A
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS						ENDURANCE — Hours								
		ENGINE SPEED	MAN. PRESS.	MIXTURE	APPROXIMATE			812.5 LBS	700 LBS	600 LBS	500 LBS	400 LBS	300 LBS	200 LBS	100 LBS	50 LBS
					TOTAL	SPEED/KNTS.										
POUNDS	FEET	RPM	IN. HG		LB/HR	TAS	CAS	FUEL	FUEL	FUEL	FUEL	FUEL	FUEL	FUEL	FUEL	FUEL
5800	SL	6400			552	0	0	1.47	1.26	1.09	.90	.72	.54	.36	.18	.09
	2,000	↑			544	0	0	1.49	1.28	1.10	.92	.73	.55	.37	.18	.09
	4,000				533	0	0	1.52	1.31	1.12	.94	.75	.56	.37	.19	.09
	6,000				526	0	0	1.54	1.33	1.14	.95	.76	.57	.38	.19	.09
	8,000				517	0	0	1.57	1.35	1.16	.97	.77	.58	.39	.19	.10
	10,000				501	8	7	1.62	1.40	1.20	1.00	.80	.60	.40	.20	.10
	12,000				471	18	15	1.73	1.49	1.28	1.06	.85	.64	.43	.21	.11
	14,000	↓														
	16,000	6400														
6100	SL	6400			572	0	0	1.42	1.22	1.05	.87	.70	.52	.35	.17	.09
	2,000	↑			563	0	0	1.44	1.24	1.06	.89	.71	.53	.35	.18	.09
	4,000				557	0	0	1.46	1.26	1.08	.90	.72	.54	.36	.18	.09
	6,000				549	0	0	1.48	1.28	1.09	.91	.73	.55	.36	.18	.09
	8,000				532	9	8	1.53	1.32	1.13	.94	.75	.56	.38	.19	.09
	10,000				501	19	16	1.62	1.40	1.20	1.00	.80	.60	.40	.20	.10
	12,000															
	14,000	↓														
	16,000	6400														
6600	SL	6400			606	0	0	1.34	1.15	.99	.82	.66	.49	.33	.16	.08
	2,000	↑			600	0	0	1.35	1.16	1.00	.83	.66	.50	.33	.17	.08
	4,000				590	8	8	1.38	1.19	1.02	.85	.68	.51	.34	.17	.08
	6,000				563	16	15	1.44	1.24	1.06	.89	.71	.53	.35	.18	.09
	8,000				533	28	25	1.52	1.31	1.12	.94	.75	.56	.37	.19	.09
	10,000															
	12,000															
	14,000	↓														
	16,000	6400														

REMARKS: (1) Fuel Flow X 1.05
(2) Normal Rated Power
(3) M.P. & Mixture omitted for turbine engine.

Chart 14-13. Hovering endurance (Sheet 2 of 14)

HOVERING ENDURANCE

A

STANDARD DAY

MODEL(S): UH-1A
DATA AS OF: January 1961
DATA BASIS : AFFTC Phase IV
Flight Test of YH-40

ENGINE: Lycoming T53-L-1A
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LBS/GAL

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS						ENDURANCE — Hours								
		ENGINE SPEED	MAN. PRESS.	MIX-TURE	APPROXIMATE			812.5 LBS	700 LBS	600 LBS	500 LBS	400 LBS	300 LBS	200 LBS	100 LBS	50 LBS
					TOTAL	SPEED/KNTS										
POUNDS	FEET	RPM	IN. HG		LB/HR	TAS	CAS	FUEL	FUEL	FUEL	FUEL	FUEL	FUEL	FUEL	FUEL	FUEL
7200	SL	6400			639	9	9	1.27	1.09	.94	.78	.63	.47	.31	.16	.08
	2,000				613	17	17	1.33	1.15	.98	.82	.65	.49	.33	.16	.08
	4,000				590	20	19	1.38	1.19	1.02	.85	.68	.51	.34	.17	.08
	6,000				563	29	27	1.44	1.24	1.06	.89	.71	.53	.35	.18	.09
	8,000															
	10,000															
	12,000															
	14,000															
	16,000	6400														

REMARKS: (1) Fuel Flow X 1.05
(2) Normal Rated Power
(3) M.P. & Mixture omitted for turbine engine.

Chart 14-13. Hovering endurance (Sheet 3 of 14)

HOVERING ENDURANCE

B-5

STANDARD DAY

ARMY MODEL(S): UH-1B
DATA AS OF: September, 1962
DATA BASIS: Flight Test (FTC-TDR-62-21, "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					ENDURANCE — Hours										
		ENGINE SPEED	TORQUE PRESS	APPROXIMATE			1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
				FUEL FLOW	SPEED/KNTS												
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
5000	SL	6600	22.7	461.9	0.0	0.0	2.3	2.2	1.9	1.7	1.5	1.3	1.1	0.9	0.6	0.4	0.2
	2000	↑	22.8	451.1	0.0	0.0	2.4	2.2	2.0	1.8	1.6	1.3	1.1	0.9	0.7	0.4	0.2
	4000		23.0	439.6	0.0	0.0	2.4	2.3	2.0	1.8	1.6	1.4	1.1	0.9	0.7	0.5	0.2
	6000		23.2	428.3	0.0	0.0	2.5	2.3	2.1	1.9	1.6	1.4	1.2	0.9	0.7	0.5	0.2
	8000		23.4	418.6	0.0	0.0	2.6	2.4	2.1	1.9	1.7	1.4	1.2	1.0	0.7	0.5	0.2
	10000		23.6	412.4	0.0	0.0	2.6	2.4	2.2	1.9	1.7	1.5	1.2	1.0	0.7	0.5	0.2
	12000		23.8	402.5	0.0	0.0	2.7	2.5	2.2	2.0	1.7	1.5	1.2	1.0	0.7	0.5	0.2
	14000		24.1	398.5	0.0	0.0	2.7	2.5	2.3	2.0	1.8	1.5	1.3	1.0	0.8	0.5	0.2
	16000		24.4	398.4	0.0	0.0	2.7	2.5	2.3	2.0	1.8	1.5	1.3	1.0	0.8	0.5	0.3
	18000	↓	23.3	376.7	12.5	9.5	2.8	2.7	2.4	2.1	1.9	1.6	1.3	1.1	0.8	0.5	0.3
	20000	6600	22.0	354.2	19.3	14.1	3.0	2.8	2.5	2.3	2.0	1.7	1.4	1.1	0.8	0.6	0.3
5500	SL	6600	25.2	493.4	0.0	0.0	2.2	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6	0.4	0.2
	2000	↑	25.4	482.1	0.0	0.0	2.2	2.1	1.9	1.7	1.5	1.2	1.0	0.8	0.6	0.4	0.2
	4000		25.6	471.5	0.0	0.0	2.3	2.1	1.9	1.7	1.5	1.3	1.1	0.8	0.6	0.4	0.2
	6000		25.8	461.7	0.0	0.0	2.3	2.2	1.9	1.7	1.5	1.3	1.1	0.9	0.6	0.4	0.2
	8000		26.0	453.5	0.0	0.0	2.4	2.2	2.0	1.8	1.5	1.3	1.1	0.9	0.7	0.4	0.2
	10000		26.3	448.4	0.0	0.0	2.4	2.2	2.0	1.8	1.6	1.3	1.1	0.9	0.7	0.4	0.2
	12000		26.6	444.1	0.0	0.0	2.4	2.3	2.0	1.8	1.6	1.4	1.1	0.9	0.7	0.5	0.2
	14000		25.8	423.9	10.8	8.7	2.5	2.4	2.1	1.9	1.7	1.4	1.2	0.9	0.7	0.5	0.2
	16000		24.6	400.3	17.0	13.3	2.7	2.5	2.2	2.0	1.7	1.5	1.2	1.0	0.7	0.5	0.2
	18000	↓	23.3	376.6	22.3	16.9	2.8	2.7	2.4	2.1	1.9	1.6	1.3	1.1	0.8	0.5	0.3
	20000	6600	22.0	354.5	27.7	20.2	3.0	2.8	2.5	2.3	2.0	1.7	1.4	1.1	0.8	0.6	0.3

REMARKS:
1. Engine specification fuel flow increased 5% per MIL-M-7700A.
2. Endurance data not shown where power required exceeds normal rated power available.

Chart 14-13. Hovering endurance (Sheet 4 of 14)

HOVERING ENDURANCE

B-5

STANDARD DAY

ARMY MODEL(S): UH-1B
DATA AS OF: September, 1962
DATA BASIS: Flight Test (FTC-TDR-62-21, "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					ENDURANCE – Hours										
		ENGINE SPEED	TORQUE PRESS	APPROXIMATE			1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
				FUEL FLOW	SPEED/KNTS												
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
6000	SL	6600	27.9	526.8	0.0	0.0	2.0	1.9	1.7	1.5	1.3	1.1	0.9	0.8	0.6	0.4	0.2
	2000	↑	28.1	515.2	0.0	0.0	2.1	1.9	1.7	1.6	1.4	1.2	1.0	0.8	0.6	0.4	0.2
	4000		28.3	505.8	0.0	0.0	2.1	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6	0.4	0.2
	6000		28.5	498.2	0.0	0.0	2.2	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6	0.4	0.2
	8000		28.8	492.7	0.0	0.0	2.2	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6	0.4	0.2
	10000		28.1	473.9	8.9	7.7	2.3	2.1	1.9	1.7	1.5	1.3	1.1	0.8	0.6	0.4	0.2
	12000		27.0	448.9	15.0	12.5	2.4	2.2	2.0	1.8	1.6	1.3	1.1	0.9	0.7	0.4	0.2
	14000		25.8	423.9	20.2	16.3	2.5	2.4	2.1	1.9	1.7	1.4	1.2	0.9	0.7	0.5	0.2
	16000	↓	24.6	400.5	24.9	19.4	2.7	2.5	2.2	2.0	1.7	1.5	1.2	1.0	0.7	0.5	0.2
	18000	6600	23.3	376.7	29.9	22.6	2.8	2.7	2.4	2.1	1.9	1.6	1.3	1.1	0.8	0.5	0.3
6500	SL	6600	30.5	561.6	0.0	0.0	1.9	1.8	1.6	1.4	1.2	1.1	0.9	0.7	0.5	0.4	0.2
	2000	↑	30.7	550.3	0.0	0.0	1.9	1.8	1.6	1.5	1.3	1.1	0.9	0.7	0.5	0.4	0.2
	4000		31.0	543.0	0.0	0.0	2.0	1.8	1.7	1.5	1.3	1.1	0.9	0.7	0.6	0.4	0.2
	6000		30.7	528.9	5.2	4.7	2.0	1.9	1.7	1.5	1.3	1.1	0.9	0.8	0.6	0.4	0.2
	8000		29.3	500.3	13.0	11.5	2.1	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6	0.4	0.2
	10000		28.1	474.3	17.9	15.4	2.3	2.1	1.9	1.7	1.5	1.3	1.1	0.8	0.6	0.4	0.2
	12000	↓	27.0	448.9	22.6	18.8	2.4	2.2	2.0	1.8	1.6	1.3	1.1	0.8	0.7	0.4	0.2
	14000	6600	25.7	423.6	27.1	21.8	2.5	2.4	2.1	1.9	1.7	1.4	1.2	0.9	0.7	0.5	0.2

REMARKS:

1. Engine specification fuel flow increased 5% per MIL-M-7700A.
2. Endurance data not shown where power required exceeds normal rated power available.

Chart 14-13. Hovering endurance (Sheet 5 of 14)

HOVERING ENDURANCE

STANDARD DAY

B-5

ARMY MODEL(S): UH-1B
DATA AS OF: September, 1962
DATA BASIS: Flight Test (FTC-TDR-62-21, "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					ENDURANCE — Hours										
		ENGINE SPEED	TORQUE PRESS	APPROXIMATE			1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
				FUEL FLOW	SPEED/KNTS												
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
7000	SL	6600	33.1	579.0	0.0	0.0	1.8	1.7	1.5	1.3	1.2	1.0	0.8	0.7	0.5	0.3	0.2
	2000	↑	33.5	587.6	0.0	0.0	1.8	1.7	1.5	1.4	1.2	1.0	0.9	0.7	0.5	0.3	0.2
	4000		32.1	558.0	10.0	9.4	1.9	1.8	1.6	1.4	1.3	1.1	0.9	0.7	0.5	0.4	0.2
	6000		30.7	528.6	15.6	14.3	2.0	1.9	1.7	1.5	1.3	1.1	0.9	0.8	0.6	0.4	0.2
	8000		29.3	500.2	20.2	17.9	2.1	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6	0.4	0.2
	10000	↓	28.1	474.1	24.5	21.0	2.3	2.1	1.9	1.7	1.5	1.3	1.1	0.8	0.6	0.4	0.2
	12000	6600	27.0	448.9	28.8	24.0	2.4	2.2	2.0	1.8	1.6	1.3	1.1	0.9	0.7	0.4	0.2
7500	SL	6600	34.8	619.2	5.6	5.6	1.7	1.6	1.5	1.3	1.1	1.0	0.8	0.6	0.5	0.3	0.2
	2000	↑	33.5	588.2	12.4	12.1	1.8	1.7	1.5	1.4	1.2	1.0	0.9	0.7	0.5	0.3	0.2
	4000		32.1	558.4	17.3	16.3	1.9	1.8	1.6	1.4	1.3	1.1	0.9	0.7	0.5	0.4	0.2
	6000	↓	30.7	528.7	21.7	19.9	2.0	1.9	1.7	1.5	1.3	1.1	0.9	0.8	0.6	1.4	0.2
	8000	6600	29.3	500.3	26.0	23.0	2.1	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6	0.4	0.2
8000	SL	6600	34.8	619.2	14.4	14.4	1.7	1.6	1.5	1.3	1.1	1.0	0.8	0.6	0.5	0.3	0.2
	2000	↑	33.5	588.7	18.7	18.1	1.8	1.7	1.5	1.4	1.2	1.0	0.8	0.7	0.5	0.3	0.2
	4000	↓	32.1	558.0	22.9	21.6	1.9	1.8	1.6	1.4	1.3	1.1	0.9	0.7	0.5	0.4	0.2
	6000	6600	30.7	529.0	27.0	24.6	2.0	1.9	1.7	1.5	1.3	1.1	0.9	0.8	0.6	0.4	0.2
8500	SL	6600	34.8	619.3	20.0	20.0	1.7	1.6	1.5	1.3	1.1	1.0	0.8	0.6	0.5	0.3	0.2
	2000	↕	33.5	588.6	23.7	23.0	1.8	1.7	1.5	1.4	1.2	1.0	0.8	0.7	0.5	0.3	0.2
	4000	6600	32.1	558.3	27.7	26.1	1.9	1.8	1.6	1.4	1.3	1.1	0.9	0.7	0.5	0.4	0.2

REMARKS:
1. Engine specification fuel flow increased 5% per MIL-M-7700A.
2. Endurance data not shown where power required exceeds normal rated power available.

Chart 14-13. Hovering endurance (Sheet 6 of 14)

B9/11 **B9/11**

HOVERING ENDURANCE

STANDARD DAY

6600 RPM

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					ENDURANCE — Hours										
		ENGINE SPEED	APPROX.		SPEED/KNTS		1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
			TORQUE PRESS	FUEL FLOW													
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
5000	SL	6600	22.7	477.4	0.0	0.0	2.2	2.1	1.9	1.7	1.5	1.3	1.0	0.8	0.6	0.4	0.2
	2000	↑	22.8	463.5	0.0	0.0	2.3	2.2	1.9	1.7	1.5	1.3	1.1	0.9	0.6	0.4	0.2
	4000		23.0	450.8	0.0	0.0	2.4	2.2	2.0	1.8	1.6	1.3	1.1	0.9	0.7	0.4	0.2
	6000		23.2	438.2	0.0	0.0	2.4	2.3	2.1	1.8	1.6	1.4	1.1	0.9	0.7	0.5	0.2
	8000		23.4	426.9	0.0	0.0	2.5	2.3	2.1	1.9	1.6	1.4	1.2	0.9	0.7	0.5	0.2
	10000		23.6	417.6	0.0	0.0	2.6	2.4	2.2	1.9	1.7	1.4	1.2	1.0	0.7	0.5	0.2
	12000		23.8	408.8	0.0	0.0	2.6	2.4	2.2	2.0	1.7	1.5	1.2	1.0	0.7	0.5	0.2
	14000		24.1	402.6	0.0	0.0	2.7	2.5	2.2	2.0	1.7	1.5	1.2	1.0	0.7	0.5	0.2
	16000		24.4	400.6	0.0	0.0	2.7	2.5	2.2	2.0	1.7	1.5	1.2	1.0	0.7	0.5	0.2
	18000	↓	24.9	404.1	0.0	0.0	2.7	2.5	2.2	2.0	1.7	1.5	1.2	1.0	0.7	0.5	0.2
	20000	6600	25.6	409.8	0.9	0.7	2.6	2.4	2.2	2.0	1.7	1.5	1.2	1.0	0.7	0.5	0.2
5500	SL	6600	25.2	505.0	0.0	0.0	2.1	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6	0.4	0.2
	2000	↑	25.4	492.0	0.0	0.0	2.2	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6	0.4	0.2
	4000		25.6	480.7	0.0	0.0	2.2	2.1	1.9	1.7	1.5	1.2	1.0	0.8	0.6	0.4	0.2
	6000		25.8	469.0	0.0	0.0	2.3	2.1	1.9	1.7	1.5	1.3	1.1	0.9	0.6	0.4	0.2
	8000		26.0	459.8	0.0	0.0	2.3	2.2	2.0	1.7	1.5	1.3	1.1	0.9	0.7	0.4	0.2
	10000		26.3	451.4	0.0	0.0	2.4	2.2	2.0	1.8	1.6	1.3	1.1	0.9	0.7	0.4	0.2
	12000		26.6	445.6	0.0	0.0	2.4	2.2	2.0	1.8	1.6	1.3	1.1	0.9	0.7	0.4	0.2
	14000		27.1	443.0	0.0	0.0	2.4	2.3	2.0	1.8	1.6	1.4	1.1	0.9	0.7	0.5	0.2
	16000		27.7	445.7	0.0	0.0	2.4	2.2	2.0	1.8	1.6	1.3	1.1	0.9	0.7	0.4	0.2
	18000	↓	27.3	438.2	11.5	8.7	2.4	2.3	2.1	1.8	1.6	1.4	1.1	0.9	0.7	0.5	0.2
	20000	6600	25.6	410.1	19.8	14.5	2.6	2.4	2.2	2.0	1.7	1.5	1.2	1.0	0.7	0.5	0.2

REMARKS:
1. Engine Specification fuel flow increased 5% per MIL-M-7700A
2. Endurance data not shown where power required exceeds normal rated power available.

Chart 14-13. Hovering endurance (Sheet 7 of 14)

B9/11 **B9/11**

HOVERING ENDURANCE

STANDARD DAY

6600 RPM

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					ENDURANCE – Hours										
		ENGINE SPEED	APPROX. TORQUE PRESS	APPROX. FUEL FLOW	SPEED/KNTS		1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
6000	SL	6600	27.9	533.6	0.0	0.0	2.0	1.9	1.7	1.5	1.3	1.1	0.9	0.7	0.6	0.4	0.2
	2000	↑	28.1	521.9	0.0	0.0	2.1	1.9	1.7	1.5	1.3	1.1	1.0	0.8	0.6	0.4	0.2
	4000		28.3	512.6	0.0	0.0	2.1	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6	0.4	0.2
	6000		28.5	502.3	0.0	0.0	2.1	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6	0.4	0.2
	8000		28.8	496.2	0.0	0.0	2.2	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6	0.4	0.2
	10000		29.2	490.7	0.0	0.0	2.2	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6	0.4	0.2
	12000		29.8	490.0	0.0	0.0	2.2	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6	0.4	0.2
	14000		30.5	493.5	0.0	0.0	2.2	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6	0.4	0.2
	16000		29.0	463.8	15.1	11.8	2.3	2.2	1.9	1.7	1.5	1.3	1.1	0.9	0.6	0.4	0.2
	18000	↓	27.3	438.3	21.9	16.5	2.4	2.3	2.1	1.8	1.6	1.4	1.1	0.9	0.7	0.5	0.2
	20000	6600	25.6	410.1	28.8	21.0	2.6	2.4	2.2	2.0	1.7	1.5	1.2	1.0	0.7	0.5	0.2
6500	SL	6600	30.5	563.3	0.0	0.0	1.9	1.8	1.6	1.4	1.2	1.1	0.9	0.7	0.5	0.4	0.2
	2000	↑	30.7	554.4	0.0	0.0	1.9	1.8	1.6	1.4	1.3	1.1	0.9	0.7	0.5	0.4	0.2
	4000		31.0	547.5	0.0	0.0	2.0	1.8	1.6	1.5	1.3	1.1	0.9	0.7	0.5	0.4	0.2
	6000		31.3	540.6	0.0	0.0	2.0	1.8	1.7	1.5	1.3	1.1	0.9	0.7	0.6	0.4	0.2
	8000		31.8	538.8	0.0	0.0	2.0	1.9	1.7	1.5	1.3	1.1	0.9	0.7	0.6	0.4	0.2
	10000		32.5	539.3	0.0	0.0	2.0	1.9	1.7	1.5	1.3	1.1	0.9	0.7	0.6	0.4	0.2
	12000		32.3	529.2	9.7	8.1	2.0	1.9	1.7	1.5	1.3	1.1	0.9	0.8	0.6	0.4	0.2
	14000	↓	30.7	495.6	17.6	14.2	2.2	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6	0.4	0.2
	16000	6600	29.0	463.8	23.7	18.5	2.3	2.2	1.9	1.7	1.5	1.3	1.1	0.9	0.6	0.4	0.2

REMARKS:
1. Engine Specification fuel flow increased 5% per MIL-M-7700A
2. Endurance data not shown where power required exceeds normal rated power available.

Chart 14-13. Hovering endurance (Sheet 8 of 14)

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HOVERING ENDURANCE

STANDARD DAY

6600 RPM

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					ENDURANCE — Hours										
		ENGINE SPEED	APPROX.		SPEED/KNTS		1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
			TORQUE PRESS	FUEL FLOW													
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
7000	SL	6600	33.1	595.4	0.0	0.0	1.8	1.7	1.5	1.3	1.2	1.0	0.8	0.7	0.5	0.3	0.2
	2000	↑	33.5	590.5	0.0	0.0	1.8	1.7	1.5	1.4	1.2	1.0	0.8	0.7	0.5	0.3	0.2
	4000		33.9	587.2	0.0	0.0	1.8	1.7	1.5	1.4	1.2	1.0	0.9	0.7	0.5	0.3	0.2
	6000		34.4	586.8	0.0	0.0	1.8	1.7	1.5	1.4	1.2	1.0	0.9	0.7	0.5	0.3	0.2
	8000		35.1	591.7	0.0	0.0	1.8	1.7	1.5	1.4	1.2	1.0	0.8	0.7	0.5	0.3	0.2
	10000		33.8	561.9	13.2	11.4	1.9	1.8	1.6	1.4	1.2	1.1	0.9	0.7	0.5	0.4	0.2
	12000	↓	32.3	529.1	19.5	16.2	2.0	1.9	1.7	1.5	1.3	1.1	0.9	0.8	0.6	0.4	0.2
	14000	6600	30.7	495.7	25.1	20.2	2.2	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6	0.4	0.2
7500	SL	6600	35.9	631.7	0.0	0.0	1.7	1.6	1.4	1.3	1.1	0.9	0.8	0.6	0.5	0.3	0.2
	2000	↑	36.4	631.8	0.0	0.0	1.7	1.6	1.4	1.3	1.1	0.9	0.8	0.6	0.5	0.3	0.2
	4000		37.0	634.1	0.0	0.0	1.7	1.6	1.4	1.3	1.1	0.9	0.8	0.6	0.5	0.3	0.2
	6000		37.0	629.4	7.7	7.1	1.7	1.6	1.4	1.3	1.1	1.0	0.8	0.6	0.5	0.3	0.2
	8000		35.4	596.6	15.5	13.7	1.8	1.7	1.5	1.3	1.2	1.0	0.8	0.7	0.5	0.3	0.2
	10000	↓	33.9	562.1	21.0	18.0	1.9	1.8	1.6	1.4	1.2	1.1	0.9	0.7	0.5	0.4	0.2
	12000	6600	32.3	529.2	26.2	21.9	2.0	1.9	1.7	1.5	1.3	1.1	0.9	0.8	0.6	0.4	0.2

REMARKS:

1. Engine Specification fuel flow increased 5% per MIL-M-7700A
2. Endurance data not shown where power required exceeds normal rated power available.

Chart 14-13. Hovering endurance (Sheet 9 of 14)

B9/11 **B9/11**

HOVERING ENDURANCE

STANDARD DAY

6600 RPM

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					ENDURANCE — Hours										
		ENGINE SPEED	APPROX.		SPEED/KNTS		1073 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL	300 LBS FUEL	200 LBS FUEL	100 LBS FUEL
			TORQUE PRESS	FUEL FLOW													
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
8000	SL	6600	38.8	674.3	0.0	0.0	1.6	1.5	1.3	1.2	1.0	0.9	0.7	0.6	0.4	0.3	0.1
	2000	↑	38.9	670.4	6.1	5.9	1.6	1.5	1.3	1.2	1.0	0.9	0.7	0.6	0.4	0.3	0.1
	4000		38.5	659.8	10.9	10.3	1.6	1.5	1.4	1.2	1.1	0.9	0.8	0.6	0.5	0.3	0.2
	6000		37.0	629.3	17.1	15.6	1.7	1.6	1.4	1.3	1.1	1.0	0.8	0.6	0.5	0.3	0.2
	8000	↓	35.4	596.1	22.2	19.7	1.8	1.7	1.5	1.3	1.2	1.0	0.8	0.7	0.5	0.3	0.2
	10000	6600	33.8	562.0	27.2	23.4	1.9	1.8	1.6	1.4	1.2	1.1	0.9	0.7	0.5	0.4	0.2
8500	SL	6600	38.9	675.1	13.0	13.0	1.6	1.5	1.3	1.2	1.0	0.9	0.7	0.6	0.4	0.3	0.1
	2000	↑	38.9	670.2	15.3	14.8	1.6	1.5	1.3	1.2	1.0	0.9	0.7	0.6	0.4	0.3	0.1
	4000		38.5	659.5	18.3	17.3	1.6	1.5	1.4	1.2	1.1	0.9	0.8	0.6	0.5	0.3	0.2
	6000	↓	37.0	629.1	23.1	21.1	1.7	1.6	1.4	1.3	1.1	1.0	0.8	0.6	0.5	0.3	0.2
	8000	6600	35.4	596.2	28.0	24.8	1.8	1.7	1.5	1.3	1.2	1.0	0.8	0.7	0.5	0.3	0.2

REMARKS:

1. Engine Specification fuel flow increased 5% per MIL-M-7700A
2. Endurance data not shown where power required exceeds normal rated power available.

Chart 14-13. Hovering endurance (Sheet 10 of 14)

HOVERING ENDURANCE

540

STANDARD DAY

6600 RPM

ARMY MODEL(S): UH-1B (540)
DATA AS OF: FEBRUARY 1964
DATA BASIS: MILITARY POTENTIAL TEST OF MODEL 540
"DOOR HINGE" ROTOR SYSTEM
"PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					ENDURANCE — Hours										
		ENGINE SPEED	TORQUE PRESS	APPROXIMATE			1573 LBS FUEL	1400 LBS FUEL	1300 LBS FUEL	1200 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL
				FUEL FLOW	SPEED/KNTS												
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
5000	0	6600	26.0	512.9	0	0	3.1	2.7	2.5	2.3	1.9	1.8	1.6	1.4	1.2	1.0	0.8
	2000	↑	25.3	490.8	0	0	3.2	2.9	2.6	2.4	2.0	1.8	1.6	1.4	1.2	1.0	0.8
	4000		24.8	471.4	0	0	3.3	3.0	2.8	2.5	2.1	1.9	1.7	1.5	1.3	1.1	0.8
	6000		24.5	453.3	0	0	3.5	3.1	2.9	2.6	2.2	2.0	1.8	1.5	1.3	1.1	0.9
	8000		24.3	437.9	0	0	3.6	3.2	3.0	2.7	2.3	2.1	1.8	1.6	1.4	1.1	0.9
	10000		24.2	425.7	0	0	3.7	3.3	3.1	2.8	2.3	2.1	1.9	1.6	1.4	1.2	0.9
	12000		24.3	416.4	0	0	3.8	3.4	3.1	2.9	2.4	2.2	1.9	1.7	1.4	1.2	1.0
	14000		24.8	408.9	0	0	3.8	3.4	3.2	2.9	2.4	2.2	2.0	1.7	1.5	1.2	1.0
	16000		24.9	407.1	0	0	3.9	3.4	3.2	2.9	2.5	2.2	2.0	1.7	1.5	1.2	1.0
	18000	↓	25.4	411.6	0	0	3.8	3.4	3.2	2.9	2.4	2.2	1.9	1.7	1.5	1.2	1.0
	20000	6600	25.6	413.3	5	4	3.8	3.4	3.1	2.9	2.4	2.2	1.9	1.7	1.5	1.2	1.0
5500	0	6600	27.5	529.9	0	0	3.0	2.6	2.5	2.3	1.9	1.7	1.6	1.3	1.1	0.9	0.8
	2000	↑	27.1	510.6	0	0	3.1	2.7	2.5	2.4	2.0	1.8	1.6	1.4	1.2	1.0	0.8
	4000		26.8	494.2	0	0	3.2	2.8	2.6	2.4	2.0	1.8	1.6	1.4	1.2	1.0	0.8
	6000		26.7	479.4	0	0	3.3	2.9	2.7	2.5	2.1	1.9	1.7	1.5	1.3	1.0	0.8
	8000		26.7	468.0	0	0	3.4	3.0	2.8	2.6	2.1	1.9	1.7	1.5	1.3	1.1	0.9
	10000		26.9	458.5	0	0	3.4	3.1	2.8	2.6	2.2	2.0	1.7	1.5	1.3	1.1	0.9
	12000		27.2	453.2	0	0	3.5	3.1	2.9	2.6	2.2	2.0	1.8	1.5	1.3	1.1	0.9
	14000		27.6	449.9	0	0	3.5	3.1	2.9	2.7	2.2	2.0	1.8	1.6	1.3	1.1	0.9
	16000		28.2	452.1	0	0	3.5	3.1	2.9	2.7	2.2	2.0	1.8	1.5	1.3	1.1	0.9
	18000	↓	27.3	439.3	10	7	3.6	3.2	3.0	2.7	2.3	2.0	1.8	1.6	1.4	1.1	0.9
	20000	6600	25.6	413.3	17	13	3.8	3.4	3.1	2.9	2.4	2.2	1.9	1.7	1.5	1.2	1.0

REMARKS:
1. Engine specification fuel flow increased 5% per MIL-M-7700A.
2. Cargo mirror installation will reduce endurance 3%.
3. Endurance data not shown where power required exceeds normal rated power available.

Chart 14-13. Hovering endurance (Sheet 11 of 14)

HOVERING ENDURANCE

540

STANDARD DAY

6600 RPM

ARMY MODEL(S): UH-1B (540)
DATA AS OF: FEBRUARY 1964
DATA BASIS: MILITARY POTENTIAL TEST OF MODEL 540
"DOOR HINGE" ROTOR SYSTEM
"PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					ENDURANCE — Hours										
		ENGINE SPEED	TORQUE PRESS	APPROXIMATE FUEL FLOW	APPROXIMATE SPEED/KNTS		1573 LBS FUEL	1400 LBS FUEL	1300 LBS FUEL	1200 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
6000	0	6600	29.4	550.7	0	0	2.9	2.5	2.4	2.2	1.8	1.6	1.5	1.3	1.1	0.9	0.7
	2000	↑	29.2	535.1	0	0	2.9	2.6	2.4	2.2	1.9	1.7	1.5	1.3	1.1	0.9	0.7
	4000		29.1	522.1	0	0	3.0	2.7	2.5	2.3	1.9	1.7	1.5	1.3	1.1	1.0	0.8
	6000		29.2	511.2	0	0	3.1	2.7	2.5	2.3	2.0	1.8	1.6	1.4	1.2	1.0	0.8
	8000		29.4	504.0	0	0	3.1	2.8	2.6	2.4	2.0	1.8	1.6	1.4	1.2	1.0	0.8
	10000		29.8	498.6	0	0	3.2	2.8	2.6	2.4	2.0	1.8	1.6	1.4	1.2	1.0	0.8
	12000		30.3	498.1	0	0	3.2	2.8	2.6	2.4	2.0	1.8	1.6	1.4	1.2	1.0	0.8
	14000		30.6	493.7	5	4	3.2	2.8	2.6	2.4	2.0	1.8	1.6	1.4	1.2	1.0	0.8
	16000		28.9	462.6	13	10	3.4	3.0	2.8	2.6	2.2	1.9	1.7	1.5	1.3	1.1	0.9
	18000	↓	27.3	439.3	20	15	3.6	3.2	3.0	2.7	2.3	2.0	1.8	1.6	1.4	1.1	0.9
	20000	6600	25.6	413.3	25	18	3.8	3.4	3.1	2.9	2.4	2.2	1.9	1.7	1.5	1.2	1.0
6500	0	6600	31.5	575.9	0	0	2.7	2.4	2.3	2.1	1.7	1.6	1.4	1.2	1.0	0.9	0.7
	2000	↑	31.5	564.9	0	0	2.8	2.5	2.3	2.1	1.8	1.6	1.4	1.2	1.1	0.9	0.7
	4000		31.7	556.2	0	0	2.8	2.5	2.3	2.2	1.8	1.6	1.4	1.3	1.1	0.9	0.7
	6000		32.0	550.0	0	0	2.9	2.5	2.4	2.2	1.8	1.6	1.5	1.3	1.1	0.9	0.7
	8000		32.4	547.6	0	0	2.9	2.6	2.4	2.2	1.8	1.6	1.5	1.3	1.1	0.9	0.7
	10000		33.0	547.9	0	0	2.9	2.6	2.4	2.2	1.8	1.6	1.5	1.3	1.1	0.9	0.7
	12000		32.2	528.0	9	8	3.0	2.7	2.5	2.3	1.9	1.7	1.5	1.3	1.1	0.9	0.8
	14000		30.6	493.7	15	12	3.2	2.8	2.6	2.4	2.0	1.8	1.6	1.4	1.2	1.0	0.8
	16000	↓	28.9	462.6	21	17	3.4	3.0	2.8	2.6	2.2	1.9	1.7	1.5	1.3	1.1	0.9
	18000	6600	27.3	439.3	26	20	3.6	3.2	3.0	2.7	2.3	2.0	1.8	1.6	1.4	1.1	0.9

REMARKS:
1. Engine specification fuel flow increased 5% per MIL-M-7700A.
2. Cargo mirror installation will reduce endurance 3%.
3. Endurance data not shown where power required exceeds normal rated power available.

Chart 14-13. Hovering endurance (Sheet 12 of 14)

HOVERING ENDURANCE

540

STANDARD DAY

6600 RPM

ARMY MODEL(S): UH-1B (540)
DATA AS OF: FEBRUARY 1964
DATA BASIS: MILITARY POTENTIAL TEST OF MODEL 540
"DOOR HINGE" ROTOR SYSTEM
"PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					ENDURANCE — Hours										
		ENGINE SPEED	TORQUE PRESS	APPROXIMATE			1573 LBS FUEL	1400 LBS FUEL	1300 LBS FUEL	1200 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL
				FUEL FLOW	SPEED/KNTS												
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
7000	0	6600	34.0	606.0	0	0	2.6	2.3	2.1	2.0	1.7	1.5	1.3	1.2	1.0	0.8	0.7
	2000	↑	34.2	600.6	0	0	2.6	2.3	2.2	2.0	1.7	1.5	1.3	1.2	1.0	0.8	0.7
	4000		34.5	597.4	0	0	2.6	2.3	2.2	2.0	1.7	1.5	1.3	1.2	1.0	0.8	0.7
	6000		35.1	597.5	0	0	2.6	2.3	2.2	2.0	1.7	1.5	1.3	1.2	1.0	0.8	0.7
	8000		35.7	600.4	2	2	2.6	2.3	2.2	2.0	1.7	1.5	1.3	1.2	1.0	0.8	0.7
	10000		33.9	562.6	11	10	2.8	2.5	2.3	2.1	1.8	1.6	1.4	1.2	1.1	0.9	0.7
	12000		32.2	528.0	17	14	3.0	2.7	2.5	2.3	1.9	1.7	1.5	1.3	1.1	0.9	0.8
	14000	↓	30.6	493.7	23	18	3.2	2.8	2.6	2.4	2.0	1.8	1.6	1.4	1.2	1.0	0.8
	16000	6600	28.9	462.6	28	21	3.4	3.0	2.8	2.6	2.2	1.9	1.7	1.5	1.3	1.1	0.9
7500	0	6600	36.7	642.3	0	0	2.4	2.2	2.0	1.9	1.6	1.4	1.2	1.1	0.9	0.8	0.6
	2000	↑	37.1	642.6	0	0	2.4	2.2	2.0	1.9	1.6	1.4	1.2	1.1	0.9	0.8	0.6
	4000		37.6	646.1	0	0	2.4	2.2	2.0	1.9	1.5	1.4	1.2	1.1	0.9	0.8	0.6
	6000		37.4	637.0	7	6	2.5	2.2	2.0	1.9	1.6	1.4	1.3	1.1	0.9	0.8	0.6
	8000		35.7	600.4	13	12	2.6	2.3	2.2	2.0	1.7	1.5	1.3	1.2	1.0	0.8	0.7
	10000		33.9	562.6	19	16	2.8	2.5	2.3	2.1	1.8	1.6	1.4	1.2	1.1	0.9	0.7
	12000	↓	32.2	528.0	24	20	3.0	2.7	2.5	2.3	1.9	1.7	1.5	1.3	1.1	0.9	0.8
	14000	6600	30.6	493.7	28	23	3.2	2.8	2.6	2.4	2.0	1.8	1.6	1.4	1.2	1.0	0.8
8000	0	6600	38.9	675.1	7	7	2.3	2.1	1.9	1.8	1.5	1.3	1.2	1.0	0.9	0.7	0.6
	2000	↑	38.9	670.3	8	8	2.3	2.1	1.9	1.8	1.5	1.3	1.2	1.0	0.9	0.7	0.6
	4000		38.9	666.2	10	9	2.4	2.1	2.0	1.8	1.5	1.4	1.2	1.1	0.9	0.8	0.6
	6000		37.4	637.0	14	13	2.5	2.2	2.0	1.9	1.6	1.4	1.3	1.1	0.9	0.8	0.6
	8000		35.7	600.4	20	17	2.6	2.3	2.2	2.0	1.7	1.5	1.3	1.2	1.0	0.8	0.7
	10000	↓	33.9	562.6	24	21	2.8	2.5	2.3	2.1	1.8	1.6	1.4	1.2	1.1	0.9	0.7
	12000	6600	32.2	528.0	29	24	3.0	2.7	2.5	2.3	1.9	1.7	1.5	1.3	1.1	0.9	0.8

REMARKS:
1. Engine specification fuel flow increased 5% per MIL-M-7700A.
2. Cargo mirror installation will reduce endurance 3%.
3. Endurance data not shown where power required exceeds normal rated power available.

Chart 14-13. Hovering endurance (Sheet 13 of 14)

HOVERING ENDURANCE

540

STANDARD DAY

6600 RPM

ARMY MODEL(S): UH-1B (540)
DATA AS OF: FEBRUARY 1964
DATA BASIS: MILITARY POTENTIAL TEST OF MODEL 540
"DOOR HINGE" ROTOR SYSTEM
"PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT	PRESS. ALT.	POWER SETTINGS					ENDURANCE — Hours										
		ENGINE SPEED	TORQUE PRESS	APPROXIMATE			1573 LBS FUEL	1400 LBS FUEL	1300 LBS FUEL	1200 LBS FUEL	1000 LBS FUEL	900 LBS FUEL	800 LBS FUEL	700 LBS FUEL	600 LBS FUEL	500 LBS FUEL	400 LBS FUEL
				FUEL FLOW	SPEED/KNTS.												
POUNDS	FEET	RPM	PSIG	LB/HR	TAS	CAS											
8500	0	6600	38.9	675.1	14	14	2.3	2.1	1.9	1.8	1.5	1.3	1.2	1.0	0.9	0.7	0.6
	2000	↑	38.9	670.3	15	14	2.3	2.1	1.9	1.8	1.5	1.3	1.2	1.0	0.9	0.7	0.6
	4000		38.9	666.2	16	15	2.4	2.1	2.0	1.8	1.5	1.4	1.2	1.1	0.9	0.8	0.6
	6000		37.4	637.0	20	19	2.5	2.2	2.0	1.9	1.6	1.4	1.3	1.1	0.9	0.8	0.6
	8000	↓	35.7	600.4	25	22	2.6	2.3	2.2	2.0	1.7	1.5	1.3	1.2	1.0	0.8	0.7
	10000	6600	33.9	562.6	29	25	2.8	2.5	2.3	2.1	1.8	1.6	1.4	1.2	1.1	0.9	0.7
9000	0	6600	38.9	675.1	19	19	2.3	2.1	1.9	1.8	1.5	1.3	1.2	1.0	0.9	0.7	0.6
	2000	↑	38.9	670.3	20	19	2.3	2.1	1.9	1.8	1.5	1.3	1.2	1.0	0.9	0.7	0.6
	4000		38.9	666.2	21	20	2.4	2.1	2.0	1.8	1.5	1.4	1.2	1.1	0.9	0.8	0.6
	6000	↓	37.4	637.0	25	23	2.5	2.2	2.0	1.9	1.6	1.4	1.3	1.1	0.9	0.8	0.6
	8000	6600	35.7	600.4	30	26	2.6	2.3	2.2	2.0	1.7	1.5	1.3	1.2	1.0	0.8	0.7
9500	0	6600	38.9	675.1	23	23	2.3	2.1	1.9	1.8	1.5	1.3	1.2	1.0	0.9	0.7	0.6
	2000	↑	38.9	670.3	24	24	2.3	2.1	1.9	1.8	1.5	1.3	1.2	1.0	0.9	0.7	0.6
	4000	↓	38.9	666.2	26	25	2.4	2.1	2.0	1.8	1.5	1.4	1.2	1.1	0.9	0.8	0.6
	6000	6600	37.4	637.0	30	27	2.5	2.2	2.0	1.9	1.6	1.4	1.3	1.1	0.9	0.8	0.6

REMARKS:

1. Engine specification fuel flow increased 5% per MIL-M-7700A.
2. Cargo mirror installation will reduce endurance 3%.
3. Endurance data not shown where power required exceeds normal rated power available.

Chart 14-13. Hovering endurance (Sheet 14 of 14)

LANDING DISTANCE - FEET

A

POWER ON

MODEL(S): UH-1A
DATA AS OF: February 1961
DATA BASIS: AFFTC Phase IV
Flight Test of YH-40

FIRM DRY SOD
No Wind - Engine RPM 6400

ENGINE: Lycoming T53-L-1A
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL
CONFIGURATION: CLEAN

GROSS WEIGHT LB	PRESSURE ALTITUDE	BEST IAS APPROACH		−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		M.P.H.	KN	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′
4300	SL		50	0	0	0	0	0	0	0	0	0	0
	2,000		49	0	0	0	0	0	0	0	0	0	283
	4,000		48	0	0	0	0	0	0	0	0	0	298
	6,000		48	0	0	0	0	0	0	0	0	0	313
	8,000		48	0	0	0	0	0	0	0	0	20	346
	10,000		47	0	0	0	0	0	0	0	328	20	350
	12,000		47	0	0	0	0	0	0	0	328	20	332
	14,000		46	0	0	0	0	0	327	20	324	20	274
	16,000		42	0	0	0	0	0	296	20	254	20	183
4800	SL		51	0	0	0	0	0	0	0	0	0	291
	2,000		51	0	0	0	0	0	0	0	0	0	306
	4,000		50	0	0	0	0	0	0	0	0	20	340
	6,000		50	0	0	0	0	0	0	0	322	20	350
	8,000		50	0	0	0	0	0	0	0	330	20	346
	10,000		50	0	0	0	0	0	0	0	323	20	315
	12,000		48	0	0	0	0	0	320	20	303	20	240
	14,000		45	0	0	0	0	0	274	20	220	20	153
	16,000		41	0	0	0	266	20	183	20	135		
5300	SL		53	0	0	0	0	0	0	0	0	0	311
	2,000		53	0	0	0	0	0	0	0	0	20	344
	4,000		53	0	0	0	0	0	0	0	325	20	350
	6,000		52	0	0	0	0	0	0	0	330	20	340
	8,000		50	0	0	0	0	0	330	20	336	20	298
	10,000		46	0	0	0	0	0	312	20	286	20	216
	12,000		46	0	0	0	309	0	244	20	200		
	14,000		44	0	0	0	247	20	186				
	16,000		42	0	243	20	175						

REMARKS: (1) IAS are average values for air temperatures shown & represent velocity over 50 ft. obstacle.
(2) Ground run limited to 20 ft. by skid gear.
(3) Ground roll distances are given as zero when this helicopter can hover either in or out or ground effect at 6400 engine RPM.

Chart 14-14. Landing distance – power on (Sheet 1 of 16)

LANDING DISTANCE - FEET

A

POWER ON

MODEL(S): UH-1A
DATA AS OF: February 1961
DATA BASIS: AFFTC Phase IV
Flight Test of YH-40

FIRM DRY SOD
No Wind - Engine RPM 6400

ENGINE: Lycoming T53-L-1A
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL
CONFIGURATION: CLEAN

GROSS WEIGHT LB	PRESSURE ALTITUDE	BEST IAS APPROACH		−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		M.P.H.	KN	GROUND ROLL	CLEAR 50'	GROUND ROLL	CLEAR 50'	GROUND ROLL	CLEAR 50'	GROUND ROLL	CLEAR 50'	GROUND ROLL	CLEAR 50'
5800	SL		55	0	0	0	0	0	0	0	0	20	346
	2,000		55	0	0	0	0	0	0	0	328	20	350
	4,000		54	0	0	0	0	0	0	0	329	20	335
	6,000		52	0	0	0	0	0	328	20	330	20	286
	8,000		49	0	0	0	0	0	306	20	272	20	201
	10,000		48	0	0	0	302	20	263	20	184		
	12,000		45	0	0	0	235	20	173				
	14,000		42	0	233	20	166						
	16,000		39	0	142								
6100	SL		56	0	0	0	0	0	0	0	324	20	350
	2,000		56	0	0	0	0	0	0	0	330	20	343
	4,000		55	0	0	0	0	0	330	20	340	20	306
	6,000		50	0	0	0	0	0	317	20	296	20	230
	8,000		48	0	0	0	0	0	269	20	215	20	147
	10,000		46	0	0	0	264	20	204	20	134		
	12,000		43	0	264	20	197	20	162				
	14,000		43	0	175								
	16,000												
6600	SL		58	0	0	0	0	0	0	0	330	20	341
	2,000		56	0	0	0	0	0	330	20	338	20	302
	4,000		54	0	0	0	0	0	316	20	293	20	225
	6,000		50	0	0	0	0	0	266	20	212	20	143
	8,000		48	0	0	0	262	20	202	20	145		
	10,000		48	0	262	20	197						
	12,000		45	0	177								
	14,000												
	16,000												

REMARKS: (1) IAS are average values for air temperatures shown & represent velocity over 50 ft. obstacle.
(2) Ground run limited to 20 ft. by skid gear.
(3) Ground roll distances are given as zero when this helicopter can hover either in or out of ground effect at 6400 RPM.

Chart 14-14. Landing distance – power on (Sheet 2 of 16)

LANDING DISTANCE - FEET
POWER ON

A

MODEL(S): UH-1A
DATA AS OF: February 1961
DATA BASIS: AFFTC Phase IV
Flight Test of YH-40

FIRM DRY SOD
No Wind - Engine RPM 6400

ENGINE: Lycoming T53-L-1A
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL
CONFIGURATION: CLEAN

GROSS WEIGHT LB	PRESSURE ALTITUDE	BEST IAS APPROACH		−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		M.P.H.	KN	GROUND ROLL	CLEAR 50'	GROUND ROLL	CLEAR 50'	GROUND ROLL	CLEAR 50'	GROUND ROLL	CLEAR 50'	GROUND ROLL	CLEAR 50'
7200	SL		57	0	0	0	0	0	328	20	332	20	290
	2,000		55	0	0	0	328	0	310	20	280	20	210
	4,000		52	0	328	0	308	20	274	20	198	20	133
	6,000		51	0	310	0	251	20	190				
	8,000		49	0	253	20	186						
	10,000		46	0	166								
	12,000												
	14,000												
	16,000												

REMARKS: (1) IAS are average values for air temperatures shown & represent velocity over 50 ft. obstacle.
(2) Ground run limited to 20 ft. by skid gear.
(3) Ground roll distances are given as zero when this helicopter can hover either in or out of ground effect at 6400 engine RPM.

Chart 14-14. Landing distance – power on (Sheet 3 of 16)

B-5

LANDING DISTANCE - FEET

POWER ON

ENGINE SPEED - 6600 RPM

ARMY MODEL(S): UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR-62-21 "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

GROSS WEIGHT LB	PRESSURE ALTITUDE	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'
5000	SL	0	0	0	0	0	0	0	0	0	0
	2,000	0	0	0	0	0	0	0	0	10	12
	4,000	0	0	0	0	0	0	0	0	16	27
	6,000	0	0	0	0	0	0	0	0	21	76*
	8,000	0	0	0	0	0	0	0	0	26	100*
	10,000	0	0	0	0	0	0	15	21	32	132*
	12,000	0	0	0	0	0	0	21	93*	-	-
	14,000	0	0	0	0	11	12	26	118*	-	-
	16,000	0	0	0	0	20	40	-	-	-	-
	18,000	0	0	15	24	26	100*	-	-	-	-
	20,000	11	13	23	85*	-	-	-	-	-	-
5500	SL	0	0	0	0	0	0	0	0	12	16
	2,000	0	0	0	0	0	0	0	0	18	34
	4,000	0	0	0	0	0	0	0	0	23	86*
	6,000	0	0	0	0	0	0	7	6	28	113*
	8,000	0	0	0	0	0	0	16	30	-	-
	10,000	0	0	0	0	0	0	22	84*	-	-
	12,000	0	0	0	0	14	22	28	114*	-	-
	14,000	0	0	0	0	22	51	-	-	-	-
	16,000	0	0	17	31*	28	114*	-	-	-	-
	18,000	13	18	24	95*	-	-	-	-	-	-
	20,000	23	56	-	-	-	-	-	-	-	-

REMARKS:
1. No wind.
2. Distances to clear 50 ft. are given as zero when the helicopter can hover out-of-ground effect. When the helicopter cannot hover out-of-ground effect minimum possible distances and speeds to clear a 50 ft. obstacle are given. These are minimum values and require good pilot technique for a normal landing, the distance and speeds given for power off landings will provide safer operation within the height - Velocity diagram for the helicopter.

*3. Landing distance includes a 30 foot estimated skid distance where it is not possible to hover at a two foot skid height.

4. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.
5. Landing distance not shown above 20,000 feet or cruise ceiling.

Chart 14-14. Landing distance – power on (Sheet 4 of 16)

B-5

LANDING DISTANCE - FEET
POWER ON

ARMY MODEL(S): UH-1B
ENGINE SPEED - 6600 RPM
ENGINE: Lycoming T53-L-5
DATA AS OF: September 1962
FUEL GRADE: JP-4
DATA BASIS: Flight Test (FTC-TDR-62-21 "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16B
FUEL DENSITY: 6.5 Lb/Gal.

GROSS WEIGHT LB	PRESSURE ALTITUDE	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'
6000	SL	0	0	0	0	0	0	0	0	18	41
	2,000	0	0	0	0	0	0	0	0	23	93*
	4,000	0	0	0	0	0	0	7	6	28	124*
	6,000	0	0	0	0	0	0	17	36	-	-
	8,000	0	0	0	0	0	0	23	93*	-	-
	10,000	0	0	0	0	15	27	28	126*	-	-
	12,000	0	0	2	1	22	89*	-	-	-	-
	14,000	0	0	18	38	28	125*	-	-	-	-
	16,000	14	24	25	103*	-	-	-	-	-	-
	18,000	23	61	-	-	-	-	-	-	-	-
	20,000	30	141*	-	-	-	-	-	-	-	-
6500	SL	0	0	0	0	0	0	0	0	23	101*
	2,000	0	0	0	0	0	0	7	6	28	133*
	4,000	0	0	0	0	0	0	17	38	-	-
	6,000	0	0	0	0	0	0	23	100*	-	-
	8,000	0	0	0	0	16	33	29	136*	-	-
	10,000	0	0	7	6	22	94*	-	-	-	-
	12,000	0	0	18	42	28	135*	-	-	-	-
	14,000	14	25	25	110*	-	-	-	-	-	-
	16,000	22	65	-	-	-	-	-	-	-	-
	18,000	30	148*	-	-	-	-	-	-	-	-
	20,000	-	-	-	-	-	-	-	-	-	-

REMARKS:
1. No wind.
2. Distances to clear 50 ft. are given as zero when the helicopter can hover out-of-ground effect. When the helicopter cannot hover out-of-ground effect minimum possible distances and speeds to clear a 50 ft. obstacle are given. These are minimum values and require good pilot technique for a normal landing, the distance and speeds given for power off landings will provide safer operation within the height - Velocity diagram for the helicopter.

*3. Landing distance includes a 30 foot estimated skid distance where it is not possible to hover at a 2 foot skid height.

4. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.
5. Landing distance not shown above 20,000 feet or cruise ceiling.

Chart 14-14. Landing distance – power on (Sheet 5 of 16)

B-5

LANDING DISTANCE - FEET

POWER ON

ARMY MODEL(S): UH-1B

ENGINE SPEED - 6600 RPM

ENGINE: Lycoming T53-L-5

DATA AS OF: September 1962

FUEL GRADE: JP-4

DATA BASIS: Flight Test (FTC-TDR-62-21 "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16B

FUEL DENSITY: 6.5 Lb/Gal.

GROSS WEIGHT LB	PRESSURE ALTITUDE	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'
7000	SL	0	0	0	0	0	0	9	11	28	141*
	2,000	0	0	0	0	0	0	17	40	34	191*
	4,000	0	0	0	0	0	0	23	103*	-	-
	6,000	0	0	0	0	15	33	29	144*	-	-
	8,000	0	0	5	4	22	98*	-	-	-	-
	10,000	0	0	18	46	28	141*	-	-	-	-
	12,000	13	24	25	114*	-	-	-	-	-	-
	14,000	22	67	-	-	-	-	-	-	-	-
	16,000	29	151*	-	-	-	-	-	-	-	-
	18,000	-	-	-	-	-	-	-	-	-	-
	20,000	-	-	-	-	-	-	-	-	-	-
7500	SL	0	0	0	0	0	0	16	39	34	200*
	2,000	0	0	0	0	0	0	22	103	-	-
	4,000	0	0	0	0	14	31	28	146*	-	-
	6,000	0	0	0	0	22	70	-	-	-	-
	8,000	0	0	17	43	28	144*	-	-	-	-
	10,000	12	22	24	118*	-	-	-	-	-	-
	12,000	21	66	31	171*	-	-	-	-	-	-
	14,000	28	148*	-	-	-	-	-	-	-	-
	16,000	-	-	-	-	-	-	-	-	-	-
	18,000	-	-	-	-	-	-	-	-	-	-
	20,000	-	-	-	-	-	-	-	-	-	-

REMARKS:
1. No wind.
2. Distances to clear 50 ft. are given as zero when the helicopter can hover out-of-ground effect. When the helicopter cannot hover out-of-ground effect minimum possible distances and speeds to clear a 50 ft. obstacle are given. These are minimum values and require good pilot technique for a normal landing, the distance and speeds given for power off landings will provide safer operation within the height - Velocity diagram for the helicopter.

*3. Landing distance includes a 30 foot estimated skid distance where it is not possible to hover at a 2 foot skid height.

4. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.
5. Landing distance not shown above 20,000 feet or cruise ceiling.

Chart 14-14. Landing distance – power on (Sheet 6 of 16)

B-5

LANDING DISTANCE - FEET
POWER OFF

ARMY MODEL(S): UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR-62-21 "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

GROSS WEIGHT LB	PRESSURE ALTITUDE	BEST IAS APPROACH KNOTS	−25°C (−13°F) GROUND ROLL	−25°C (−13°F) CLEAR 50′	−5°C (+23°F) GROUND ROLL	−5°C (+23°F) CLEAR 50′	+15°C (+59°F) GROUND ROLL	+15°C (+59°F) CLEAR 50′	+35°C (+95°F) GROUND ROLL	+35°C (+95°F) CLEAR 50′	+55°C (+131°F) GROUND ROLL	+55°C (+131°F) CLEAR 50′
8000	SL	49	30	557	30	578	30	599	30	615	-	-
	2,000	48	↑	576	↑	599	↑	615	30	631	-	-
	4,000	47		596		618	↓	633	-	-	-	-
	6,000	46		615		633	30	641	-	-	-	-
	8,000	44		633	↓	641	-	-	-	-	-	-
	10,000	42	↓	641	30	631	-	-	-	-	-	-
	12,000	39	30	631	-	-	-	-	-	-	-	-
	14,000	-	-	-	-	-	-	-	-	-	-	-
	16,000	-	-	-	-	-	-	-	-	-	-	-
	18,000	-	-	-	-	-	-	-	-	-	-	-
	20,000	-	-	-	-	-	-	-	-	-	-	-
8500	SL	50	30	607	30	629	30	653	30	666	-	-
	2,000	49	↑	626	↑	657	↕	669	-	-	-	-
	4,000	48		650		669	30	680	-	-	-	-
	6,000	46		669	↓	678	-	-	-	-	-	-
	8,000	44	↓	680	30	672	-	-	-	-	-	-
	10,000	41	30	672	-	-	-	-	-	-	-	-
	12,000	-	-	-	-	-	-	-	-	-	-	-
	14,000	-	-	-	-	-	-	-	-	-	-	-
	16,000	-	-	-	-	-	-	-	-	-	-	-
	18,000	-	-	-	-	-	-	-	-	-	-	-
	20,000	-	-	-	-	-	-	-	-	-	-	-

REMARKS:
1. No wind.
2. IAS are representive values for velocity over a 50 ft. obstacle. Best velocity may vary plus or minus three knots.
3. Ground roll limited to 30 feet by skid gear.
4. Landing distance not shown above 20,000 feet or cruise ceiling.
5. Distances are based on limited flight test data.

Chart 14-14. Landing distance – power on (Sheet 7 of 16)

B9/11 **B9/11**

LANDING DISTANCE - FEET
POWER ON

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

6600 RPM

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT LB	PRESSURE ALTITUDE	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'
5000	SL	0	0	0	0	0	0	0	0	0	0
	2000	0	0	0	0	0	0	0	0	0	0
	4000	0	0	0	0	0	0	0	0	0	0
	6000	0	0	0	0	0	0	0	0	0	0
	8000	0	0	0	0	0	0	0	0	0	0
	10000	0	0	0	0	0	0	0	0	3	1
	12000	0	0	0	0	0	0	0	0	17	28
	14000	0	0	0	0	0	0	14	19	26	97*
	16000	0	0	0	0	7	5	22	49	-	-
	18000	0	0	0	0	20	40	29	114*	-	-
	20000	0	0	16	26	27	104*	-	-	-	-
5500	SL	0	0	0	0	0	0	0	0	0	0
	2000	0	0	0	0	0	0	0	0	0	0
	4000	0	0	0	0	0	0	0	0	0	0
	6000	0	0	0	0	0	0	0	0	0	0
	8000	0	0	0	0	0	0	0	0	9	9
	10000	0	0	0	0	0	0	0	0	18	37
	12000	0	0	0	0	0	0	16	29	25	97*
	14000	0	0	0	0	11	13	25	100*	-	-
	16000	0	0	0	0	21	48	-	-	-	-
	18000	0	0	18	36	-	-	-	-	-	-
	20000	16	30	26	106*	-	-	-	-	-	-

REMARKS:
1. No wind.
2. Distances to clear 50 feet are given as zero when the helicopter can hover O.G.E. When the helicopter cannot hover O.G.E., minimum possible distances and speeds to clear a 50 foot obstacle are given. These are minimum values and require good pilot technique. For a normal landing, the distances and speeds given for power off landings will provide safer operation, within the height-velocity diagram for the helicopter.

*3. Landing distance includes a 30 foot estimated skid distance where it is not possible to hover at a 2 foot skid height.

4. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.
5. Landing distance not shown above 20,000 feet or cruise ceiling.

Chart 14-14. Landing distance – power on (Sheet 8 of 16)

B9/11 **B9/11**

LANDING DISTANCE - FEET
POWER ON

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

6600 RPM

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT LB	PRESSURE ALTITUDE	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'
6000	SL	0	0	0	0	0	0	0	0	0	0
	2000	0	0	0	0	0	0	0	0	0	0
	4000	0	0	0	0	0	0	0	0	0	0
	6000	0	0	0	0	0	0	0	0	11	13
	8000	0	0	0	0	0	0	3	1	19	45
	10000	0	0	0	0	0	0	17	40	28	123*
	12000	0	0	0	0	12	18	24	98*	-	-
	14000	0	0	0	0	22	57	-	-	-	-
	16000	0	0	18	40	-	-	-	-	-	-
	18000	18	38	-	-	-	-	-	-	-	-
	20000	26	111*	-	-	-	-	-	-	-	-
6500	SL	0	0	0	0	0	0	0	0	0	0
	2000	0	0	0	0	0	0	0	0	0	0
	4000	0	0	0	0	0	0	0	0	12	19
	6000	0	0	0	0	0	0	7	6	20	52
	8000	0	0	0	0	0	0	18	42	26	118*
	10000	0	0	0	0	12	20	24	107*	-	-
	12000	0	0	0	0	22	63	-	-	-	-
	14000	0	0	18	43	-	-	-	-	-	-
	16000	17	38	26	120*	-	-	-	-	-	-
	18000	26	118*	-	-	-	-	-	-	-	-
	20000	-	-	-	-	-	-	-	-	-	-

REMARKS:
1. No wind.
2. Distances to clear 50 feet are given as zero when the helicopter can hover O.G.E. When the helicopter cannot hover O.G.E., minimum possible distances and speeds to clear a 50 foot obstacle are given. These are minimum values and require good pilot technique. For a normal landing, the distances and speeds given for power off landings will provide safer operation, within the height-velocity diagram for the helicopter.

*3. Landing distance includes a 30 foot estimated skid distance where it is not possible to hover at a 2 foot skid height.

4. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.
5. Landing distance not shown above 20,000 feet or cruise ceiling.

Chart 14-14. Landing distance – power on (Sheet 9 of 16)

B9/11 **B9/11**

LANDING DISTANCE - FEET
POWER ON

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

6600 RPM

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT LB	PRESSURE ALTITUDE	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'
7000	SL	0	0	0	0	0	0	0	0	0	0
	2000	0	0	0	0	0	0	0	0	12	20
	4000	0	0	0	0	0	0	7	7	20	56
	6000	0	0	0	0	0	0	18	46	26	125*
	8000	0	0	0	0	12	21	24	113*	-	-
	10000	0	0	0	0	22	65	-	-	-	-
	12000	0	0	18	43	-	-	-	-	-	-
	14000	16	36	26	122*	-	-	-	-	-	-
	16000	28	89	-	-	-	-	-	-	-	-
	18000	-	-	-	-	-	-	-	-	-	-
	20000	-	-	-	-	-	-	-	-	-	-
7500	SL	0	0	0	0	0	0	0	0	12	21
	2000	0	0	0	0	0	0	3	1	20	59
	4000	0	0	0	0	0	0	18	48	26	129*
	6000	0	0	0	0	12	22	24	116*	-	-
	8000	0	0	0	0	21	64	-	-	-	-
	10000	0	0	17	41	28	145*	-	-	-	-
	12000	14	30	25	91	-	-	-	-	-	-
	14000	24	87	-	-	-	-	-	-	-	-
	16000	-	-	-	-	-	-	-	-	-	-
	18000	-	-	-	-	-	-	-	-	-	-
	20000	-	-	-	-	-	-	-	-	-	-

REMARKS:

1. No wind.
2. Distances to clear 50 feet are given as zero when the helicopter can hover O.G.E. When the helicopter cannot hover O.G.E., minimum possible distances and speeds to clear a 50 foot obstacle are given. These are minimum values and require good pilot technique. For a normal landing, the distances and speeds given for power off landings will provide safer operation, within the height-velocity diagram for the helicopter.

*3. Landing distance includes a 30 foot estimated skid distance where it is not possible to hover at a 2 foot skid height.

4. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.
5. Landing distance not shown above 20,000 feet or cruise ceiling.

Chart 14-14. Landing distance – power on (Sheet 10 of 16)

B9/11 **B9/11**

LANDING DISTANCE - FEET
POWER ON

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

6600 RPM

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT LB	PRESSURE ALTITUDE	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'
8000	SL	0	0	0	0	0	0	2	6	19	58
	2000	0	0	0	0	0	0	16	42	25	130*
	4000	0	0	0	0	10	15	25	132*	-	-
	6000	0	0	0	0	20	63	30	170*	-	-
	8000	0	0	15	36	26	141*	-	-	-	-
	10000	12	22	24	90	-	-	-	-	-	-
	12000	22	78	-	-	-	-	-	-	-	-
	14000	-	-	-	-	-	-	-	-	-	-
	16000	-	-	-	-	-	-	-	-	-	-
	18000	-	-	-	-	-	-	-	-	-	-
	20000	-	-	-	-	-	-	-	-	-	-
8500	SL	0	0	0	0	0	0	15	40	24	130*
	2000	0	0	0	0	8	10	22	82	30	181*
	4000	0	0	0	0	19	59	28	163*	-	-
	6000	0	0	14	31	25	140*	-	-	-	-
	8000	9	14	22	82	-	-	-	-	-	-
	10000	20	69	-	-	-	-	-	-	-	-
	12000	-	-	-	-	-	-	-	-	-	-
	14000	-	-	-	-	-	-	-	-	-	-
	16000	-	-	-	-	-	-	-	-	-	-
	18000	-	-	-	-	-	-	-	-	-	-
	20000	-	-	-	-	-	-	-	-	-	-

REMARKS:
1. No wind.
2. Distances to clear 50 feet are given as zero when the helicopter can hover O.G.E. When the helicopter cannot hover O.G.E., minimum possible distances and speeds to clear a 50 foot obstacle are given. These are minimum values and require good pilot technique. For a normal landing, the distances and speeds given for power off landings will provide safer operation, within the height-velocity diagram for the helicopter.

*3. Landing distance includes a 30 foot estimated skid distance where it is not possible to hover at a 2 foot skid height.

4. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.
5. Landing distance not shown above 20,000 feet or cruise ceiling.

Chart 14-14. Landing distance – power on (Sheet 11 of 16)

LANDING DISTANCE - FEET

540

POWER ON

ARMY MODEL(S): UH-1B (540) ENGINE SPEED - 6600 RPM
DATA AS OF: FEBRUARY 1964
DATA BASIS: ANALYTICAL METHOD
"PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT LB	PRESSURE ALTITUDE	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'
5000	0	0	0	0	0	0	0	0	0	0	0
	2000	0	0	0	0	0	0	0	0	0	0
	4000	0	0	0	0	0	0	0	0	0	0
	6000	0	0	0	0	0	0	0	0	0	0
	8000	0	0	0	0	0	0	0	0	0	0
	10000	0	0	0	0	0	0	0	0	7.6	6.
	12000	0	0	0	0	0	0	0	0	15.5	24.
	14000	0	0	0	0	0	0	13.1	17.	22.0	78.
	16000	0	0	0	0	7.8	6.	20.5	72.	29.0	114.
	18000	0	0	0	0	17.1	29.	27.6	106.	35.5	156.
	20000	0	0	13.7	19.	24.7	91.	34.1	146.	42.1	207.
5500	0	0	0	0	0	0	0	0	0	0	0
	2000	0	0	0	0	0	0	0	0	0	0
	4000	0	0	0	0	0	0	0	0	0	0
	6000	0	0	0	0	0	0	0	0	0	0
	8000	0	0	0	0	0	0	0	0	10.1	11.
	10000	0	0	0	0	0	0	5.3	3.	17.1	32.
	12000	0	0	0	0	0	0	14.6	24.	23.5	91.
	14000	0	0	0	0	9.7	10.	21.8	82.	30.2	130.
	16000	0	0	0	0	18.4	67.	28.6	120.	36.5	177.
	18000	0	0	14.9	24.	25.7	103.	35.0	164.	43.1	235.
	20000	14.2	22.	23.0	88.	32.1	143.	41.4	219.		

REMARKS:
1. No wind.
2. Distances to clear 50 feet are given as zero when the helicopter can hover OGE. When helicopter cannot hover OGE, minimum possible distances and speeds to clear a 50 foot obstacle are given. These are minimum values and require good pilot technique. For a normal landing the distances and speeds given for power off landings will provide safer operation, within the height-velocity diagram for the helicopter.
3. Landing distances includes a 30 foot estimated skid distance where it is not possible to hover at a 20 foot skid height.
4. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.
5. Landing distance not shown above 20,000 feet or cruise ceiling.

Chart 14-14. Landing distance – power on (Sheet 12 of 16)

LANDING DISTANCE - FEET

POWER ON

540

ARMY MODEL(S): UH-1B (540) ENGINE SPEED - 6600 RPM ENGINE: LYCOMING T53-L-11
DATA AS OF: FEBRUARY 1964 FUEL GRADE: JP-4
DATA BASIS: ANALYTICAL METHOD FUEL DENSITY: 6.5 LB/GAL
"PRELIMINARY DATA"

GROSS WEIGHT LB	PRESSURE ALTITUDE	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'
6000	0	0	0	0	0	0	0	0	0	0	0
	2000	0	0	0	0	0	0	0	0	0	0
	4000	0	0	0	0	0	0	0	0	0	0
	6000	0	0	0	0	0	0	0	0	11.6	16.
	8000	0	0	0	0	0	0	7.3	6.	18.1	69.
	10000	0	0	0	0	0	0	15.5	29.	23.4	101.
	12000	0	0	0	0	10.7	14.	22.5	91.	30.8	144.
	14000	0	0	3.6	2.	18.9	73.	29.1	132.	36.9	193.
	16000	0	0	15.4	28.	26.1	112.	35.2	179.	43.5	257.
	18000	14.5	25.	23.3	95.	32.4	156.	41.7	239.		
	20000	22.8	92.	29.9	137	39.4	216.				
6500	0	0	0	0	0	0	0	0	0	0	0
	2000	0	0	0	0	0	0	0	0	0	0
	4000	0	0	0	0	0	0	0	0	12.3	20.
	6000	0	0	0	0	0	0	8.2	9.	18.6	75.
	8000	0	0	0	0	0	0	16.1	34.	24.7	110.
	10000	0	0	0	0	11.1	16.	22.7	97.	30.9	155.
	12000	0	0	3.9	2.	19.0	77.	29.2	141.	37.0	208.
	14000	0	0	15.4	[illegible]1.	26.0	118.	35.2	191.	43.5	276.
	16000	14.2	26.	23.2	100.	32.2	165.	41.6	255.		
	18000	22.4	95.	29.6	144.	39.0	228.				
	20000	29.1	140.								

REMARKS: 1. No wind.
2. Distances to clear 50 feet are given as zero when the helicopter can hover OGE. When helicopter cannot hover OGE, minimum possible distances and speeds to clear a 50 foot obstacle are given. These are minimum values and require good pilot technique. For a normal landing the distances and speeds given for power off landings will provide safer operation, within the height-velocity diagram for the helicopter.
3. Landing distances includes a 30 foot estimated skid distance where it is not possible to hover at a 20 foot skid height.
4. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.
5. Landing distance not shown above 20,000 feet or cruise ceiling.

Chart 14-14. Landing distance – power on (Sheet 13 of 16)

LANDING DISTANCE - FEET

540

POWER ON

ARMY MODEL(S): UH-1B (540)
ENGINE SPEED - 6600 RPM
ENGINE: LYCOMING T53-L-11
DATA AS OF: FEBRUARY 1964
FUEL GRADE: JP-4
DATA BASIS: ANALYTICAL METHOD "PRELIMINARY DATA"
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT LB	PRESSURE ALTITUDE	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'
7000	0	0	0	0	0	0	0	0	0	0	0
	2000	0	0	0	0	0	0	0	0	12.6	22.
	4000	0	0	0	0	0	0	8.5	10.	18.9	80.
	6000	0	0	0	0	0	0	16.1	36.	24.9	117.
	8000	0	0	0	0	11.1	17.	22.7	102.	30.9	164.
	10000	0	0	2.6	1.	18.9	80.	29.0	148.	36.8	219.
	12000	0	0	14.9	31.	25.6	122.	34.8	200.	43.0	289.
	14000	13.5	25.	22.5	101.	31.7	171.	41.0	266.		
	16000	21.6	95.	28.9	147.	38.2	234.				
	18000	28.3	142.	36.3	214.						
7500	0	0	0	0	0	0	0	0	0	12.2	22.
	2000	0	0	0	0	0	0	8.1	10.	18.6	82.
	4000	0.	0	0	0	0	0	15.7	37.	24.5	120.
	6000	0	0	0	0	10.6	17.	22.1	104.	30.6	170.
	8000	0	0	0	0	18.3	80.	28.5	152.	36.3	227.
	10000	0	0	13.9	29.	25.0	124.	34.3	206.	42.3	299.
	12000	12.2	22.	21.6	100.	31.0	174.	40.3	273.		
	14000	20.5	93.	28.1	148.	37.2	237.				
	16000	27.3	141.	34.6	209						
	18000	34.3	207.								

REMARKS:
1. No wind.
2. Distances to clear 50 feet are given as zero when the helicopter can hover OGE. When helicopter cannot hover OGE, minimum possible distances and speeds to clear a 50 foot obstacle are given. These are minimum values and require good pilot technique. For a normal landing the distances and speeds given for power off landings will provide safer operation, within the height-velocity diagram for the helicopter.
3. Landing distances includes a 30 foot estimated skid distance where it is not possible to hover at a 2 foot skid height.
4. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.
5. Landing distance not shown above 20,000 feet or cruise ceiling.

Chart 14-14. Landing distance – power on (Sheet 14 of 16)

LANDING DISTANCE - FEET

POWER ON

540

ARMY MODEL(S): UH-1B (540) ENGINE SPEED - 6600 RPM
DATA AS OF: FEBRUARY 1964
DATA BASIS: ANALYTICAL METHOD
"PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT LB	PRESSURE ALTITUDE	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'
8000	0	0	0	0	0	0	0	7.0	8.	17.9	51.
	2000	0	0	0	0	0	0	15.0	36.	23.8	121.
	4000	0	0	0	0	9.6	15.	21.4	103.	29.9	173.
	6000	0	0	0	0	17.4	48.	27.7	153.	35.6	233.
	8000	0	0	12.6	25.	24.2	123.	33.4	209.	41.4	305.
	10000	10.4	17.	20.5	97.	30.2	176.	39.2	276.		
	12000	19.0	88.	26.9	146.	36.0	237.				
	14000	26.0	138.	33.3	207.						
	16000	32.5	199.								
8500	0	0	0	0	0	0	0	14.0	33.	22.7	117.
	2000	0	0	0	0	7.8	10.	20.2	99.	28.9	172
	4000	0	0	0	0	16.1	44.	26.6	150.	34.7	235.
	6000	0	0	10.9	20.	23.0	120.	32.5	210.	40.4	307.
	8000	8.0	11.	19.0	92.	29.0	173.	38.1	276.	46.6	399.
	10000	17.4	51.	25.6	142.	34.8	236.				
	12000	24.5	132.	31.8	202						
	14000	30.8	191								

REMARKS: 1. No wind.

2. Distances to clear 50 feet are given as zero when the helicopter can hover OGE. When helicopter cannot hover OGE, minimum possible distances and speeds to clear a 50 foot obstacle are given. These are minimum values and require good pilot technique. For a normal landing the distances and speeds given for power off landings will provide safer operation, within the height-velocity diagram for the helicopter.
3. Landing distances includes a 30 foot estimated skid distance where it is not possible to hover at a 2 foot skid height.
4. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.
5. Landing distance not shown above 20,000 feet or cruise ceiling.

Chart 14-14. Landing distance – power on (Sheet 15 of 16)

LANDING DISTANCE - FEET

540

POWER ON

ARMY MODEL(S): UH-1B (540) ENGINE SPEED - 6600 RPM
DATA AS OF: FEBRUARY 1964
DATA BASIS: ANALYTICAL METHOD
"PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT LB	PRESSURE ALTITUDE	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'	BEST APPROACH TAS KNOTS	DISTANCE AFTER CLEARING 50'
9000	0	0	0	0	0	4.9	4.	18.9	94.	27.6	167.
	2000	0	0	0	0	14.4	37.	25.4	146.	33.5	232.
	4000	0	0	8.7	14.	21.6	114.	31.2	205.	39.1	305.
	6000	4.7	4.	17.4	54.	27.8	169.	36.7	273.	45.2	398.
	8000	15.4	43.	24.2	136.	33.3	229.	42.7	359.		
	10000	22.7	122.	30.0	192						
	12000	28.9	181.								
9500	0	0	0	5.6	6.	12.4	29.	23.8	138.	32.0	224.
	2000	5.6	6.	8.5	14.	19.8	105.	29.8	199.	37.7	300.
	4000	8.4	13.	15.4	45.	26.3	161.	35.4	267.	43.6	392.
	6000	13.1	32.	22.4	125.	31.9	223.	41.0	350.		
	8000	20.7	112.	28.4	183.	37.6	298.				
	10000	27.1	169.	34.4	255.						
	12000	33.3	241.								

REMARKS:
1. No wind.
2. Distances to clear 50 feet are given as zero when the helicopter can hover OGE. When helicopter cannot hover OGE, minimum possible distances and speeds to clear a 50 foot obstacle are given. These are minimum values and require good pilot technique. For a normal landing the distances and speeds given for power off landings will provide safer operation, within the height-velocity diagram for the helicopter.
3. Landing distances includes a 30 foot estimated skid distance where it is not possible to hover at a 20 foot skid height.
4. Speed over the 50 foot obstacle is in true airspeed (TAS) because values of indicated airspeed (IAS) below 20 knots may not be reliable.
5. Landing distance not shown above 20,000 feet or cruise ceiling.

Chart 14-14. Landing distance – power on (Sheet 16 of 16)

LANDING DISTANCE - FEET

A

POWER OFF

MODEL(S): UH-1A
DATA AS OF: February 1961
DATA BASIS: AFFTC Phase IV
Flight Test of YH-40

FIRM DRY SOD

ENGINE: Lycoming T53-L-1A
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL
CONFIGURATION: CLEAN

GROSS WEIGHT LB	PRESSURE ALTITUDE	BEST IAS APPROACH		−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		M.P.H.	KN	GROUND ROLL	CLEAR 50'	GROUND ROLL	CLEAR 50'	GROUND ROLL	CLEAR 50'	GROUND ROLL	CLEAR 50'	GROUND ROLL	CLEAR 50'
4300	SL		50	20	232	20	249	20	263	20	277	20	288
	2,000		49	20	248	20	263	20	278	20	291	20	303
	4,000		48	20	263	20	278	20	292	20	305	20	318
	6,000		48	20	278	20	293	20	307	20	321	20	333
	8,000		48	20	292	20	307	20	323	20	336	20	346
	10,000		47	20	307	20	324	20	338	20	348	20	350
	12,000		47	20	324	20	339	20	349	20	348	20	332
	14,000		46	20	339	20	350	20	347	20	324	20	274
	16,000		42	20	350	20	344	20	316	20	254	20	183
4800	SL		51	20	255	20	271	20	285	20	298	20	311
	2,000		51	20	270	20	285	20	300	20	312	20	326
	4,000		50	20	284	20	300	20	314	20	328	20	340
	6,000		50	20	300	20	314	20	329	20	342	20	350
	8,000		50	20	314	20	330	20	343	20	350	20	346
	10,000		50	20	330	20	344	20	350	20	343	20	315
	12,000		48	20	344	20	350	20	340	20	303	20	240
	14,000		45	20	350	20	337	20	294	20	220	20	153
	16,000		41	20	336	20	286	20	183	20	135		
5300	SL		53	20	275	20	290	20	304	20	318	20	331
	2,000		53	20	290	20	305	20	320	20	333	20	344
	4,000		53	20	304	20	320	20	334	20	345	20	350
	6,000		52	20	320	20	335	20	346	20	350	20	340
	8,000		50	20	335	20	347	20	350	20	336	20	298
	10,000		46	20	347	20	349	20	332	20	286	20	216
	12,000		46	20	349	20	329	20	264	20	200		
	14,000		44	20	328	20	267	20	186				
	16,000		42	20	263	20	175						

REMARKS: (1) No Wind.
(2) IAS are average values for air temperatures shown and represent velocity over 50 ft. obstacle.
(3) Ground run limited to 20 feet by skid gear.

Chart 14-15. Landing distance — power off (Sheet 1 of 16)

LANDING DISTANCE - FEET

A

POWER OFF

MODEL(S): UH-1A
DATA AS OF: February 1961
DATA BASIS: AFFTC Phase IV
Flight Test of YH-40

FIRM DRY SOD

ENGINE: Lycoming T53-L-1A
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL
CONFIGURATION: CLEAN

GROSS WEIGHT LB	PRESSURE ALTITUDE	BEST IAS APPROACH		−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		M.P.H.	KN	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′
5800	SL		55	20	293	20	308	20	323	20	336	20	346
	2,000		55	20	307	20	326	20	337	20	348	20	350
	4,000		54	20	322	20	337	20	348	20	349	20	335
	6,000		52	20	337	20	349	20	348	20	330	20	286
	8,000		49	20	349	20	348	20	326	20	272	20	201
	10,000		48	20	348	20	322	20	263	20	184		
	12,000		45	20	322	20	255	20	173				
	14,000		42	20	255	20	166						
	16,000		39	20	162								
6100	SL		56	20	303	20	319	20	333	20	344	20	350
	2,000		56	20	317	20	333	20	346	20	350	20	343
	4,000		55	20	332	20	346	20	350	20	340	20	306
	6,000		50	20	344	20	350	20	337	20	296	20	230
	8,000		48	20	350	20	335	20	289	20	215	20	147
	10,000		46	20	335	20	284	20	204	20	134		
	12,000		43	20	284	20	197	20	162				
	14,000		43	20	195								
	16,000												
6600	SL		58	20	309	20	334	20	346	20	350	20	341
	2,000		56	20	333	20	346	20	350	20	338	20	302
	4,000		54	20	346	20	350	20	336	20	293	20	225
	6,000		50	20	350	20	334	20	286	20	212	20	143
	8,000		48	20	335	20	282	20	202	20	145		
	10,000		48	20	282	20	197						
	12,000		45	20	197								

REMARKS: (1) No wind.
(2) IAS are average values for air temperatures shown and represent velocity over 50 ft obstacle.
(3) Ground run limited to 20 feet by skid gear.

Chart 14-15. Landing distance — power off (Sheet 2 of 16)

LANDING DISTANCE - FEET

A

POWER OFF

MODEL(S): UH-1A
DATA AS OF: February 1961
DATA BASIS: AFFTC Phase IV
Flight Test of YH-40

FIRM DRY SOD

ENGINE: Lycoming T53-L-1A
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL
CONFIGURATION: CLEAN

GROSS WEIGHT LB	PRESSURE ALTITUDE	BEST IAS APPROACH		−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		M.P.H.	KN	GROUND ROLL	CLEAR 50'	GROUND ROLL	CLEAR 50'	GROUND ROLL	CLEAR 50'	GROUND ROLL	CLEAR 50'	GROUND ROLL	CLEAR 50'
7200	SL		57	20	336	20	348	20	348	20	332	20	290
	2,000		55	20	348	20	348	20	330	20	280	20	210
	4,000		52	20	348	20	328	20	274	20	198	20	133
	6,000		51	20	330	20	271	20	190				
	8,000		49	20	273	20	186						
	10,000		46	20	186								
	12,000												
	14,000												
	16,000												

REMARKS: (1) No wind.
(2) IAS are average values for air temperatures shown and represent velocity over 50 ft. obstacle.
(3) Ground run limited to 20 ft. by skid gear.

Chart 14-15. Landing distance — power off (Sheet 3 of 16)

B-5

LANDING DISTANCE - FEET
POWER OFF

ARMY MODEL(S): UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR-62-21 "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

GROSS WEIGHT LB	PRESSURE ALTITUDE	BEST IAS APPROACH	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		KNOTS	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′
5000	SL	43	30	300	30	307	30	316	30	324	30	331
	2,000	42	↑	306	↑	316	↑	325	↑	333	↑	341
	4,000	41		317		325		333		344		352
	6,000	40		324		334		344		353		364
	8,000	39		334		345		356		366	↓	377
	10,000	38		345		357		369		379	30	390
	12,000	37		356		369		381	↓	393	-	-
	14,000	36		369		381		395	30	404	-	-
	16,000	35		384		396	↓	407	-	-	-	-
	18,000	34	↓	397	↓	408	30	412	-	-	-	-
	20,000	33	30	408	30	412	-	-	-	-	-	-
5500	SL	44	30	338	30	347	30	361	30	366	30	376
	2,000	43	↑	345	↑	357	↑	367	↑	378	↑	388
	4,000	42		357		367		379		390		402
	6,000	41		366		380		391		404	↓	414
	8,000	40		379		393		405	↓	417	30	429
	10,000	39		393		407		419	30	432	-	-
	12,000	38		407		420		434	-	-	-	-
	14,000	37		425		435	↓	446	-	-	-	-
	16,000	36		437	↓	448	30	450	-	-	-	-
	18,000	35	↓	448	30	449	-	-	-	-	-	-
	20,000	33	30	449	-	-	-	-	-	-	-	-

REMARKS:
1. No wind.
2. IAS are representive values for velocity over a 50 ft. obstacle. Best velocity may vary plus or minus three knots.
3. Ground roll limited to 30 feet by skid gear.
4. Landing distance not shown above 20,000 feet or cruise ceiling.
5. Distances are based on limited flight test data.

Chart 14-15. Landing distance — power off (Sheet 4 of 16)

B-5

LANDING DISTANCE - FEET
POWER OFF

ARMY MODEL(S): UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR-62-21, "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

GROSS WEIGHT LB	PRESSURE ALTITUDE	BEST IAS APPROACH	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		KNOTS	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′
6000	SL	45	30	377	30	389	30	401	30	411	30	424
	2,000	44	↑	387	↑	401	↑	413	↑	426	↑	438
	4,000	43		399		413		426		440	↓	454
	6,000	42		413		427		442		456	30	469
	8,000	41		427		442		458	↓	471	-	-
	10,000	40		442		459		472	30	484	-	-
	12,000	39		459		474	↓	486	-	-	-	-
	14,000	38		476	↓	486	30	488	-	-	-	-
	16,000	37		486	30	486	-	-	-	-	-	-
	18,000	35	↓	486	-	-	-	-	-	-	-	-
	20,000	33	30	474	-	-	-	-	-	-	-	-
6500	SL	46	30	420	30	432	30	448	30	457	30	473
	2,000	45	↑	432	↑	448	↑	461	↑	476	↕	489
	4,000	44		446		461		476		493	30	506
	6,000	43		461		478		495	↓	509	-	-
	8,000	42		476		495		511	30	521	-	-
	10,000	41		495		512	↓	523	-	-	-	-
	12,000	40		512	↓	523	30	526	-	-	-	-
	14,000	39		523	30	524	-	-	-	-	-	-
	16,000	37	↓	524	-	-	-	-	-	-	-	-
	18,000	34	30	510	-	-	-	-	-	-	-	-
	20,000	31	-	-	-	-	-	-	-	-	-	-

REMARKS:
1. No wind.
2. IAS are representive values for velocity over a 50 foot obstacle. Best velocity may vary plus or minus three knots.
3. Ground roll limited to 30 feet by skid gear.
4. Landing distance not shown above 20,000 feet or cruise ceiling.
5. Distances are based on limited flight test data.

Chart 14-15. Landing distance — power off (Sheet 5 of 16)

LANDING DISTANCE - FEET
POWER OFF

B-5

ARMY MODEL(S): UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR-62-21 "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

GROSS WEIGHT LB	PRESSURE ALTITUDE	BEST IAS APPROACH	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		KNOTS	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′
7000	SL	47	30	463	30	480	30	494	30	511	30	526
	2,000	46	↑	478	↑	494	↑	513	↑	527	30	542
	4,000	45		494		513		531	↓	545	-	-
	6,000	44		511		531		547	30	560	-	-
	8,000	43		529		547	↓	569	-	-	-	-
	10,000	42		549	↓	562	30	565	-	-	-	-
	12,000	41		562	30	563	-	-	-	-	-	-
	14,000	38	↓	563	-	-	-	-	-	-	-	-
	16,000	36	30	549	-	-	-	-	-	-	-	-
	18,000	-	-	-	-	-	-	-	-	-	-	-
	20,000	-	-	-	-	-	-	-	-	-	-	-
7500	SL	48	30	509	30	526	30	545	30	563	30	579
	2,000	47	↑	526	↑	545	↑	565	↕	579	-	-
	4,000	46		545		565		583	30	595	-	-
	6,000	45		565		583	↓	597	-	-	-	-
	8,000	44		583		597	30	603	-	-	-	-
	10,000	42		597	↓	603	-	-	-	-	-	-
	12,000	40	↓	603	30	580	-	-	-	-	-	-
	14,000	37	30	580	-	-	-	-	-	-	-	-
	16,000	-	-	-	-	-	-	-	-	-	-	-
	18,000	-	-	-	-	-	-	-	-	-	-	-
	20,000	-	-	-	-	-	-	-	-	-	-	-

REMARKS:
1. No wind.
2. IAS are representive values for velocity over a 50 ft. obstacle. Best velocity may vary plus or minus three knots.
3. Ground roll limited to 30 feet by skid gear.
4. Landing distance not shown above 20,000 feet or cruise ceiling.
5. Distances are based on limited flight test data.

Chart 14-15. Landing distance — power off (Sheet 6 of 16)

LANDING DISTANCE - FEET
POWER OFF

B-5

ARMY MODEL(S): UH-1B
DATA AS OF: September 1962
DATA BASIS: Flight Test (FTC-TDR-62-21 "YUH-1B Category II Performance Test") and Lycoming Engine Specification No. 104.16-B

ENGINE: Lycoming T53-L-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 Lb/Gal.

GROSS WEIGHT LB	PRESSURE ALTITUDE	BEST IAS APPROACH	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		KNOTS	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′
8000	SL	49	30	557	30	578	30	599	30	615	-	-
	2,000	48	↑	576	↑	599	↑	615	30	631	-	-
	4,000	47		596		618	↓	633	-	-	-	-
	6,000	46		615		633	30	641	-	-	-	-
	8,000	44		633	↓	641	-	-	-	-	-	-
	10,000	42	↓	641	30	631	-	-	-	-	-	-
	12,000	39	30	631	-	-	-	-	-	-	-	-
	14,000	-	-	-	-	-	-	-	-	-	-	-
	16,000	-	-	-	-	-	-	-	-	-	-	-
	18,000	-	-	-	-	-	-	-	-	-	-	-
	20,000	-	-	-	-	-	-	-	-	-	-	-
8500	SL	50	30	607	30	629	30	653	30	666	-	-
	2,000	49	↑	626	↑	657	↕	669	-	-	-	-
	4,000	48		650		669	30	680	-	-	-	-
	6,000	46		669	↓	678	-	-	-	-	-	-
	8,000	44	↓	680	30	672	-	-	-	-	-	-
	10,000	41	30	672	-	-	-	-	-	-	-	-
	12,000	-	-	-	-	-	-	-	-	-	-	-
	14,000	-	-	-	-	-	-	-	-	-	-	-
	16,000	-	-	-	-	-	-	-	-	-	-	-
	18,000	-	-	-	-	-	-	-	-	-	-	-
	20,000	-	-	-	-	-	-	-	-	-	-	-

REMARKS:
1. No wind.
2. IAS are representive values for velocity over a 50 ft. obstacle. Best velocity may vary plus or minus three knots.
3. Ground roll limited to 30 feet by skid gear.
4. Landing distance not shown above 20,000 feet or cruise ceiling.
5. Distances are based on limited flight test data.

Chart 14-15. Landing distance — power off (Sheet 7 of 16)

B9/11

LANDING DISTANCE - FEET
POWER OFF

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT LB	PRESSURE ALTITUDE	BEST IAS APPROACH	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		KNOTS	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′
5000	SL	43	30	300	30	307	30	316	30	324	30	331
	2000	42	30	306	30	316	30	325	30	333	30	341
	4000	41	30	317	30	325	30	333	30	344	30	352
	6000	40	30	324	30	334	30	344	30	353	30	364
	8000	39	30	334	30	345	30	356	30	366	30	377
	10000	38	30	345	30	357	30	369	30	379	30	390
	12000	37	30	356	30	369	30	381	30	393	30	403
	14000	36	30	369	30	381	30	395	30	404	30	411
	16000	35	30	384	30	396	30	407	30	412	-	-
	18000	34	30	397	30	408	30	412	30	407	-	-
	20000	33	30	408	30	412	30	405	-	-	-	-
5500	SL	44	30	338	30	347	30	361	30	366	30	376
	2000	43	30	345	30	357	30	367	30	378	30	388
	4000	42	30	357	30	367	30	379	30	390	30	402
	6000	41	30	366	30	380	30	391	30	404	30	414
	8000	40	30	379	30	393	30	405	30	417	30	429
	10000	39	30	393	30	407	30	419	30	432	30	443
	12000	38	30	407	30	420	30	434	30	445	30	449
	14000	37	30	425	30	435	30	446	30	450	-	-
	16000	36	30	437	30	448	30	450	-	-	-	-
	18000	35	30	448	30	449	-	-	-	-	-	-
	20000	33	30	449	30	437	-	-	-	-	-	-

REMARKS:
1. No wind.
2. I.A.S. are representative values for velocity over 50 foot obstacle. Best velocity may vary plus or minus 3 knots.
3. Ground roll limited to 30 foot by skid gear.
4. Landing distance not shown above 20,000 feet or cruise ceiling.
5. Distances are based on limited flight test data.

Chart 14-15. Landing distance — power off (Sheet 8 of 16)

B9/11

LANDING DISTANCE - FEET
POWER OFF

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT LB	PRESSURE ALTITUDE	BEST IAS APPROACH	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		KNOTS	GROUND ROLL	CLEAR 50'	GROUND ROLL	CLEAR 50'	GROUND ROLL	CLEAR 50'	GROUND ROLL	CLEAR 50'	GROUND ROLL	CLEAR 50'
6000	SL	45	30	377	30	389	30	401	30	411	30	424
	2000	44	30	387	30	401	30	413	30	426	30	438
	4000	43	30	399	30	413	30	426	30	440	30	454
	6000	42	30	413	30	427	30	442	30	456	30	469
	8000	41	30	427	30	442	30	458	30	471	30	481
	10000	40	30	442	30	459	30	472	30	484	30	488
	12000	39	30	459	30	474	30	486	30	488	-	-
	14000	38	30	476	30	486	30	488	-	-	-	-
	16000	37	30	486	30	486	-	-	-	-	-	-
	18000	35	30	486	-	-	-	-	-	-	-	-
	20000	33	30	474	-	-	-	-	-	-	-	-
6500	SL	46	30	420	30	432	30	448	30	457	30	473
	2000	45	30	432	30	448	30	461	30	476	30	489
	4000	44	30	446	30	461	30	476	30	493	30	506
	6000	43	30	461	30	478	30	495	30	509	30	520
	8000	42	30	476	30	495	30	511	30	521	30	526
	10000	41	30	495	30	512	30	523	30	526	-	-
	12000	40	30	512	30	523	30	526	-	-	-	-
	14000	39	30	523	30	524	-	-	-	-	-	-
	16000	37	30	524	30	511	-	-	-	-	-	-
	18000	34	30	510	-	-	-	-	-	-	-	-
	20000	-	-	-	-	-	-	-	-	-	-	-

REMARKS:

1. No wind.
2. I.A.S. are representative values for velocity over 50 foot obstacle. Best velocity may vary plus or minus 3 knots.
3. Ground roll limited to 30 foot by skid gear.
4. Landing distance not shown above 20,000 feet or cruise ceiling.
5. Distances are based on limited flight test data.

Chart 14-15. Landing distance — power off (Sheet 9 of 16)

B9/11

LANDING DISTANCE - FEET
POWER OFF

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T-53-L-9/9A/11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT LB	PRESSURE ALTITUDE	BEST IAS APPROACH	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		KNOTS	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′
7000	SL	47	30	463	30	480	30	494	30	511	30	526
	2000	46	30	478	30	494	30	513	30	527	30	542
	4000	45	30	494	30	513	30	531	30	545	30	558
	6000	44	30	511	30	531	30	547	30	560	30	564
	8000	43	30	529	30	547	30	560	30	565	-	-
	10000	42	30	549	30	562	30	565	-	-	-	-
	12000	41	30	562	30	563	-	-	-	-	-	-
	14000	38	30	563	30	551	-	-	-	-	-	-
	16000	36	30	549	-	-	-	-	-	-	-	-
	18000	-	-	-	-	-	-	-	-	-	-	-
	20000	-	-	-	-	-	-	-	-	-	-	-
7500	SL	48	30	509	30	526	30	545	30	563	30	579
	2000	47	30	526	30	545	30	565	30	579	30	593
	4000	46	30	545	30	565	30	583	30	595	30	603
	6000	45	30	565	30	583	30	597	30	603	-	-
	8000	44	30	583	30	597	30	603	-	-	-	-
	10000	42	30	597	30	603	30	593	-	-	-	-
	12000	40	30	603	30	580	-	-	-	-	-	-
	14000	37	30	580	-	-	-	-	-	-	-	-
	16000	-	-	-	-	-	-	-	-	-	-	-
	18000	-	-	-	-	-	-	-	-	-	-	-
	20000	-	-	-	-	-	-	-	-	-	-	-

REMARKS:
1. No wind.
2. I.A.S. are representative values for velocity over 50 foot obstacle. Best velocity may vary plus or minus 3 knots.
3. Ground roll limited to 30 foot by skid gear.
4. Landing distance not shown above 20,000 feet or cruise ceiling.
5. Distances are based on limited flight test data.

Chart 14-15. Landing distance — power off (Sheet 10 of 16)

B9/11

LANDING DISTANCE - FEET

POWER OFF

ARMY MODEL(S): UH-1B
DATA AS OF: SEPTEMBER, 1962
DATA BASIS: FLIGHT TESTS (FTC-TDR-62-21, "YUH-1B CATEGORY II PERFORMANCE TESTS") AND LYCOMING ENGINE SPECIFICATION NO. 104.22B (1) & 104.28

ENGINE(S): LYCOMING T53-L-9/9A/11
FUEL GRADE JP-4
FUEL DENSITY: 6.5 LB/GAL.

GROSS WEIGHT LB	PRESSURE ALTITUDE	BEST IAS APPROACH	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		KNOTS	GROUND ROLL	CLEAR 50'	GROUND ROLL	CLEAR 50'	GROUND ROLL	CLEAR 50'	GROUND ROLL	CLEAR 50'	GROUND ROLL	CLEAR 50'
8000	SL	49	30	557	30	578	30	599	30	615	30	631
	2000	48	30	576	30	599	30	615	30	631	30	641
	4000	47	30	596	30	618	30	633	30	641	-	-
	6000	46	30	615	30	633	30	641	30	633	-	-
	8000	44	30	633	30	641	30	633	-	-	-	-
	10000	42	30	641	30	631	-	-	-	-	-	-
	12000	39	30	631	-	-	-	-	-	-	-	-
	14000	-	-	-	-	-	-	-	-	-	-	-
	16000	-	-	-	-	-	-	-	-	-	-	-
	18000	-	-	-	-	-	-	-	-	-	-	-
	20000	-	-	-	-	-	-	-	-	-	-	-
8500	SL	50	30	607	30	629	30	653	30	666	30	677
	2000	49	30	626	30	657	30	669	30	680	30	672
	4000	48	30	650	30	669	30	680	30	675	-	-
	6000	46	30	669	30	678	30	675	-	-	-	-
	8000	44	30	680	30	672	-	-	-	-	-	-
	10000	41	30	672	-	-	-	-	-	-	-	-
	12000	-	-	-	-	-	-	-	-	-	-	-
	14000	-	-	-	-	-	-	-	-	-	-	-
	16000	-	-	-	-	-	-	-	-	-	-	-
	18000	-	-	-	-	-	-	-	-	-	-	-
	20000	-	-	-	-	-	-	-	-	-	-	-

REMARKS:

1. No wind.
2. I.A.S. are representative values for velocity over 50 foot obstacle. Best velocity may vary plus or minus 3 knots.
3. Ground roll limited to 30 foot by skid gear.
4. Landing distance not shown above 20,000 feet or cruise ceiling.
5. Distances are based on limited flight test data.

Chart 14-15. Landing distance — power off (Sheet 11 of 16)

LANDING DISTANCE - FEET

540

POWER OFF

ARMY MODEL(S): UH-1B (540)
DATA AS OF: FEBRUARY 1964
DATA BASIS: ANALYTICAL METHOD
"PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT LB	PRESSURE ALTITUDE	BEST IAS APPROACH	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		KNOTS	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′
5000	0	48	30	229	30	245	30	263	30	281	30	300
	2000	48	30	244	30	263	30	283	30	303	30	323
	4000	49	30	262	30	284	30	305	30	327	30	347
	6000	49	30	283	30	306	30	329	30	351	30	370
	8000	49	30	306	30	331	20	354	30	374	30	392
	10000	49	30	331	30	355	30	377	30	395	30	410
	12000	48	30	355	30	379	30	398	30	414	30	426
	14000	48	30	379	30	400	30	416	30	428	30	437
	16000	46	30	401	30	418	30	430	30	439	30	444
	18000	45	30	419	30	432	30	440	30	445	30	446
	20000	44	30	433	30	441	30	445	30	445		
5500	0	51	30	271	30	293	30	316	30	338	30	361
	2000	51	30	291	30	316	30	340	30	364	30	386
	4000	51	30	315	30	341	30	366	30	390	30	411
	6000	51	30	340	30	368	30	393	30	415	30	433
	8000	51	30	367	30	394	30	417	30	437	30	453
	10000	50	30	394	30	419	30	440	30	456	30	468
	12000	50	30	419	30	441	30	458	30	471	30	479
	14000	49	30	442	30	460	30	473	30	481	30	486
	16000	47	30	461	30	474	30	482	30	487	30	487
	18000	46	30	475	30	483	30	487	30	486		
	20000	45	30	484	30	487	30	484				

REMARKS:
1. No wind.
2. IAS are representative values for velocity over 50 foot obstacle. Best velocity may vary plus or minus 3 knots.
3. Ground roll limited to 30 feet by skid gear.
4. Landing distances not shown above 20,000 feet or cruise ceiling.
5. Distances are based on limited flight test data.

Chart 14-15. Landing distance — power off (Sheet 12 of 16)

LANDING DISTANCE - FEET

POWER OFF

540

ARMY MODEL(S): UH-1B (540)
DATA AS OF: FEBRUARY 1964
DATA BASIS: ANALYTICAL METHOD
"PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT LB	PRESSURE ALTITUDE	BEST IAS APPROACH	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		KNOTS	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′
6000	0	54	30	320	30	347	30	374	30	400	30	424
	2000	54	30	345	30	374	30	402	30	428	30	450
	4000	54	30	373	30	403	30	430	30	454	30	474
	6000	53	30	402	30	431	30	456	30	477	30	494
	8000	53	30	431	30	458	30	480	30	497	30	510
	10000	52	30	458	30	481	30	499	30	512	30	521
	12000	51	30	481	30	501	30	514	30	523	30	528
	14000	49	30	501	30	515	30	524	30	529	30	528
	16000	48	30	516	30	525	30	529	30	526		
	18000	47	30	525	30	529	30	525				
	2000	46	30	529	30	523						
6500	0	56	30	374	30	406	30	436	30	464	30	488
	2000	56	30	404	30	437	30	466	30	491	30	513
	4000	55	30	435	30	467	30	494	30	516	30	534
	6000	55	30	466	30	495	30	519	30	537	30	551
	8000	54	30	494	30	520	30	539	30	553	30	563
	10000	53	30	520	30	540	30	555	30	564	30	569
	12000	50	30	540	30	556	30	565	30	570	30	569
	14000	50	30	556	30	566	30	570	30	568		
	16000	49	30	566	30	571	30	566	30			
	18000	48	30	571	30	565						
	20000	47	30	563								

REMARKS:
1. No wind.
2. IAS are representative values for velocity over 50 foot obstacle. Best velocity may vary plus or minus 3 knots.
3. Ground roll limited to 30 feet by skid gear.
4. Landing distances not shown above 20,000 feet or cruise ceiling.
5. Distances are based on limited flight test data.

Chart 14-15. Landing distance — power off (Sheet 13 of 16)

LANDING DISTANCE - FEET

540

POWER OFF

ARMY MODEL(S): UH-1B (540)
DATA AS OF: FEBRUARY 1964
DATA BASIS: ANALYTICAL METHOD
"PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT LB	PRESSURE ALTITUDE	BEST IAS APPROACH	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		KNOTS	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′
7000	0	58	30	434	30	468	30	500	30	527	30	550
	2000	58	30	466	30	500	30	530	30	554	30	573
	4000	57	30	499	30	530	30	556	30	576	30	590
	6000	56	30	529	30	557	30	578	30	593	30	603
	8000	55	30	556	30	579	30	595	30	605	30	611
	10000	53	30	579	30	595	30	606	30	612	30	611
	12000	52	30	596	30	607	30	612	30	610		
	14000	51	30	607	30	612	30	608				
	16000	50	30	612	30	607						
	18000	49	30	606								
7500	0	59	30	496	30	532	30	564	30	590	30	610
	2000	59	30	530	30	564	30	592	30	613	30	629
	4000	58	30	563	30	592	30	615	30	632	30	643
	6000	57	30	591	30	616	30	633	30	645	30	652
	8000	55	30	616	30	634	30	646	30	658	30	653
	10000	54	30	634	30	647	30	653	30	652		
	12000	53	30	647	30	653	30	651				
	14000	52	30	653	30	650						
	16000	50	30	650	30	625						
	18000	48	30	623								

REMARKS:
1. No wind.
2. IAS are representative values for velocity over 50 foot obstacle. Best velocity may vary plus or minus 3 knots.
3. Ground roll limited to 30 feet by skid gear.
4. Landing distances not shown above 20,000 feet or cruise ceiling.
5. Distances are based on limited flight test data.

Chart 14-15. Landing distance — power off (Sheet 14 of 16)

LANDING DISTANCE - FEET

POWER OFF

540

ARMY MODEL(S): UH-1B (540)
DATA AS OF: FEBRUARY 1964
DATA BASIS: ANALYTICAL METHOD
"PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT LB	PRESSURE ALTITUDE	BEST IAS APPROACH	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		KNOTS	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′
8000	0	61	30	559	30	596	30	626	30	650	30	667
	2000	60	30	594	30	626	30	651	30	670	30	683
	4000	59	30	625	30	652	30	671	30	684	30	692
	6000	57	30	651	30	672	30	686	30	693	30	695
	8000	55	30	672	30	686	30	694	30	695		
	10000	55	30	686	30	694	30	694				
	12000	53	30	694	30	693	30	676				
	14000	52	30	693	30	673						
	16000	50	30	672								
8500	0	62	30	623	30	659	30	686	30	707	30	721
	2000	61	30	657	30	686	30	708	30	723	30	732
	4000	59	30	685	30	709	30	724	30	734	30	737
	6000	59	30	708	30	725	30	734	30	737		
	8000	58	30	724	30	735	30	736				
	10000	55	30	735	30	736	30	723				
	12000	54	30	736	30	721						
	14000	53	30	721								

REMARKS:
1. No wind.
2. IAS are representative values for velocity over 50 foot obstacle. Best velocity may vary plus or minus 3 knots.
3. Ground roll limited to 30 feet by skid gear.
4. Landing distances not shown above 20,000 feet or cruise ceiling.
5. Distances are based on limited flight test data.

Chart 14-15. Landing distance — power off (Sheet 15 of 16)

LANDING DISTANCE - FEET

540

POWER OFF

ARMY MODEL(S): UH-1B (540)
DATA AS OF: FEBRUARY 1964
DATA BASIS: ANALYTICAL METHOD, "PRELIMINARY DATA"

ENGINE: LYCOMING T53-L-11
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

GROSS WEIGHT LB	PRESSURE ALTITUDE	BEST IAS APPROACH	−25°C (−13°F)		−5°C (+23°F)		+15°C (+59°F)		+35°C (+95°F)		+55°C (+131°F)	
		KNOTS	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′	GROUND ROLL	CLEAR 50′
9000	0	63	30	686	30	719	30	743	30	761	30	772
	2000	61	30	717	30	744	30	762	30	773	30	778
	4000	60	30	743	30	762	30	774	30	778	30	774
	6000	59	30	762	30	774	30	778	30	772		
	8000	59	30	774	30	778	30	770				
	10000	57	30	778	30	769						
	12000	55	30	769								
9500	0	63	30	748	30	777	30	798	30	812	30	819
	2000	62	30	776	30	798	30	812	30	819	30	818
	4000	61	30	797	30	813	30	820	30	817		
	6000	60	30	812	30	820	30	816				
	8000	59	30	820	30	815						
	10000	56	30	815	30	785						
	12000	54	30	785								

REMARKS:
1. No wind.
2. IAS are representative values for velocity over 50 foot obstacle. Best velocity may vary plus or minus 3 knots.
3. Ground roll limited to 30 feet by skid gear.
4. Landing distances not shown above 20,000 feet or cruise ceiling.
5. Distances are based on limited flight test data.

Chart 14-15. Landing distance — power off (Sheet 16 of 16)

APPENDIX I
REFERENCES

The following references of the issue in effect at the date of this publication are required for use by operational personnel in performance of their duties.

Maintenance Forms

DD Form 365 Series	Weight and Balance Record
DA Form 2407	Maintenance Request
DA Form 2408	Equipment Log Book Assembly (Records)
DA Form 2408-12	Army Aviator's Flight Record
DA Form 2408-15	Service Record for Aircraft
DA Form 2408-17	Aircraft Inventory Record
AR 95-2	Flight Regulations for Army Aircraft
AR 95-16	Weight and Balance Army Aircraft
AR 95-55	Nuclear Weapon Jettison
AR 310-1	Military Publications (General Policies)
AR 310-3	Military Publications (Preparations and Processing)
AR 320-5	Dictionary of United States Army Terms
AR 320-50	Authorized Abbreviations and Brevity Codes
AR 385-25	Safety Studies and Reviews of Atomic Weapon Systems
AR 385-40	Accident Reporting and Records
AR 385-62	Firing Guided Missiles and Heavy Rockets for Training, Target Practice and Combat
AR 385-63	Regulations for Firing Ammunition
AR 700-1300-8	Malfunctions Involving Ammunition and Explosives (Reports Control Symbol ORD-43)
AR 746-2300-1	Color and Marking of Vehicles and Equipment
AR 750-5	Organization Policies

Maintenance Forms

AR 750-8	Command Maintenance Management Inspections
DA PAM 310-1	Index of Administrative Publications
DA PAM 310-2	Index of Blank Forms
DA PAM 310-4	Bulletins, Lubrication Orders and Modification Work Orders
TB AVN 2	Recommended and Alternate Grade Fuels, Engine and Transmission Oils for Army Aircraft Engine Combinations
TB AVN 23-16	Test Flight and Maintenance Operational Checks of Army Aircraft
TM 1-215	Attitude Instrument Flying
TM 3-220	Decontamination
TM 9-207	Operation and Maintenance of Ordnance Materiel in Extreme Cold Weather 0° to -65°F
TM 9-247	Materials Used for Cleaning, Preserving, Abrading and Cementing Ordnance Materiel
TM 9-273	Lubrication of Ordnance Materiel
TM 6920-210-14	Targets, Target Material, and Training Course Lay-Outs
TM 9-1305-200	Small Arms Ammunition
TM 9-1950	Rockets
TM 38-750	The Army Equipment Record System and Procedures
FM 5-25	Explosives and Demolition
FM 21-6	Techniques of Military Instruction
FM 31-70	Basic Cold Weather Manual
SM 9-5-1340	FSC Group — Ammunition and Explosives
SB 38-100	Preservation, Packaging, and Packing Materials, Supplies and Equipment Used by the Army

APPENDIX II

CROSS REFERENCE TO MAC

Note

Assigned maintenance functions are contained in the Maintenance Allocation Chart, Appendix II of TM 55-1520-211-20.

APPENDIX III

AIRCRAFT INVENTORY MASTER GUIDE

The Aircraft Inventory Master Guide will be found only in TM 55-1520-211-20 Appendix III.

APPENDIX IV

OPERATOR'S CHECKLIST

The condensed operator's checklist is printed as a separate publication. Refer to TM 55-1520-211-10CL.

ALPHABETICAL INDEX

Asterisk (*) preceding Page No. denotes Illustration or Chart or Table.