*TM55-1520-240-CL

TECHNICAL MANUAL

Operator's and Crewmember's Checklist

ARMY CH-47D
HELICOPTER
(EIC: RCD)

*This manual supersedes TM 55-1520-240-CL, dated 10 November 1982, including all changes.

HEADQUARTERS
DEPARTMENT OF THE ARMY
30 April 1992

URGENT

TM 55–1520–240–CL
C12

CHANGE NO. 12

HEADQUARTERS
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WASHINGTON, D.C., 29 DECEMBER 2000

Operator's and Crewmember's
Checklist

ARMY MODEL CH–47D HELICOPTER
(EIC: RCD)

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P–3 and P–4	P–3 and P–4
P–4.1 and P–4.2	P–4.1 and P–4.2

2. Retain this sheet in front of manual for reference purposes.

TM 55-1520-240-CL
C12

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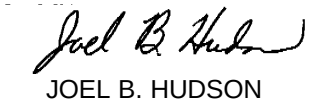

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TM 55-1520-240-CL
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CHANGE
NO. 11

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Operator's and Crewmember's
Checklist

ARMY MODEL CH-47D HELICOPTER
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N-1 and N-2	N-1 and N-2
E-13/(E-14 blank)	E-13 and E-14
------	E-15/(E-16 blank)
P-1 and P-2	P-1 and P-2
P-2.1/(P-2.2 blank)	P-2.1 and P-2.2

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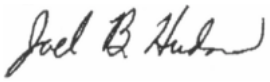

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Operator's and Crewmember's
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ARMY MODEL CH-47D HELICOPTER
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Remove pages	Insert pages
N-1 through N-6	N-1 through N-6
N-6.1/(N-6.2 blank)	N-6.1/(N-6.2 blank)
N-7 through N-10	N-7 through N-10
E-1 and E-2	E-1 and E-2
- - - - -	E-2.1 and E-2.2
P-1 through P-4	P-1 through P-4
- - - - -	P-4.1 and P-4.2

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Operator's and Crewmember's
Checklist

ARMY MODEL CH-47D HELICOPTER
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Remove pages	Insert pages
N-5 and N-6	N-5 and N-6
P-21 and P-22	P-21 and P-22

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TM 55-1520-240-CL
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Operator's and Crewmember's
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Remove pages	insert pages
N-1 and N-2	N-1 and N-2

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Operator's and Crewmember's
Checklist

ARMY MODEL CH-47D HELICOPTER
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Remove pages	Insert pages
E-5 and E-6	E-5 and E-6
E-7 through E-10	E-7 through E-10
P-1 and P-2	P-1 and P-2
- - - - - - - - - - - - -	P-2.1/(P-2.2 blank)
P-3 and P-4	P-3 and P-4

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Operator's and Crewmember's
Checklist

ARMY MODEL CH-47D HELICOPTER
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i and ii	i and ii
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NO. 5

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DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 25 June 1997

OPERATOR'S AND CREWMEMBER'S
CHECKLIST

ARMY MODEL
CH-47D HEUCOPTER
(EIC:RCD)

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N-5 through N-10	N-5 through N-10

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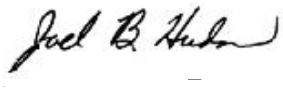

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Operator's and Crewmember's Checklist

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Remove pages	Insert pages
N-5 and N-6	N-5 and N-6
P-5 through P-9	P-5 through P-25
/(P-10 blank)	/(P-26 blank)

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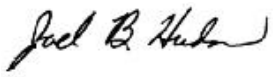

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Operator's and Crewmember's Checklist

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Remove pages	Insert pages
N-7 and N-7	N-7 and N-8
P-9 through P-10	P-9 through P-10
P-1 and P-2	P-1 and P-2)

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TM 55-1520-240CL
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Operator's and Crewmember's
Check List

ARMY MODEL CH-47D HELICOPTER

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Remove pages	Insert pages
E-5 and E-6	E-5 and E-6
- - -	E-6.1/(E-6.2 blank)
E-7 and E-8	E-7 and E-8

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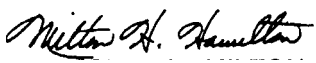

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CHANGE NO. 1

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Operator's and Crewmember's
Checklist

ARMY MODEL CH-47D HELICOPTER

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Remove pages	Insert pages
P-7/(P-8 blank)	P-7 through P-9/(P-10 blank)

2. Retain this sheet in front of manual for reference purposes.

TM 55-1520-240-CL
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GENERAL INFORMATION AND SCOPE

SCOPE. This checklist contains the operator's and crew member's checks to he accomplished during normal and emergency operations.

GENERAL INFORMATION. This checklist consists of three parts: normal procedures, emergency procedures, and performance data. Normal procedures consist of the procedures required for normal flight. Emergency procedures are subdivided into 11 classifications as follows: engine. rotor/transmission/ drive. fire, fuel. electrical, hydraulic, landing and ditching. flight controls. bailout. armament and mission equipment, as applicable. Performance data consists of performance checks.

NOTE

This checklist does not replace the amplified version of the procedures in the operator's manual (TM 55-1520-240-10). but is a condensed version of each procedure.

Normal Procedures Pages. The contents of the normal procedures of this manual are a condensation of the amplified checklist appearing in the normal procedures or crew duties portion of the applicable operator's manual.

Emergency Procedures Pages. The requirements in this section of the condensed checklist (CL) are identical to those for the normal procedures. except that the information is drawn from the amplified checks in the emergency procedures portion of the operator's manual. The emergency requirements are subdivided into the 11 classifications listed above.

Symbols Preceding Numbered Steps.

* -Indicates performance of step is mandatory before each flight or "Thru-Flights."

★ -Indicates a detailed procedure for this step is included in the Performance Checks section. located at the back of this checklist.

F -Indicates flight engineer function or response.

O -Indicates "If Installed."

④ -Indicates copilot duties.

Immediate action emergency items are underlined.

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if' you know of a way to improve the procedures. please let us know. Mail your letter. DA Form 2028 (Recommended Changes to Publications and Blank Forms). or DA Form 2028-2 located in the back of' the applicable Aircraft Operator's manual direct to: Commander. U.S. Army Aviation and Missile Command. ATTN: AMSAM-MMC-LS-LP. Redstone Arsenal. AL 35898-5230. A reply will he furnished to you. You may also send in your comments electronically to our e-mail address: 1s-1p@redstone.army.mil or by fax 205-842-6546/DSN 788-6546. Instructions for sending an electronic 2028 may be found at the back of the Aircraft Operator's manual.

BEFORE EXTERIOR CHECK

*1. Publications - Check.
*2. Ignition lock switch - On.
3. 712 EMERGENCY ROWER panel - Check.
4. 712 Topping stops -Check stowed.
5. Cockpit area - Check.
*6. Forward transmission - Check.
7. Fuel sample - Check first flight of day.

INTERIOR CHECK

FORWARD CABIN

1. Flight control closet - Check.
2. Heater compartment - Check.
3. Emergency escape ax - Check.
4. Cabin door - Check.
5. Avionics equipment - Check.
6. Fire extinguisher - Check.
7. Cabin escape panel - Check.
8. Transformer-rectifier air intake screens - Check.
9. Seats, litters, first aid kits, cargo, and jettisonable cabin windows -Check.
10. Utility hatch door and lower rescue door - Check.
11. Center cargo hook - Check.
12. Forward and aft cargo hook release lever - Check.
O 13. Forward, center, and aft cargo hook release lever-Check.
13.1 714A DECUs - Check.
O 14. ERFS installed - Check.
*O 14.1 ERFS II installed - Check.

AFT CABIN

1. Ramp - Check.
2. Engine fire extinguisher bottles — Check.

3. POWER STEERING MODULE -Check.
4. FUEL VALVE #2 ENGINE - Check OPEN.
5. FUEL VALVE CROSSFEED (right) - CLOSED.
6. HYD SYS FILL module -Check.
*7. APU start accumulators - Check.
*8. MAINTENANCE PANEL-Check.
O 8.1 AFT POS LIGHT switch - Set as required.
O 9. PWR MDL CHIP BURN-OFF - Check.
*10. Aft transmission - Check.
11. APU - Check.
12. EMERGENCY APU FLUID SHUT OFF VALVE -Check OPEN.
13. COMPASS FLUX VALVE - Check.
14. FUEL VALVE CROSSFEED (left) - Check CLOSED.
15. FUEL VALVE #1 ENGINE - Check OPEN.
16. Fire extinguisher - Check.

EXTERIOR CHECK

AFT CABIN

1. Position light - Check.
1.1 714A In me wash system connectors - Check.
2. Right aft landing gear area - Check.
3. Vent and fluid drain lines-Check.

RIGHT CABIN

1. Fuselage - Check.
*2. Fuel system - Check.
3. Position light - Check.
4. Forward landing gear area - Check.
5. Pressure refueling control panel - Check.
6. Static port - Check.
7. Right electrical compartment - Check.

FORWARD CABIN

1. Heater intake, exhaust, and combustor drain -Check.
2. Pilot's jettisonable door - Check.
3. Pilot's pedal area -Check.
4. Right AFCS yaw ports - Check.
5. Pitot tubes - Check.
6. Antennas -Check.
7. Searchlights - Check.
8. Windshield and wipers - Check.
9. Left AFCS yaw ports - Check.
10. Copilot's pedal area - Check.
11. Copilot's jettisonable door - Check.

LEFT CABIN

1. Fuselage - Check.
2. Left electrical compartment - Check.
3. Forward landing gear area - Check.
4. Forward and aft cargo hooks - Check.
5. Lower anti-collision light - Check condition.
6. Static port - Check.

*7. Fuel s stem - Check.

7.1 714A Engine wash system connectors — Check.

8. Left aft landing gear area - Check.
9. Vent and fluid drain lines - Check.

TOP OF FUSELAGE

*1. No. 2 engine - Check.

2. Anticollision light and formation lights — Check.

*3. Aft rotor (right side) -Check.

O 4. Droop stop shrouds - Check.

5. Upper boost actuator-Check.

*6. Hydraulic compartment - Check.

*7. Combining transmission area - Check.
*8. Aft rotor (left side) - Check.
O 9. Droop stop shrouds -Check.
10. Upper boost actuator - Check.
*11. No. 1 engine - Check.
12. Drive shaft area - Check.
*13. Forward rotor (right side) - Check.
14. Forward transmission oil cooler inlet - Check for obstructions.
15. Upper boost actuators - Check.
16. Forward transmission -Check.
*17. Hydraulic compartment - Check.
*18. Forward rotor (left side) - Check.
19. Brake accumulator pressure - Check.
*20. Pylon fairings, work platforms, and inspection panels - Check.
21. Top of fuselage - Check.
O 22. Remove the fuel vent covers (3) (if installed) before using ERFS.

*WALK AROUND INSPECTION/SECURITY BRIEF

1. All access doors - Check.
2. Tiedowns, locking devices, covers, and ground cables - Removed and secured.
3. Cockpit, fwd transmission, and fwd cabin area soundproofing installed - Check.
4. Crew/passenger briefing - Complete as required.

BEFORE STARTING ENGINES

1. Pedal adjustment - Matched.
2. Shoulder harness locks - Check operation and leave unlocked.
*3. No. 1 and No. 2 PDP's. - Check.

★*4. Overhead switches and controls - As required.
5. FIRE PULL handles - In.
6. AGENT DISCH switch - Check.
*7. XMSN OIL PRESS switch - SCAN.
*8. XMSN OIL TEMP switch - SCAN
*9. VGI switches - NORM.
10. CYCLIC TRIM switch - AUTO.
*11. AFCS SYSTEM SEL switch - OFF.
*12. FLARE DISP switch - SAFE.
13. Avionics equipment - OFF; set as required.
O 13.1 HUD- OFF.
14. 712 EMERG ENG TRIM switches-AUTO.
15. SWIVEL switch - LOCK.

STARTING ENGINES

*(1). BAIT switch-ON.
2. CAUTION LT TEST switch - TEST.
3. Clocks - Running. Set as required.
F (4). TROOP WARN ALARM and JUMP LT - Check.
*F 5. Fire guard -Posted.
★*(6). APU- Start.
*(7). APU GEN switch-ON.
*(8). PWR XFER 1 and 2 switches - ON. Check HYD FLT CONTR caution capsules out.
*F 9. MAINTENANCE PANEL - Check.
*10. Avionics - On.
O 10.1 HUD- ON.
★11. CARGO HOOKS HOIST/WINCH - Check operation as required.
12. SLT-FIL switches - Check and set as required.
*13. PARKING BRAKE - Set.
14. CRUISE GUIDE indicator - Check.
*15. Altimeters - Set and check.
16. FIRE DETR switch - TEST.

* 17. Fuel quantity -Check as required.
* 18. Cyclic trim indicators - Check GND position.
*F 19. Rotor blades - Check position.
*20. AFCS SYSTEM SEL switch - Check.
**21. Flight control travel and hydraulics - Check. Return to neutral.
**F21.1 714A DECU PRESTART BIT - Perform.
** 21.2 AN/ASN 149 (V) GPS - STARTUP and configure.
22. Avionics - Perform operational check and set as required.
23. 712 ENGINE BEEP TRIM switch (NO. 1 & 2) - DECREASE for 8 seconds.
* F 24. Area - Clear for start.
★* (25). 712 First engine - Start.
★* (25.1). 714A First engine - Start.
★* (26). Second engine - Start same as first.
26.1 714A P-3 Bellows - Check.
* (27). Transmission oil pressures - Check.
* (28). ENG COND levers - FLT.
★*29. 712 RRPM - Set as required.
* (30). GEN 1 and 2 switches - ON. 712 No. 1 & 2 GEN OFF 714A GEN 1 & 2 caution capsules out.
* (31). APU GEN switch -OFF.
★*F31.1 714A DECU START BIT- Perform.
* (32). PWR XFER 1 and 2 switches - OFF.
* (33). APU switch - OFF. APU ON caution capsule out.
*34. Systems -Check normal.
* (35). Transponder - STBY.

ENGINE GROUND OPERATION

★ (1). FUEL PUMP and XFEED - Check operation.
* (2). FUEL CONTR switches - Set.
3. VGI switches - As required.
(4). ANTI-ICE systems - Check as required.
* (5). Flight instruments-Check.
(6). 712 Emergency engine trim system - Check.

*6.1 714A FACEC system - Reversionary system check (First flight of day).

7. Radar altimeters - PUSH-TO-TEST.

(8) Transponder - Check and set.

9. Navigation Set DGNS - Perform operational check, confirm waypoint entry and SAS/AS as required.

*BEFORE TAXI

(1). SWIVEL switch - As required.
(2). AFCS switch-As required.
3. Cyclic trim indicators - Check GND position.
O 3.1 HUD - Adjust brightness, mode, barometric altitude, pitch, and roll as necessary.
FO 4. Flare dispenser safety pin - Remove and stow.
F 5. Chocks - Removed and secured.
F 6. Ramp and cabin door - As required.
F 7. Crew, passengers, and mission equipment - Check ready for taxi.
F 8. Taxi director and blade watchers - Positioned.
9. PARKING BRAKE - As required.

*TAXIING CHECK

1. Brakes - Check pilot's and copilot's as required.
2. Power steering - Check as required.

BEFORE HOVER

* 1. SWIVEL switch - LOCK.
*2. AFCS control panel - Set as required.
3. 712 HIT check - Perform as required.
* 3.1 714A Power Assurance Check - Perform first flight of the day (may be delayed until HOVER CHECK).
* 4. RRPM - Set as required.

HOVERCHECK

1. Flight controls - Check.
2. Systems instruments -Check.
3. Flight instruments - Check.
FO 4. GROUND CONTACT indicating lights - Check both off.
5. AFCS - Check. (First flight of day.)
6. Power - Check.
*7. 714A Power Assurance Check - Perform first flight of the day.

* BEFORE TAKEOFF

1. Systems - Check.
2. PARKING BRAKE - As required.
3. AFXX SYSTEM SEL switch - As required.
4. CYCLIC TRIM switch -Check.
5. SWIVEL switch - LOCK.
6. Transponder - As required.

F7. Crew, passengers, and mission equipment - Check.

CRUISE CHECK

1. Fuel consumption - Check.
2. HDG select - As required.
3. BARO/RAD altitude hold - As required.

F4. Ramp area - Check every 30 minutes.

BEFORE LANDING

1. System - Check.
2. PARKING BRAKE - As required.
3. AFCS control panel - Check.

F4. Crew, passengers, and mission equipment - Check.

AFTER LANDING

1. AFCS SYSTEM SEL switch - As required.
2. SWIVEL switch - As required.
3. Transponder - As required.
4. ANTI - ICE switches - OFF.

F O 5. GROUND CONTACT indicating lights - Check on.

6. Cyclic trim indicators - Check GND indication.

ENGINE SHUTDOWN

1. Flight Controls - Neutralize, initiate cool down as required.
2. PARKING BRAKE - Set.
3. HTG switches - OFF.
4. SLT-FIL switches - OFF and stow as required.
5. AFCS SYSTEM SEL switch - OFF.

F 6. Ramp - As required.

F 7. Wheels - Chocked.

F 8. Mission equipment - Safe as required.

F 9. Fire guard - Posted.

★ 10. APU -Start.

11. APU GEN switch - ON.

12. GEN 1 and 2 switches - OFF.

13. PWR XFER 1 and 2 switches -ON.

14. Cyclic trim indicators - Check GND position.

15. ENG COND levers - GND, ensure 2 minute cool down is met.

16. FUEL CONTR switches - Set.

17 ENG COND levers - STOP.

★*F 17.1 714A DECU SHUTDOWN BIT - Check.

18. Avionics - OFF.

O 18.1. HUD- OFF.

19. Radar altimeters - OFF.

F 20. MAINTENANCE PANEL - Check.

21. PWR XFER 1 and 2 switches - OFF after rotors have stopped.

21.1. 714A FADEC B/U PWR — OFF.

22. APU GEN switch — OFF.

23. APU switch-OFF.

24. Light switches-OFF as reqired.

25. BATT switch - OFF.
26. Ignition lock switch -OFF.
27. 712 EMERGENCY POWER panel - Check.

BEFORE LEAVING HELICOPTER

1. Walk around inspection - Perform.
F 2. Check fluid levels, bypass indicators and filter buttons, jam indicators, cabin and mission equipment secured, tiedowns, grounding cables, and covers.
3. Complete all forms and records.
4. Helicopter - Secure as required.

ENGINE

Dual Failure; Low Altitude/Low Airspeed

1. AUTOROTATE.
2. External cargo - Jettison.

Dual Failure; Cruise

1. AUTOROTATE.
2. External cargo - Jettison.
3. ALT switch - Disengage.
4. Deleted.

Single Engine Failure; Low Altitude/Low Airspeed

Continued flight & possible:

1. Thrust control - Adjust.
2. 712 ENGINE BEEP TRIM switch - RPM INCREASE as required.
3. External cargo - Jettison (if required).
4. ALT switch - Disengage.
5. Land as soon as practicable.
6. EMER ENG SHUTDOWN (when conditions permit).

Continued flight is not possible:

Land as soon as possible.

Engine Restart During Flight

1. APU - Start.
2. 712 ENG COND 1ever (inoperative engine) - STOP
2.1 714A ENG COND lever (inoperative engine) - STOP, then GND.
3. FIRE PULL handle - In.
4. All FUEL PUMP switches - ON.
5. XFEED switch - As required.
6. Starting engine - Perform.
7. APU - OFF.

712 Normal Engine Beep Trim System Failure (High Side) or N2 Governor Failure

1. Thrust control - Adjust as required to maintain RRPM within limits.
2. ENG COND lever (affected engine) - Adjust to a position between FLT and GND that will control RRPM.
3. ENGINE BEEP TRIM switch NO. 1 & 2 - Adjust as required.

Land as soon as practicable.

712 Normal Engine Beep Trim System Failure (Low Side or Static)

1. EMERG ENG TRIM switch (affected engine) - Adjust as required.
2. EMERG ENG TRIM AUTO/MANUAL switch (affected engine) - MANUAL.
3. EMERG ENG TRIM switch (affected engine) -Adjust in coordination with the ENGINE BEEP TRIM NO. 1 & 2 switch to obtain operating RRPM and match torque.

714A FADEC FAILURES

FADEC 1 or FADEC 2 Caution

1. FADEC INC-DEC beep switch (affected engine) -Match TQs.
2. Reduce rate of THRUST CONT lever change.
3. Land as soon as practicable.

714A FADEC 1 and FADEC 2 Cautions

1. FADEC ENG 1 and ENG 2 INC-DEC been switches - Beep to 100-perent. Match TQs.
2. Reduce rate of THRUST CONT lever change.
3. Land as soon as practicable.

714A REV 1 and/or REV 2 (WITH) FADEC LIGHT ON

If a malfunction to the high side occurs, perform the following:

1. THRUST CONT lever- Adjust.
2. FIRE PULL handle (affected engine) - Pull as required.
3. NR - Check 100 percent.
4. Land as soon as practicable.

714A REV 1 and/or REV 2 CAUTION (WITHOUT) FADEC LIGHT

1. Land as soon as practicable.

CAUTION

Do not manually select Reversionary mode on affected engine as uncontrolled power changes may occur.

714A Torque Measuring System Malfunctions

1. DC Torque circuit breakers - In
2. LOAD SHARE switch - Check. If switch is set to TRQ, proceed to step 3. If the switch is set to PTIT, proceed to step 4.
3. Load Share switch - Select PTIT.
4. Fuel flow - Monitor. 1896 PPH is equal to ap proximately 100% torque rotor speed.
5. Land as soon as practicable.
6. Verify that PTITs are matched.
7. Minimize power as practical.

Engine Transmission Clutch Fails To Engage

1. ENG COND lever (affected engine only) - STOP.

When N1 reaches zero (0):

2. ENG COND lever (engaged engine) - STOP.

Engine Shutdown - Complete Electrical Failure

F 1. FUEL VALVE #1 and #2 ENGINE-CLOSE.
2. Normal shutdown - Perfom.

Engine Shutdown — Condition Lever Failure

1. FIRE PULL handle (affected engine) — Pull.
2. Normal shutdown — Perform.

Engine Shutdown With APU or APU Generator Inoperative

1. No. 2 Engine — Perform a normal shutdown.
2. All unnecessary electrical switches (except BATT switch) — OFF.
3. GEN 1 and 2 switches — OFF.
4. ENG COND 1 lever — GND. Wait until PTIT decreases and then begins to increase; then move the ENG COND 1 lever to STOP.
5. ENG 1 START switch — MTR until rotors stop or PTIT is below 260°C.
6. Normal shutdown — Perform.

NO. 1 or NO. 2 ENG OIL LOW or NO. 1 or NO. 2 ENG CHIP DET Caution

Engine power is not required:

1. **EMER ENG SHUTDOWN** (affected engine).
2. Land as soon as practicable.

Engine power is required:

Land as soon as possible.

ROTOR, TRANSMISSION, AND DRIVE SYSTEMS

NO. 1 or NO. 2 ENG XMSN HOT Caution

1. **EMER ENG SHUTDOWN.**

F 2. **Affected engine transmission — Check.**

3. **Land as soon as possible.**

Transmission Debris Screen Latches

FWD, COMB, or AFT DEBRIS SCREEN indicator:

F **RESET/GND/TEST switch – RESET.**

If indicator does not reset:

Land as soon as possible.

LEFT or **RIGHT** DEBRIS SCREEN indicator:

F **RESET/GND/TEST switch – RESET.**

If indicator does not reset and engine power is not required then:

1. **EMER ENG SHUTDOWN.**
2. Land as soon as practicable.

If engine power is required:

Land as soon as possible.

Transmission Low Oil Pressure or High Temperature Indications

If abnormal pressure or temperature develop, monitor the XMSN OIL PRESS and XMSN OIL HOT caution capsules. Additional information may be obtained by monitoring the MAINTENANCE PANEL.

XMSN OIL PRESS Caution

FWD or **COMB (MIX)**:

1. Altitude – Descend to minimum safe altitude.
2. Airspeed – 100 KIAS or Vne whichever is slower.
3. Land as soon as practicable.

AFT or **AFT SHAFT**:

Land as soon as possible.

LEFT or **RIGHT**

Engine power is not required:

1. EMER ENG SHUTDOWN.
2. Land as soon as practicable.

Engine power is required

Land as soon as possible.

XMSN OIL PRESS and XMSN AUX OIL PRESS or XMSN CHIP DET Caution

Land as soon as possible.

XMSN AUX OIL PRESS Caution

MAIN XMSN (FWD, COMB (MIX), or AFT)

Main transmission oil pressure and temperature are abnormal:

Land as soon as possible.

Main transmission oil pressure and temperature are normal:

Land as soon as practicable.

XMSN OIL HOT Caution

FWD or COMB (MIX)

Land as soon as possible.

AFT transmission is indicated:

1. Electrical load - Reduce as much as possible.
2. Land as soon as possible.

LEFT or RIGHT

Engine power is not required:

1. EMER ENG SHUTDOWN.
2. Land as soon as practicable.

Engine power is required.

Land as soon as possible.

Torque Measuring System Malfunctions

1. AC and DC TORQUE circuit breakers - In.
2. N1 - Monitor when power changes are made or power outputs are matched.

3. Fuel flow indicator - Monitor 2,000 pounds per hour is equal to approximately 100% torque.

4. Land as soon as practicable.

FIRE

Engine Hot Start

1. ABORT START.

Residual Fire During Shutdown

1. ABORT START
2. FIRE PULL handle (affected engine) - Pull.

Auxiliary Power Unit (APU) Fire

1. APU switch - OFF.
2. ABORT START.

Engine or Fuselage Fire - Flight

1. Land as soon as possible.

F2. Engine fire confirm.

3. EMER ENG SHUTDOWN (affected engine).

After landing:

EMER ENG SHUTDOWN,

Engine Compartment, Fuselage or Electrical Fire - Ground

1. EMER ENG SHUTDOWN.
2. APU switch - OFF (if operating).
3. BATT switch - OFF.

Electrical Fire - Flight

1. Airspeed - 100 KIAS or Vne whichever is slower.
2. GEN 1 & 2 switches - OFF.
3. Land as soon as possible.

After landing:

4. **EMER ENG SHUTDOWN.**
5. **BATT** switch - **OFF.**

Smoke and Fume Elimination

1. **Airspeed - Above 60 KIAS.**
2. **Pilot's sliding window - Open.**
3. **Helicopter attitude - Yaw left, one half to one ball width** on turn and slip indicator.
4. **Upper half of main cabin door - Open.**
5. **Cargo loading ramp - Open.**
6. Copilot's sliding window - Closed.
7. NVG curtain - Open (if applicable).

FUEL SYSTEM

Aux Fuel Pump Failure

1. FUEL QUANTITY selector switch - Check.

If one or both fuel ranks have fuel remaining:

2. AC-DC FUEL PUMP circuit breakers - Check in.
3. FWD and AFT AUX FUEL PUMP switches (affected side) - OFF.
4. AUX FUEL PUMP switch - ON (each aux tank with fuel remaining).

If AUX PRESS indicating light remains on:

5. AUX FUEL PUMP switch(es) (inoperative pump(s)) - OFF. Monitor FUEL QUANTITY indicator for the affected tank.
6. AUX FUEL PUMP switch(es) - ON for operative pumps or OFF for inoperative pumps.

Fuel Venting

1. AUX FUEL PUMP switches (affected side) - OFF.
2. Main tank (affected side) - Monitor.

when 1,000 pounds of fuel remain:

3. AUX FUEL PUMP switches - ON (monitor fuel quantity).

When tank quantity reaches 1,600 pounds:

4. AUX FUEL PUMP switches - OFF.
5. Steps 2 through 4 - Repeat until auxiliary tanks are empty.

L or R FUEL PRESS Caution

1. XFEED switch - OPEN (above 6,000 feet PA).
2. FUEL PUMP(S) circuit breakers - Check in.

Pump(s) are operational - Proceed with step 3.

Pump(s) are not operational - Proceed with step 4.

3. XFEED switch - CLOSED.
4. FUEL PUMP switches - OFF (inoperative pump(s)).

Fuel Low Caution

1. Fuel quantity - Check individual tanks.
2. XFEED switch - As required
3. Land as soon as practicable.

Fuel Low and Fuel Pressure Caution

1. XFEED - CLOSED,
2. Land as soon as possible.

ELECTRICAL SYSTEM

NO. 1 or NO. 2 GEN OFF CAUTION

If bus tie exists:

1. GEN switch - OFF RESET, then ON.

If the caution remains on:

2. GEN switch- OFF.
3. Land as soon as practicable.

If no bus tie exists and a generator cannot be restored:

Land as soon as possible.

NO. 1 and NO. 2 GEN OFF Cautions

1. AFCS SYSTEM SEL switch - OFF.
2. PDPs-Check circuit breakers and gang bar down
3. Each GEN switch-OFF RESET, then ON.

Electrical power is restored (from either generator):

1. **PDP's-Gang Bar Up**
2. **Land as soon as practicable.**

Electrical power is not restored:

1. APU - Start.
2. APU GEN - ON.
3. Land as soon as possible.

NO. 1 or NO. 2 RECT OFF Caution

DC bus tie has occured:

1. PDP's - Check.
2. Land as soon as practicable.

DC bus tie has not occured:

Land as soon as possible.

NO. 1 and NO. 2 RECT OFF Cautions

1. AFCS SYSTEM switch - OFF.
2. PDPs - Check circuit breakers in.
3. DC equipment not required - OFF or pull out circuit breakers.
4. Land as soon as possible.

BATT SYS MAL Caution

1. BATT CHGR circuit breaker - Out then in.

If the BAT SYS MAL caution capsule remains on:

2. BATT switch - OFF.

HYDRAULIC

NO. 1 or NO. 2 HYD FLT CONTR Caution

Fluid loss is evident:

Land as soon as possible

Fluid loss is not evident:

1. PWR XFER 1 or 2 switch (affected system) - ON.

F2. MAINTENANCE PANEL - Monitor.

3. Land as soon as possible.

High fluid temperature is evident:

Land as soon as possible.

NO. 1 and NO. 2 HYD FLT CONTR Caution

1. PWR XFER 1 and 2 switches - ON.
2. Land as soon as possible.

UTIL HYD SYS Caution

Fluid loss is evident:

1. Isolation switch - OFF.
2. Land as soon as possible.

High fluid temperature is evident:

Land as soon as possible.

Fluid loss is not evident:

1. APU - Start.
2. Land as soon as practicable.

F3. MAINTENANCE PANEL - Monitor.

LANDING AND DITCHING

Emergency Descent

High Speed Straight Ahead Descent:

1. Thrust control - Lower.
2. Airspeed - Adjust.
3. Recovery -Initiate at or above 600 feet AGL

Out-of- Trim Descent:

1. Thrust control -Lower.
2. Airspeed -Adjust.
3. Trim -Adjust.
4. Recovery -Initiate at or above 600 feet AGL.

Low Speed Maneuvering Descent:

1. Thrust control - Lower.
2. Airspeed - Adjust.
3. Bank angle - Adjust.
4. Recovery - Initiate at or above **600** feet AGL.

LANDING IN TREES

Power on:

1. **Approach to a hover - 5 to 10 feet.**
2. **EMER ENG SHUTDOWN.**
3. **AUTOROTATE.**

Power off

4. **AUTOROTATE.**

Ditching - Power On

1. Land away from personnel in the water.
2. EMER ENG SHUTDOWN.

Ditching - Power Off

AUTOROTATE.

FLIGHT CONTROLS

Longitudinal Cyclic Trim (LCT) System Failure

If in AUTO mode:

1. **Airspeed - Adjust.**
2. CYCLIC TRIM switch - MANUAL.
3. FWD and AFT CYCLIC TRIM switches - Adjust for airspeed.

If LCT operation is not indicated:

FWD and AFT CYCLIC TRIM switches - RET for 30 seconds, before landing.

If in MANUAL mode:

1. **Airspeed - Adjust.**
2. CYCLIC TRIM switch - AUTO.

If normal LCT operation is not indicated:

1. CYCLIC TRIM switch - MANUAL.
2. FWD and AFT CYCLIC TRIM switches - RET both LCTs for 30 seconds before landing.

Single AFCS Failure - BOTH Selected

1. **Airspeed - Reduce** to 100 KIAS or Vne, whichever is slower.
2. **Altitude - Adjust** as required.
3. AFCS SYSTEM SEL switch - Isolate defective system.

If system is not isolated:

AFCS SYS SEL switch - **OFF.**

Dual AFCS Failure

AFCS SYSTEM SEL switch - **OFF.**

If IMC:

Land as soon as practicable.

Vertical Gyro (VGI) Malfunction

1. **Airspeed - 100 KIAS or Vne,** whichever is slower.
2. Affected VGI switch - EMER.
3. AFCS - Select remaining system.

Differential Airspeed Hold (DASH) Failure

Avoid nose high attitudes.

Cockpit-Control Driver Actuator (CCDA) Failure

1. THRUST CONT lever - Slip as required.

2. RAD ALT/BARO ALT switch - DISENGAGED.

ARMAMENT

Misfire

F 1. **Weapon - Point at safe area.**

F 2. **Bolt - Retract, remove cartridge.**

Runaway Gun

F **Break the ammunition feed belt.**

CARGO

Jettisoning External Cargo

Primary Method:

CARGO HOOK EMERG switch - REL ALL.

DUAL HOOK FAULT

Alternate Method. Helicopter equipped with **forward** and **aft** emergency release lever:

F 1. Mid hook emergency release handle (D ring) - Pull.

F 2. Forward and aft hook release lever - Pull aft.

DUAL HOOK FAULT

Alternate Method. Helicopter equipped with **forward, center,** and **aft** emergency release lever:

F Forward, center, and aft hook release lever - Pull aft.

ERFS II

Failure of Fuel Quantity Gauge

F Remove filler cap from filler opening and look into tank. Using a explosion proof flashlight or other sealed beam light source locate fuel tabs which are attached to inside of

column module at calibrated heights, in increments of 1/4, 1/2, and 3/4. Any tab covered with fuel will normally not be visible.

No or Slow Fuel Transfer to the Main Tanks

F 1. Manually operated fuel/defuel valve – Check CLOSED.
F 2. UNISEX COUPLINGS – Check OPEN.
F 3. Breakaway valves – Check OPEN and for fracture.
F 4. Pumps – Check for operation.
F 5. Tank circuit breakers on FUEL CONTROL PANEL – Check reset IN.
F 6. Ensure vent lines connected.

IN FLIGHT Emergency ERFS II Fuel Transfer to Main Tanks

F Using the FARE Fuel pump.

1. FARE pump module to rear ERFS II tank – Install.
2. STA 380 fuel transfer hose to rear ERFS II tank manifold hose – Disconnect.
3. ERFS II tank fuel manifold hose to FARE pump inlet – Connect.
4. FARE pump outlet to STA 380 fuel transfer hose – Connect.
5. "T" coupling on ERFS II tank – CLOSE.
6. FARE valve control handle – OFF LOAD position.
7. FARE pump – ON.
8. ERFS II tank manually operated fuel/defuel valve – OPEN.
9. ERFS II tank empty, fuel manifold "T" – CLOSE.
10. Next ERFS II tank fuel manifold "T" – OPEN.

11. Next ERFS II tank fuel/defuel valve – OPEN.
12. ERFS II tank fuel manifold "T" – CLOSE.
13. FARE pump – OFF.

FARE Pump Failure During Ground FARE Refueling Operation

F

1. Filters – Remove.
2. Overwiring nozzle – Install and use.
3. Manually operated fuel/defuel valves – OPEN.
4. ERFS II tank pumps – ON.

HOIST

1. Personnel – Clear.
2. CABLE CUTTER switch – ON.

DETAILED PROCEDURES

ERFS II

For each installed ERFS II Tank Assembly.

1. Tank restraint assembly – Check location and security.
2. Cavity overboard drain – Check connection and security of drain in use. Check drain not in use is capped.
3. Grounding cable – Check connection security.
4. Vent hose assembly – Check connection security. Ensure dust cover is secure on retention strap and connected to dust cap stowage connector.
- 5. Fuel transfer hose assembly – Check connection security; all Unisex valves OPEN.
- 6. Single point pressure refueling hose assembly – Check connection security; Unisex valve at ERFS II Tank CLOSED.
7. Electrical harness – Check connection security of J1.
8. Fuel quantity sensing wiring harness – Check connection security of J2.
9. Fuel/defuel vent valve – Check in the CLOSED position.
10. ERFS II tank sump fuel sample – Check before first flight of the day.
11. Filler cap – Check in place, closed, and locked.
12. ERFS II Fuel Control Panel – Check of set as follows:
    a. Electrical harness – helicopter receptacles to fuel control panel – Check connection security of J5.
    b. Electrical harness – fuel control panel to tank assembly – Check connection security of J1, J2, and J3.

c. Wiring harness – fuel quantity sensing – Check connection security of J4.

d. PUMP AC circuit breakers, six (6) each – Check in reset position on TANK 1, TANK 2, and TANK 3 (if installed).

e. PANEL POWER circuit breaker – Check in reset position.

f. PANEL LIGHTNING circuit breaker – Check in reset position.

g. PUMP switches – OFF on TANK 1, TANK 2, and TANK 3.

h. PRESS LOW lights, three (3) each – Press to test (aircraft power must be on to illuminate).

i. REFUEL VALVE – Check CLOSED.

j. PANEL illumination switch/rheostat – OFF.

k. FUEL QUANTITY switch – Set to 1, 2, 3 and TOTAL to check quantity in each tank (aircraft power must on to illuminate).

HYDRAULIC COMPARTMENTS CHECKS

AFT COMPARTMENT

1. Condition and security of lines and coolers.
2. No. 2 flight control system accumulator for proper indication (see chart this section).
3. Utility reservoir pressurization accumulator for **2500** to **3500** psi charge.

FORWARD COMPARTMENT

1. Condition and security of lines and coolers.
2. No. 1 flight control system accumulator for proper indication (see chart this section).

OVERHEAD SWITCHES AND CONTROL PANELS

*1. EXT LTG switches – As required.
*2. CPLT LTG switches – As required.
3. COMPASS switch – As required.
4. TROOP WARN switches – OFF.
5. HTG switches – As required.
6. W/S WIPER switch – OFF.
7. ELECT switches – OFF.
*8. LTG switches – As required.
*9. FUEL CONTR switches – Set as follows:
   a. XFEED switch – OPEN.
   b. REFUEL STA switch – OFF.
   c. L MAIN FUEL PUMP switches – ON.
   d. All remaining FUEL PUMP switches – OFF.
10. 712 START switches – OFF.
11. ENG COND levers – STOP.
*11.1 714A FADEC switches – Check or set as follows:
   a. B/U PWR switch – OFF.
   b. LOAD SHARE switch – TQ.
   c. 1 and 2 PRI/REV switches – PRI.
   d. NR% switch – 100.
*12. INTR LTG switches – As required.
*13. PLT LTG – As required.
14. ANTI-ICE switches – OFF.
15. HOIST switches – OFF.
16. CARGO HOOK switches – Set as follows:
   a. MSTR switch – OFF.
   b. HOOK SEL switch – As required.
   c. EMERG REL ALL switch – OFF, Cover down.
17. HYD switches – Set as follows:
   a. PWR XFER switches – OFF.
   b. FLT CONTR switch – BOTH.

c. BRK STEER switch – ON, Cover down.

d. RAMP PWR switch – ON.

e. RAMP EMER switch – HOLD, Cover down.

*APU START

1. BATT switch – ON.
2. Fire guard – Posted.
3. APU – Start as follows:
   a. APUY switch – RUN for **3** to **5** seconds.
   b. APU switch – START for **2** seconds, then RUN.
   c. APU ON indicating light – Check on.
4. UTIL HYD SYS caution – Check out within **30** seconds after APU ON light.
5. APU GEN switch – ON NO.1 and 2 RECT OFF and L and R FUEL PRESS caution capsules out.
6. PWR XFER 1 & 2 switches – ON. Check HYD FLT CONTR caution capsules out.

CARGO HOOK OPERATIONAL CHECK

1. CARGO HOOK MSTR switch – ARM.
2. CARGO HOOK SEL switch – FWD.

3. CARGO HOOK RELEASE switch (pilot's cyclic) — Press.
4. CARGO HOOK SEL switch — MID.
5. CARGO HOOK RELEASE switch (copilot's cyclic) — Press.
6. CARGO HOOK SEL switch -AFT.

F7. CARGO HOOK switch on HOIST OPERATORS PANEL-ARM.

F8. CARGO HOOK RELEASE switch (WINCH/HOIST CONTROL GRIP) — Press.

9. CARGO HOOK MSTR switch — RESET and release to OFF, then set to ARM.
10. CARGO HOOK SEL switch -TANDEM.
11. CARGO HOOK RELEASE switch (pilots cyclic) — Press.
12. CARGO HOOK MSTR switch — RESET and release to OFF, then set to ARM.
13. CARGO HOOK SEL switch — ALL.
14. CARGO HOOK RELEASE switch (copilots cyclic) — Press.
15. CARGO HOOK MSTR switch — RESET and release to OFF.
16. CARGO HOOK RELEASE switch — Press.

FLIGHT CONTROL TRAVEL AND HYDRAULICS

Flight control travel and hydraulics —

NOTE

Mixing of flight control inputs during ground operation on a single hydraulic system should be avoided.

Check as follows:

Check each individual flight control hydraulic system as follows. With slow smooth flight control inputs, check each axis individually through full travel for smoothness of operation.

Check caution capsules as the check is being performed. If the flight controls are moved rapidly or erratically during the control check, unusual vibrations may be felt, or flight boost hydraulic pressure fail indications may result.

FLT CONTR switch — Both.

With slow smooth flight control inputs, check cyclic for freedom of movement while mixing pitch, roll, and yaw axis inputs.

Check for a minimum of 7 inches forward and 4 inches aft travel.

Position the cyclic and pedals at neutral, thrust at ground detent.

714A DECU PRESTART BIT

1. B/U PWR switch -On.
2. Wait until ENG FAIL, FADEC, and REV Lights go out.
3. ENG COND levers — GND.

F 4. DECU -display 88.

ENGINE START (EITHER ENGINE)

712 First engine — Start as follows:

1. L and R FUEL PRESS lights — Check out.
2. ENG COND lever-STOP.
3. ENG START switch — MTR.
4. Motor engine to a minimum of **15% N1.** Set ENG COND lever — GND; ENG START switch to START immediately.

5. Release START switch to MTR before ptit reaches 200°C. When n1 is 50%, set START switch to OFF. Check STARTER ON light out.
6. Engine instruments-Check when stabilized at ground idle (N1 at 60 to 63%). Check engine oil pressure for 20 psi minimum. The engine should accelerate to ground idle speed within 45 seconds.

714A First engine — Start as follows:

1. ENG START switch — Select engine to be started and hold until N1 accelerates to 10%, then release switch.
2. Engine should accelerate to ground idle (50 to 59%) within 45 seconds.
3. Transmission oil pressures — Check increasing.
4. Engine oil pressure — Check 5 psi minimum.
5. P3 BELLOW -Check as follows:
   a. FADEC PRI-REV switch (started engine) — REV.
   b. N1 — Maximum change ± 3%.
   c. FADEC PRI-REV switch (started engine) — PRI.

714A DECU START BIT

1. ENG COND levers — Retard 5°.
2. DECU display — Check display read 88.
3. ENG COND levers — FLT.

714A FADEC Reversionary system — Check First flight of day.

1. FADEC 1 and 2 PRI-REV switches — PRI.
2. NR% selector switch — 100%.

3. FADEC 1 — Check as follows:
   a. FADEC 1 PRI-REV switch — REV.
   b. FADEC 1 INC - DEC switch — DEC. Check for decrease in No. 1 engine N1 and torque, and corresponding increase in No. 2 engine N1 and torque.
   c. FADEC 1 INC - DEC switch — INC. Check for increase in No. 1 engine N1 and torque, and corresponding decrease in No. 2 engine N1 and torque.
   d. FADEC 1 PRI-REV switch — PRI.
4. Repeat check for FADEC 2.

714A Power Assurance Check (PAC) — Perform first flight of day:

1. NR% switch — 100%.
2. ENG 1 ENG COND lever -Adjust.
3. THRUST CONT lever — Raise until TRQ reads 60% to 80%. Stabilize for 30 seconds.

F 4. TEST switch ENG 2 — PWR ASSURANCE Check DECU display. Compare displayed value with the PAT Trigger Value. Record the results.

5. THRUST CONT lever — Adjust.
6. ENG 1 ENG **COND** lever — FLT.
7. Repeat check with ENG 2 ENG COND lever.

Second engine — Start by using the same method as first engine.

FUEL PUMP AND XFEED CHECK

FUEL PUMP and XFEED check operation as follows:

1. All FUEL PUMP switches -OFF. Check L and R FUEL PRESS caution capsules should come on.

2. L AFT MAIN FUEL PUMP switch ON. Check L and R FUEL PRESS caution capsules should go out. Then switch OFF.

3. Remaining MAIN FUEL PUMP switches Check as in step 2 above.

4. L AFT AUX FUEL PUMP switch ON. Check L AUX PRESS light on overhead panel comes on, then goes out. Set pump switch to OFF.

5. Remaining three AUX FUEL PUMP s Check as in step 4., except check R AUX PRESS light on, then off, for R AUX FUEL PUMP switches.

Engine Fire Extinguisher Bottles Pressures

AMBIENT TEMPERATURE (C)	MINIMUM INDICATION (PSI)	MAXIMUM INDICATION (PSI)
-540	271	344
-51°	275	350
-40°	292	370
-29°	320	400
-18°	355	437
-70	396	486
4°	449	540
150	518	618
27°	593	702
380	691	784
520	785	902

AN/ASN-149(V) NAVIGATION SET (GPS) START-UP

1. Set mode switch to INIT.
2. Ensure data transfer module (if required) is programmed with current data, then insert into data transfer module receptacle.
3. Set data switch to VAR-DTM.
4. Check display line 1. If WP is displayed, press WP key.
5. Check map datum on map in use. Refer TM 55-1520-240-10, Chapter 3, Table 3-16. Compare map datum (DTM) code displayed on display line 3 with Table 3-16 map datum code. If displayed DTM code is incorrect, enter correct DTM code on display line 3.
6. Set data switch to POS.
7. Check latitude/MGRS zone displayed on display line 2. If displayed position and actual position differ by more than 60 miles or 100 kilometers, enter correct position on display line 2.
8. Check longitude/MGRS coordinates displayed on display line 3. If displayed position and actual position differ by more than 60 miles or 100 kilometers, enter correct position on display line 3.
9. Check altitude on display line 4. If displayed versus actual altitude differ by more than 656 feet (FT) or 200 meters (M), enter correct altitude on display line 4.
10. Set data switch to TRK-GS.
11. Press slew key.
12. Check Zulu time displayed on display line 2. If displayed versus actual Zulu time differ by more than 1 minute, enter correct time on display line 2.

13. Check year (YR) and day of year (DOY) on display line 4. If displayed versus actual YR and DOY differ, enter actual values for YR and DOY on display line 4.

14. Set data select switch to MSN.

15. Check display line 3; if *DOP ONLY displayed, press line select key 3.

16. Check display line 4; if *GPS ONLY displayed, press line select key 4.

17. Press slew key.

18. Check display line 4; if ←BARO is displayed, press line select key 4.

19. Remove data transfer module from data transfer module receptacle if installed.

20. Set mode switch to NAV.

21. Set data switch to STAT.

22. Check number of satellite measurements (SAT) being used in the navigation solution and estimated position error (EPE) on display line 3. GPS is ready for operation when four satellite measurements are being used and EPE is appropriate for your mission, approximately 3 minutes. If only three satellites are available, GPS may be prepared for use by entering an altitude estimate. Altitude can be entered by setting the data switch to POS and entering the altitude estimate. M will be displayed to left of altitude display indicating that an altitude may be entered. If an altitude has been entered AHLD (altitude hold) will alternate with FM while the entered altitude is being used. M and AHLD will be automatically dropped when four satellites are acquired. Manual altitude hold may be dropped by pressing line select key 4 twice.

23. If Selective Availability/Antispoofing (SA/AS) protection is desired for the mission, keys should have been loaded thru either the data transfer module (ref. step 2) or manually. The only way to check for key entry is by performance of the GPS set.

    a. If figure of merit (FM) on display line 1 is higher than expected, satellite system SA may be enabled with no or incorrect keys loaded.

    b. Set data switch to STAT and mode switch to NAV. Slew down to page 4. Display line 3 shows frequency (FC) link codes. These codes should be IP or 2P. If they are IC or 2C, satellite system AS may be enabled with no or incorrect keys loaded.

AN/ASN-149(V) NAVIGATION SET (GPS): NORTH REFERENCE, COORDINATE SYSTEM, UNITS OF MEASUREMENT, ALTITUDE REFERENCE AND LEVER ARM SELECTION North Reference Set as follows:

1. Set mode switch to INIT or NAV.

2. Set data switch to OPT.

3. Check display line 1. If WP is displayed, press WP key.

4. Press line select key 2 to select a desired north reference: TRUE, GRID, or MAG (magnetic).

5. Check convergence factor (CF) displayed on display line 3. If the displayed convergence factor is different than the convergence factor of the map datum in use, enter new convergence factor on display line 3.

Coordinate System - Set as follows:

1. Set mode switch to INIT or NAV.
2. Set data switch to OPT.
3. Press line select key 4 until desired coordinate system is displayed on display line 4:

   L/L SECONDS - Latitude/longitude in degrees, minutes, seconds, and tenths of seconds.

   LIL MINUTES - Latitude/longitude in degrees, minutes, and thousandths of minutes.

   MGRS - Military grid reference system.

Units Of Measurement and Altitude Reference Set as follows: 1. Set mode switch to INIT or NAV.

2. Set data switch to OPT.
3. Press slew key.
4. Press line select key 1 to select FT (feet) or M (meters) for altitude (ALT) and estimated position error (EPE) displays.
5. Press line select key 2 to select NM (nautical miles) or KM (kilometers) for distance (DIS) displays.
6. Press line select key 3 to select KTS (knots) or KPH (kilometers per hour) for speed (VEL) displays.
7. Press line select key 4 to select mean sea level (MSL) or map datum (DTM) for altitude (ALT) reference.

Lever Arm - Set as follows:

1. Set mode switch to INIT or NAV.
2. Set data switch to OPT.
3. Press and release slew key until LA SRC is displayed on line 2.

4. Check lever arm source (LA SRC) on line 2:

   ANT antenna

   CDU C-11702/UR (Control/Display Unit) DL data loader HF aircraft external navigation equipment

5. Check status of LA SRC on line 3:

   AVAILABLE Indicates data is available for the LA SRC displayed on line 2, but is not currently being used. NO DATA Indicates no data is available for LA SRC displayed on line 2.USING Indicates LA SRC displayed on line 2 is being used for lever arm input. DEFAULT Indicates GPS has no LA SRC in memory. The default lever arm data source is the antenna. To select the antenna, press line select key 3. Display line 3 will automatically change from DEFAULT to USING. If line select key 3 is not pressed, the GPS will automatically select the antenna as the LA SRC.

6. Select desired LA SRC on display line 2 by pressing line select key 2.

7. Press and release slew key until CW is displayed on line 1.

8. Enter 08 on line 1.

9. Check current up/down (+=up, =down) lever arm displayed in meters (M) on line 2.

10. Enter 09 on line 1.

11. Check current fore/aft (+ =fore, =aft) lever arm displayed in meters (M) on line 2.

12. Enter 10 on display line 1.

13. Check current left/right (+ =left, =right) lever arm displayed in meters (M) on line 2.

14. Enter 05 on line 1.

15. Enter desired up/down (+ =up, =down) lever arm displayed in meters (M) on line 2.

16. Enter 06 on line 1.

17. Enter desired fore/aft (+ =fore, =aft) lever arm displayed in meters (M) on line 2.

18. Enter 07 on line 1.

19. Enter desired left/right (+ =left, =right) lever arm displayed in meters (M) on line 2.

ENTERING STATIONARY WAYPOINTS (MANUAL)

1. Ensure mode switch set to NAV or INIT.

2. Set data switch to VAR-DTM.

3. Check display line 1. If > is displayed, press WP key.

4. Enter waypoint (WP) number (1 thru 209) for waypoint to be defined on line 1.

5. Enter waypoint magnetic variation (VAR) on display line 2. First character must be E (east) or W (west).

6. Enter waypoint map datum (DTM) code on line 3. Map datum codes are listed in Table 316, TM 55-1520-240-10, Chapter 3).

7. Set data switch to POS.

8. Enter waypoint latitude or MGRS grid zone on display line 2.

9. Enter waypoint longitude or MGRS coordinates on display line 3.

10. Enter waypoint altitude on display line 4.

11. Press slew key.

12. Enter waypoint alphanumeric identifier on display line 2 (six characters maximum).

13. Enter NAVAID frequency or channel on display line 3. Allowable NAVAID frequencies are:

    VOR 108.00 to 117.99
    TACAN IX to 126X and 1Y to 126Y.
    NDB 1. to 9999.
    Decimal point must be entered for VOR or NDB frequencies 14. Set data switch to DTK-VA.

15. Enter desired track (DTK) to waypoint as referenced to true (T), grid (G), or magnetic (M) north on display line 2.

16. Press slew key.

17. Enter vertical angle (VA) from present position to waypoint on display line 2.

ENTERING MOVING WAYPOINTS (MANUAL)

1. Ensure mode switch set to NAV or INIT.

2. Set data switch to VAR-DTM.

3. Check display line 1. If I> is displayed, press WP key.

4. Enter waypoint (WP) number (I thru 209) for waypoint to be defined on line 1. 5. Enter waypoint magnetic variation (VAR) on display line 2. First character must be E (east) or W (west).

6. Enter waypoint map datum (DTM) code on line 3. Map datum codes are listed in Table 316, TM 55-1520-240-10, Chapter 3).

7. Set data switch to POS.

8. Enter waypoint latitude or MGRS grid zone on display line 2.

9. Enter waypoint longitude or MGRS coordinates on display line 3.

10. Enter waypoint altitude on display line 4.

11. Press slew key.

12. Enter moving waypoint alphanumeric identifier. Alphanumeric identifier can be a maximum of six characters.

13. Enter NAVAID frequency or channel on display line 3. Allowable NAVAID frequencies are:

    VOR 108.00 to 117.99 TACAN 1X to 126X and 1Y to 126Y
    NDB 1. to 9999.
    Decimal point must be entered for VOR or NDB frequencies

14. Set data switch to TRK-GS.

15. Enter moving waypoint track C(TRK) referenced to true (T), grid (G), or magnetic (M) north on display line 2.

16. Enter moving waypoint ground speed (GS) in knots (KTS) or kilometers per hour (KPH) on display line 3.

NOTE

Time of Fix (TOF) is the time at which the waypoint was at the position coordinates, altitude, TRK, and GS just entered; or The starting time for the waypoint to begin moving.

17. Press slew key.

18. Enter time of fix (TOF) of moving waypoint on display line 2.

19. Enter year (YR) and Julienne date (day of year) (DOY) on display line 4.

20. Set data switch to POS.

21. Check display line 1. If t> is displayed, press WP key.

22. Press slew key.

23. Enter waypoint number on display line 4 where waypoint data is to be moved.

ENTERING WAYPOINTS BY BEARING, RANGE, AND ELEVATION ANGLE (MANUAL)

1. Ensure mode switch set to NAV or INIT.

2. Set data switch to POS.

3. Check display line 1 If [> is selected, press WP key.

4. Enter waypoint (WP) number (1 thru 209) for waypoint to be defined on display line 1

5. Set data switch to DIS-TG.

6. Enter bearing (BRG) to waypoint referenced to true (T), grid (G), or magnetic (M) north on display line 4.

7. Enter range (RNG) in kilometers (KM) or nautical miles (NM) on display line 2.

8. Enter elevation angle (EL ANG) on display line 3.

9. Enter reference waypoint number or alphanumeric identifier on display line 4.

10. Press slew key to return to normal DIS-TG display.

11. Set data switch to POS.

12. Press slew key.

13. Enter waypoint alphanumeric identifier on display line 2. Alphanumeric identifier can be a maximum of six Characters.

14. Enter NAVAID frequency or channel on display line 3. Allowable NAVAID frequencies are:

    VOR 108.00 to 117.99
    TACAN 1X to 126X and 1Y to 126Y NDB 1. to 9999.
    Decimal point must be entered for VOR or NDB frequencies.

CHECKING WAYPOINTS

1. Ensure mode switch set to NAV or INIT.
2. et data switch to POS.
3. heck display line 1 If D> is selected, press WP key.
4. Enter waypoint (WP) number, alphanumeric identifier, or NAVAID frequency of channel on line 1.
5. Check waypoint (WP) identifier displayed on line 1.
   a. If incorrect, press line select key 3 (NEXT) for next waypoint with the same frequency or channel.
   b. If correct, press line select key 4 (USE) to return to normal display.
6. Check waypoint position coordinates and altitude on display lines 2, 3, and 4.
7. Press slew key.
8. Check waypoint number on display line 1, alphanumeric identifier on display line 2, and NAVAID frequency or channel on display line 3.
9. Set data switch to VAR-DTM.
10. Check magnetic variation (VAR) on display line 2 and map datum (DTM) code on display line 3. If no magnetic variation is stored display line 2 will display dashes (--).
11. Set data switch to DIS-TG.

12. Check great circle distance (DIS) to waypoint on display line 2; time to go (TG) to waypoint in days, hours, minutes, and seconds on display line 3; and bearing (BRG) to waypoint on display line 4.

13. Press slew key.

14. Check slant range (RNG) to waypoint on display line 2.

15. Set data switch to TRK-GS._

16. Check ground track (TRK) on display line 2 and ground speed (GS) for the moving waypoint (*REND operation only) on display line 3.

17. Press slew key.

18. Check starting time of fix (TOF) for moving_ waypoint (*REND operation only) on display line 2 and year (YR) and day of year (DOY) for the starting time on display line 4. Display line 3 always displays YR and DOY as label references for line 4.

19. Set data switch to DTK-VA.

20. Check desired track (DTK) to rendezvous with moving waypoint (*REND operation only) or desired track (DTK) stored with stationary waypoint on display line 2. If no DTK is stored, display line 2 will display dashes (---).

21. Press slew key.

22. Check vertical angle (VA) to moving waypoint (*REND operation only) or vertical angle stored with stationary waypoint on display line 2. If no VA is stored, display line 2 will display dashes (---).

DISPLAYING PRESENT POSITION

1. Set mode switch to NAV.

2. Set data switch to POS.

3. Check display line 1. If WP is displayed, press WP key.

4. Read present position:

   Display line 2 - Latitude or MGRS zone
   Display line 3 - Longitude or MGRS coordinates
   Display line 4 - Altitude in feet (FT) or meters (M), referenced to mean sea level (MSL) or datum (DTM).
5. If manual altitude hold is desired, enter present altitude estimate on display line 4. M will continue to be displayed and AHLD will alternate with FM.
6. Set data switch to OPT.
7. Press and release slew key until STATIONARY is displayed on display 1.
8. Check display line 1, if -STATIONARY displayed press line select key 1.
9. Set data switch to POS.
10. Repeat steps 4 and 5.
11. Set data switch to OPT.
12. Press and release slew key until *STATIONARY is displayed on display line 1.
13. Press line select key 1.

AREA NAVIGATION (RNAV)

1. Set mode switch to NAV.
2. Set data switch to POS.
3. Check display line 1. If Iis displayed, press WP key.
4. Check display line 1. If waypoint (WP) number, alphanumeric identifier, NAVAID frequency or channel displayed is the next steer-to-destination go to step 7. If waypoint (WP) number, alphanumeric identifier, NAVAID frequency or channel displayed is not the next steer-to-destination go to step 5.

5. Enter waypoint (WP) number, alphanumeric identifier, NAVAID frequency or channel of steer-to-destination on display line 1. If multiple waypoints were entered that have the same NAVAID frequency or channel, go to step 6. If not, go to step 7.
6. Check alphanumeric identifier displayed on display line 1.
   a. If incorrect, press line select key 3 (NEXT) for waypoint with the same frequency or channel.
   b. If correct, press line select key 4 (USE) to return to normal display.
7. Check waypoint position coordinates and altitude to be sure that the correct waypoint is displayed.
8. Press WP key. The I> will be displayed on display line 1; present position coordinates and altitude will be displayed on display lines 2, 3, and 4.
9. Check steer-to destination number on display line 1. If not correct, enter correct steer-to destination number on display line 1.
10. Set data switch to MSN.
11. Check mission profile. If waypoint is not moving, RNAV mission profile should be selected (TREND displayed). If waypoint is moving, rendezvous mission profile should be selected (*REND displayed). Press line select key 2 until correct profile is displayed on display line 2.
12. Set data switch to DIS-TG.
13. Read great circle distance (DIS) in nautical miles (NM) or kilometers (KM) to destination on display line 2.
14. Read time-to-go (TG) on display line 3.
15. Read bearing (BRG) to destination referenced to true (T), grid (G), or magnetic (M) north on display line 4._

16. Press slew key.
17. Read slant range (RNG) in nautical miles (NM) or kilometers (KM) to destination on display line 2.
18. Set data switch to DTK-VA.
19. Select source of desired track (DTK) by pressing line select key 3. Sources are:

USING OE DTK - Using operator entered DTK. If selected and there is no operator entered DTK, display line 2 will display dashes (---). A DTK may be entered by completing step 21 on display line 2. A DTK may be cleared by pressing line select key 2 twice. Display line 3 will automatically display USING OE DTK if an entry has been made on display line 2.

USING WP DTK - Using DTK entered during waypoint entering (Table 3-10, TM 55-1520-240-10, Chapter 3). If DTK was not entered, display line 2 will display dashes (---).

TO-TO NAV - Using FROM waypoint entered on display line 4 and the destination to define a great circle path as the desired course. If no valid FROM waypoint is entered (by completing step 20), display lines 2 and 4 will display dashes (-). Display line 3 will automatically display TO-TO NAV if a valid FROMwaypoint has been entered on display line 4.

DIRECT-TO - Using present position to destination great circle desired track. Gives desired track (DTK) defined by the great circle path from the present position to the destination.

20. Enter desired waypoint (WP) number or alphanumeric identifier on display line 4.
21. Enter desired track (DTK) display line 2.
22. Read desired track (DTK) display line 2.
23. Press slew key.
24. Select source of vertical angle (VA) by pressing line select key 3. Sources of VA are:

    USING OE VA - Using operator entered VA. If selected and there are no operator entered VA, display line 2 will display dashes (---). A VA may be entered by completing step 25 on display line 2. A VA may be cleared by pressing line select key 2 twice. Display line 3 will automatically display USING OE VA if an entry has been made on display line 2.

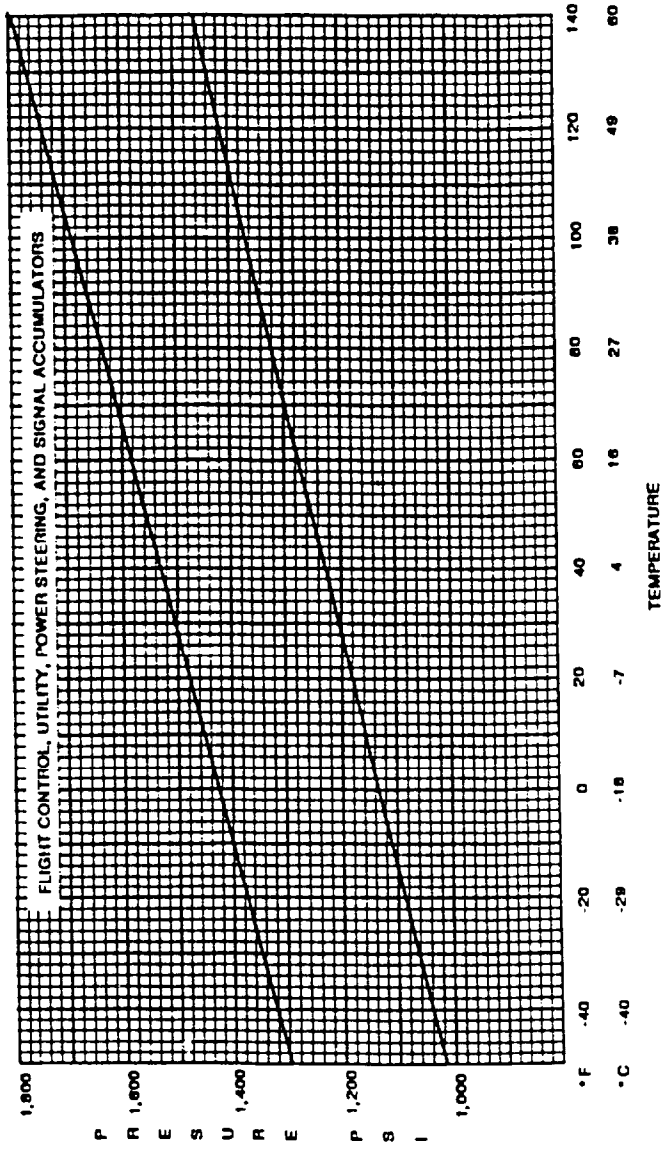
    USING WP VA - Using the VA entered during stationary waypoint entering (Table 3-10, TM 55-1520-240-0, Chapter 3). If VA was not entered, display line 2 will display dashes (---).

    NO VA USED - No VA computation made or desired. If VA is not desired, go to step 27.
25. Enter vertical angle (VA) on display line 2.
26. Read vertical angle (VA) on display line 2.
27. Set data switch to ERR.
28. Read crosstrack error (XTK) left (L) or right (R) of desired course in nautical miles (NM) or kilometers (KM) on display line 2.
29. Read track angle error (TKE) in degrees left (L) or right (R) of desired track on display line 3.
30. Read vertical error (VE) in meters (M) or feet (F) above (+) or below (-) desired vertical angle (VA) on display line 4.
31. Set data switch to TRK-GS.

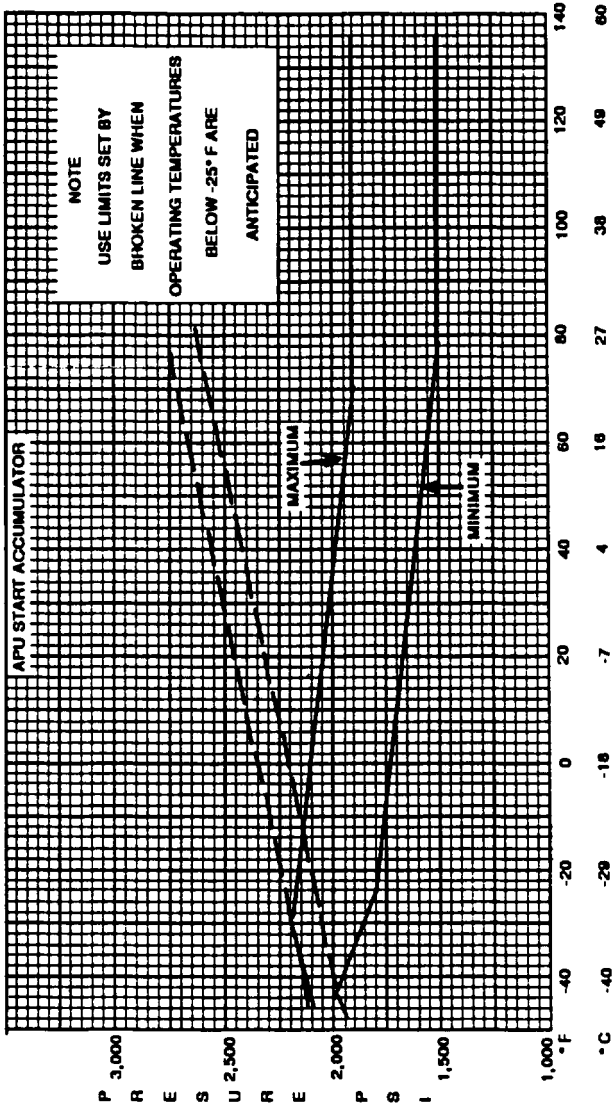
32. Read present ground track (TRK) referenced to true (T), grid (g) or magnetic (M) north on display line 2.
33. Read present ground speed (GS) in knots (KTS) or kilometers per hour (KPH) on display line 3.

TSEC/KY-100 KEY CHECK

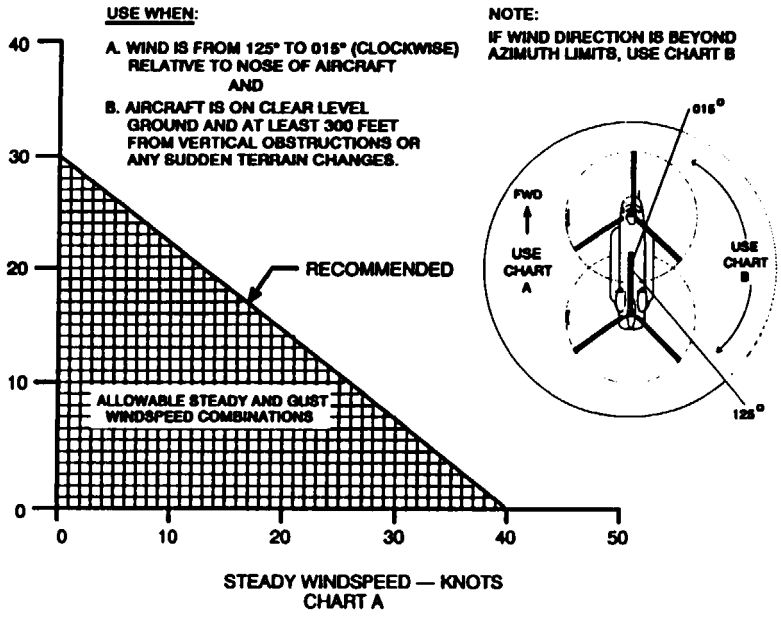
1. PRESET switch - MAN (to turn on unit).
2. If **CLD START** displayed on turn-on, no keys are loaded. Do not continue with steps 3 or 4.
3. MODE switch - OFFLINE.
4. Use ↑ or → pushbutton until KEY OPS is displayed. Press INIT and scroll thru KEY OPS sub-menus until **UPDATE** is displayed. Press INIT, **UDTN** ## is displayed (N = **key** and ## = update count). Repeatedly press ↑ or → until all keys checked. Rotate MODE switch out of OFFLINE to exit key check operation.



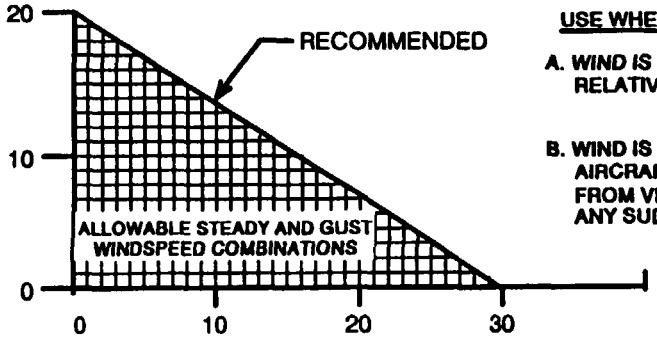
Flight Control, Utility System, Power Steering, and Signal Accumulators Precharge Limits



APU Start Accumulator Precharge Limits



Rotor Blade Start-Up & Shutdown Limits
(Sheet 2 of 2)



Rotor Blade Start-Up & Shutdown Limits
(Sheet 2 of 2)

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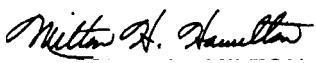
General, United States Army
Chief of Staff

Official:



MILTON H. HAMLITON
Administrative Assistant to the Secretary of the Army
01624

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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigrams = .035 ounce
1 dekagram = 10 grams = .35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

PIN: 052069-012