CH-47 AIRCRAFT MAINTENANCE TEST FLIGHT HANDBOOK

LIST OF CHARTS

- Pedal Split Conversion Chart
- Engine Fire Extinguisher Pressures
- CH-47A Cockpit Controls Position Envelope
- CH-47B Cockpit Controls Position Envelope
- CH-47C Cockpit Controls Position Envelope
- Power Topping T55-L-5
- Power Topping T55-L7/7B
- Power Topping T55-L7C (66:1)
- Power Topping T55-L7C (64:1)
- Interstage Air Bleed Band Closure

LOCATED AFTER EMERGENCY PROCEDURES

1 October 1969
CH-47 AMTPC

BEFORE EXTERIOR CHECK

Required paperwork completed and log book and records checked
Weight and balance forms checked (Compute if necessary)
Flight crew briefing on purpose and objectives of flight
BATTERY switch OFF

EXTERIOR CHECK

Entrance Door
1. Condition — CHECK
2. Upper section escape panel — CHECK secure

General Inspection
1. Protective covers — REMOVED
2. Blade tiedowns — REMOVED
3. Wheels — CHOCKED
4. Fuel leakage — CHECK
5. Area — Clear of obstructions and loose objects

Right Cabin Fuselage Section
1. AC power equip compartment
   a. Equipment — CHECK
   b. Door — LATCHED
2. Fwd Aux Fuel Tank — CHECK leakage, servicing, and cap secure
3. Static port — CHECK
4. Fuel vents — CHECK clear
5. Navigation light — CHECK condition
6. Forward landing gear support structure — open access panel — CHECK for cracks or distortion
7. Forward landing gear — CHECK the following:
   a. Tires for inflation, condition, and ply rating
   b. Shock strut for inflation
   c. Hoses and wheel brake assembly for leakage, chafing, and security
   d. Fwd Aux fuel tank electrical connections and fuel lines — CHECK condition and security
   e. Close access panel
8. Fuel main tank — CHECK leakage, required servicing, and cap secure
9. Fuselage skin — CHECK for dents, wrinkles, and loose or missing rivets
10. Fuel vents — CHECK clear
11. Aft aux fuel tank — CHECK leakage, servicing, and cap secure
12. Windows — CHECK for cracks and cleanliness
Top of Fuselage

1. Forward rotor — CHECK lag damper lockouts removed, security of components, oil level in all reservoirs, forward and aft blades for damage, sight cups ("A" Model only). Rotor — Phasing marks alignment, droop stops, pitch links, swashplate, upper boost actuators for condition security and leakage, and speed trim actuator for condition

2. SAS Port and Lines — CHECK condition and security "A" Model only

3. Forward transmission — CHECK for servicing

4. Hydraulic filter buttons and hydraulic lines — CHECK

5. First and second stage mixing units — CHECK for condition and security

6. Synch shaft adapter — CHECK

7. Forward pylon fairing — CHECK secure

8. Drive shafting, lord mounts, Thomas couplings, and support brackets — CHECK for condition, security, and foreign objects

9. Push-pull tubes, bellcranks, oil lines, hydraulic lines and electrical wiring — CHECK for condition and security

10. Drive shaft fairing — CHECK secure

11. Formation lights — CHECK condition
CH-47 AMTPC

12. Top of fuselage — CHECK for foreign objects
13. Fuselage skin — CHECK condition
14. No. 1 engine — CHECK as follows:
   a. Inlet cover removed
   b. Inlet for foreign objects
   c. Oil level and cap secure
   d. Fairing secure
   e. Tailpipe for cracks, hot spots, security, and cover removed
   f. Power turbine section, ignitors, and fire warning system
15. Aft rotor — CHECK as follows:
   a. Lag damper lockouts removed
   b. Oil levels in all reservoirs, sight cups ("A" Model only) for oil
   c. Droop stops, pitch links, swashplate, upper boost actuators, and speed trim actuator
   d. Thrust bearing — CHECK condition
16. Upper boost actuator safety blocks — REMOVED
17. Aft transmission — CHECK condition
18. Hydraulic filters, reservoirs and lines — CHECK for condition and security
19. Rotor phasing marks — CHECK for proper alignment
20. Anti-collision and formation lights — CHECK
21. Combining transmission area — CHECK as follows:
   a. Oil coolers and lines
   b. Servicing
   c. Phasing mechanism
   d. Engine to transmission drive shafting
22. Doors and covers — SECURE
23. No. 2 engine — CHECK same as No. 1 engine

Aft Pylon Section
1. Aft landing gear support structure — CHECK for cracks or distortion
2. Aft landing gear — CHECK the following:
   a. Tires for inflation and condition
   b. Tires for ply rating
   c. Shock strut for inflation and static lock unlocked
   d. Power steering actuator, wheel brakes, and hoses for leakage, chafing, and security
   e. Electrical connections for condition and security
3. All access doors and covers — SECURE
4. Ramp control — As required and close access door
5. Hydraulic system test panel — CHECK all caps secure
6. Hydraulic oil cooler air inlet — CHECK clear
7. Fluid vent and drain lines — CHECK clear
8. APU air inlet — CHECK clear
9. Cargo loading ramp — CHECK condition
10. APU exhaust outlet — CHECK cover removed and outlet clear
11. Navigation light — CHECK condition
12. Fluid vent and drain lines — CHECK clear
13. All access doors and covers — CHECK secure
14. Aft landing gear support structure — CHECK for cracks or distortion
15. Aft landing gear — CHECK the following:
   a. Tires for inflation, condition, and ply rating
   b. Static ground wire secure and contacting the ground
   c. Shock strut for inflation and static lock unlocked
   d. Hoses and wheel brake assembly for leakage, chafing, and security

**Left Cabin Fuselage Section**

1. Windows — CHECK for cracks and cleanliness
2. Fuselage skin — CHECK for dents, wrinkles, loose or missing rivets
3. Aft aux tank fuel vent — CHECK clear
4. Main and aux fuel tanks — CHECK leakage, required servicing, and caps secure
5. Fuel vents — CHECK clear
6. Static port — CHECK clear
7. Navigation lights — CHECK condition
8. Anticollision lights — CHECK condition
9. Antennas — CHECK condition and security
10. Forward landing gear support structure — CHECK for cracks or distortion
11. Forward landing gear — CHECK the following:
   a. Tires for inflation, condition, and ply rating
   b. Shock strut for inflation
   c. Hoses and wheel brake assembly for leakage, chafing, and security
   d. Fwd aux fuel tank electrical connections and fuel lines — CHECK condition and security
12. DC power equipment — CHECK battery connected, transformer rectifiers for condition and security, and sump jar
13. Access door — SECURE
14. Escape panel — SECURE
Forward Cabin Section

1. Copilot’s jettisonable door — CHECK condition and security
2. Copilot’s hydraulic brake lines — CHECK for leakage
3. SAS yaw ports — CHECK clear
4. Pitot tube — CHECK cover removed
5. Windshields — CHECK for cracks and cleanliness
6. Windshield wipers — CHECK condition
7. Nose access panel — CHECK secure
8. Rear view mirror — CHECK condition and cover as required
9. Landing-search lights — CHECK condition
10. Pilot’s hydraulic brake lines — CHECK for leakage
11. Outside air thermometer — CHECK
12. Pilot’s jettisonable door — CHECK condition and security
13. Heater intake and exhaust outlet — CHECK clear

NEUTRAL RIG CHECK

Perform Neutral Rig Check Controls
(left stick)
Pedals — Neutral (Even)
CH-47 AMTPC

Longitudinal — $11\frac{1}{2}'' \pm \frac{1}{2}''$ from Emergency Switch

Lateral — $15\frac{1}{2}'' \pm \frac{1}{2}''$ from left side frame

Thrust — $5\frac{3}{8}'' \pm \frac{3}{8}''$ from top of pivot block

Stick positioner should be at ‘‘0’’

All Upper Boost Actuators

$6\frac{1}{4}'' \pm \frac{1}{4}''$

Ball Slider

Forward — $2\frac{5}{8}'' \pm \frac{1}{8}''$

Aft — $2\frac{7}{8}'' \pm \frac{1}{16}''$

INTERIOR CHECK

Cabin Fuselage Section (right-hand side)

1. Cabin and ramp lights forward control switches — As required

2. Interior — CHECK for loose equipment

3. Speed trim amplifier function switch — CHECK at AC position

NOTE

During flight, if the switch is left at AFT, FWD, A/S, or MAN., longitudinal cyclic speed trim programming may be affected
4. Heater compartment — CHECK security of components, vibrator contact position, and ignition circuit fuse

5. Winch and winch accessories — CHECK security

6. Emergency escape axe — CHECK condition and security

7. Seats, litters, or cargo — CHECK security

8. Heat outlets — position as required

9. Cabin lights — CHECK condition

10. Jettisonable cabin windows — CHECK security

11. First aid kits — CHECK security

12. Rescue hatch door — CHECK and position as required

13. Cargo hook — CHECK and position as required — check air charge — 2100 PSI

14. Lower rescue door — CHECK and position as required

15. Hoist control panel — CHECK switches and stow grip

16. Litter straps — CHECK stowed if not used

**Aft Cabin Section**

1. Combining transmission area — CHECK for leaks

2. Cabin and ramp lights switch — As required

3. Ramp control sequence valve — As required
4. Ramp control lever — As required

5. ENGINE NO. 2 fuel valve — CHECK CLOSED
   (Check Open "C" Model only)

6. ENGINE NO. 2 FUEL VALVE caution light — PRESS-TO-TEST. The BATTERY switch must be at ON to check the light. (Light will not illuminate on "C" Model unless Fuel Valve is closed)

7. CROSSFEED FUEL VALVE — CHECK CLOSED

8. CROSSFEED FUEL VALVE caution light — PRESS-TO-TEST. The BATTERY switch must be ON to check the light

9. MANIFOLD VALVE — As required

10. MANUAL DEFUELING VALVE — CHECK CLOSED

11. Hand pump — CHECK condition and leaks

12. Manual control valve — CHECK NORMAL

13. Utility Filler and Pressurized Tank — CHECK for leaks and fluid level

14. Utility hydraulic accumulators — CHECK

**NOTE**

If pressure in the utility hydraulic accumulator is below 3,000 psi, it is necessary to pressurize the system with the hand pump before attempting to start the APU.
15. Ramp area hydraulic lines — CHECK for leaks and filter button position
16. Utility bleed valve — CHECK for contamination
17. Ramp — CHECK condition and position as required
18. Ramp escape panel — CHECK security
19. Jettisonable cargo door — CHECK secure
20. APU — CHECK condition
21. AGB area lines — CHECK for leaks and condition
22. Flight control accumulators — CHECK 1,400 psi precharge
23. Flight boost manifolds — CHECK for leaks
24. Aft transmission and AGB — CHECK for oil level and condition (Use the OIL LEVEL CHECK light switch if necessary.)
25. Engine fire extinguisher pressures — CHECK (Refer to Table 2, Engine Fire Extinguisher Pressures)
26. Fire extinguisher circuit breakers — IN
27. Troop alarm box — CHECK condition
28. APU fuel solenoid valve — CHECK
29. APU manual fuel shutoff valve — CHECK OPEN
30. Compass flux valve — CHECK security
CH-47 AMTPC

31. Rearview mirror — CHECK stowed (If not installed)

32. APU fuel pump — CHECK for leaks and condition ("A" & "B" Model)

33. Engine No. 1 fuel valve — CHECK CLOSED (CHECK OPEN - "C" Model)

34. ENGINE NO. 1 FUEL VALVE caution light — PRESS-TO-TEST. The BATTERY switch must be ON to check the light. (The light will not illuminate on "C" Model unless Fuel Valve is closed)

35. Ramp interphone control panel — As required

36. Hand fire extinguisher — CHECK pressure and security

Cabin Fuselage Section (left-hand side)

1. First aid kits — CHECK security

2. Litter straps — CHECK stowed if not used

3. Jettisonable cabin windows — CHECK secure

4. Handcrank — CHECK stowed

5. Cabin heater thermostat — CHECK

NOTE

If the left side of the A/C is exposed to the sun, the thermostat will heat up sufficiently to signal the heater not to light off.

6. Transformer-rectifier air intake screens — CHECK clear
CH-47 AMTPC

7. Cabin escape panel — CHECK security
8. Hand fire extinguisher — CHECK pressure and security
9. Troop alarm box — CHECK condition
10. Avionic equipment — CHECK security of components and connections
11. CHECK SAS Electrical connections for condition and security
12. Litter poles — CHECK secure
13. SAS amplifier selector switches — CHECK at AC position
14. First aid kit — CHECK security
15. Troop CMDR seat

Flight Control Closet
1. Filters — CHECK
2. Hydraulic Lines — CHECK for leaks and security
3. SAS extensible links — CHECK condition and security
4. Electrical wiring and plugs — check condition and security
5. Lower Boost Actuators — CHECK for condition, leaks, and security
6. DCP Speed and Stick Trim Actuator — CHECK nominal length — $34\frac{13}{32}'' \pm \frac{1}{6}''$ condition and security
CH-47 AMTPC

7. Flight Controls — CHECK all push-pull tubes, magnetic brakes and viscous dampers for condition and security
Cockpit Check

Pilot/Copilot Seats — CHECK
1. Axis adjustment and lock in place
2. Seat belt and shoulder harness
3. “G” lock manual and automatic operation

Pilot/Copilot Windows and Doors
1. Open and close (50-lb maximum force)
2. Slide operation (15-lb maximum force)
3. Handle alignment — CHECK
4. Jettison doors using inside and outside handles - 50-lb maximum force (optional)

Fire Bottle Security

Spare Lamp Box — CHECK

Cockpit Placard
1. Takeoff and landing checklist
2. Radio identification
3. Magnetic compass card

Adjust Mirror (if installed)

Circuit Breakers — As required

Switches
1. Lights — As required
2. Battery switch — OFF
CH-47 AMTPC

3. Generator switches — OFF
4. Utility System switch — As required
5. Anti-icing switches — OFF
6. Ignition switches — OFF
7. Start fuel switches — CLOSE
8. Flight control centering switch — ON
9. Hydraulic boost switch — BOTH ON
10. SAS switch — BOTH ON
11. Heater — OFF
12. Troop jump lights switch — OFF
13. Troop alarm switch — OFF
14. Windshield wipers switch — OFF
15. Engine fuel valve switches — CLOSE ("A" and "B" model only)
16. Crossfeed fuel valve switch — CLOSE
17. Fuel booster pump switches — OFF
18. Hoist control and cargo hook switches — OFF
19. Static discharger — OFF

Instrument Panel

1. Magnetic compass — free of bubbles
2. Fire extinguisher agent switch — NEUTRAL
3. Fire control handles — CHECK IN
4. Instrument range markings
a. Rotor tach
   ("A" Model)
   Red radial at 204, 233, 261
   Green arc from 204 to 233
   
   ("B" Model)
   Red radial at 204, 233, 261
   Yellow arc from 204 to 223
   Green arc from 223 to 233
   
   ("C" Model)
   Red radial at 214, 233, 261
   Yellow arc from 214 to 223
   Green arc from 223 to 233

b. Torque meter
   ("A" & "B" Model)
   Red radial at 860
   
   ("C" Model)
   Red radial at 890 (Dual Engine)
   1015 (Single Eng.)

c. A/S IND
   ("A" Model)
   Red radial at 132 knots
   
   ("B" & "C" Model)
   Red radial at 174 knots

d. N₁ Tach
   Red radial
   Per individual eng.

e. EGT Gauge (L-7C Engine)
   Red radial: 740 and 816
Blue radial: 700
Green arc: 230 to 660
Yellow arc: 752 to 816
(L-7/L-7B)

Red radial: 735, 816
Green arc: 230 to 635
Yellow arc: 746 to 816
(L-5)

Red radial: 638, 760
Green arc: 230 to 602
Yellow arc: 649 to 760

f. Eng. oil temp.
   Red radial at 138°C

g. Eng. oil press.
   Red radial 10 and 110 psi
   Yellow arc 40 to 50 psi
   Green arc 50 to 90 psi

h. Xmsn oil press.
   Red radial 20 psi
   Green arc 20 to 90 psi

i. Xmsn oil temp.
   Red radial 130, 140°C
   Green arc 60 to 130°C
   Yellow arc 130 to 140°C

j. Flight boost press.
   Red radial 2500, 3200 psi
   Green arc 2500 to 3200 psi
k. Utility boost press.
   Red radial 2500, 3400 psi
   Green arc 2500 to 3400 psi
5. Transmission oil pressure selector switch — AFT
6. Transmission oil temp. selector switch — SCAN
7. Fuel quantity selector switch — LH Tank, ("C" Model-Total)
8. Radar altimeter (if installed) — SET
9. Compass slaving switches — IN
10. VGI switches — NORM
11. Clocks — SET
12. Cockpit air knobs — CLIMATIC

Console
1. Navigation equip — OFF
2. Stick positioner — ZERO
3. Air control handles — CLIMATIC
4. Marker beacon sensitivity switch — As required
5. Marker beacon switch — OFF
6. Aft wheel swivel lock switch — As required
7. Engine condition levers — STOP
8. Emergency SAS release — RELEASE (Guard up)
CH-47 AMTPC

9. Speed trim function switch — AUTO
10. Pilot and copilot interphone panel switches — As required
11. Communications equip — OFF
12. Transponder — (IFF) OFF
13. Power steering switch — OFF
14. Troop commander’s interphone panel switches — As required
15. Personal equip — CHECK
Battery Switch — ON

1. Check ICS all positions
2. Cockpit lights
   a. Dome and utility lights
   b. Instrument flood lights
   c. Jump lights and troop alarm
   d. Cabin lights (jump lights go to dim on red cabin light position)
3. UHF radio — ON then OFF

BATTERY Switch to Emergency Position

1. ICS — CHECK
2. Caution lights — OUT
3. FM radio — ON then OFF
4. Emergency beep
5. BATTERY switch to ON

Caution Lights

1. Test switch (all lights illuminate)
2. Master caution lights — press to reset
3. Bright dim switch — Operation
4. Dome light switch to white position; dim caution lights go to bright

Utility Hydraulic Switch — ON

1. Reset parking brake
2. Check parking brake caution light operation E2
3. Check swivel lock operation

**APU Start**

1. APU switch to APU position A2
2. Three warning lights operation — (EXH. TEMP. and OVSP illuminated) (OIL PRESS press to test) A3
3. APU to START (90% within 14 seconds maximum) A4

**Generator - Rectifier Operation**

1. Turn on each generator D17
2. Each generator operates both T/Rs D18,19

**Aft Transmission Pressure-Check**

**Hydraulic Boost Pressure Indications**

1. Pressure within 30 seconds maximum after APU start E3
2. No. 1 and No. 2 boost pressure stabilize at 2500-3200 psi E4-6
3. Utility boost press stabilize at 2500 - 3400 psi
4. $\pm 50$ psi fluctuation maximum
Windshield Anti-Ice

**CAUTION**

Do not operate system above an outside air temperature of 24°C.

Pitot and SAS Port Heat

1. Observe No. 2 A/C load meter

Lights

1. Search
   a. Light
   b. Auto retract
2. Anti-collision
3. Position and formation lights
4. Instrument
5. Emergency flood lights
   a. Pilot instrument light rheostat — ON
   b. GENERATOR CONTROL and BATTERY switches — OFF
   c. Check emergency flood lights — ON

Center Flight Controls

Radios — ON

Fire Detection Lights
T-Handle Fuel Shutoff

1. Turn both fuel valves — ON
2. Operate T-Handles
3. Fuel valve closed — CHECK

Crossfeed Valve Operation

VGI

1. 90 seconds maximum to align
2. Pitch/roll adjustment and travel
3. Emergency operation

Turn and Slip Indicators

1. Alignment between indicators

Altimeters

1. Set field barometric press on both altimeters
2. Observe both alt ±50 feet of field elevation

Fuel Gauge

1. Left side:
2. Right side:
3. Total (Full tanks-7000 lbs) "C" Model (Full tanks-4000 lbs) "A" "B" Models
4. Left and right - total
   \[ \pm 300 \text{ lbs. "C" Model} \]
   \[ \pm 50 \text{ lbs. "A" & "B" Models} \]

Control Interference

1. Perform control check
   a. Both boost
   b. Single boost

NOTE
Pedals adjusted full aft, will not contact floor.

NOTE
As each boost is turned OFF, observe warning light ON at 2,000 \( \pm 50 \text{ psi} \). As each boost is turned on, observe boost press to normal range within two seconds. Select No. 1 boost On and place APU/AGB switch to start, observe No. 1 boost drop to 500 \( \pm 50 \text{ psi} \) and No. 2 boost returns to normal range as No. 1 falls below 2,000 psi.

Control Centering

1. Switch ON — holds control at full displacement
2. Switch OFF — CHECK control force feel
CH-47 AMTPC

Malfunction

Control Travels

1. Check cockpit indicator position vs measured neutral measurements obtained from previous rig check
   a. Longitudinal travel 7.5” fwd
      6.5” aft ± 0.5” (Use indicator)
   b. Trim wheel full fwd, travel 8” ± 0.5”
   c. Trim wheel full aft, long. aft travel
      7 1/8” ± 0.5”
2. Lateral travel from measured neutral approximately equal
3. Directional travel approximately equal
4. Thrust travel detent to full down 1 to 1.5”
5. Lateral play between cyclics 1/8” maximum

Control Break Out Forces

1. Longitudinal fwd and aft 1.2 to 2 lbs
2. Lateral left and right 1.2 to 2 lbs
3. Directional left and right 11 to 20 lbs
4. Detent (5 lbs max. up and 9 lb. max. down)
   (”A” Model detent — 4 lbs max. up and 5 lbs max. down)
CH-47 AMTPC

Malfunction

NOTE

Break out forces should be approximately symmetrical.

Aft Transmission Pressure — SCAN

Engine Start and Operation

1. Prestart
   a. Beep full decrease (hold for 8 sec.) G2,3
   b. E.C.L. to GND.
   c. Fuel boost pumps — ON
   d. Fuel Valve — OPEN ("A" & "B" Models)
   e. Start fuel — ON
   f. Ignition — ON

2. Start
   a. Depress Start Button and hold until $N_1$ reaches 35%
   b. Start fuel off at EGT 450°C or $N_1 = 35$
   c. Engine motoring speed 18% within 15 seconds G4,5

3. Start to ground idle speed 45 seconds maximum ($N_1$ 37.5 - 42.7%) EGT not to exceed 816°C for L-7, 760°C for L-5 G6,7
4. Oil pressure 10 psi minimum

5. Ignition off
   a. Cross feed — OPEN ("C" Model)
   b. Repeat steps 1b, 1d, 1e, and 1f for other eng.
   c. Repeat steps 2, 3, and 4
   d. After engine stabilizes at ground idle — Ignition — OFF

6. Ground idle to flight idle over 80 rotor rpm. (Torque not to exceed 1200 foot lbs) (On single engine "C" Model, 1300 foot lbs)
   a. Boost Pumps — ON
      Crossfeed — CLOSED ("C" Model)

7. Beep switch operation, pilot and copilot No. 1 and BOTH
   a. Pilot and copilot rotor tachometer readings 4 rpm split max.

8. Bleed band check (optional) (Ref. Fig. 5)
   a. Operate eng. at F.1. for 2 min.
   b. Station C.E. at eng. to determine closure
   c. Slowly increase beep (rate not to exceed 1% $N_1$ in 10 sec.)
   d. Check $N_1$ speed with Fig. 5 (Tolerance $+0, -2\% N_1$)

APU OFF

NOTE
Rotors at 230 rpm (225 "B" Model)

Fuel Boost and Crossfeed — CHECK
1. All boost pumps off
   a. Observe both warning lights — ON
2. Crossfeed — OPEN
3. Turn on boost pump (one at a time)
   a. Observe both warning lights — OUT
4. Check all boost pumps

Underfrequency Check
1. Both engines to minimum beep
2. Both emergency beeps to full decrease
3. Remain at or below 193 ± 4 rpm for 5 seconds ("A" and "B" Model) 204 ± 4 rpm for 5 seconds ("C" Model and "B" Model w/2200 series xmsn)
4. Check generators remain on line above 197 or 208 rpm
5. Beep to 230 rpm (225 "B" Model)

No Relative Torque Change From Detent to Full Down Movement of Thrust
Malfunction

Transmission Press Indicator Operation

1. Check individual readings. Maximum allowable flux (10% of nominal reading)
2. Scan reading ± 3 psi of low transmission
3. Test position to 0 psi
4. Warning lights ON at 20 ± 2 psi

Transmission Temperature Indicator Operation

1. Check individual readings
2. Scan reading ± 5° of high temp. Xmsn
3. Test position to -70°C or below

Engine Vibration Check (optional)

Blade Track (SAS "OFF")

1. 230 rpm (225 "B" Model)
2. Thrust in detent
3. ¼" spread between each blade and master blade
4. ⅞" maximum total separation

Radio Operation

1. Ensure all radios are operating

Anti-Collision Lights — ON
TAXI AND HOVER CHECK

Brakes
1. Pilots and copilots, right and left 11-13

Power Steering Check
1. Left and right turns
   a. Full 90° turns
2. Wheel centering — swivel locks E17,18
   LOCKED
3. Directional control E14-16
   a. Swivels unlocked — 10° deviation per 100 ft.
   b. Swivels locked — 5° deviation per 100 ft.

Lift Off
1. Check ground instability
2. Apply brakes and lift front gear off ground and check rear brakes
3. Check flight control response
4. SAS "ON". Check for hardovers
5. Check instruments for normal operating ranges
6. Lift off to hover

SAS Check F1-6
1. Stabilize at a hover
2. Check pitch, roll, and yaw on Both, No. 1, and No. 2 SAS

NOTE
No return to trim in roll axis on "B" & "C" Model

3. Check engage error on each SAS

Control Positions

NOTE
SAS off if engage error exists

1. Longitudinal
   a. Crosswind hover
   b. Measure position
   c. Note indicator position
   d. Tolerance \( \frac{3}{8} \)" forward to \( \frac{5}{8} \)" aft of neutral position

2. Lateral
   a. Hover into wind
   b. Measure position
   c. 0 to \( \frac{1}{2} \)" right of neutral position

3. Directional
   a. Hover into wind
   b. Measure position
   c. \( \frac{1}{2} \)" maximum split (Refer to Table 1.)
4. Trim wheel operation
   a. Note longitudinal cyclic position on indicator
   b. Rotate trim wheel full forward

   **NOTE**
   Position indicator should move 1.4 ±0.5 inch
   c. Repeat for aft

**Engine Anti-Ice — CHECK (Do not check with screens installed)**
1. Place A/C on ground. Thrust in detent
2. Engine Anti-Ice switch — ON
   a. Note EGT rise (both engines)
   b. Note N\textsubscript{1} drop (both engines)

**Single Engine Operation**
1. Hover on individual engines
2. Note
   a. N\textsubscript{1}
   b. EGT
   c. TQ
3. Torques should be within 12% differential

**Emergency Beep Operation**
1. Both generators — OFF
2. Battery switch to emergency
   \[\text{G19}\]
3. Check each emer beep switch for increase then decrease

**EGT — CHECK**

1. Match \(N_1\)'s
2. Note EGT readings
   \[\text{B15}\]

**Droop Eliminator**

1. Establish 230 rpm in detent (225 "B" Model)
2. Lift off to stabilized hover
3. Maximum stabilized droop ± 3 rpm
   \[\text{G20}\]

**Fuel Boost — CHECK**

1. All boost pumps OFF for 2 minutes
   \[\text{H11}\]

**Heater Operation**

1. Check heater duct controls
2. Light off within 30 seconds
3. Switch heater OFF. Check that blower continues to run until combustion chamber cools
4. Vent position operation
   \[\text{D36-39}\]

**Flight Instruments**

1. Gyro compass 2° split between pilot and copilot indicators
CH-47 AMTPC

Malfunction

2. Mag compass ±5° of gyro compass indication
3. VGI alignment
4. Turn and slip indicator
5. IVSI
6. Clocks

Instrument Check

1. Check all instruments for normal operation B16,17
FORWARD FLIGHT CHECK - CH-47A

Speed Sweep Check

NOTE
Record zero A/S long. cyc. position from hover check.

1. Airspeed 60 knots
   a. Record long. cyclic pos. from indicator
   b. Record lateral cyclic position
   c. Record directional pedal split
   d. Check airspeed on pilot and copilot indicators

NOTE
7 knot differential between indicators
4 knot fluctuation all speeds

2. Airspeed 80 knots
   a. Record long. cyc. position
   b. Record cyc. speed trim lift off (lift off 80 knots ± 10 knots)

3. Airspeed 100 knots
   a. Record long. cyclic position
   b. Note airspeed pilot and copilot indicators (5 knots difference maximum)
c. Record cyclic speed trim full extension 100 ± 10 knots.

4. Airspeed 120 knots
   a. Record long. cyclic position

5. Airspeed 132 knots or Vne
   a. Record long. cyclic position
   b. Record lateral cyclic position
   c. Record directional pedal split
   d. Check airspeed of pilot and copilot indicators (5 knots difference maximum)
   e. Evaluate 1/Rev and 3/Rev vibration at rotor rpm closest to 230 for minimum vibration level
   f. Check coordinated turns

6. Airspeed 100 knots
   a. Record retraction of speed trim 100 ± 10 knots

7. Airspeed 80 knots
   a. Record full retraction of speed trim (80 knots ± 10 knots)

**Manual Operation**

1. Establish 90 knots A/S

2. Place speed trim switch to manual. Fully extend and retract both actuators, observing indicator movement. Switch to auto.
CH-47 AMTPC

Malfunction

NOTE
Indicators return to mid range

SAS evaluation 100 knots

1. Check both No. 1 and No. 2 in pitch, roll and yaw axis.

2. Check coordinated turns on single SAS

FORWARD FLIGHT CHECK - CH-47B

Speed Sweep Check

NOTE
Record zero A/S long. cyc. position from hover check

1. Stabilize A/S at 50 knots. Observe that both speed trim indicators are in the lower green block

2. Increase A/S to 60 knots
   a. Record long. cyclic position from indicator
   b. Record lateral cyclic position
   c. Record directional pedal split
   d. Check airspeed on pilot and copilot indicators

NOTE
7 knot differential between indicators
4 knot fluctuation all airspeeds
3. Increase A/S to 70 knots. Observe that both indicators have started to move from retracted position. Record cyc. speed trim lift off. (Lift off 60 knots ±10 knots)

4. Airspeed 80 knots. Record long. cyclic position

5. Airspeed 100 knots
   a. Record long. cyclic position
   b. Note airspeed, pilot and copilot indicators (5 knots difference maximum)

6. Airspeed 120 knots
   a. Record long. cyclic position
   b. Observe that both indicators are in the upper green block (Fully extended 120 knots ±10 knots)

7. Airspeed 140 knots
   a. Record long. cyclic position
   b. Record lateral cyclic position
   c. Record directional pedal split
   d. Check airspeed of pilot and copilot indicators. (6 knots difference maximum)
8. Airspeed 150 knots
   a. Evaluate 1/Rev and 3/Rev vibration
   b. Check coordinated turns

9. Airspeed 120 knots
   Record retraction of speed trim 120 ± 10 knots

10. Airspeed 60 knots
    Record full retraction of speed trim
       (60 knots ± 10 knots)

Manual Operation

1. Establish 90 knots A/S

2. Place speed trim switch to manual. \textbf{F11}
   Fully extend and retract both actuators observing indicator movement. Switch to auto, note indicators return to mid range.

SAS evaluation 120 knots \textbf{F12,13}

1. Check both, No. 1 and No. 2 in pitch, roll and yaw axis.

2. Check coordinated turns on single SAS
FORWARD FLIGHT CHECK - CH-47C

Speed Sweep Check

**NOTE**

Record zero A/S long cyclic position from hover check

1. Stabilize A/S at 50 knots. Observe that both speed trim indicators are in the lower green block

2. Increase A/S to 60 knots
   a. Record long cyclic position from indicator
   b. Record lateral cyclic position
   c. Record directional pedal split
   d. Check airspeed on pilot and copilot indicators

**NOTE**

7 knot differential between indicators
4 knot fluctuation all airspeeds

3. Increase A/S to 70 knots. Observe that both indicators have started to move from retracted position
   
   Record cyclic speed trim lift off (lift off 60 knots ± 10 knots)

4. Airspeed 80 knots
   
   Record long cyclic position
5. Airspeed 100 knots
   a. Record long. cyclic position
   b. Note airspeed pilot and copilot indicators (5 knot difference maximum)

6. Airspeed 120 knots
   Record long. cyclic position

7. Airspeed 140 knots
   a. Record long. cyclic position
   b. Record lateral cyclic position
   c. Record directional pedal split
   d. Check airspeed of pilot and copilot indicators (6 knots difference maximum)

8. Airspeed 150 knots
   a. Record long. cyclic position
   b. Evaluate 1/Rev. and 3/Rev. vibration
   c. Check coordinated turns

9. Increase airspeed to 160 knots. Observe that both indicators are in the upper green block (fully extended 160 knots ± 13 knots)

**NOTE**

If unable to reach 160 knots, estimate indicator position
10. Airspeed 150 knots
   Record retraction of speed trim (160 knots ± 13 knots)

11. Airspeed 60 knots
   Record full retraction of speed trim
   (60 knots ± 10 knots)

Manual Operation

1. Establish 110 knots A/S

2. Place speed trim switch to manual.
   Fully extend and retract both actuators observing indicator movement.
   Switch to auto, note indicators return to mid range

SAS Evaluation 120 knots

1. Check both, No. 1 and No. 2 in pitch, roll and yaw axis

2. Check coordinated turns on single SAS

Engine Power

1. Determine topping altitude from Figure 1, 2, 3, or 4

2. Single engine at maximum beep-droop rotor rpm to attain maximum $N_1$ reading

3. Record
   a. Pressure altitude (Set altimeter at 29.92)
   b. Outside air temp.
c. Airspeed
d. Torque
e. RPM
f. $N_1$
g. EGT

NOTE
"C" Model — maximum torque single engine 1015 lb. ft. Dual engine 890 lb. ft.

Autorotation

1. Establish 70 knots
2. Record
   a. Pressure altitude
   b. Outside air temp.
   c. Fuel
d. RPM in detent
e. RPM in flat pitch
   f. Pedal split (2" maximum) (Refer to Table 1.)

Navigation and Communication

1. UHF
   a. Transmit and receive
   b. Preset and manual tune
2. FM
   a. Transmit and receive
   b. Homing
      (1) Center needle note relative course
      (2) OFF flags concealed

3. Gyro and magnetic compass
   a. Synchronize compass
   b. Magnetic compass ± 5% of gyro compass on North, South, East, West headings
   c. 2° maximum difference between pilot and copilot indicators

4. VOR
   a. Tuning, reception, volume
   b. No. 2 needle on gyro compass ±3° of true magnetic course to station
   c. Course direction indicator
      (1) ±3° of true magnetic course
      (2) 10° off course gives full needle displacement
   d. Station passage
   e. Total No. 2 needle fluctuation 10°

5. ADF
   a. Tuning, reception, volume
CH-47 AMTPC

Malfunction

b. Check ADF, ANT, LOOP, and BFO operation

c. No. 1 needle on gyro compass $\pm 3^\circ$ 12,13 of magnetic bearing to station

d. Total No. 1 needle fluctuation $\pm 5^\circ$ J14

e. Station passage

6. Marker beacon

a. Push-to-test lights J15

b. Check audio high and low

c. Check light operation high and low J16

7. Transponder CHECK APX-44 or IFF J17

a. Master Control Switch — ST. BY. pilot light — ON

b. Warm up 3 to 5 minutes

c. Audio switch — OFF

d. I/P switch — OFF

e. Function control switch — CIVIL

f. Mode 2 and 3 switch — As required

g. Mode 1 and 3 code control switch — As required

Miscellaneous

1. IVSI

2. Turn and slip indicators

3. Altimeters
Malfunction

a. Pilot and copilot difference
   100 @ 0 to 500 feet
   150 @ 1000 - 2000 feet
   200 @ 2000 - 4000 feet
   300 @ 4000 - 8000 feet
   350 @ 8000 - 10,000 feet

b. No needle sticking at any altitude

4. Heater operation

Record Instrument Indications

After Landing Check

1. Anti-collision lights OFF
2. Transponder (IFF) OFF
3. SAS OFF
4. Swivel locks — As required
5. Power steering — As required

Engine Shutdown

1. Parking brakes — SET
2. Minimum beep — CHECK

a. Both engines
   (1) 204 ± 4 rpm (L-5 engines)
   (2) 208 ± 4 rpm (L-7 engines)
   (3) 220 ± 2 rpm ("C" Model)

b. Individual engines
   (1) 204 ± 4 (L-5 engines)
CH-47 AMTPC

Malfunction

(2) 208 ± 4 (L-7 engines)
(3) 216 ± 2 ("C" Model)

c. Adjust for closest possible TQ match without excessive N₁ split

NOTE

1. "B" Model with -2200 series aft transmission installed, "C" Model minimum beep applies

2. During minimum beep check, record ground idle speed for each engine.

3. Always beep up then down after each adjustment

   d. No. 2 engine condition lever — GROUND THEN STOP

   e. Fuel boost pump switches — OFF

   f. Fuel valve switch — CLOSE ("A" & "B" Models only)

   g. Engine beep trim switch (No. 1 and 2) Regain 230 ROTOR RPM 225 ROTOR RPM "B" Model

   h. APU — START

   i. Engine beep trim switch (No. 1 and 2) — DECREASE

   j. No. 1 engine condition lever — GROUND THEN STOP

   k. Fuel boost pump switches — OFF
CH-47 AMTPC

Malfunction

I. Fuel valve switch — CLOSE ("A" & "B" Models only)

m. All radios and navigation equipment — OFF

n. Generator switches — OFF

o. APU — STOP

p. Battery switch — OFF

Conclusion and De-Briefing

1. Check engine topping (See figure 1, 2, 3, or 4)

2. Check stick plot (See chart 1, 2, or 3)
# CH-47 AMTPC

## SECTION A

### APU

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Probable Cause</th>
</tr>
</thead>
</table>
| **A1.** APU will not start | a. Precharge on accumulator too low  
b. No fuel to APU  
c. No ignition  
d. Acceleration schedule too low |
| **A2.** Warning lights do not press to test | a. Battery disconnected  
b. Burned out bulb  
c. Battery low  
d. Faulty wiring |
| **A3.** APU does not read 90% RPM within 14 seconds | a. Clogged start fuel nozzle  
b. Fuel control "acceleration schedule" requires adjustment  
c. Inadequate fuel supply  
d. Main fuel injectors clogged  
e. Defective fuel control |
| **A4.** APU operates below normal stabilized speed of 98 to 106% | a. Fuel control "rated speed adjustment" requires adjustment |
### CH-47 AMTPC

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Probable Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>b.</td>
<td>Defective hydraulic pump motor is causing APU drag</td>
</tr>
<tr>
<td>c.</td>
<td>APU bearing wear causing excessive drag</td>
</tr>
</tbody>
</table>
## SECTION B
### INSTRUMENTS

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Probable Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>B1.</strong> Altimeters in excess of ±50 feet of field elevation</td>
<td>a. Altimeter set wrong</td>
</tr>
<tr>
<td></td>
<td>b. Faulty altimeter</td>
</tr>
<tr>
<td><strong>B2.</strong> Pilots and copilots rotor tachometer indicator inoperative</td>
<td>a. Defective rotor tachometer generator</td>
</tr>
<tr>
<td></td>
<td>b. Defective wiring</td>
</tr>
<tr>
<td><strong>B3.</strong> Pilots rotor tachometer indicator inoperative</td>
<td>a. Defective rotor tachometer indicator</td>
</tr>
<tr>
<td></td>
<td>b. Defective wiring</td>
</tr>
<tr>
<td><strong>B4.</strong> Greater than 4 RPM split between pilots and copilots rotor tach indicators</td>
<td>a. Defective indicators</td>
</tr>
<tr>
<td></td>
<td>b. Defective wiring</td>
</tr>
<tr>
<td><strong>B5.</strong> Pressure on low individual indication is more or less than ±3 psi of scan indication</td>
<td>a. Faulty indicator</td>
</tr>
<tr>
<td></td>
<td>b. Faulty selector switch</td>
</tr>
<tr>
<td><strong>B6.</strong> Fluctuation is more than 10% of nominal indication</td>
<td>a. Faulty transducer</td>
</tr>
</tbody>
</table>
CH-47 AMTPC

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Probable Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. Defective pressure relief valve</td>
<td></td>
</tr>
</tbody>
</table>

**B7.** Transmission oil pressure indicating system inoperative

<table>
<thead>
<tr>
<th>Probable Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Transmission oil pressure circuit breaker out</td>
</tr>
<tr>
<td>b. Defective indicator</td>
</tr>
<tr>
<td>c. Defective selector switch</td>
</tr>
<tr>
<td>d. Defective wiring</td>
</tr>
</tbody>
</table>

**B8.** When scan select switch is placed to test, pointer moves to 0 psi but the transmission oil low caution light does not come on

<table>
<thead>
<tr>
<th>Probable Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Defective indicator</td>
</tr>
<tr>
<td>b. Defective wiring</td>
</tr>
</tbody>
</table>

**B9.** Temperature drops to -70°C (scan or individual positions)

<table>
<thead>
<tr>
<th>Probable Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Faulty temperature bulb</td>
</tr>
<tr>
<td>b. Broken wire</td>
</tr>
<tr>
<td>c. Faulty indicator</td>
</tr>
<tr>
<td>d. Faulty selector switch</td>
</tr>
</tbody>
</table>

**B10.** Temperature goes to full high indication

<table>
<thead>
<tr>
<th>Probable Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Faulty temperature bulb</td>
</tr>
<tr>
<td>b. Faulty indicator</td>
</tr>
<tr>
<td>c. Faulty selector switch</td>
</tr>
</tbody>
</table>

**B11.** Temperature indication on high individual indication is more or less than ±5° of scan indication

<table>
<thead>
<tr>
<th>Probable Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Faulty indicator</td>
</tr>
</tbody>
</table>
b. Faulty selector switch

c. Defective wiring

**B12.** With scan selector switch in TEST position, the indicator pointer moves toward but not below -70°C

a. Defective indicator

b. Defective selector switch

**B13.** Transmission oil temperature indicating system inoperative (all positions)

a. Transmission oil temperature circuit breaker out

b. Defective selector switch

c. Defective indicator

d. Defective wiring

**B14.** One transmission does not indicate when selected

a. Defective selector switch

**B15.** EGT's have excessive split with matched N₁'s

a. Faulty EGT indicator

b. Faulty EGT harness

c. Check EGT system calibration

**B16.** Engine oil pressure fluctuates in excess of ±5 psi

a. Defective indicator

b. Defective transmitter

c. Filters clogged
<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Probable Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>d. Sticky relief valve</td>
<td></td>
</tr>
<tr>
<td>e. Defective oil pump</td>
<td></td>
</tr>
<tr>
<td>B17. Unable to reduce angle box pressure</td>
<td>a. Stiff or hung up pressure relief spring</td>
</tr>
<tr>
<td></td>
<td>b. Crossed wires between combining and engine transmissions</td>
</tr>
<tr>
<td>B18. Excessive A/S indicator fluctuations</td>
<td>a. Faulty indicator</td>
</tr>
<tr>
<td></td>
<td>b. Leak in pitot static lines</td>
</tr>
<tr>
<td>B19. Greater than 7 knots difference between pilots and copilots A/S indicators</td>
<td>a. Faulty indicator</td>
</tr>
<tr>
<td></td>
<td>b. Leaking lines</td>
</tr>
</tbody>
</table>
SECTION C
FLIGHT CONTROLS

Malfunction | Probable Cause
--- | ---
**C1.** Binding in controls  
a. Connecting bolts overtorqued  
b. Faulty rod ends  
c. Improper rigging  
d. Floor fasteners loose  
e. Defective stick boost actuators

**C2.** Trim wheel will not function  
a. Disconnected DCP actuator motor  
b. AC S/T circuit breaker out  
c. Defective S/T amplifier  
d. Trim wheel inoperative  
e. DCP actuator inoperative  
f. Defective wiring

**C3.** Magnetic brake will not hold controls at full travel  
a. Switch wired backwards  
b. Magnetic brake slipping  
c. Magnetic brake inoperative  
d. Circuit breaker out  
e. Control centering incorrectly rigged  
f. Defective centering spring
CH-47 AMTPC

Malfunction | Probable Cause
--- | ---
C4. | Control system will not stay in displaced position
   a. Twisted brake line (pedals)
   b. Improper balance spring setting
   c. Defective viscous dampers
   d. Defective artificial feel system
   e. Improperly adjusted balance and detent

C5. | Control centering lacks authority throughout range
   a. Magnetic brake positioning arm not properly adjusted
   b. Wrong magnetic brake installed

C6. | Control travel incorrect
   a. Improper rigging; stops improperly set or upper boost actuator improperly set
   b. Cockpit indicator incorrect
   c. Binding in controls

C7. | Breakout forces not symmetrical
   a. Balance springs improperly set
   b. Binding in controls
   c. Improper spring installed

C8. | In crosswind hover longitudinal cyclic stick position is greater than $\frac{3}{8}''$ forward or $\frac{5}{8}''$ aft of neutral
   a. A/C improperly rigged
b. Cyclic position indicator improperly positioned

c. Trim wheel not centered
d. Speed trim not properly set
e. Pitch link adjustment required

C9. Excessive control displacements

a. A/C incorrectly rigged
b. SAS engage error

C10. Lateral stick is out of tolerance during an into-the-wind hover

a. A/C incorrectly rigged

C11. Excessive pedal split in hover

a. SAS engage error
b. A/C incorrectly rigged

C12. With trim wheel rotated full forward cyclic stick moves aft 1.4 ± 0.5 inches as noted on stick position indicator

a. Trim wheel installed backwards
b. Wiring reversed to trim wheel electrical connector

C13. With trim wheel moved full aft, cyclic stick position indicator indicates less than 1.4 ± 0.5 inch aft cyclic stick travel

a. Defective servo-amplifier card in speed trim amplifier
b. Defective trim wheel
c. Defective (DCP) stick trim actuator

C14. Autorotation rpm low
   a. A/C incorrectly rigged
   b. Blade pitch angle too high

C15. Excessive pedal split
   a. A/C improperly rigged
   b. SAS engage error
### Malfunction Probable Cause

**D1.** No indication of battery power supplied to the helicopter
- a. Caution lights circuit breaker out
- b. Battery disconnected
- c. Battery low
- d. Faulty battery relay
- e. Faulty battery switch
- f. Defective wiring

**D2.** Cockpit dome lights inoperative
- a. Circuit breaker out
- b. Burned out bulb
- c. Defective switch
- d. Defective wiring

**D3.** Cockpit dome lights will not dim
- a. Defective rheostat
- b. Defective wiring

**D4.** Cockpit white dome lights only inoperative
- a. Defective bulbs
- b. Defective light selector switch
- c. Defective wiring
<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Probable Cause</th>
</tr>
</thead>
</table>
| **D5.** Utility lights inoperative | a. Circuit breaker out  
b. Defective light assembly  
c. Defective wiring |
| **D6.** Instrument flood lights inoperative | a. Defective bulbs  
b. Defective instrument panel flood light switch  
c. Defective wiring |
| **D7.** Jump lights and TROOP ALARM inoperative | a. Defective jump light relay  
b. Defective wiring |
| **D8.** Troop alarm bells inoperative | a. Circuit breaker out  
b. Defective alarm bell switch  
c. Defective wiring |
| **D9.** Cabin and ramp lights inoperative | a. Defective cabin light relay  
b. Defective switch  
c. Defective wiring |
| **D10.** Cabin and ramp lights inoperative in RED | a. Defective switch  
b. Defective bulbs  
c. Defective relay |
Malfunction | Probable Cause
--- | ---
d. Defective wiring

D11. No power to emergency bus
   a. Feeder circuit breaker out
   b. Defective BATTERY switch
   c. Defective emergency bus relay
   d. Defective wiring

D12. Caution lights inoperative
   a. BATTERY switch OFF or in EMERGENCY
   b. Caution light circuit breakers out
   c. Defective caution light panel
   d. Defective wiring

D13. Caution lights do not come on when test switch is depressed
   a. Defective test switch
   b. Defective caution light panel
   c. Defective wiring

D14. Master caution light (MCLC) won't cancel when reset
   a. Master caution capsule sticking in panel
   b. Defective master caution light panel

D15. Caution lights do not dim
   a. Defective dim switch
   b. Defective dimming relay
   c. Defective caution light panel
   d. Defective wiring
**CH-47 AMTPC**

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Probable Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>D16.</strong> When dome light switch is placed to WHITE (caution lights dimmed) the caution lights do not go to bright</td>
<td></td>
</tr>
<tr>
<td>a. Defective dimming lock-out relay</td>
<td></td>
</tr>
<tr>
<td>b. Defective wiring</td>
<td></td>
</tr>
<tr>
<td><strong>D17.</strong> No. 1 generator won't come on line</td>
<td></td>
</tr>
<tr>
<td>a. Defective voltage regulator</td>
<td></td>
</tr>
<tr>
<td>b. Defective protection control panel</td>
<td></td>
</tr>
<tr>
<td>c. Defective frequency sensing and time delay relay (APU and generator control box)</td>
<td></td>
</tr>
<tr>
<td>d. Defective wiring</td>
<td></td>
</tr>
<tr>
<td>e. Defective generator</td>
<td></td>
</tr>
<tr>
<td><strong>D18.</strong> No. 1 or No. 2 generator OFF, No. 1 or 2 GEN OUT CAUTION light ON (no ac cross-tie indicated on load meter) No. 2 transformer/rectifier warning light ON</td>
<td></td>
</tr>
<tr>
<td>a. Ac bus control circuit breaker out</td>
<td></td>
</tr>
<tr>
<td>b. Defective ac bus-tie relay</td>
<td></td>
</tr>
<tr>
<td>c. Defective wiring</td>
<td></td>
</tr>
<tr>
<td><strong>D19.</strong> Both generators on line, No. 2 rectifier OFF caution light is on, indicating dc cross tie (No. 1 loadmeter indication increasing)</td>
<td></td>
</tr>
<tr>
<td>a. Secondary bus insufficiently loaded</td>
<td></td>
</tr>
<tr>
<td>b. No. 2 transformer/rectifier 3-phase ac circuit breaker out</td>
<td></td>
</tr>
<tr>
<td>c. Defective No. 2 transformer/rectifier</td>
<td></td>
</tr>
</tbody>
</table>
CH-47 AMTPC

Malfunction | Probable Cause
---|---
d. Defective wiring

**D20.** Windshield anti-ice system will not cycle at present temperature of 45°C
a. Defective windshield temperature sensor element
b. Defective windshield anti-ice controller
c. Defective anti-ice control relay

**D21.** Windshield anti-ice system will not operate below an outside air temperature of 24°C
a. Windshield anti-ice ac circuit breaker out
b. DC circuit breaker out
c. Defective temperature sensing element
d. Defective windshield
e. Defective controller
f. Defective wiring

**D22.** No pitot heat and SAS port heat
a. Pitot heat circuit breaker out
b. Defective pitot heat switch
c. Defective heating elements
d. Defective wiring

**D23.** Searchlight-pilots or copilots search light will not come on
a. Searchlight circuit breaker out
b. Defective searchlight filament (SLT-FIL) switch on thrust lever
CH-47 AMTPC

Malfunction Probable Cause

c. Defective bulb
d. Defective searchlight assembly
e. Defective wiring

D24. Pilot’s or copilot’s searchlight will not extend
   a. Searchlight control circuit breaker out
   b. Defective SEARCHLIGHT control switch on thrust lever
   c. Defective SEARCHLIGHT switch (SLT CONT)
   d. Defective wiring
   e. Defective searchlight assembly

D25. Pilot’s or copilot’s searchlight will not rotate left or right
   a. Defective SEARCHLIGHT control switch
   b. Defective wiring
   c. Defective searchlight assembly

D26. Top and bottom anti-collision lights will not rotate or come on
   a. Anti-collision lights circuit breaker out
   b. Defective anti-collision light switch
   c. Defective wiring
   d. Defective light assembly

D27. Anti-collision light rotates but will not come on
   a. Defective bulb
CH-47 AMTPC

Malfunction	Probable Cause

b. Defective light assembly

D28. All position lights inoperative
   a. Position lights circuit breaker out
   b. Defective position lights switch
   c. Defective wiring

D29. Position lights will not dim
   a. Defective position lights switch
   b. Defective position lights dimming resistor
   c. Defective wiring

D30. Instrument lights inoperative
   a. Circuit breaker out
   b. Defective rheostat
   c. Defective dimming rheostat
   d. Defective wiring

D31. Instrument lights will not brighten
   a. Defective rheostat
   b. Dimming rheostat requires adjustment

D32. No emergency flood lights when GENERATOR CONTROL and BATTERY switches are OFF
   a. SECONDARY COCKPIT LIGHTS circuit breaker out
   b. Pilot's instrument light's rheostat is OFF
   c. Defective flood light relay
   d. Defective wiring
<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Probable Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>D33.</strong> Fire detection lights inoperative</td>
<td></td>
</tr>
</tbody>
</table>
  a. Burned out bulb  
  b. Defective PRESS-TO-TEST switch  
  c. Defective wiring  
  d. Defective eng detection element  
  e. Defective controller |
| **D34.** At emergency minimum beep, generators drop off the line at 198 or 209 rpm |  
  a. Defective frequency and time delay relay  
  b. Defective PMG section on generator |
| **D35.** When engine anti-ice switch is placed to ON, a decrease in $N_1$ is not detected and EGT does not rise |  
  a. Defective switch  
  b. System blocked  
  c. Defective valve |
| **D36.** Heater blower inoperative |  
  a. Heater blower circuit breaker out  
  b. Defective blower relay  
  c. Defective blower  
  d. Defective wiring |
| **D37.** Heater will not light off but vent works |  
  a. Plug fouled  
  b. Thermostat hot |
<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Probable Cause</th>
</tr>
</thead>
</table>
| **D38.** Heater does not light off within 30 seconds | a. Defective blower  
b. Defective air pressure switch  
c. Defective relays  
d. Defective wiring |
| **D39.** Heater inoperative | a. Defective blower system  
b. Defective fuel system  
c. Defective ignition system |
# SECTION E
## HYDRAULIC

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Probable Cause</th>
</tr>
</thead>
</table>
| **E1.** Parking brake won't reset | a. Utility hydraulic switch inoperative  
b. Brake incorrectly rigged |
| **E2.** Parking brake warning light won't stay on | a. Brake incorrectly rigged  
b. Microswitch incorrectly rigged |
| **E3.** No boost pressure indication | a. Defective transmitter  
b. Inoperative pump |
| **E4.** Fluctuating pressure | a. Defective transmitter  
b. Low service level  
c. Defective gauge  
d. Trapped air in the system  
e. Defective flight control hydraulic boost pump |
| **E5.** No. 2 flight boost pump pressure does not build up within 30 seconds after APU start | a. AGB overloaded  
b. AGB hydraulic motor defective  
c. Defective frequency sensing and time delay relay |
CH-47 AMTPC

**Malfunction** | **Probable Cause**
---|---

d. Defective wiring

**E6.** No. 1 boost pressure is below 2500 psi
a. Low reservoir level
b. Trapped air in system
c. Hoses kinked
d. Defective flight control hydraulic boost indicator
e. Defective flight control hydraulic boost transmitter
f. Defective flight control hydraulic boost pump

**E7.** Hydraulic boost switch OFF, caution light out
a. Defective hydraulic boost pressure switch
b. Defective wiring

c. Defective hydraulic boost pump

**E8.** Hydraulic boost pressure does not indicate within 2 seconds after switch is turned on
a. Defective hydraulic boost switch
b. Defective hydraulic boost solenoid valve
c. Defective hydraulic boost pump

**E9.** Able to turn off both flight boosts
a. Interlock malfunction

**E10.** No. 1 boost will not drop to 500 ± 50 PSI
a. AGB switch malfunction
b. Defective boost pump solenoid valve
c. Defective No. 1 hydraulic boost pump
Malfunction | Probable Cause
---|---
d. Defective wiring

E11. Brakes are spongy
  a. Air in brake line

E12. Brakes are leaking
  a. Over serviced
  b. Faulty seal

E13. Brakes will not hold
  a. Defective utility hydraulic system
  b. Defective wheel brake

E14. Intermittent power steering

**NOTE**

When power steering or swivel lock switch is cycled, if hydraulic pressure drops approximately 200 pounds, stays there for short duration and returns to previous value, the problem is hydraulic; if no drop, the problem is electrical

  a. Faulty actuator
  b. Faulty control box

E15. Power steering turns left or right with control in neutral
  a. Struts uneven
  b. Aft gear misaligned
  c. Power steering not properly adjusted
  d. Defective actuator
<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Probable Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>e.</td>
<td>Defective hydraulic system</td>
</tr>
<tr>
<td>f.</td>
<td>Defective wiring</td>
</tr>
</tbody>
</table>

**E16.** Aircraft turns left or right with swivels locked
- a. Struts uneven
- b. Aft gear misaligned
- c. Swivels not locking

**E17.** Wheels will not center with swivel locks turned ON
- a. Aft gear misaligned
- b. Swivel lock inoperative

**E18.** Wheel does not center after liftoff
- a. Defective utility hydraulic system
- b. Defective centering cam assembly
## Malfunction Probable Cause

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Probable Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>F1.</strong> Yaw kicks</td>
<td></td>
</tr>
</tbody>
</table>
  a. Water in side slip lines  
  b. Defective SAS link |
| **F2.** No pitch or roll response |  
  a. Failed gyro in SAS box |
| **F3.** Hardover |  
  a. Defective card in SAS box |
| **F4.** Oscillation |  
  a. Faulty link  
  b. Gain too high in given channel |
| **F5.** Excessive left pedal with helicopter trimmed in hover and SAS on |  
  a. Pedals incorrectly rigged  
  b. Yaw extensible link not adjusted for neutral |
| **F6.** In a hover SAS is switched from BOTH ON to single SAS ON and a kick is felt in the yaw axis (engagement error) |  
  a. Yaw channel for given SAS requires balancing  
  b. Yaw link feedback potentiometer requires adjustment |
<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Probable Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>c. Defective demodulator-modulator card in yaw channel</td>
<td></td>
</tr>
<tr>
<td>d. Defective SAS box</td>
<td></td>
</tr>
<tr>
<td><strong>F7.</strong> Forward or aft cyclic trim actuator does not start to extend at 60 or 80 knots indicated air speed</td>
<td></td>
</tr>
<tr>
<td>a. Forward or aft cyclic trim channels out of adjustment</td>
<td></td>
</tr>
<tr>
<td>b. Failed actuator</td>
<td></td>
</tr>
<tr>
<td>c. Defective amplifier</td>
<td></td>
</tr>
<tr>
<td>d. Leak in pitot static lines to the amplifier</td>
<td></td>
</tr>
<tr>
<td><strong>F8.</strong> Cyclic speed trim does not fully extend or is fully extended too soon</td>
<td></td>
</tr>
<tr>
<td>a. Speed trim out of adjustment</td>
<td></td>
</tr>
<tr>
<td><strong>F9.</strong> Cyclic position plot too high or low</td>
<td></td>
</tr>
<tr>
<td>a. DCP schedule out of adjustment</td>
<td></td>
</tr>
<tr>
<td>b. A/C incorrectly rigged</td>
<td></td>
</tr>
<tr>
<td><strong>F10.</strong> Cyclic speed trim completely inoperative in automatic mode</td>
<td></td>
</tr>
<tr>
<td>a. Speed trim ac circuit breaker out</td>
<td></td>
</tr>
<tr>
<td>b. Defective amplifier</td>
<td></td>
</tr>
<tr>
<td>c. Defective wiring</td>
<td></td>
</tr>
<tr>
<td><strong>F11.</strong> Cyclic speed trim does not operate manually</td>
<td></td>
</tr>
<tr>
<td>a. Failed actuator</td>
<td></td>
</tr>
<tr>
<td>b. Faulty switch</td>
<td></td>
</tr>
<tr>
<td>c. Defective wiring</td>
<td></td>
</tr>
</tbody>
</table>
CH-47 AMTPC

Malfunction                Probable Cause

F12.  Uncoordinated turns
      a. SAS roll yaw circuit faulty
      b. Leak in side slip lines

F13.  Yaw hunting
      a. High gain in yaw channel in SAS box
      b. Leak in side slip lines
### SECTION G

**ENGINES AND TRANSMISSIONS**

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Probable Cause</th>
</tr>
</thead>
</table>
| **G1.** Emergency beep inoperative | a. Faulty relay  
b. Faulty or failed actuator motor  
c. BATTERY switch OFF |
| **G2.** Normal $N_{II}$ system inoperative | a. No AC power, circuit breaker not reset  
b. Defective remote control box  
c. Defective wiring |
| **G3.** Both normal and emergency engine control systems inoperative | a. Defective $N_{II}$ actuator  
b. Defective emergency trim relay  
c. Defective wiring between remote control box and actuator |
| **G4.** No. 1 engine will not motor with START button depressed | a. Engine start circuit breaker out  
b. Defective start switch  
c. Defective engine start solenoid valve  
d. Defective start relay  
e. Defective utility hydraulic system  
f. Defective wiring |
<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Probable Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>G5.</td>
<td>Engine will not accelerate to 19% within 15 seconds during start cycle</td>
</tr>
<tr>
<td></td>
<td>a. Insufficient starting fuel</td>
</tr>
<tr>
<td></td>
<td>b. Defective utility hydraulic start solenoid valve</td>
</tr>
<tr>
<td></td>
<td>c. Defective utility hydraulic system</td>
</tr>
<tr>
<td></td>
<td>d. Defective hydraulic starter motor</td>
</tr>
<tr>
<td>G6.</td>
<td>Engine will not accelerate to ground idle</td>
</tr>
<tr>
<td></td>
<td>a. N₁ improperly rigged</td>
</tr>
<tr>
<td></td>
<td>b. Faulty start motor</td>
</tr>
<tr>
<td></td>
<td>c. G.I. ADJ screw requires adjustment</td>
</tr>
<tr>
<td>G7.</td>
<td>Engine will not accelerate from ground idle to flight range within 45 seconds</td>
</tr>
<tr>
<td></td>
<td>a. N₁ actuator slow</td>
</tr>
<tr>
<td></td>
<td>b. Fuel control acceleration and start fuel requires adjustment</td>
</tr>
<tr>
<td></td>
<td>c. Bleed band defective</td>
</tr>
<tr>
<td></td>
<td>d. Defective engine fuel control</td>
</tr>
<tr>
<td>G8.</td>
<td>No oil pressure</td>
</tr>
<tr>
<td></td>
<td>a. Transmitter disconnected</td>
</tr>
<tr>
<td></td>
<td>b. Transmitter failed</td>
</tr>
<tr>
<td></td>
<td>c. Gauge inoperative</td>
</tr>
<tr>
<td>G9.</td>
<td>Engine oil pressure below 10 psi</td>
</tr>
<tr>
<td></td>
<td>a. Clogged No. 2 bearing filter</td>
</tr>
<tr>
<td></td>
<td>b. Engine oil pump not adjusted properly</td>
</tr>
</tbody>
</table>
CH-47 AMTPC

Malfunction	Probable Cause

c. Defective indicator
d. Defective engine oil pressure transmitter
e. Improper transmitter installed

G10. Transient torque exceeds 1200 foot pounds (1300 foot pounds, single engine)
a. Acceleration schedule set too high
b. Faulty fuel control
c. Faulty torque indicating system
d. Engine beep trim switches not at minimum beep prior to moving ECL to FI

G11. Pilot and copilot beep trim switches inoperative
a. Engine trim dc circuit breaker out
b. Defective wiring

G12. Pilot’s NO. 1 AND 2 ENGINE BEEP TRIM switch inoperative
a. Defective switch
b. Defective wiring

G13. To match engine torques, engine beep trim switches must be beeped in opposite directions
a. Excessive $N_{II}$ actuators speeds between engine No. 1 and No. 2
b. Beep trim actuator speeds in the No. 1 and No. 2 engine remote control box vary excessively
<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Probable Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>G14.</strong> Engine torques will not match</td>
<td></td>
</tr>
</tbody>
</table>
  a. $N_{II}$ system not rigged properly  
  b. Defective $N_{II}$ actuator  
  c. Defective engine fuel control  
  d. Defective engine torque transmitter  
  e. Defective torque indicator  
  f. Defective engine |
| **G15.** While beeping engines to match torque, No. 1 engine beeps up much faster than No. 2 causing an excessive torque split, and No. 1 engine must be beeped in the opposite direction to match torques (engines stabilized, torques remain matched) |  
  a. Excessive difference in $N_{II}$ actuator speeds between the No. 1 and No. 2 engine  
  b. Defective $N_{II}$ actuator  
  c. Defective remote control box |
| **G16.** Excessive hunting with engine torques matched |  
  a. Defective $N_{II}$ actuator  
  b. Defective remote control box  
  c. Defective wiring |
| **G17.** Excessive change in engine torque when thrust lever is moved to full down |  
  a. Flight controls (thrust system) incorrectly rigged |
b. Engine droop eliminator potentiometer out of adjustment

G18. Difference in engine torque indications during single engine operation greater than 6% of average TO between engines
   a. Faulty torque indicator
   b. Faulty torque indicating system of engine
   c. Emergency engine trim circuit breaker out
   d. Defective emergency beep trim switch
   e. Defective wiring

G19. Engine emergency beep trim switch operates in increase but inoperative when placed to decrease
   a. Defective switch
   b. Defective actuator
   c. Defective emergency trim relay
   d. Defective wiring

G20. Droop greater than ±3 rpm
   a. Droop potentiometers improperly adjusted
   b. Engine improperly rigged
   c. Defective droop eliminator potentiometer

G21. Excessive torque fluctuation of topping
   a. Faulty transducer
   b. Faulty indicator
   c. Excessive A/C vibration
CH-47 AMTPC

Malfunction | Probable Cause
---|---
G22. Excessive $N_1$ fluctuation at topping
   a. Faulty indicator
   b. Faulty tachometer generator
   c. Defective wiring
G23. Topping too low
   a. $N_1$ improperly rigged
   b. $N_{II}$ improperly rigged
   c. Topping adjustment low
   d. Torque rate limiter adjustment low
   e. Improper bleed band adjustment
G24. Torque low at topping ($N_1$ and EGT appear normal)
   a. Defective torque indicating system
G25. At minimum beep, rotor rpm not $208 \pm 4$, $204 \pm 4$, or $216 \pm 2$
   a. Minimum beep trim resistor in RH pod requires adjustment
G26. Unable to adjust minimum beep
   a. $N_{II}$ engine controls improperly rigged
   b. Defective minimum beep trim variable resistor
   c. Defective $N_{II}$ actuator (feed back pot)
CH-47 AMTPC

SECTION H
FUEL

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Probable Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>H1.</strong></td>
<td>Main fuel valve does not close when fire T-handle is pulled out</td>
</tr>
<tr>
<td></td>
<td>a. Faulty T-handle micro switch</td>
</tr>
<tr>
<td></td>
<td>b. Defective wiring</td>
</tr>
<tr>
<td><strong>H2.</strong></td>
<td>Crossfeed valve does not open when switch is placed to ON</td>
</tr>
<tr>
<td></td>
<td>a. Crossfeed control circuit breaker out</td>
</tr>
<tr>
<td></td>
<td>b. Defective crossfeed valve switch</td>
</tr>
<tr>
<td></td>
<td>c. Defective crossfeed valve</td>
</tr>
<tr>
<td></td>
<td>d. Defective wiring</td>
</tr>
<tr>
<td><strong>H3.</strong></td>
<td>Indicator pointer pegged full scale for all positions of fuel selector switch</td>
</tr>
<tr>
<td></td>
<td>a. Open shielded wiring from tank probes</td>
</tr>
<tr>
<td><strong>H4.</strong></td>
<td>No fuel indication all switch positions</td>
</tr>
<tr>
<td></td>
<td>a. FUEL QTY system requires calibration</td>
</tr>
<tr>
<td></td>
<td>b. Defective indicator</td>
</tr>
<tr>
<td></td>
<td>c. Defective selector switch</td>
</tr>
<tr>
<td></td>
<td>d. Defective wiring</td>
</tr>
<tr>
<td><strong>H5.</strong></td>
<td>Indicated total does not equal computed total by $\pm 50$ pounds or $\pm 300$ pounds</td>
</tr>
<tr>
<td></td>
<td>a. FUEL QTY system requires calibration</td>
</tr>
<tr>
<td></td>
<td>b. Defective selector switch</td>
</tr>
<tr>
<td></td>
<td>c. Defective wiring</td>
</tr>
<tr>
<td>Malfunction</td>
<td>Probable Cause</td>
</tr>
<tr>
<td>-------------</td>
<td>----------------</td>
</tr>
</tbody>
</table>
| **H6.** Fuel quantity indicator pointer erratic  | a. Open shielded wiring from tank probes  
b. Defective indicator  
c. Defective wiring  
d. Defective probes |
| **H7.** Tanks full, no single tank indication. Total indication OK.  | a. Defective selector switch  
b. Defective wiring |
| **H8.** No fuel pressure warning lights when fuel boost pumps are OFF  | a. Caution lights circuit breaker out  
b. Defective wiring |
| **H9.** Boost pump inoperative  | a. Fuel boost pump circuit breaker out  
b. Defective boost pump relay  
c. Defective pump  
d. Defective wiring |
| **H10.** With crossfeed switch at OPEN and single boost pump turned on, only the caution light for the tested system turned on goes out  | a. Crossfeed circuit breaker out  
b. Defective crossfeed valve  
c. Defective caution light  
d. Defective wiring |
<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Probable Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>H11.</td>
<td>Engine flames out with boost pumps off</td>
</tr>
<tr>
<td></td>
<td>a. Failed engine driven boost pump</td>
</tr>
</tbody>
</table>
SECTION I
VIBRATIONS

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Probable Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I1.</strong> Excessive 1/Rev vibration</td>
<td>a. Blades out of track</td>
</tr>
<tr>
<td></td>
<td>b. Weak lag damper</td>
</tr>
<tr>
<td></td>
<td>c. Blades unbalanced</td>
</tr>
<tr>
<td><strong>I2.</strong> Excessive 3/Rev vibration</td>
<td>a. Loose aft pylon splice bolts</td>
</tr>
<tr>
<td></td>
<td>b. Loose component support fitting</td>
</tr>
<tr>
<td></td>
<td>c. Loose engine, fairing, or tail cone</td>
</tr>
<tr>
<td></td>
<td>d. Loose landing gear, work platforms, access doors, ramps, escape panels,</td>
</tr>
<tr>
<td></td>
<td>windows, or doors</td>
</tr>
<tr>
<td><strong>I3.</strong> High frequency vibration</td>
<td>a. Sync shaft out of balance</td>
</tr>
<tr>
<td></td>
<td>b. Engine out of balance or has F.O.D.</td>
</tr>
<tr>
<td></td>
<td>c. Excessive radial play on transmission shafts</td>
</tr>
<tr>
<td></td>
<td>d. Defective lord mount on sync shafting</td>
</tr>
</tbody>
</table>
### Malfunction Probable Cause

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Probable Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>J1. No ICS</td>
<td>a. Intercom switches off           b. Failed intercom box</td>
</tr>
<tr>
<td></td>
<td>c. Broken jack cord                d. Broken or improper headset</td>
</tr>
<tr>
<td></td>
<td>e. Faulty interphone junction box</td>
</tr>
<tr>
<td>J3. VGI will not align</td>
<td>a. Faulty gyro                    b. Faulty indicator</td>
</tr>
<tr>
<td></td>
<td>c. Circuit breaker out</td>
</tr>
<tr>
<td>J4. UHF continues to channel</td>
<td>a. Faulty control head</td>
</tr>
<tr>
<td>J5. FM homing will not center, always gives full right or left deflection</td>
<td>a. Faulty antenna            b. Faulty home sensing unit</td>
</tr>
<tr>
<td></td>
<td>c. Shortened coaxial cable        d. Weak receiver</td>
</tr>
<tr>
<td>Malfunction</td>
<td>Probable Cause</td>
</tr>
<tr>
<td>-------------</td>
<td>----------------</td>
</tr>
<tr>
<td>J6.</td>
<td>Gyro compass will not hold sync</td>
</tr>
<tr>
<td></td>
<td>a. Faulty gyro</td>
</tr>
<tr>
<td></td>
<td>b. Faulty flux valve</td>
</tr>
<tr>
<td></td>
<td>c. Faulty indicator</td>
</tr>
<tr>
<td>J7.</td>
<td>Gyro compass will not sync</td>
</tr>
<tr>
<td></td>
<td>a. Faulty indicator</td>
</tr>
<tr>
<td></td>
<td>b. Flux valve needs re-swinging</td>
</tr>
<tr>
<td>J8.</td>
<td>VOR volume weak</td>
</tr>
<tr>
<td></td>
<td>a. Faulty receiver</td>
</tr>
<tr>
<td></td>
<td>b. Low sensitivity</td>
</tr>
<tr>
<td>J9.</td>
<td>VOR off heading (No. 2 needle)</td>
</tr>
<tr>
<td></td>
<td>a. Faulty receiver</td>
</tr>
<tr>
<td>J10.</td>
<td>Course direction indicator does not give 10° sweep</td>
</tr>
<tr>
<td></td>
<td>a. Receiver requires adjustment</td>
</tr>
<tr>
<td>J11.</td>
<td>Excessive needle flux</td>
</tr>
<tr>
<td></td>
<td>a. Faulty receiver</td>
</tr>
<tr>
<td>J12.</td>
<td>ADF indicates OFF heading greater than 3°</td>
</tr>
<tr>
<td></td>
<td>a. Antenna loop requires compensation</td>
</tr>
<tr>
<td></td>
<td>b. Faulty receiver</td>
</tr>
<tr>
<td>J13.</td>
<td>No. 1 needle more than ±3° off magnetic bearing to station</td>
</tr>
<tr>
<td></td>
<td>a. Gyro compass not synchronized</td>
</tr>
<tr>
<td></td>
<td>b. Faulty antenna</td>
</tr>
<tr>
<td></td>
<td>c. Faulty receiver</td>
</tr>
<tr>
<td>Malfunction</td>
<td>Probable Cause</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>J14.</strong></td>
<td>Excessive No. 1 needle flux</td>
</tr>
<tr>
<td></td>
<td>a. Faulty receiver</td>
</tr>
<tr>
<td></td>
<td>b. Faulty antenna</td>
</tr>
<tr>
<td><strong>J15.</strong></td>
<td>Marker beacon audio weak or inoperative</td>
</tr>
<tr>
<td></td>
<td>a. Low sensitivity (place adjustment to position 5)</td>
</tr>
<tr>
<td></td>
<td>b. Faulty receiver</td>
</tr>
<tr>
<td><strong>J16.</strong></td>
<td>Marker beacon light inoperative or inoperative on low position</td>
</tr>
<tr>
<td></td>
<td>a. Low sensitivity</td>
</tr>
<tr>
<td></td>
<td>b. Faulty receiver</td>
</tr>
<tr>
<td></td>
<td>c. Antenna not peaked</td>
</tr>
<tr>
<td><strong>J17.</strong></td>
<td>Transponder malfunction: pilot light not on; press the test button. If pilot</td>
</tr>
<tr>
<td></td>
<td>light still fails to light, either the bulb is burned out or no power is</td>
</tr>
<tr>
<td></td>
<td>reaching the set</td>
</tr>
</tbody>
</table>
FAILURE OF ONE ENGINE DURING TAKEOFF

Maintain Necessary Control and Power (Continued Flight)

- Engine beep trim switch (No. 1 & 2) — MAINTAIN 230 ROTOR RPM
- Airspeed — BEST SINGLE-ENGINE CLIMB

Cleanup Dead Engine

- Engine condition lever (affected engine) — STOP
- Presence of fire — CHECK
- Fuel valve switch (affected engine) — CLOSE
- Crossfeed switch — AS REQUIRED
- Fuel booster pump switches (affected engine) — AS REQUIRED

Maintain Necessary Control and Power (Discontinued Flight)

- Thrust control rod — MAINTAIN SETTING
- Cyclic stick and directional pedals — ADJUST
- Thrust control rod — RAISE
FAILRE OF BOTH ENGINES DURING FLIGHT

Maintain Necessary Control

Thrust control rod — ADJUST

Airspeed — MAINTAIN 70 OR 90 KNOTS

Engine or engines — RESTART

Cleanup Dead Engines

Engine condition levers — STOP

Presence of fire — CHECK

Fuel valve switches — CLOSE

Crossfeed switch — CLOSE

Fuel booster pump switches — OFF
FAILURE OF ONE ENGINE DURING FLIGHT

Maintain Necessary Control And Power

Engine beep trim switch (No. 1 & 2) — MAINTAIN 230 ROTOR RPM

Airspeed — BEST SINGLE-ENGINE CRUISE

Cleanup Dead Engine

Engine condition lever (affected engine) — STOP

Presence of fire — CHECK

Fuel valve switch (affected engine) — CLOSE

Crossfeed switch — AS REQUIRED

Fuel booster pump switches (affected engine) — AS REQUIRED
ENGINE RESTART DURING FLIGHT

Engine condition lever — GROUND
Fire control handle — CHECK IN
Fuel booster pump switches (affected engine) — CHECK ON
Crossfeed switch — AS REQUIRED
Fuel valve switch — OPEN
Ignition switch — ON
Start fuel switch — OPEN
Start pushbutton — DEPRESS AND HOLD
Start fuel switch — CLOSE (600°C)
Engine oil pressure — CHECK
Ignition switch — OFF
Engine instruments — RECHECK
Engine condition lever — FLIGHT
Rotor rpm — 230
Engine torque — MATCH
FUEL PRESSURE DROP — ENGINE OPERATING NORMALLY

Below 6,000 Feet — Engine Operating Normally

- Master caution light — PUSH TO RESET
- Crossfeed switch — OPEN
- Master caution panel — CHECK

Above 6,000 Feet — Engine Flames Out

- Engine condition lever (affected engine) — STOP
- Master caution light — PUSH TO RESET
- Crossfeed switch — OPEN
- Master caution panel — CHECK
- Engine — RESTART
GO-AROUND WITH ONE ENGINE INOPERATIVE

Cyclic stick — ADJUST

Engine beep trim switch (No. 1 & 2) — MAINTAIN 230 ROTOR RPM

Thrust control rod — ADJUST

TAKEOFF WITH ONE ENGINE INOPERATIVE

Prior to Takeoff

Thrust control rod — 3-DEGREE DETENT

Rotor rpm — 230

Takeoff

Thrust control rod — RAISE AND MAINTAIN 230 ROTOR RPM

Cyclic stick — ADJUST

Trim wheel — ADJUST

Airspeed — BEST SINGLE-ENGINE CLIMB
NORMAL ENGINE BEEP TRIM SWITCH FAILURE

Both ac eng trim circuit breakers — PULL IMMEDIATELY

Emergency beep trim switches — USE

EMERGENCY ENGINE SHUTDOWN

During Failure of Ac and Dc Electrical Systems

Fuel valves — CLOSE (Manually)

All other switches and controls — OFF

EMERGENCY ENGINE SHUTDOWN

During Gas Producer Actuator or Condition Lever Failure

Fuel valve switch (affected engine) — CLOSE

All other switches and controls — OFF

LOW OIL QUANTITY

Master caution lights — PUSH TO RESET

Oil temperature and pressure indicators (affected engine) — CHECK
TRANSMISSION OIL TEMPERATURE OR PRESSURE CAUTION LIGHT ON

Master caution lights — PUSH TO RESET
Thrust control rod — LOWER
Transmission oil temperature and pressure indicators — CHECK

ENGINE FIRE DURING STARTING OR SHUTDOWN

Engine condition lever (affected engine) — STOP
Fuel valve switch (affected engine) — CLOSE
Engine start pushbutton (affected engine) — PRESS AND HOLD
Start fuel switch (affected engine) — CLOSE
Ignition switch (affected engine) — OFF
Fuel booster pumps — OFF

AUXILIARY POWER UNIT FIRE

APU switch — STOP
Engine condition levers — STOP
Fuel valve switches — CLOSE
Portable fire extinguisher — USE
**ENGINE COMPARTMENT FIRE IN FLIGHT**

- Engine condition lever (affected engine) — STOP
- Fire control handle (affected engine) — PULL
- Fire extinguisher agent switch — SELECT BOTTLE NO. 1 OR BOTTLE NO. 2
- Fuel valve switch (affected engine) — CLOSE
- Crossfeed switch — AS REQUIRED
- Fuel booster pump switches (affected engine) — AS REQUIRED

**ELECTRICAL FIRE**

- Personnel — ALERTED
- Airspeed — 100 KNOTS OR BELOW
- Battery switch — EMERGENCY
- Generator switches — OFF
- Hand fire extinguisher — AS REQUIRED
- Helicopter — LAND AS SOON AS PRACTICAL
SMOKE AND FUME ELIMINATION

Airspeed — 80 to 100 knots
Cargo loading ramp — OPEN
Upper half of main cabin door — OPEN
Pilot’s sliding window — OPEN
Helicopter attitude — 20° LEFT YAW

FUEL BOOSTER PUMP FAILURE

Master caution light — PUSH TO RESET
Engine condition lever (affected engine) — STOP
Crossfeed switch — OPEN
Master caution panel — CHECK
Fuel booster pump switches (affected tank) — OFF
Engine — RESTART

FUEL LOW CAUTION LIGHT ON

Master caution light — PUSH TO RESET
Fuel quantity indicator — CHECK
Fuel quantity — BALANCE
FAILURE OF ONE AC GENERATOR

Master caution lights — PUSH TO
RESET

All circuit breakers — CHECK

Generator switch — RESET AND
THEN ON

Master caution panel — CHECK

FAILURE OF BOTH AC GENERATORS

Airspeed — 100 KNOTS OR BELOW

Helicopter — LAND AS SOON AS
PRACTICAL

Altitude — DESCEND BELOW 6,000 FEET

Generator switches — TEST

Ac bus cont circuit breaker — PULL

Generator switch — RESET THEN ON

To isolate

Generator switch — OFF

Circuit breakers — PULL

Generator switch — RESET THEN ON

Circuit breakers — PUSH IN

Ac bus cont circuit breaker — PUSH IN

Battery switch — AS REQUIRED

Emergency engine beep trim switches —
AS REQUIRED

Helicopter — LAND AS SOON AS
PRACTICAL
FAILURE OF BOTH TRANSFORMER-RECTIFIERS

Master caution lights — PUSH TO RESET
Airspeed — 100 KNOTS OR BELOW
Battery switch — AS REQUIRED
All dc equipment not essential to flight — OFF

EMERGENCY DESCENT

Thrust control rod — LOWER
Airspeed — ESTABLISH AN AIRSPEED WHICH WILL PRODUCE MAXIMUM RATE OF DESCENT
AUTOROTATIVE LANDING

Thrust control rod — LOWER IMMEDIATELY
Airspeed — MAINTAIN 70 OR 85 KNOTS
Longitudinal cyclic speed trim — CHECK RETRACTED
Personnel — ALERT
Iff — EMERGENCY
Radio call — COMPLETE
Shoulder harness — LOCK
Parking brake — CHECK RELEASED
Flare — 100 FEET
Thrust control rod — RAISE
Wheel brakes — AS REQUIRED
PRACTICE AUTOROTATION

Entry
Aft wheel swivel locks — LOCKED
Rotor rpm — 230
Thrust control rod — LOWER
Airspeed — 70 OR 85 KNOTS
Longitudinal cyclic speed trim — CHECK RETRACTED

At Approximately 100 Feet
Cyclic — FLARE
Thrust control rod — AS REQUIRED

At Approximately 15 Feet (Aft Wheel Height)
Thrust control rod — RAISE
Cyclic stick and directional pedals — AS REQUIRED

After Touchdown
Cyclic stick — FORWARD
Thrust control rod — LOWER
Wheel brakes — USE
EMERGENCY LANDING IN HEAVILY WOODED AREAS

- Engine condition levers — STOP
- Generator switches — OFF
- Battery switch — OFF

LONGITUDINAL CYCLIC SPEED TRIM SYSTEM FAILURE

- Airspeed — AS REQUIRED
- Ac and dc speed trim circuit breakers — CHECK IN
- Speed trim function switch — SELECT OTHER FUNCTION

SINGLE SAS FAILURE — BOTH ON

- Helicopter — MAINTAIN CONTROL
- Airspeed — REDUCE TO 60 TO 80 KNOTS IAS
- Longitudinal cyclic speed trim — CHECK RETRACTED
- Altitude — INCREASE IF AT EXTREMELY LOW GROUND CLEARANCE
- Malfunctioning system — ISOLATE
- Malfunctioning SAS, SAS dc circuit breaker — PULL
BAILOUT CHECKLIST

Alarm bell — RING
Airspeed — 80 KNOTS
Flight controls — TRIM
Helicopter — EXIT

PILOT AND COPILOT
JETTISONABLE DOOR

Exterior Ground Jettisoning

Trigger button — PUSH
Jettisoning handle — TURN HANDLE
UP OR DOWN
If door does not fall away — PULL

In-Flight Jettisoning

Jettisoning handle — ROTATE
If door is not carried away — PUSH
### Table 1

**Pedal Split Conversion Chart**

<table>
<thead>
<tr>
<th>Difference at Floor Pedal Neutral/Pedal Displaced</th>
<th>Actual Pedal Split</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \frac{1}{8} )</td>
<td>( \frac{3}{8} )</td>
</tr>
<tr>
<td>( \frac{1}{4} )</td>
<td>( \frac{3}{4} )</td>
</tr>
<tr>
<td>( \frac{3}{8} )</td>
<td>( 1\frac{1}{8} )</td>
</tr>
<tr>
<td>( \frac{1}{2} )</td>
<td>( 1\frac{1}{2} )</td>
</tr>
<tr>
<td>( \frac{5}{8} )</td>
<td>( 1\frac{5}{16} )</td>
</tr>
<tr>
<td>( \frac{3}{4} )</td>
<td>( 2\frac{5}{16} )</td>
</tr>
<tr>
<td>( \frac{7}{8} )</td>
<td>( 2\frac{1}{16} )</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>1( \frac{1}{8} )</td>
<td>3( \frac{3}{16} )</td>
</tr>
<tr>
<td>1( \frac{1}{4} )</td>
<td>3( \frac{3}{16} )</td>
</tr>
<tr>
<td>1( \frac{3}{8} )</td>
<td>4( \frac{1}{4} )</td>
</tr>
<tr>
<td>1( \frac{1}{2} )</td>
<td>4( \frac{5}{8} )</td>
</tr>
</tbody>
</table>

All dimensions are in inches.
## Table 2

### Engine Fire Extinguisher Pressures

<table>
<thead>
<tr>
<th>Ambient Temperature (Fahrenheit)</th>
<th>Minimum Indication (Psi)</th>
<th>Maximum Indication (Psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-65°</td>
<td>271</td>
<td>344</td>
</tr>
<tr>
<td>-60°</td>
<td>275</td>
<td>350</td>
</tr>
<tr>
<td>-40°</td>
<td>292</td>
<td>370</td>
</tr>
<tr>
<td>-20°</td>
<td>320</td>
<td>400</td>
</tr>
<tr>
<td>0°</td>
<td>355</td>
<td>437</td>
</tr>
<tr>
<td>20°</td>
<td>396</td>
<td>486</td>
</tr>
<tr>
<td>40°</td>
<td>449</td>
<td>540</td>
</tr>
<tr>
<td>60°</td>
<td>518</td>
<td>618</td>
</tr>
<tr>
<td>80°</td>
<td>593</td>
<td>702</td>
</tr>
<tr>
<td>100°</td>
<td>691</td>
<td>784</td>
</tr>
<tr>
<td>125°</td>
<td>785</td>
<td>902</td>
</tr>
</tbody>
</table>
CH-47A COCKPIT CONTROLS POSITION ENVELOPE

AIRCRAFT CONFIGURATION
STANDARD UNBALLASTED

ROTOR RPM - 230
RATE OF CLimb - 0 FT/MIN.
STICK POSITION TRIM - "0"

CH-47 AMTPC
CH-47A COCKPIT CONTROLS POSITION ENVELOPE
LATERAL STICK POSITION (INCHES)

PEDAL SEPARATION (INCHES)

CLIMB AND AUTOROTATION
60 KNOTS

AIRSPEED (KNOTS)
CH-47B COCKPIT CONTROLS POSITION ENVELOPE

AIRCRAFT CONFIGURATION
STANDARD UNBALLASTED

ROTOR RPM - 225
RATE OF CLimb - 0 FT/Min
STICK POSITION - "0"

NOTE: LONGITUDINAL STICK MUST BE FURTHER FWD AT 100 KNOTS THAN 60 KNOTS & AT 155 KNOTS THAN 100 KNOTS.

CH-47 AMTPC (1 of 2)
CH-47B COCKPIT CONTROLS POSITION ENVELOPE
Chart 2

LATERAL STICK POSITION (INCHES)

RIGHT

LEFT

CLIMB AND AUTOROTATION

60 KNOTS

PEDAL SEPARATION (INCHES)

AIRSPEED (KNOTS)
CH-47C COCKPIT CONTROLS POSITION ENVELOPE

AIRCRAFT CONFIGURATION
STANDARD UNBALLASTED

ROTOR RPM - 230
RATE OF CLIMB - 0 FT/MIN
STICK POSITION - "0"

NOTE: LONGITUDINAL STICK MUST
BE FURTHER FWD AT 100
KNOTS THAN 60 KNOTS &
AT 155 KNOTS THAN 100
KNOTS

LONG STICK POSITION (INCHES)
FWD
AFT

Chart 3
(1 of 2)
CH-47C COCKPIT CONTROLS POSITION ENVELOPE
POWER TOPPING T55-L7C (66:1)

NOTES

1. NEW ENGINE ASSUMED. ENGINE DETERIORATION FACTOR NOT INCLUDED.

2. TORQUE AND SHAFT HORSEPOWER SCALES BASED ON COMRESSOR INLET TEMPERATURE = OAT PLUS 2°C

3. WHERE OAT, PRESSURE ALTITUDE, IAS, ROTOR RPM, AND TORQUE ARE UNCALIBRATED READOUTS, TOPPING TORQUE (READOUT) IS ACCEPTABLE TO 6% LESS THAN THE TORQUE DETERMINED ON THE CHART

4. SAMPLE TOPPING: OAT 20°C, PRESSURE ALTITUDE 5,000 FEET, IAS 88 KNOTS (TAS 100 KNOTS), ROTOR RPM 230.
   a. ENTER CHART AT POINT A (20°C). READ -.3% N1 TEMPERATURE CORRECTION. MAXIMUM RATED N1 (PER ENGINE DATA CARD) PLUS TEMPERATURE CORRECTION IS ACCEPTABLE.
   b. PROCEED VERTICAL TO POINT B. (5,000' PRESSURE ALTITUDE.)
   c. PROCEED HORIZONTAL TO POINT C. (100K TAS.)
   d. PROCEED ALONG 2,120 SHP LINE TO INTERSECT 230 ROTOR RPM VERTICAL LINE AT POINT D.
   e. PROCEED HORIZONTAL TO POINT E. READ 804 POUND-FEET TORQUE

5. CONVERT IAS TO TAS BY THE HOMOGRAPHS BELOW

Figure 3
CH-47 AMTPC

POWER TOPPING T55-L7C (64:1)

NOTES

1. NEW ENGINE ASSUMED. ENGINE DETERIORATION FACTOR NOT INCLUDED

2. TORQUE AND SHAFT HORSEPOWER SCALES BASED ON COMPRESSOR INLET TEMPERATURE = OAT PLUS 2°C

3. WHERE OAT, PRESSURE ALTITUDE, IAS, ROTOR RPM, AND TORQUE ARE UNCALIBRATED READOUTS, TOPPING TORQUE (READOUT) IS ACCEPTABLE TO 5% LESS THAN THE TORQUE DETERMINED ON THE CHART

4. SAMPLE TOPPING: OAT 20°C, PRESSURE ALTITUDE 5,000 FEET, IAS 100 KNOTS (TAS 110 KNOTS), ROTOR RPM 230.
   a. ENTER CHART AT POINT A (20°C). READ -.3% NI TEMPERATURE CORRECTION. MAXIMUM RATED NI (PER ENGINE DATA CARD) PLUS TEMPERATURE CORRECTION IS ACCEPTABLE.
   b. PROCEED VERTICAL TO POINT B. (5,000' PRESSURE ALTITUDE.)
   c. PROCEED HORIZONTAL TO POINT C. (110K TAS.)
   d. PROCEED ALONG 2,350 SHP LINE TO INTERSECT 230 ROTOR RPM LINE AT POINT D.
   e. PROCEED HORIZONTAL TO POINT E. READ 829 POUND-FEET TORQUE

5. CONVERT IAS TO TAS BY THE NOMOGRAPHS BELOW.

Figure 4
INTERSTAGE AIR BLEED BAND CLOSURE

Figure 5

Figure 5