TM 55-1520-210-23-1

TECHNICAL MANUAL

AVIATION UNIT AND INTERMEDIATE MAINTENANCE INSTRUCTIONS ARMY MODEL UH-1H/V/EH-1H/X HELICOPTERS

This manual supersedes TM 55-1520-210-23-1, 20 February 1979, including all changes.

HEADQUARTERS, DEPARTMENT OF THE ARMY
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HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 30 September 1987

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REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

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

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PREFACE

P–1. General.

a. This manual is the official document for Aviation Unit and Intermediate Maintenance of Army Model UH–1V, UH–1H, EH–1H, and EH–1X Helicopters.

b. The purpose of this manual is to familiarize you with the maintenance functions to be performed at the Aviation Unit (AVUM) and Intermediate Maintenance (AVIM) levels. The Table of Contents for this manual is provided to assist in determining the chapter in the manual in which individual functions are covered. This manual provides all essential information for personnel to accomplish Aviation Unit and Intermediate Maintenance on the complete airframe, its components, and systems, excluding armament and avionics subsystem as indicated for Aviation Unit and Intermediate Maintenance activities in the Maintenance Allocation Chart (MAC). (Refer to Appendix B.)

P–2. Quality Assurance/Quality Control (QA/QC). Personnel will assure proper maintenance has been performed by verifying dimensions and tolerances contained throughout this technical manual have been complied with.

P–3. Description. Army helicopter models UH–1V, UH–1H, EH–1H, and EH–1X are single engine, utility type helicopters. The EH–1H and EH–1X are especially configured for electronic counter measures missions. The fuselage is all metal construction consisting of the forward section and aft section (tailboom). The forward section provides support for the cabin, landing gear, power plant, fuel cells, transmission, and tailboom. The rotor system consists of two bladed semi–rigid main rotor and a two bladed, delta hinged tail rotor.

P-4. Reporting of Errors. You can improve this manual. If you find any mistakes or if you know of a way to improve these procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) located in the back of this manual, directly to: Commander, U.S. Army Aviation and Missile Command, ATTN: AMSAM-MMC-MC-NP, Redstone Arsenal, AL 35898-5000. A reply will be furnished to you. You may also provide DA Form 2028 information to AMCOM via e-mail, fax, or the World Wide Web. Our fax number is DSN 788-6546 or Commercial 256-842-6546. Our e-mail address is: 2028@redstone.army.mil. Instructions for sending an electronic 2028 may be found at the back of this manual immediately preceding the hard copy 2028. For the World Wide Web Use: http://amcom2028.redstone.army.mil.

P–5. Destruction of Army Material to Prevent Enemy Use. For destructions of Army material to prevent enemy use, refer to TM 750–244–1–5.

P–6. Maintenance of Forms and Records. Maintenance of forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by DA PAM 738–751.

P–7. Authority for Substitution. Substitution of interchange of items of material for maintenance or Department of the Army aircraft/helicopter shall not be authorized, nor shall orders be issued for shipment. Substitution or interchangeability shall only be authorized by AMCOM.

P–8. Special Tools and Equipment. Aviation Unit (AVUM) and Intermediate Maintenance (AVIM) special tools and equipment will be found in TM 55–1520–210–23P Repair Parts and Special Tools List (RPSTL). Special tools and test equipment for complex tasks are included in this manual.

P–9. Calibration.

a. Helicopter components, accessories, and instruments requiring calibration are specified in Chapter 1.

b. Special tools and test equipment shall be calibrated as specified in TB 750–25, Army Metrology and Calibration System and TB 43–180, Calibration Procedure.

P–10. Storage. Refer to TM 740–90–1 and to Appendix E for Storage of Aircraft.

P–11. Explanation of Change Symbols. Changes, except as noted below to the text and tables, including new material on added pages, are indicated by a verticle line in the outer margin extending close to the entire area of the material affected; exception; pages with emergency markings, which consist of black diagonal lines around three edges, may have the verticle line or change symbol placed along the inner margins.

Symbols show current changes only. A miniature pointing hand symbol is used to denote a change to an illustration. However, a vertical bar in the outer margin, rather than miniature pointing hand is utilized where there have been extensive changes made to an illustration. Change symbols are not utilized to indicate changes in the following:

a. Introductory material.

b. Indexes and tabular data where changes cannot be identified.

c. Blank space resulting from the deletion of text, an illustration, or a table.

d. Correction of minor inaccuracies, such as spelling, punctuation, relocation of material, etc., unless such correction changes the meaning of instructive information and procedures.

P–12. Engineering Authorization. All request for engineering authorization, when required by this manual will be forwarded to USA AMCOM, ATTN: AMSAM–RD–AE–I–D–U, Redstone Arsenal, AL 35898–5230. Urgent requests shall be clearly identified to insure priority handling and response. The requests shall include detailed information on the problem, e.g. sketches, photographs, dimensional data, etc., to assist in the evaluation and prompt reply.

P–13. Designator Symbols. Designator symbols **H** , **V** , **C B** , or **M B** are used in conjunction with text contents, text headings and illustration titles to show limited effectivity of the material. One or more designator symbols may follow a text heading or illustration titles to show limited effectivity of the material. One or more designator symbols may follow text heading or illustration title to indicate proper effectivity, unless the material applies to all models an configurations within the manual. If the material applies to all series and configurations, no designator symbols will be used. Where practical, descriptive information shall be condensed and combined for all models to avoid duplication. The symbol **H** refers to UH–1H, **V** refers to UH–1V. The symbol **C B** refers to the composite main rotor blade and **M B** refers to the metal main rotor blade.

CHAPTER 1

AIRCRAFT GENERAL

SECTION I. SERVICING

1-1. SERVICING.

1-2. Description - Servicing. Instructions and information for complete servicing of the helicopter with fuel, oil, hydraulic fluid, and other fluids are provided in the following paragraphs. Locations of sight gages and drains are shown on Servicing Points Diagram with indication of how frequently each reservoir should be checked and filled or drained and refilled (figure 1-1). Instructions for use of greases and other lubrication not shown in servicing illustration will be found in figure 1-6, Lubrication Chart.

1-3. Fuel Systems - Servicing.

WARNING

Servicing personnel must comply with all safety precautions specified in FM 10-68, Aircraft Refueling Field Manual.

a. Fuel Tank Capacities.

FUEL TANK CAPACITY	U.S. GALLON
Total	208.5
Usable	206.5

b. Approved Fuel.

ENGINE FUEL SPECIFICATION

Army Standard Fuel	Alternate Fuel	Emergency Fuel
MIL-T-5624 Grade JP-4	MIL-T-5624 Grade JP-5	MIL-G-5572 Aviation Gasoline (Refer to TB 55-9150-200-24)

NOTE

Service with specified turbine fuel (C119). When specified fuel is not available, refer to TM 55-1520-210-10 and TB 55-9150-200-24 for information on other fuels and limitations on their use. An entry shall be made on the DA Form 2408-13 if emergency fuel is used.

c. The helicopter can be serviced by any of the following methods. Refer to figure 1-1.

(1) Closed Circuit Refueling (Power Off).

(a) Make sure fire guard is in position with fire extinguisher.

(b) Ground servicing unit to ground rod.

(c) Make sure helicopter is statically grounded to a ground rod.

(d) Bond servicing unit to helicopter

(e) Bond fuel nozzle to ground receptacle (2) located below fuel receptacle on helicopter.

CAUTION

Make sure servicing unit pressure is not above 125 psi while refueling.

(f) Remove fuel tank filler cap (3) and make sure refueling module is in closed and locked position (3.1).

(g) Remove nozzle cap, insert nozzle into fuel receptacle and lock into position.

(h) Position flow control handle to ON or FLOW. Fuel flow will automatically stop when fuel cell is full. Just before normal automatic shutoff, fuel flow may cycle several times as maximum fuel level is reached.

(i) Make sure flow control handle is in OFF or NO FLOW position and remove nozzle.

(j) Replace fuel nozzle cap and fuel tank filler cap (3).

(k) Disconnect fuel nozzle ground cable.

(l) Disconnect ground cable from helicopter to ground rod.

(m) Disconnect servicing unit ground cables from ground rod and helicopter.

(n) Return fire extinguisher to designated location.

(2) Gravity or Open Port Refueling (Power Off).

(a) Make sure fire guard is in position with fire extinguisher.

(b) Ground servicing unit to ground rod.

(c) Make sure helicopter is statically grounded to a ground rod.

(d) Bond servicing unit to helicopter.

(e) Bond fuel nozzle to ground receptacle (2) located below fuel receptacle on helicopter.

(f) Remove fuel tank filler cap (3).

(g) Using latch tool attached to filler cap lanyard (3.2), unlatch and open refueling module (3.3).

(h) Remove nozzle cap and insert nozzle into fuel receptacle.

(i) Refuel to specified level, remove nozzle and replace nozzle cap.

(j) Close refueling module by pulling lanyard (3.2) until latch (3.4) is in locked position. Replace fuel tank filler cap (3).

(k) Disconnect fuel nozzle ground cable.

(l) Disconnect ground cable from helicopter to ground rod.

(m) Disconnect servicing unit ground cables from ground rod and helicopter.

(n) Return fire extinguisher to designated location.

(3) Rapid (Hot) Refueling (Closed Circuit).

(a) Before Rapid Refueling:

(1) Throttle – Idle.

(2) FORCE TRIM – ON or controls frictioned.

WARNING

In case of fire, observe fire emergency procedures in FM 10-68. During Rapid Refueling, a crewmember should observe the refueling operation (performed by authorized refueling personnel) and stand fire guard as required. One crewmember must remain in the aircraft to monitor controls. Only emergency radio transmission should be made during Rapid Refueling.

(b) Make sure fire guard is in position with fire extinguisher.

(c) Ground servicing unit to ground rod.

(d) Make sure helicopter is statically grounded to a ground rod.

(e) Bond servicing unit to helicopter.

(f) Bond fuel nozzle to ground receptacle (2) located below fuel receptacle on helicopter.

CAUTION

Make sure servicing unit pressure is not above 125 psi while refueling.

(g) Remove fuel tank filler cap (3) and make sure refueling module is in closed and locked position (3.1).

(h) Remove nozzle cap, insert nozzle in fuel receptacle and lock into position.

(i) Position flow control handle to ON or FLOW. Fuel flow will automatically stop when fuel cell is full. Just before normal automatic shutoff, fuel flow may cycle several times as maximum fuel level is reached.

(j) Make sure flow control handle is in OFF or NO FLOW position and remove nozzle.

(k) Replace fuel nozzle cap and fuel tank filler cap (3).

(l) Disconnect fuel nozzle ground cable.

(m) Disconnect ground cable from helicopter to ground rod.

(n) Disconnect servicing unit ground cables from ground rod and helicopter.

(o) Advise pilot that the fuel cap is secure and grounding cables are removed.

(p) Return fire extinguisher to designated location.

(4) Rapid (Hot) Refueling (Gravity).

(a) Before Rapid Refueling:

(1) Throttle – Idle.

WARNING

(2) FORCE TRIM – ON or controls frictioned.

In case of fire, observe emergency procedures in FM 10-88.

During Rapid Refueling, a crewmember should observe the refueling operation (performed by authorized refueling personnel) and stand fire guard as required. One crewmember must remain in the aircraft to monitor controls. Only emergency radio transmissions should be made during rapid refueling.

(b) Make sure fire guard is in position with fire extinguisher.

(c) Ground servicing unit to ground rod.

(d) Make sure helicopter is statically grounded to ground rod.

(e) Bond servicing unit to helicopter.

(f) Bond fuel nozzle to ground receptacle (2) located below fuel receptacle on helicopter.

(9) Remove fuel tank filler cap (3).

(h) Using latch tool attached to filler cap lanyard (3.2) unlatch and open refueling module (3.3),

(i) Remove nozzle cap and insert nozzle into fuel receptacle.

(j) Refuel to specified level, remove nozzle and replace nozzle cap.

(k) Close refueling module by pulling lanyard (3.2) until latch (3.4) is in looked position (3. 1). Replace filler cap [3).

(1) Disconnect fuel nozzle ground cable.

(m) Disconnect ground cable from helicopter to ground rod,

(n) Disconnect servicing unit ground cables from landing gear cross tube. ground rod and helicopter.

(o) Advise pilot that the fuel cap is secure and grounding cables are removed.

(p) Return fire extinguisher to designated location.

d. Defueling.

NOTE

Refer to FM 10-68 for Defueling procedures.

After defueling operation is complete, drain residual fuel in tanks through defuel valves.

e. Defueling Valves.

(1) Defuel helicopters, with noncrashworthy fuel system incorporated, at defuel valves (16, figure 1-1).

(2) Defuel helicopters, with crashworthy fuel system incorporated, at gravity defuel valves located on sumps adjacent to drain valves (18, figure 1-1). The defuel valve is activated by using a fitting such as: AN815-12 union, AN832-12 union, AN919-12 reducer, and MS33656E12 end fitting after removing protection cover.

NOTE

When cover is installed after defueling, use only enough torque to slightly compress seal.

(3) Drain trapped fuel at drain valves (17 and 18, figure 1-1).

NOTE

Each forward cell has two drain valves, one forward and one aft of internal baffle.

(4) Electric boost pump has a seal valve.

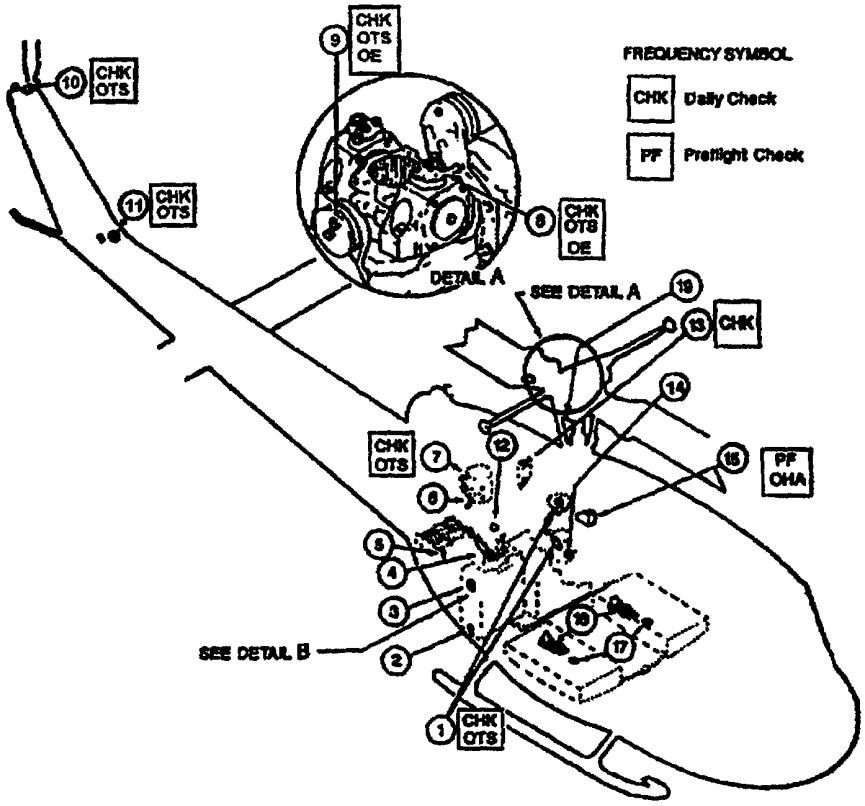
(5) To drain main fuel filter (13, figure 1-1) use valve in drain line from filter sump. Access is by opening lower left engine cowl. Drain line discharges just forward of aft

NOTE

An entry shall be made on DA Form 2408-13 if emergency fuel is used.

1-4. Auxiliary Fuel System—Crashworthy. A crashworthy fuel system, when installed, is located at the rear of the cabin and is accessible through the cargo doors. Each fuel cell is filled through a filler cap or a closed circuit refueling receiver located on top of the fuel cell. Each cell contains 150 U.S. gallons of fuel and the drain valves are located at cabin floor level, outboard of the fuel cells. Observe same fuel handling precautions as the main fuel system.

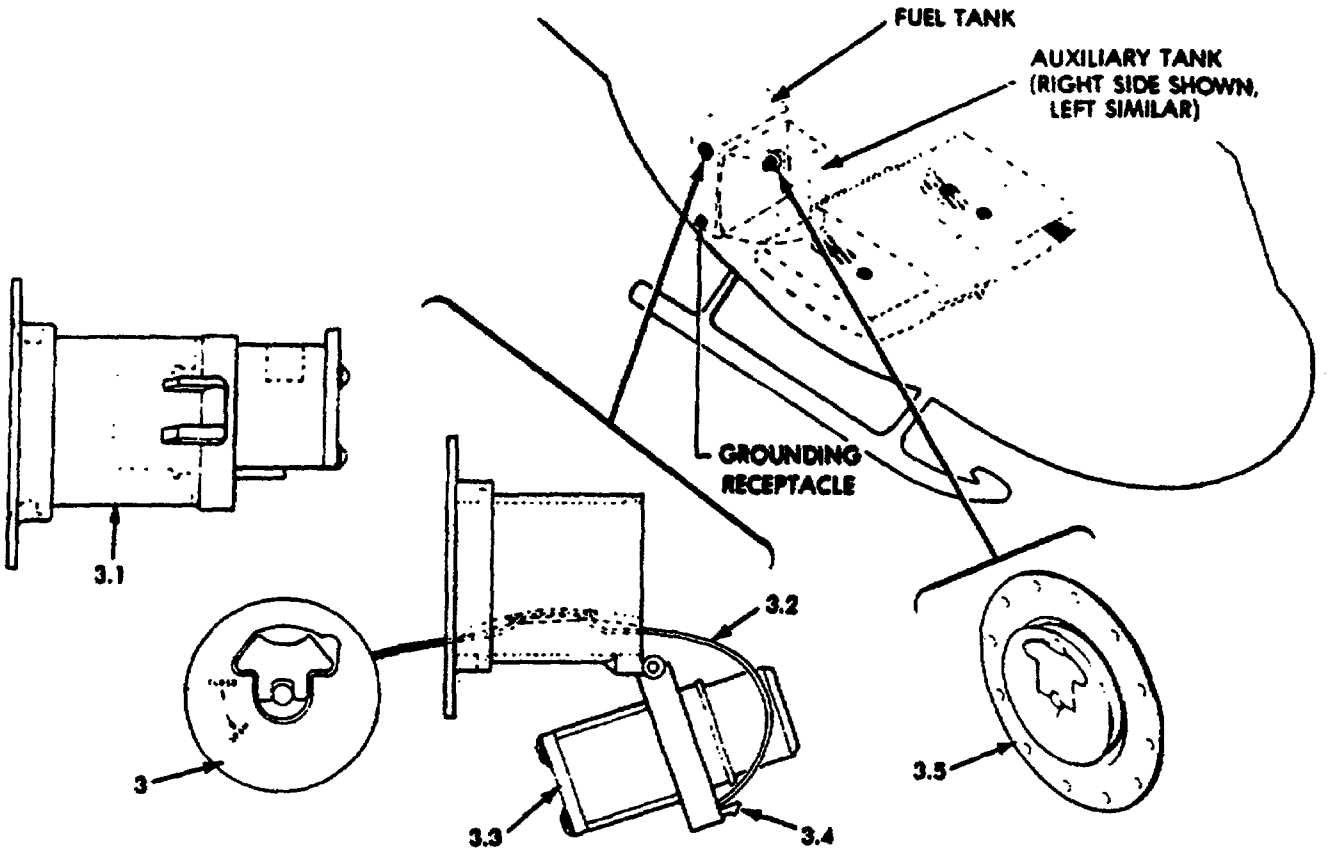
1-5. Engine Oil System. Engine oil tank (7, figure 1-1) is in engine compartment at right side. Oil level can be checked through small door marked ACCESS FOR FIRE EXTINGUISHERS by viewing sight gage plugs on tank. Before servicing oil, determine whether system contains MIL-L-7808 (C168) or MIL-L-23699 oil (C166).



LUBRICANT - TEMPERATURE REQUIREMENTS

Symbol	Specification	Ambient Temperature
OTS	MIL-L-23699 (C166)	-25°F and above
	MIL-L-7808 (C168)	0°F and below
	DOD-L-85734 (C166A)	0°F and above
	NOTE	
	OTS oil, DOD-L-85734 (C166A) should be used only in transmission and not in the engine.	
OHA	MIL-H-83282 (C131)	-30°F (-35°C) and above
	NOTE	
	Changing to fire resistant hydraulic fluid requires system draining. Refer to TB 55-1500-344-25.	
	MIL-H-5606 (C130)	-31°F (-36°C) and below
OE		
	NOTE	
	OE oil is used only in main rotor hub P/N 204-012-101-31. Do not mix OE and OTS oil.	
	MIL-L-2104 Grade 40 (C172)	40°F (5°C) and above
	MIL-L-2104 Grade 30 (C173)	0°F (-18°C) to 39°F (4°C)
	or	
	MIL-L-46152 Grade 30 (C170)	
	MIL-L-2104 Grade 10 (C174)	-20°F (-29°C) to -1°F (-19°C)
	or	
	MIL-L-46152 Grade 10W30 (C171)	
	MIL-L-46167 (C132)	-65°F (-54°C) to -21°F (-30°C)

Figure 1-1. Servicing Points Diagram (Sheet 1 of 2)



DETAIL B

1. Transmission filler and sight gage (OTS)
2. Ground receptacle
3. Fuel tank filler
3.1. Closed circuit refueling receiver (Module closed)
3.2. Lanyard
3.3. Module (Open)
3.4. Latch
3.5. Auxiliary fuel tank filler (gravity)
4. Transmission oil cooler drain
5. Engine oil cooler drain
6. Engine oil tank drain
7. Engine oil tank (OTS)
8. Pillow block reservoir (OTS or OE)
9. Grip reservoir (OTS or OE)
10. Tail rotor gearbox (OTS)
11. Intermediate gearbox (OTS)
12. External power receptacle
13. Fuel filter
14. Transmission sump drain
15. Hydraulic reservoir (OHA)
16. Deleted
17. Forward fuel cell drain valves
18. Sump drain valves
19. Stabilizer bar dampers (use only MIL-H-5606)

Figure 1-1. Servicing Points Diagram (Sheet 2 of 2)

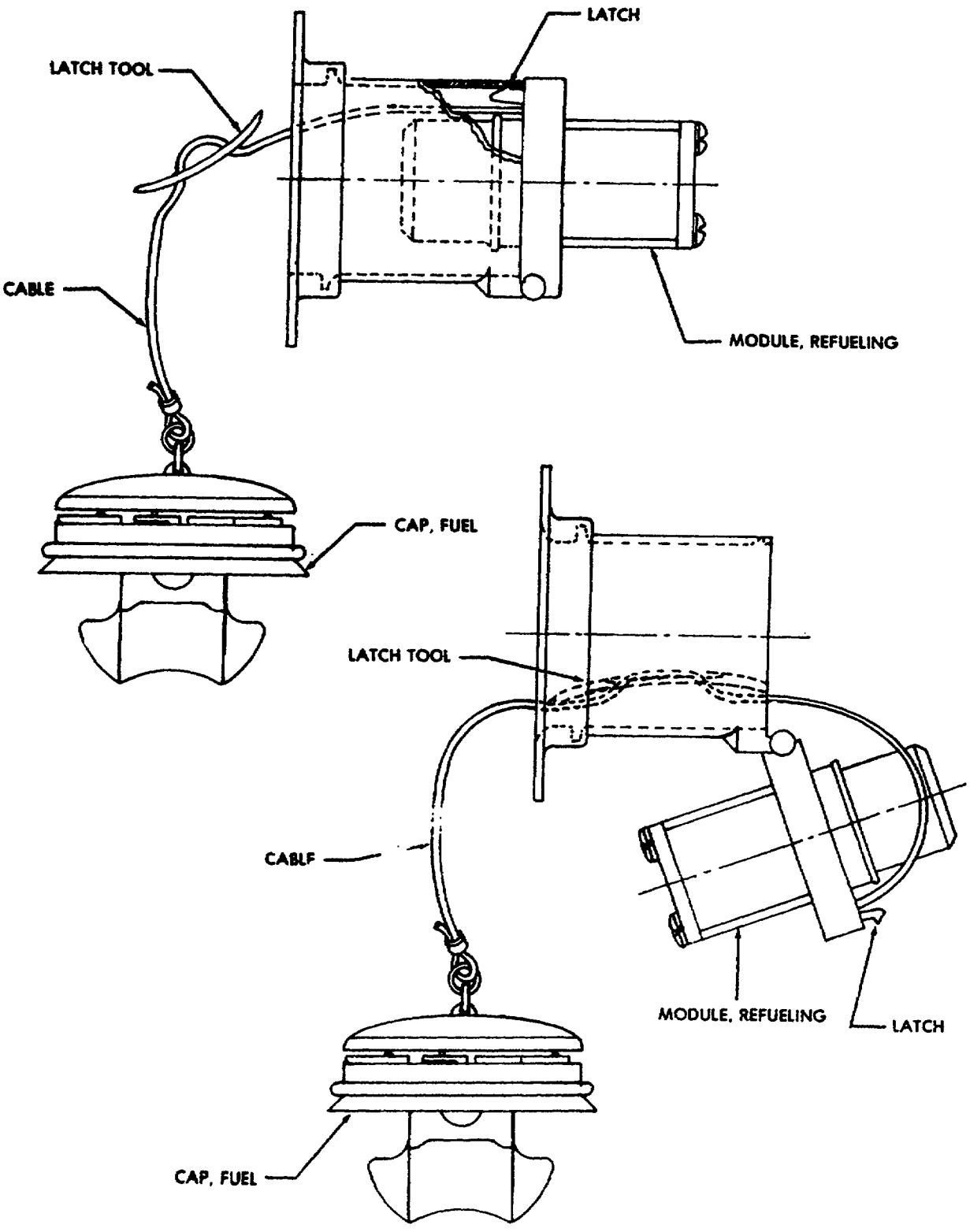


Figure 1-1.1. Receiver and Cap Assembly