TM 55-1510-221-MTF

MAINTENANCE TEST FLIGHT MANUAL

ARMY MODEL RC-12H

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HEADQUARTERS
DEPARTMENT OF THE ARMY
30 APRIL 1991

URGENT

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HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 01 October 2009

MAINTENANCE TEST FLIGHT MANUAL

ARMY MODEL
RC-12H
AIRCRAFT

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TM 55-1510-221-MTF, 30 April 1991 is changed as follows:

1. Remove and insert pages as indicated below. A vertical bar in the margin indicates new or changed text material. A miniature pointing hand indicates an illustration change.

Remove pages	Insert pages
- - - - - - - - -	A and B
i and ii	i and ii
2-49 and 2-52	2-49 through 2-52
4-3 and 4-4	4-3 and 4-4
5-3 and 5-4	5-3 and 5-4

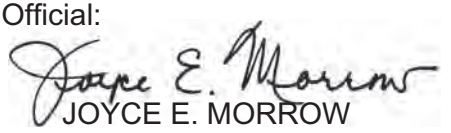
2. Retain this sheet in front of manual for reference purposes.

3. This change incorporates SAFETY OF FLIGHT, OPERATIONAL, RCS CSGLD-1860 (R1), RC-12 SERIES AIRCRAFT, STALL WARNING SYSTEM TEST, C-12-04-02 MSG DTG 141200Z JUN 04.

By Order of the Secretary of the Army:

GEORGE W. CASEY, JR.
General, United States Army
Chief of Staff

Official:



JOYCE E. MORROW
Administrative Assistant to the
Secretary of the Army
0926611

Distribution:

To be distributed in accordance with the initial distribution number (IDN) 313140, requirements for TM 55-1510-221-MTF.

WARNING

A maintenance test flight is an exceptionally demanding operation and requires a thorough flight readiness inspection (PREFLIGHT). The flight readiness inspection is prescribed in TM 55-1510-221-10 operator's manual and must be completed prior to each maintenance test flight Emergency procedures are found in the applicable -10 or checklist (-CL) and are not duplicated in this publication Prior to each maintenance test flight, the pilot will contact maintenance/ quality control personnel to determine the maintenance that has been performed This manual should be used only by qualified maintenance test flight pilots as required in AR 95-1

LIST OF EFFECTIVE PAGES

INSERT LATEST CHANGE PAGES. DESTROY SUPERSEDED PAGES.

NOTE: The portion of the text affected by the changes is indicated by a vertical line in the outer margins of the page. Changes to illustrations are indicated by miniature pointing hands. Changes to wiring diagrams are indicated by shaded areas.

Dates of issue for original and change pages are:
Original . . . . . 0 . . . . . 30 April 1991
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TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 178, CONSISTING OF THE FOLLOWING:

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Title	0
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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) located in the back of the applicable Aircraft Operator's manual, ensure the publication number and title reflect this MTF) directly to Program Executive Office-Aviation, ATTN: SFAE-AV-AS-FW, Redstone Arsenal, AL 35898-5000. A reply will be furnished to you. You may also send your comments electronically to our e-mail address, troy.brown@redstone.army.mil, by fax 256-955-0887/DSN 645-0887. A reply will be furnished to you.

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SECTION I. INTRODUCTION

1. PURPOSE. The purpose of this manual is to provide complete Instructions for performing a maintenance test flight of RC-12H aircraft. For the specific conditions which require a general or limited maintenance test flight, refer to applicable FAR's and manufacturer's maintenance manuals.

2. DEFINITIONS.

a. Maintenance Test Flight. A functional test flight for which the primary purpose is to determine whether the airframe, powerplant, accessories, and other equipment are functioning in accordance with predetermined requirements while subjected to the Intended environment

b. Warnings, Cautions, and Notes Warnings, cautions, and notes are used to emphasize Important and critical instructions and are used for the following conditions

WARNING

An operating procedure, practice, etc., which, If not correctly followed, could result in personal injury or loss of life

CAUTION

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

NOTE

An operating procedure, condition, etc, which is essential to highlight

3. GENERAL INFORMATION.

a. This manual covers only maintenance test flight of RC-12H aircraft and in no way supersedes any information contained In TM 55-1510-22i-10 or -CL, but is to be used in conjunction with the -10 or -CL. For the purpose of maintenance test flights only, this manual satisfies all the requirements of the -CL from Interior Check through Engine Shutdown

b. Crew requirements will be as specified in TM 55-1510-221-10.

4. SPECIAL INSTRUCTIONS.

a. Cargo and Passengers Cargo and passengers are prohibited on maintenance test flights.

b Forms and Records Forms and records will be checked prior to the maintenance test flight to determine what maintenance has been performed and the type of maintenance test flight required (i e , general or limited).

c. Configuration The configuration of the aircraft should be determined prior to each maintenance test flight In order to determine performance parameters.

d. Post Test Flight Inspection A thorough visual inspection will be performed to the extent necessary to insure that deficiencies or shortcomings that may have developed as a result of the maintenance test flight are detected

e. References When a maintenance test flight is required to insure proper operation of a specific system(s), refer to the applicable maintenance manual for the limits of that system.

f. Asterisked Checks An asterisk (*) prior to a check requires that the test flight check sheet be annotated.

with a specific reading. Also a check () for satisfactory performance, or a (X) for problem detected will be recorded and a short statement entered in the remarks block of the Check Sheet

g. An (0) prior to a check indicates a requirement if the equipment is installed.

h. Maintenance Test Flight Check Sheet The check sheet contained in Section V will be used for all test flights. When a test flight is performed to determine if specific equipment or systems are operating properly, completion of only that portion of the maintenance test flight check sheet applicable to the specific equipment or systems being tested is required. The aircraft test flight check sheets may be locally reproduced. Continuation sheets may be used when necessary Items that prove to be unsatisfactory during the test flight and require corrective action, shall be listed in the remarks block during flight and transferred to DA Form 2408-13 Immediately after termination of the flight. The sheet will be attached to the DA Form 2408-13 upon completion. After accumulation of two or more sheets, the data should be reviewed to determine If trends are developing

i. Free Air Temperature (FAT) and Outside Air Temperature (OAT) For the purposes of this manual, free air temperature (FAT) is to be considered the same as outside air temperature (OAT)

SECTION II. MAINTENANCE TEST FLIGHT CHECKLIST

General. This section contains the maintenance test flight requirements peculiar to Army Model RC-12H aircraft. The requirements contained herein are established to insure a thorough inspection of the aircraft before flight, during flight, and upon completion of the maintenance test flight. The right side of the checklist (troubleshooting reference) is cross indexed to the troubleshooting guides contained in Section III. A dash between references means 'through', and a comma means 'and'. The references list the possible abnormal conditions, indications, or malfunctions which could be encountered while performing the procedure.

PROCEDURE	TROUBLESHOOTING REFERENCE
PRIOR TO MAINTENANCE TEST FLIGHT	
*1. Forms and records - Check.	
*2. Weight and balance Maintenance test flights shall be flown with ballast if required to remain within weight and center-of-gravity limits The average takeoff weight shall be 12,800 +200 pounds for the maximum cruise power and speed check and stall flights All other tests shall be conducted within normal weight limits.	
*3. Thorough flight readiness inspection in accordance with the requirements contained in TM 551510-221-10 - Performed	
4. Special preflight checks:	
a. Keylock switch - On.	C6-11
b. Battery switch - On.	

PROCEDURE	TROUBLESHOOTING REFERENCE
PRIOR TO MAINTENANCE TEST FLIGHT (CONT)	
*c. Interior, exterior, and annunciator lighted-Check.	C39
*d Fuel control panel Check the standby pumps and firewall valves as follows to insure that they are powered through the essential bus:	
(1) Battery switch OFF.	
(2) Standby pump circuit breakers (left and right) Pull	
(3) Firewall shutoff valve circuit breakers (left and night) Pull.	
(4) Firewall shutoff valve switches Close (listen for operation)	
(5) Standby pump switches ON, then listen for operation.	C41
(6) Battery switch ON Check #1 FUEL PRESS and #2 FUEL PRESS annunciator lights illuminated	
(7) Firewall shutoff valve switches OPEN. Check #1 FUEL PRESS and #2 FUEL PRESS annunciator lights extinguished	
(8) Standby pump switches OFF	

PROCEDURE	TROUBLESHOOTING REFERENCE
(9) Standby pump circuit breakers (left and right) In.	
(10) Firewall shutoff valve circuit breakers (left and right) In.	
(11) Crossfeed valve switch- Set alternately to left and right system Check that FUEL CROSSFEED annunciator light illuminates, and that the #1 and #2 FUEL PRESS annunciator lights are extinguished.	C40
(12) Crossfeed valve switch OFF	
*(13) Fuel quantity indicators- Check as follows:	B6-8
(a) Fuel quantity indicator selector switch MAIN.	
(b) Fuel quantity indicators Compare indication. With full fuel tanks, left and right fuel quantity indicators must indicate within 82 pounds of each other with fuel quantity indicator selector switch set to MAIN.	
(c) Fuel quantity indicator selector switch AUXILIARY	
(d) Fuel quantity indicators Compare indicator	

PROCEDURE	TROUBLESHOOTING REFERENCE

PRIOR TO MAINTENANCE TEST FLIGHT (CONT)

With full fuel tanks, left and right fuel quantity indicators must indicate within 35 pounds of each other with fuel quantity indicator selector switch set to AUXILIARY.

*e. Pilot tubes (2), stall warning vane, heated fuel vents (2), and TAS temperature probe Check as follows:

(1) Stall warning heat switch ON.

(2) Pilot heat switches ON.

(3) Fuel vent heat switches (2) ON.

(4) Left wing heated fuel vent Check by feel for heat and condition.

(5) Stall warning vane Check by feel for heat and condition.

(6) Left piton tube Check by feel for heat, condition and free of obstructions. C33

(7) TAS temperature probe Check by feel for heat and condition.

(8) Right pilot tube Check by feel for heat, condition, and free of obstructions. C33

PROCEDURE	TROUBLESHOOTING REFERENCE
(9) Right wing heated fuel vent Check b by feel for heat and condition.	
(10) Stall warning heat switch OFF	
(11) Pilot heat switches (2) OFF	
(12) Heated fuel vent switches (2) OFF	
*f .Flaps Check in full down and full up positions.	C31-32
g Battery switch OFF	
*h Seat belts Check for security, and proper connections	
*1 Emergency equipment Check that all required emergency equipment is available and that fire extinguishers and first-aid kits have current inspection dates	
(O)*j. Parachutes Check secure and for current inspection and repack dates	
*k Check all interior and exterior placards	
*I Trim tab travel and direction Check. Trim tabs shall be operated through the full range of travel, noting any excessive friction or binding. Tab direction and neutral position will be checked at the control and the surface	
*m Flight controls - Check operation and direction. Check	

PROCEDURE	TROUBLESHOOTING REFERENCE

PRIOR TO MAINTENANCE TEST FLIGHT (CONT)

movement of control surfaces for direction with movement of cockpit controls Check for any abnormal friction or obstructions through full range of travel

INTERIOR CHECK

1 . Cargo/loose equipment Check secure.

*2 . Cabin/cargo doors Test and lock .

a . Cabin door Check closed and latched by the following.

(1) Safety arm and diaphragm plunger Check position (lift door step).

(2) Index marks on rotary cam locks (6) Check aligned with indicator windows.

b . Cargo door Check closed and latched by the following.

(1) Upper handle Check closed and latched (Observe through cargo door latch handle access cover window).

(2) Yellow index marks on rotary cam locks (4) Check aligned with indicator windows.

(3) Lower pin latch handle Check closed and latched .

PROCEDURE	TROUBLESHOOTING REFERENCE

(Observe through cargo door lower latch handle access cover window.)

(4) Carrier rod Check orange indicator aligned with orange stripe on carner rod (Observe through window, aft lower corner.)

c . Battery switch OFF.

d . Cargo door Check closed and latched.

e . Cabin door Close but leave unlatched Check CABIN DOOR annunciator light illuminated.

f . Cabin door Open Check CABIN DOOR annunciator light extinguished.

g. Battery switch ON. Check CABIN DOOR annunciator light illuminated.

h. Cabin door Close and latch. Check CABIN DOOR annunciator light extinguished.

NOTE

The above procedures check both cargo and cabin door security provisions.

*3. Emergency exit Check secure and key removed.

*4. Mission cooling ducts Check open and free of obstructions.

PROCEDURE	TROUBLESHOOTING REFERENCE

INTERIOR CHECK (CONT)

5. Crew briefing As required

BEFORE STARTING ENGINES

1. Seats, pedals, belts, harnesses Adjust
2. Flight controls Check for free and correct movements.
*3. Parking brake Check Confirm that brakes are set by applying additional toe pressure.
*4. Oxygen system Check as follows:
    a. Oxygen supply pressure gages Check.
    b. Supply control lever (green) ON.
    c. Diluter control lever 100% OXYGEN.
    d. Emergency control lever (red) Set to TEST MASK position while holding mask directly away from face, then return to NORMAL
    e. Oxygen masks Put on and adjust
    f Emergency pressure control lever Set to TEST MASK position and check mask for leaks, then return lever to NORMAL.
    g. Flow indicator Check, during inhalation blinker appears, during exhalation blinker disappears). Repeat a minimum of 3 times.

PROCEDURE	TROUBLESHOOTING REFERENCE

5. Circuit breakers Check in.

6. Overhead control panel switches Set as follows — C39

   a Light dimming controls As required

   b Cabin temperature mode selector switch OFF

   c Ice and rain switches As required

   d Exterior light switches As required

   e Master panel lights switch As required

   f Inverter switches As required

   g Avionics master power switch As required

   h Environmental switches As required

   I Autofeather switch OFF

   j #1 engine start switches OFF

   k MASTER SWITCH As required

   l #2 engine start switches OFF.

7 Fuel panel switches Check as follows

   a Standby fuel pump switches OFF.

   b. Auxiliary transfer override switches AUTO.

   c Crossfeed switch Off.

PROCEDURE	TROUBLESHOOTING REFERENCE

BEFORE STARTING ENGINES (CONT)

*8. Magnetic compass Check for fluid, heading, and current deviation card

9 Pedestal controls Set as follows

CAUTION

Movement of power levers into reverse range while engines are shut down may result in bending and damage to control linkages

a. Power levers - IDLE E6

b Propeller levers - HIGH RPM

c Condition levers - FUEL CUT-OFF

d. Flaps - UP

e Friction locks - Check and set.

10 Pedestal extension switches - Set as follows

a. Flare/chaff dispenser control - SAFE.

b Avionics - As required

c Rudder boost switch - ON.

11. Gear alternate extension pump handle Stowed

*12 Free air temperature gage Check, note current reading

13. Instrument panel Check and set as follows:

PROCEDURE	TROUBLESHOOTING REFERENCE

a. Pilot's and copilot's course indicator switches As required.

b. Pilot's and copilot's RMI switches As required.

c. Pilot's and copilot's microphone switch As required.

d. Pilot's and copilot's compass switches As required.

e. Gyro switches SLAVE.

*f Flight instruments Check instruments for protective glass, warning flags (12 pilot, 6 copilot), static readings, and heading correction card.

g. Radar OFF.

h. APR-39 and APR-44 OFF.

*I. Engine instruments Check for protective glass and static readings.

14. Propeller synchronization switch OFF.

15. Mission panel switches and circuit breakers Set.

16. Pressurization controls Set.

17 Subpanels Check and set as follows.

a. Fire protection test switch OFF.

b. Landing, taxi, and recognition lights OFF.

c. Landing gear control switch Recheck DN.

PROCEDURE	TROUBLESHOOTING REFERENCE

BEFORE STARTING ENGINES (CONT)

d. Cabin lights switch As Required.

18. Pilot's static air source NORMAL.

19. Pilot's and copilot's audio control panels As required.

20. Ice vane pull handles In.

21. AC and DC GPU As required.

22. External power advisory annunclator lights As required. (Aircraft EXTERNAL POWER and mission EXT DC PWR ON annunciator lights illuminated.) C12

*23. DC power Check (24 VDC minimum for battery starts, 28 VDC maximum for GPU starts)

*24. Annunciator panels Test as follows: D1-4

a. MASTER CAUTION, MASTER WARNING, #1 FUEL PRESS, #2 FUEL PRESS, GEAR DN, L BL AIR FAIL, R BL AIR FAIL, and INST AC warning lights, and #1 DC GEN, #2 DC GEN, #1 NO FUEL XFR, #2 NO FUEL XFR, #1 INVERTER, #2 INVERTER, CABIN DOOR (if open), and REV NOT READY caution/advisory lights Check illuminated.

b. ANNUNCIATOR TEST switch Press and hold. Check that the annunciator panels,

PROCEDURE		TROUBLESHOOTING REFERENCE
	FIRE PULL handle lights, marker beacon lights, ANT Azimuth indicator, MASTER CAUTION and MASTER WARNING lights are illuminated Release switch and check that all lights except those in step (a) are extinguished	
	c. MASTER CAUTION and MASTER WARNING lights Press. Check that both lights extinguish.	
*25.	Stall and gear warning system Check as follows-	C34,35
	a. STALL WARN TEST switch TEST Check that warning horn sounds.	
	b. LDG GEAR WARN TEST switch TEST. Check that warning horn sounds and that the LDG GEAR CONTR handle warning lights (2) illuminate.	
*26.	Fire protection system Check as follows	C44-47
	a. Fire detector test switch Rotate counterclockwise to check three DETR positions. FIRE PULL handles should illuminate in each position Reset MASTER WARNING in each position.	
	b. Fire detector test switch Rotate counterclockwise to check two EXTGH positions SQUIB	

PROCEDURE	TROUBLESHOOTING REFERENCE

BEFORE STARTING ENGINES (CONT)

OK light, associated #1 EXTGH DISCH and #2 EXTGH DISCH annunciator caution light and MASTER CAUTION LIGHT should illuminate in each position

27. INS Align as required.

FIRST ENGINE START (BATTERY START)

NOTE

The engines must not be started until after the INS is placed into the NAV mode or OFF as required.

1. Avionics master switch As required.
2. Exterior light switches As required.
3. Strobe beacon lights switch Off
4. Propeller Clear
5. Ignition and engine start switch ON Propeller should begin to rotate and associated IGN ON light should illuminate Associated FUEL PRESS light should extinguish. A1-8

PROCEDURE	TROUBLESHOOTING REFERENCE

CAUTION

If ignition does not occur within 10 seconds after moving condition lever to LOW IDLE, initiate ENGINE CLEARING procedure. If for any reason a starting attempt is discontinued, the entire starting sequence must be repeated after allowing the engine to come to a complete stop (5 minute minimum).

6. Condition lever (after Ni RPM stabilizes, 12% minimum) LOW IDLE. E1,J1

CAUTION

Monitor TGT to avoid a hot start If there is a rapid rise in TGT, be prepared to abort the start before limits are exceeded. During starting, the maximum allowable TGT is 1000°C for five seconds. If this limit is exceeded, use ABORT START procedure and discontinue start. Enter the peak temperature and duration on DA Form 2408-13

7. TGT and N_I Monitor (TGT 1000°C maximum, N_I 52% minimum)

8. Oil pressure Check (60 PSI minimum) E7-9

9. Condition lever HIGH IDLE Monitor TGT as the condition lever is advanced

10 Ignition and engine start switch OFF, after 50% N_1

PROCEDURE	TROUBLESHOOTING REFERENCE
FIRST ENGINE START (BATTERY START) (CONT)	
11. Generator switch RESET, then ON	
SECOND ENGINE START (BATTERY START)	
1. Propeller Clear	
2. Ignition and engine start switch ON Propeller should begin to rotate and associated IGN ON light should illuminate Associated FUEL PRESS light should extinguish	A1-8
3 Condition lever (after N_1 RPM passes 12% minimum) LOW IDLE	E1,J1
4. TGT and N_1 Monitor (TGT 1000°C maximum, N_1 52% minimum)	
5. Oil pressure Check (60 PSI minimum)	E7-9
6. Ignition and engine start switch OFF after TGT stabilized	
7. Battery charge light Check (light should illuminate approximately 6 seconds after generator is brought on line Light should extinguish within 5 minutes following a normal engine start on battery)	C-38
8. Inverter switches ON, check INVERTER annunciator lights extinguished.	
9. Second engine generator switch RESET, then ON	

PROCEDURE	TROUBLESHOOTING REFERENCE

10. Strobe beacon lights switch DAY or NIGHT as required

11. Condition levers As required

ABORT START

1. Condition lever FUEL CUTOFF.

2. Ignition and engine start switch -STARTER ONLY

3. TGT Monitor for drop in temperature.

4. Ignition and engine start switch -OFF

ENGINE CLEARING

1. Condition lever FUEL CUTOFF.

2. Ignition and engine start switch -OFF (5 minute minimum).

CAUTION

Do not exceed starter limitation of 30 seconds on and 5 minutes off for two starting attempts and engine clearing procedure Allow 30 minutes off before additional starter operation

3. Ignition and engine start switch STARTER ONLY (15 seconds minimum, 30 seconds maximum)

4. Ignition and engine start switch OFF

PROCEDURE	TROUBLESHOOTING REFERENCE

FIRST ENGINE START (GPU START)

1. INS As required

NOTE

The engines must not be started until after the INS is placed into the NAV mode or OFF as required

2. Avionics master switch As required

3. Exterior light switches As required.

4 Strobe beacon lights switch Off

5 Propeller Clear

6 Ignition and engine start switch ON Propeller should begin to rotate and associated IGN ON light should illuminate Associated FUEL PRESS light should extinguish. — A1-8

7. Condition lever (after NI RPM stabilizes, 12% minimum) LOW IDLE — E1,J1

8 TGT and N_I Monitor (TGT 1000°C maximum, N_I 52% minimum).

9. Oil pressure Check (60 PSI minimum) — E7-9

10. Ignition and engine start switch -OFF after TGT stabilized

11. Condition lever HIGH IDLE — E2
Monitor TGT as the condition lever is advanced

PROCEDURE	TROUBLESHOOTING REFERENCE
12 DC GPU disconnect As required.	
13 Generator switch (GPU disconnected) RESET, then ON.	

SECOND ENGINE START (GPU CONNECTED)

1. Propeller Clear	
2. Ignition and engine start switch ON. Propeller should start to rotate and associated IGN ON light should illuminate Associated FUEL PRESS light should extinguish.	A1-8
3. Condition lever (after N_I RPM passes, 12% minimum) LOW IDLE	E1,J1
4. TGT and NI Monitor (TGT 1000°C maximum, N_I 52% minimum).	
5. Oil pressure Check (60 PSI minimum	E7-9
6. Ignition and engine start switch OFF after 50% N_I	
7 Propeller levers FEATHER	
8. AC and DC GPU Disconnect as required (Check aircraft external power and mission external power annunciator light extinguished)	
9. Propeller levers HIGH RPM	E2
10 Aircraft inverter switches ON Check #1 INVERTER and #2 INVERTER annunciator lights extinguished	
11. Generator switches RESET, then ON	

PROCEDURE **TROUBLESHOOTING REFERENCE**

SECOND ENGINE START (GPU CONNECTED) (CONT)

12. Strobe beacon lights switch DAY or NIGHT as required

13. Condition levers As required

BEFORE TAXIING

1. Brake device As required To activate the brake device system proceed as follows:

    a Bleed air valves OPEN

    b Condition levers HI IDLE

    c Brake device switch DEICE Check BRAKE DEICE ON advisory annunciator light illuminated

2. Cabin temperature and mode Set

CAUTION

Verify airflow is present from aft cockpit eyeball outlets to insure sufficient cooling for mission equipment

NOTE

For maximum cooling on the ground, turn the bleed air valve switches to ENVIRO OFF position

3. AC/DC power Check for

    a. AC frequency 394 to 406 Hz

b. AC voltage 104 to 124 VAC

c. DC load Check

d. DC voltage 270 to 28 5 VDC

WARNING

Do not operate radar in congested areas. Injury could result to personnel in close proximity to operating radar

CAUTION

Do not operate the weather radar in an area where the nearest effective surface is 50 feet or less from the antenna reflector. Scanning such surfaces within 50 feet of the antenna reflector may damage receiver crystals

4. Avionics master switch ON

5. Mission panel Set and check

*6. Automatic flight control system Check as follows:

a. Altitude alerted

NOTE

Pause a few seconds between each step to allow time for the proper indications

(1) Set alert controller more than 1000 feet above altitude indicated on pilot's altimeter.

PROCEDURE	TROUBLESHOOTING REFERENCE

BEFORE TAXIING (CONT)

The pilot's altimeter alert light should be extinguished

(2) Decrease the alert controller to within 1000 feet of the pilot's altimeter setting The alert light should illuminate

(3) Decrease the controller to less than 250 feet above the pilot's altimeter setting The alert light should extinguish.

(4) Increase the controller to 300 ±50 feet above the pilot's altimeter indication and check that the alert light illuminates

(5) Set the desired altitude.

b. Autopilot

NOTE

The autopilot must be disengaged upon completion of autopilot testing

(1) Autopilot controller UP TRIM, DN TRIM annunciators Check not illuminated

PROCEDURE **TROUBLESHOOTING REFERENCE**

CAUTION

A steady Illumination of UP TRIM or DN TRIM annunciator indicates that the automatic synchronization is not functioning and the autopilot should not be engaged.

(2) Turn knob Center

(3) Elevator trim control switch ON

(4) Control wheel Hold to mid travel.

(5) AP button Press AP ENGAGE and YD ENGAGE annunciators on autopilot controller will Illuminate Servo clutches will engage

WARNING

The autopilot does a self test whenever power Is applied to it. STBY light should Illuminate within 10 seconds If it does not, the system Is non-operative and can not be used The elevator trim system must not be forced beyond the limits which are indicated on the elevator trim tab Indicator.

(6) Elevator trim follow-up Check as follows:

(a) Control wheel Hold aft of mid travel. Trim wheel should run nose down after approx.

PROCEDURE	TROUBLESHOOTING REFERENCE
BEFORE TAXIING (CONT)	
3 seconds DN TRIM annunciator should illuminate after approximately 8 seconds	
(b) Control wheel Hold forward of mid travel Trim wheel should run nose up after approximately 3 seconds, UP TRIM annunciator should illuminate after approximately seconds, and AP TRIM FAIL annunciator and MASTER WARNING lights should illuminate after approximately 15 seconds.	
(7) AP/YD & TRIM DISC button Depress to second level. Autopilot and yaw damper should disengage and ELECT TRIM OFF annunciator should illuminate AP ENG and YD ENG annunciators on instrument panel should flash 5 times	
(8) Elevator trim control switch OFF, then on (ELEC TRIM OFF annunciator should extinguish (9) Autopilot Re-engage	
(10) Turn controller Check that control wheel follows	

PROCEDURE	TROUBLESHOOTING REFERENCE

in each applied direction, then center

(11) Pitch wheel -Check that trim responds to pitch wheel movement (UP TRIM and DN TRIM annunciators may illuminate)

(12) Heading marker Center and engage HDG Check that control follows a turn in each direction.

(13) Disengage autopilot by selecting GA Check that autopilot disengages and flight director commands 7.nose up, wings level attitude

*7 Electric elevator trim Check

a. Elevator trim switch ON

b. Pilot and copilot trim switches Check operation.

PROCEDURE **TROUBLESHOOTING REFERENCE**

BEFORE TAXIING (CONT)

WARNING

Operation of the electric trim system should occur only by movement of pairs of switches Any movement of the elevator trim wheel while depressing only one switch element denotes a system malfunction. The electric elevator trim control switch must then be turned OFF and flight conducted by operating the elevator trim wheel manually. Do not use autopilot

(I) Check pilot and copilot individual trim switch elements for no movement of trim, then check proper operation of both elements.

(2) Check pilot switches override copilot switches while turning in opposite directions, and trim moves in direction commanded by pilot

c. Check pilot and copilot trim disconnects while activating trim

d. Elevator trim switch OFF then ON (ELECT TRIM OFF annunciator extinguishes)

8. Avionics Check and set as required.

9 INS NAV mode, if on.

PROCEDURE	TROUBLESHOOTING REFERENCE
10. Flaps Check.	
11. Altimeters Set and check	
DURING TAXIING	
*1. Brakes Check.	G1-4,6-8
NOTE **If brakes have been overhauled they should be "burned in" by applying near maximum braking (short of locking) for one or two landings or high speed taxi runs After this, brakes should be checked for any tendency to drag**	
*2. Flight instruments- Check for normal operation	
*3. Nosewheel steering -Check No turning tendency should exist while taxiing straight ahead with the same RPM on both engines with no braking and no rudder applied to either side (This check must be performed with minimum cross wind) Check freedom of movement and ability to turn aircraft using rudder pedals, engines and brakes Note any Indication of nosewheel vibration or shimmy during takeoff or landing	
*4. Magnetic compass -Check for freedom of movement.	B4
ENGINE RUNUP	
1. Nose wheel -Center	

PROCEDURE	TROUBLESHOOTING REFERENCE

ENGINE RUNUP (CONT)

*2. Parking brake-Set The parking brake must lock without undue pressure on the brake pedals and release cleanly when parking brake handle is reset. G5

CAUTION

Monitor oil temperature closely during ground operation with propellers in FEATHER due to lack of air flow over oil cooler

*3. Engine low idle speed -Check 52 to 54% N_1. E1

*4. Propeller feathering -Check as follows F14,15

a Condition lever -LOW IDLE.

b Left propeller lever FEATHER. Check that propeller feathers with no hesitation

c. Check for proper pedestal control detent position.

d. Left propeller lever -HIGH RPM.

e. Repeat procedure for right propeller

*5. Engine acceleration -Check as follows. E6,14-20

a. Left power lever Set 64% N_1, then rapidly move lever to maximum

PROCEDURE	TROUBLESHOOTING REFERENCE
b. Record the time required for N_1 to reach 93 %.	
c. Left power lever Immediately retard to IDLE as N_1 passes through 93 5%0 Acceleration time should be 2 5 to 4 0 seconds	
*6. Engine high idle speed Check 70 to 73%Yo N_1	E2
*7. Brake device system Check as follows	
a. Lower Set 70% N_1	
b. Left bleed air valve switch IPNEU & ENVIRO OFF.	
c. Right bleed air valve switch OPEN	
d. Brake device switch Turn on and observe that the BRAKE DEICE ON light is illuminated	
e. Pneumatic pressure gage -Check for a momentary pressure decrease	
f. Repeat procedure for opposite bleed air valve	
*8. N_1 speed switch (air conditioning) -Check as follows:	
a. Right engine condition lever-LOW IDLE	
b. Cabin temperature mode selector switch MANUAL COOL	
c. Manual temp switch Hold to DECREASE until AIR CONYD N_1 LOW annunciator light Illustrator.	

PROCEDURE	TROUBLESHOOTING REFERENCE

ENGINE RUNUP (CONT)

(may take up to 60 seconds)

d Right engine condition lever Advance to increase N_1 to above 63%. AIR COND N_1 LOW light should extinguish

e Air conditioning compressor should turn on 8 to 12 seconds after light extinguishes, as indicated by sustained increase in TGT.

*9. Pneumatic pressure Check as follows

a. Condition levers HIGH IDLE.

b. Power levers IDLE.

c. Left bleed air valve switch PNEU & ENVIRO OFF.

d. Pneumatic pressure Check 12 to 20 PSI.

c. Left bleed air off light Check illuminated

f. Right bleed air valve switch PNEU & ENVIRO OFF

g. Left and right bleed air off lights Check illuminated

h. Left and right bleed air fall lights Check Illuminated

i. Left bleed air valve switch - OPEN Check L BL AIR OFF and L&R BL AIR FAIL lights off, and pneumatic pressure at 12 to 20 PSI

PROCEDURE	TROUBLESHOOTING REFERENCE

j. Right bleed air valve switch -OPEN

k. Right bleed air off light Check extinguished

*10. Pressurization system Check as follows

a. Condition levers HIGH IDLE

b. Bleed air valve switches (2) PNEU AND ENVIRO OFF

c. Pneumatic pressure gage Check. Pressure should drop to zero

d. Bleed air warning lights Check Illuminated.

NOTE

Setting either bleed air valve switch to the PNEU AND ENVIRO OFF position will cause the bleed air warning lights to extinguish

e. Cabin altitude controller Set 500 feet lower than field elevation

f. Cabin pressurization rate control Set to maximum

g. Cabin pressurization switch TEST (hold).

h. Left bleed air control valve switch OPEN

i. Cabin climb indicator Check for descent indication within

ENGINE RUNUP (CONT)

10 to 15 seconds, then release test switch.

j. Repeat the above procedure for the right bleed air control valve

1. Left and right bleed air valve switches OPEN.

m. Cabin altitude indicator Set to 1800 feet pressure altitude

n. Rate control Set.

o. Cabin pressure dump switch Set to PRESS position.

*11. Generators and regulators Check by observing volt-loadmeters for the following conditions — C1-6

a. Positive charging rate

b. 27 5 to 29 0 volts

c. A load indication not exceeding 0.85

d. Turn generators on one at a time to insure that each generator comes on line

e. Voltmeters must read within 1 volt of each other

f. Load paralleling must be within 1 increment on the loadmeter scale

*12. Inverter volt-frequency meters — C36, 37
Check voltage between 110 and 120 volts and frequency between 390 and 410 Hz

PROCEDURE	TROUBLESHOOTING REFERENCE

*13. Rudder boost Check as follows

a. Rudder boost switch ON.

b. Left engine power lever IDLE

c. Condition levers LOW IDLE.

d. Right engine power lever Advance until rudder boost moves right rudder In The rudder boost system should activate within the values of Ni and free air temperature specified in figure 1

e. Rudder boost switch OFF System should deactivate, releasing rudder pressure

f. Repeat above procedure for opposite engine

*14. Autofeather system Check as follows F4-15

a. Condition levers LOW IDLE

b. Autofeather switch Hold to TEST (ARM lights should remain extinguished).

c. Power levers Advance to approximately 22% torque, then move Autofeather switch to test mode Both ARM lights should illuminate

d. Left power lever Retard

(1) At 16 to 21% torque, check right AUTOFEATHER light extinguished

(2) At 7 to 12% torque, check left AUTOFEATHER light

PROCEDURE	TROUBLESHOOTING REFERENCE
ENGINE RUNUP (CONT)	
extinguished (left propeller starts to feather)	
e. Left power lever Set approximately 22% torque.	
f. Repeat steps b, c, and d for right engine.	
g. Advance each power lever to above 85 to 90% NI individually, with the autofeather switch in the arm mode ARM lights should not illuminate. With both power levers above 85 to 90% N_1, both ARM lights should illuminate.	
h. Retard left power lever below 85% N_1 Both lights should extinguish	
i. Repeat step h by retarding right power lever, with left power lever above 85 to 90% N_1.	
*15. Propeller overspeed governors Check as follows:	F1-3
a. Propeller levers HIGH RPM.	
b. Left propeller governor test switch Hold in TEST position.	
c. Left engine power lever. Advance until overspeed governor governs propeller (1830 to 1910 RPM). Observe temperature and torque limits.	

PROCEDURE	TROUBLESHOOTING REFERENCE
d. Left propeller governor test switch Release Propeller RPM should increase.	
e. Left engine power lever IDLE.	
f. Repeat steps b through e for right engine.	
*16 Autoignition system Check as follows.	
a. Power levers Set above 22% torque.	
b. Autoignition switches (2) ARM.	
c. Power levers Retard.	
d. Ignition annunciator lights Illuminated (16 to 21% torque)	
*17. Primary governors Check as follows.	F1-3
a Power levers Set 1800 RPM.	
b Propeller levers Move aft to detent.	
c. Propeller RPM Check 1600 to 1640.	
d. Propeller levers HIGH RPM.	
*18. Propeller low pitch stop Check one engine at a time as follows.	
a Aircraft Position crosswind.	
b Read the corrected propeller torque in % at 1800 RPM from figure 2.	
c. Propeller lever HIGH RPM (full forward.)	

PROCEDURE	TROUBLESHOOTING REFERENCE

ENGINE RUNUP (CONT)

d. Power levers Set 1800 RPM

e. Torquemeter Read and record torque

f. Power lever IDLE

g. Torque reading taken In step d must equal the corrected torque read from figure 2 in step b within ±2%.

h. Repeat procedure for other engine The difference in torque readings between left and right engines should not be greater than 1%.

*19. Ice vanes Check as follows:

a. Power levers Set 1800 RPM.

b. Ice vane switches EXTEND. Verify torque drop, and illumination of VANE EXT lights.

c. Ice vane switches RETRACT. Verify return to original torque, and VANE EXT lights extinguished.

20. Power levers IDLE

BEFORE TAKEOFF

1. Autofeather switch ARM.

2. Bleed air valve switches OPEN.

3. Ice and rain switches As required

4. Fuel control panel Check fuel quantity and switch positions

PROCEDURE	TROUBLESHOOTING REFERENCE

5. Flight and engine Instruments Check for normal indications.

6. Cabin altitude and rate-of-climb controller Set.

7. Annunciator panels Check (note Indications).

8. Propeller levers HIGH RPM.

9. Flaps As required.

10. Trim Set.

11. Avionics Set.

12. Flight controls Check.

13. Departure briefing Complete.

LINE UP

I. Transponder As required.

2. Engine Autoignition switch ARM.

3. Condition levers LOW IDLE.

4. Lights As required.

5. Brake device system Check as follows when required:

NOTE

Do not activate brake device system above 15°C FAT

a. Brake device switch ON.

b. Check that BRAKE DEICE ON light is illuminated, then is extinguished approximately 10 minutes after landing gear retraction

PROCEDURE	TROUBLESHOOTING REFERENCE
DURING TAKEOFF	
*1. Propeller tachometers Check During takeoff propeller tachometers should Indicate 2000 RPM. If propellers are synchronized and indicator tolerances result in a difference In indicated RPM between left and right propellers, then the lower of the two values shall be 2000 RPM. The maximum difference between the readings of the indicators shall be 20 RPM.	E28
2. Engine instruments Check the following instrument indications:	E15-20
*a Torque	E24,E28
*b TGT	B9,E22 E23
*c. N_1	E27
*d Oil pressure	E7-9
*e Oil temperature	E10

AFTER TAKEOFF

WARNING

Immediately after takeoff, the pilot flying the aircraft should avoid adjusting controls located on the aft portion of the extended pedestal to preclude inducing spatial dessentation.

1. Landing gear control switch Up.

PROCEDURE	TROUBLESHOOTING REFERENCE

NOTE
Listen for unusual noises during landing gear retraction

*2. Tail boom antenna Check that ANT OPERATE annunciator light illuminates after landing gear has been retracted

3. Flap switch UP

4. Landing lights OFF

5. Climb power Set

6. Propeller synchronization switch As required

7. Yaw damp switch As required

8. Autofeather switch As required

9. Cabin pressurization Check

*10. Wings and nacelles Check for fuel and oil leaks.

*11. Brake device system Check as follows:

a. Brake DEICE ON annunciator light Check extinguished within approximately 10 minutes after landing gear retraction

b. Brake device switch Turn off then on and observe that BRAKE DEICE ON light does not illuminate.

c. Landing gear switch DN. Observe BRAKE DEICE ON light illuminates

PROCEDURE	TROUBLESHOOTING REFERENCE

AFTER TAKEOFF (CONT)

d. Brake device switch Off.

e. Landing gear switch UP.

DURING CLIMB

*1. Engine and flight instruments Monitor All instruments must give proper indication with minimum fluctuation — B1-9,C38

*2. Engine control levers Check for alignment

*3. Vertical speed Indicators Check normal operation against altimeter as follows — B2

a. Aircraft rate of climb Fly an indicated 1000 feet per minute

b. Read altimeter at beginning of timing, and time for one minute

c. Read altimeter at end of one minute Second reading must be 1000 ±200 feet more than first reading

*4. Surface device system Check as follows — C42

a. Surface device switch SINGLE CYCLE AUTO Surface boots should inflate and automatically deflate for one cycle Wing boots should stay inflated for 6 seconds, and then tail boots should stay inflated for 4 seconds

PROCEDURE	TROUBLESHOOTING REFERENCE
b. Surface deice switch - Hold to DEICE MANUAL position. Boots should stay inflated until switch is released.	
c. Surface deice switch - Release Check boots visually to see that they are sucked down flat after use	
*5 Antenna deice system - Check as follows:	C42
a. Antenna deice switch - AUTO Check that wing dipole antenna boots inflate and automatically deflate for one cycle.	
b. Antenna deice switch - Hold to MANUAL position Check that wing dipole antenna boots inflate and stay inflated until switch is released.	
c. Antenna deice switch - Release Check boots visually to see that they are sucked down flat after use.	
*6 Propeller deice system - Check as follows:	C54
a. Propeller deice switch - Set to AUTO position.	
b. Propeller deicer ammeter - Monitor for 14 to 18 amperes and for a slight needle deflection every 30 seconds.	
c. Manual deice - Hold switch to OUTER position. Note a 05 increase in each loadmeter indication Move and hold switch	

PROCEDURE	TROUBLESHOOTING REFERENCE
DURING CLIMB (CONT)	
to INNER position and note a .05 increase in each loadmeter indication	
*7 Windshield anti-ice system - Check operation as follows: a. Pilot's windshield anti-ice switch - NORMAL, check by feel for heat. b. Pilot's windshield anti-ice switch - HI, check for an increased loadmeter Indication, then OFF. c. Copilot's windshield anti-ice switch - Check by repeating above steps.	
*8 Radome anti-icing system - Check as follows: a. Radome anti-ice switch - ON. b. Loadmeters - Monitor for increase. c. RADOME HEAT annunciator light - Check Illuminated within 5 minutes. d. RADOME HOT annunciator light - Check extinguished.	
*9. Waveguide pressurization system - Verify that the WAVE GUIDE annunciator light is illuminated when N1 is above 80%.	
*10. Cabin and cockpit ventilation system - Check the following items for flow of air, binding controls and	

	PROCEDURE	TROUBLESHOOTING REFERENCE
	the capability of being shut off by its own control. a. Eye-ball cold air vents. b. Pilot's and copilot's air vents c. Windshield defroster ducts. d. Main cabin air ducts	
*11	Air conditioning and heating system - Check as follows. a. Cabin temperature mode selector switch - MAN COOL or MAN HEAT. b. Manual temperature control switch - Hold to INCREASE position for one minute. Observe an increase in cabin temperature. c. Manual temperature control switch - Hold to DECREASE position for one minute. Observe a decrease in cabin temperature. d. Cabin temperature mode selector switch - AUTO. e. Cabin temperature control rheostat - Rotate to full INCR position Observe an increase in cabin temperature. f. Cabin temperature control rheostat - Rotate fully counterclockwise. Observe an decrease in cabin temperature.	C48-53

PROCEDURE	TROUBLESHOOTING REFERENCE

DURING CLIMB (CONT)

NOTE

Air conditioning will come on if cabin temperature is above 60 to 65°F

NOTE

The temperature control rheostat should be in Its mid position at approximately 75°F cabin temperature

*12. Air conditioning cold operation - Check as follows-
   a. Verify that the COLD OPN annunciator light is illuminated only when the FAT is below 45°F.
   b. Cabin temperature mode selector - COLD OPN Check that air conditioner turns on in 8 to 12 seconds.
   c. Verify that air conditioner operation is the same as the AUTO mode except that the air conditioner operates continuously above 63% N_1.

13. Pressurization system - Check as required (Section IV)

*14. Carbon monoxide - Check the cockpit and cabin for the presence of carbon monoxide. Maximum carbon monoxide allowable is 0. 005%.

PROCEDURE	TROUBLESHOOTING REFERENCE
CRUISE	
1. Power - Set.	
*2. Engine instrument indications - Check all engine instruments for normal indications.	E21,28
3. Recognition lights - As required	
*4. Wings and nacelles - Check for fuel and oil leaks	E29
*5. Cabin noise level - Check There shall be no undue air noise In the cabin from around the perimeter of doors or windows There shall be no undue noise in the cabin due to vibrating and rattling articles or oil canning of skins.	
6. Volt-loadmeters - Check	
7. Auxiliary fuel gages - Monitor. Insure that fuel is being transferred from auxiliary tanks.	
*8. Pilot's alternate static air source - Check as follows	
a. Maintain level flight and note airspeed and altitude	
b Pilot's alternate static air source switch - ALTERNATE Airspeed indicator, altimeter, and vertical speed indicator readings should increase.	
c Pilot's alternate static air source switch - NORMAL. Airspeed indicator, altimeter, and vertical speed indicator indications should return to their original readings.	

PROCEDURE	TROUBLESHOOTING REFERENCE

CRUISE (CONT)

*9. Propeller synchrophaser - Check capturing ability of the synchrophaser by establishing a small out of synchronization condition, then turning the synchrophaser on. Synchronization should be established and held within a few seconds.

10. Speed check at maximum cruise power - Perform as required (Section IV).

11. Maximum power lever position check - Perform as required (Section IV).

12. Engine acceptance check - Perform as required (Section IV).

*13. Engine ice vanes - Check operation as follows.

CAUTION

After the ice vanes have been manually extended, they may be mechanically retracted only. Do not attempt electrical retraction as damage to the electric actuator will result. The linkage in the nacelle area must be reset on the ground prior to operation of the electric system.

a. #1 and #2 ice vane switches (2) - EXTEND.

b. #1 and #2 ice vane extended annunciator lights (2, green) - Check illuminated.

PROCEDURE	TROUBLESHOOTING REFERENCE
c. Torquemeters - Monitor for a 7 to 16% drop in torque with ice vanes extended.	
d. #1 and #2 ice vane switches - RETRACT.	
e. Torquemeters - Monitor for an increase in torque.	
f. #1 and #2 ice vane annunciator lights (green) - Check extinguished.	
g. Ice vane control circuit breakers (2) - Pull.	
h. Airspeed - 160 KIAS.	
i. #1 and #2 Ice vane switches - EXTEND.	
j. #1 and #2 vane fall annunciator lights (yellow) - Check Illuminated within 15 to 40 seconds after ice vane switch actuation.	
k. Manual engine Ice vane controls - Pull to extend. Pulling force required to extend the ice vanes should not be excessive.	
l. #1 and #2 vane fall annunciator lights (yellow) - Check extinguished.	
m. #1 and #2 ice vane extended annunciator lights (green) - Check illuminated.	
n. #1 and #2 ice vane switches - RETRACT.	
o. #1 and #2 vane fall annunciator lights (yellow) - Check	

PROCEDURE	TROUBLESHOOTING REFERENCE
CRUISE (CONT)	
illuminated within 15 to 40 secnods after ice vane switch acute-attain.	
p. Manual engine ice vane controlls - Push in to retract.	
q. #1 and #2 ice vane extended annunciator lights (green) - Check extinguished.	
r. After landing - Have extension mechanism reset to the electric mode, and reset ice vane circuit breakers.	
14. Trim and rigging - Check as required (Section IV).	
*15. Turn and bank indicators - Check as follows.	
a. Bank - Establish a coordinated standard rate turn.	
b. Timing - Maintain turn for 1 minute. Heading change shall be 180 +25°.	
c. In straight and level flight, the turn needle will be centered to within ±1/16 inch.	
d. Repeat procedure for opposite turn direction.	
16 Avionics - Check In flight as required (Section IV).	K1-41

PROCEDURE	TROUBLESHOOTING REFERENCE

LOW SPEED SYSTEMS CHECK

Prior to conducting a MTF where the stall warning system will be checked:

The Maintenance Test Pilot (MP) and a contractor maintenance person will physically check, with a measuring tape or other approved device, the proper measurements and installation of the stall strips per the appropriate maintenance manual.

Prior to conducting a power off maneuver, the MP will consult the POWER OFF STALL SPEED TABLE (fig. 1 page 2-50.3) to determine the stall speed and stall warning horn speed range for the aircraft at its weight and configuration during the flight.

During the crew briefing prior to commencing the flight, the crew must determine and announce that they will cease aileron inputs at activation of the stall warning horn. A wings level attitude shall be maintained by careful and prudent rudder input.

WARNING

The C-12 may not produce a clean aerodynamic "break" (i.e. In the C-12 the nose does not pitch down during a stall). The indication of the stall when the aircraft pitch attitude is held constant may be a moderate buffet, a loss in control effectiveness, full aft yoke, or any sink rate as indicated on the altimeter or VSI. Generally, 800 feet of altitude will be lost during a normal stall recovery.

Delayed recovery from a stall can result in a "deep stall" which is characterized by a level pitch attitude, flight path angle of approximately 45 degrees down, and a sink rate of up to 8500 FPM. Recovery from a "deep stall" requires a 10-15 degree nose-down pitch change to break the stall. Allow the airspeed to increase to at least 25 KIAS above the stall speed before recovery.

PROCEDURE	TROUBLESHOOTING REFERENCE

LOW SPEED SYSTEMS CHECK (CONT)

NOTE

In the event of an inadvertent stall, recovery can be effected by relaxing aft control force, lowering the nose below the visible horizon and adding power to reduce altitude loss. Rapid recovery is hampered by a pronounced secondary stall tendency (recurrence of buffet). Secondary stall can be avoided by increasing the airspeed 25 KIAS above the stall speed.

Stall warning horn shall sound at no more than 12, and no less than 5, knots above the stall speed IAW fig. 1 page 2-50.3.

Do not perform the low speed systems checks in turbulence conditions greater than occasional light turbulence.

* 1. Stall warning system (gear and flaps up, power off) – Check as follows: **C34,35**

WARNING

Begin the maneuver at 160 KIAS at an altitude that will allow recovery to be safely completed no lower than 7500 AGL.

a. **GEAR** – **UP**.

b. **FLAPS** – **UP**.

c. **PROP** levers – **HIGH RPM.**

d. **CONDITION** levers – **HIGH IDLE.**

e. **POWER** levers – **IDLE**.

f. Trim aircraft to 138 KIAS (Make no further pitch trim adjustments).

PROCEDURE	TROUBLESHOOTING REFERENCE

WARNING

If the aircraft reaches an airspeed 5 KTS above the stall speed IAW fig. 1 page 2-48.3 with no stall horn activation, terminate the LOW SPEED SYSTEMS CHECK and have maintenance personnel adjust/repair the stall warning horn system.

g. Airspeed – Reduce at a rate NO GREATER THAN one knot/second until the stall horn ACTIVATES, but NO LOWER THAN 5 knots above the published stall speed specified in fig. 1 page 2-50.3.

* h. Airspeed – Record at onset of the stall warning horn and terminate the maneuver.

* 2. Stall warning system, (gear and flaps down, power off) – Check as follows:

WARNING

Begin the maneuver at 160 KIAS at an altitude that will allow recovery to be safely completed no lower than 7500 AGL.

NOTE

Configure the aircraft by performing the BEFORE LANDING CHECK. Allow the aircraft to slow to approximately 120 KIAS and perform the following.

a. **GEAR**– **DN**.

b. **FLAPS** – **DOWN**.

c. **PROP** levers – **HIGH RPM.**

d. **CONDITION** levers – **HIGH IDLE.**

e. **POWER** levers– **IDLE**.

f. Trim aircraft to 108 KIAS (Make no further pitch trim adjustments).

PROCEDURE **TROUBLESHOOTING REFERENCE**

LOW SPEED SYSTEMS CHECK (CONT)

WARNING

If the aircraft reaches an airspeed 5 KTS above the stall speed IAW fig. 1 page 2-50.3 with no stall horn activation, terminate the LOW SPEED SYSTEMS CHECK and have maintenance personnel adjust/repair the stall warning horn system.

g. Airspeed – Reduce at a rate NO GREATER THAN one knot/second until the stall horn ACTIVATES, but NO LOWER THAN 5 knots above the published stall speed specified in fig. 1 page 2-50.3.

* h. Airspeed – Record at onset of the stall warning horn and terminate the maneuver.

3. Step deleted.

4. Step deleted.

PROCEDURE **TROUBLESHOOTING REFERENCE**

NOTE

The MP is responsible for ensuring the aircraft is within required weight and balance limits IAW the appropriate maintenance manual.

RC-12H

TRIM SPEED Gear & Flaps UP Power Idle 138 KIAS
Gear & Flaps DOWN Power Idle 108 KIAS

WEIGHT	STALL SPEEDS Vs	STALL SPEEDS Vso	WARNING HORN RANGE Vs	WARNING HORN RANGE Vso
15,000	100	83	105 – 112	88 – 95
14,500	99	82	104 – 111	87 – 94
14,000	98	81	103 – 110	86 – 93
13,500	97	79	102 – 109	84 – 91
13,000	96	78	101 – 108	83 – 90
12,500	95	77	100 – 107	82 – 89
12,000	94	76	99 – 106	81 – 88
11,500	92	74	97 – 104	79 – 86
11,000	91	73	96 – 103	78 – 85

Figure 1. Stall Speed

PROCEDURE	TROUBLESHOOTING REFERENCE

d. Step deleted.

e. Step deleted.

f. Step deleted.

g. Step deleted.

h. Step deleted.

* 5. Flap operation - Check as follows: **C31,32**

a. Airspeed - Reduce to 198 KIAS or below.

b. Flaps - APPROACH. Check flaps for freedom and smoothness of operation and for excessive aircraft roll.

c. Airspeed - Reduce to 153 KIAS or below.

d. Flaps - 100%. Check flaps for freedom and smoothness of operation and for excessive aircraft roll.

e. Flap extension and retraction time -Check as follows:

(1) Airspeed - 153 KIAS.

(2) Flaps - UP.

* (3) Flap retraction time - Check and record. Flaps should retract from full down to full up in a maximum of 9 seconds.

(4) Airspeed - 153 KIAS.

PROCEDURE	TROUBLESHOOTING REFERENCE

LOW SPEED SYSTEMS CHECK (CONT)

(5) Flaps - Down (100%).

* (6) Flap extension time - Check and record. Flaps should extend from full up to full down within 13 seconds.

* 6. Minimum elevator trim - Check as follows:

a. Power- Idle.

b. Gear - DN.

c. Flaps - Down (100%).

d. Propeller levers - HIGH RPM.

e. Elevator trim control wheel -Set full nose-up trim.

* f. Record airspeed (must be between 89 and 92 KIAS).

7. Flaps - UP.

8. Gear- UP.

* 9. Autoignition - Check as follows:

a. Autoignition switches (2) -ARM.

b. Slowly retard each power lever.

c. Respective IGN ON annunciator light should illuminate at 16 to 21% torque.

d. Power - Establish cruise power with auto-ignition armed.

e. Right engine condition lever -Rapidly retard to IDLE CUT-OFF for 3 seconds, then return

PROCEDURE	TROUBLESHOOTING REFERENCE
to LOW IDLE Engine relight should occur within 3 to 5 seconds Monitor engine acceleration and TGT rise. If relight does not occur within limits, or acceleration or TGT do not appear normal, abort the start. Restart engine using Normal Procedures. f. Repeat procedure for opposite engine	
*10. Propeller feathering - Check each engine as follows: a. Airspeed - 120 KIAS. b. Power lever (engine to be feathered) - IDLE c. Propeller lever (engine to be feathered) - Set 2000 RPM. d. Condition lever (engine to be feathered) - IDLE CUTOFF. e. Propeller lever (engine to be feathered) - FEATHER. Time to feather must not exceed 10 seconds from windmilling at 2000 RPM to no rotation in the feathered position. f. Engine cleanup. (1) Condition lever - FUEL CUTOFF. (2) Engine autoignition switch - OFF. (3) Autofeather switch - OFF. (4) Generator switch - OFF.	F14,15

PROCEDURE	TROUBLESHOOTING REFERENCE

LOW SPEED SYSTEMS CHECK (CONT)

(5) Propeller synchronization switch - OFF.

g. Engine restart

(1) Cabin temperature mode selector switch - As required.
(2) Electrical load - Reduce to minimum
(3) Fire pull handle - In.
(4) Power lever - IDLE.
(5) Condition lever - FUEL CUTOFF
(6) TGT (operating engine) - 700°C or less
(7) Ignition and engine start switch - ON
(8) Condition lever - LOW IDLE.
(9) TGT - 1000°C, 5 seconds maximum
(10) Ignition and engine start switch - OFF at 50% N_1.
(11) Generator switch - RESET, then ON
(12) Engine cleanup - Perform if engine restart is unsuccessful
(13) Cabin temperature mode selector switch - OFF
(14) Autoignition switch ARM

PROCEDURE	TROUBLESHOOTING REFERENCE
h. Propeller lever - Move out of feather Propeller tachometer must reach 1000 RPM in 30 seconds or less.	
l. Propellers - Synchronized.	
j. Power - As required.	
k. Repeat procedure for opposite engine.	
*11. Propeller autofeathering system and propeller unfeathering - Check as follows:	F14,15
a. Climb power - Set (N_1 above 92%)	
b. Autofeather switch - ARM	
c. Airspeed - 120 KIAS.	
d. Propeller levers - Set 2000 RPM.	
e. Power levers - Set 100% torque.	
f. Condition lever (engine to be feathered) - IDLE CUTOFF	
*g. Record the time from fuel cut-off until propeller rotation is completely stopped (no rotation). Autofeather time is a function of oil temperature as shown in figure 4 (Propeller is considered to be feathered when the blades are individually visible to the human eye, but the propeller is still rotating.)	

PROCEDURE	TROUBLESHOOTING REFERENCE

LOW SPEED SYSTEMS CHECK (CONT)

NOTE

For proper autofeather operation propeller must stop completely

h. Engine cleanup.
   (1) Condition lever - FUEL CUTOFF
   (2) Engine autoignition switch - OFF.
   (3) Autofeather switch - OFF.
   (4) Generator switch - OFF.
   (5) Propeller synchronization switch - OFF.

i. Engine restart.
   (1) Cabin temperature mode selector switch - OFF
   (2) Electrical load - Reduce to minimum
   (3) Fire pull handle - In.
   (4) Power lever - IDLE
   (5) Condition lever - FUEL CUTOFF
   (6) TGT (operating engine) - 700°C or less.
   (7) Ignition and engine start switch - ON
   (8) Condition lever - LOW IDLE

PROCEDURE	TROUBLESHOOTING REFERENCE
(9) TGT - 1000*C, 5 seconds maximum.	
(10) Ignition and engine start switch - OFF at 50% N_1.	
(11) Generator switch - RESET, then ON.	
(12) Engine cleanup - Perform if engine restart is unsuccessful.	
(13) Cabin temperature mode selector switch - As required.	
(14) Autoignition switch ARM.	
j. Propeller - Unfeather.	
k. Propellers- Synchronized.	
l. Power - As required.	
m. Repeat procedure for other engine.	
*12. Landing gear warning horn - Check as follows:	C24-26
a. Power levers - Retard slowly, individually, until landing gear warning horn first sounds	
*b. Turbine tachometers - Read N_1 on first hearing landing gear warning horn The landing gear warning horn must sound when power levers are retarded below 86 to 88% N_1 and airspeed is below 140 KIAS or when the flaps are extended beyond the approach position (40%) re-	

PROCEDURE	TROUBLESHOOTING REFERENCE
LOW SPEED SYSTEMS CHECK (CONT)	
gardless of power lever position c. Power levers - Advance past 86 to 88% N_1. Landing gear warning horn should be armed again. With the airspeed greater than 153 KIAS and the flaps are retracted, the landing gear warning horn shall be silent regardless of power setting.	
*13. Landing gear normal operation - Check as follows: a. Airspeed - 180 KIAS. b. Landing gear control switch - DN. *c. Landing gear extension time - Record (6 seconds maximum). d. Landing gear handle lights (red) - Check Illuminated while gear is in transit. e. Landing gear down indicator lights (3, green) - Check illuminated. f. Airspeed - 162 KIAS. g. Landing gear control switch - UP. *h. Landing gear retraction time - Record (7 seconds maximum). l. Landing gear handle lights (red) - Check illuminated while gear is in transit.	C13-30

PROCEDURE	TROUBLESHOOTING REFERENCE

j. Landing gear down indicator lights (3 green) - Check all extinguished.

*14. Emergency landing gear extension system - Check operation and condition as follows:

a. Airspeed - 130 KIAS.

b. Landing gear control circuit breaker - Out (pulled).

c. Landing gear control switch - DN.

d. Landing gear alternate extension lever- Unstow.

e. Alternate landing gear extension lever- Pump.

f. Gear down indicator lights (3) - Monitor. Stop pumping lever when gear down indicator lights are illuminated or resistance is felt

NOTE

Eighty or more strokes of the handle could be required to fully extend the landing gear

g. Alternate extension lever - Stow.

DESCENT AND LOW LEVEL CRUISE

*1. Maximum rate descent (Vmo). If the test pilot is satisfied that the entire aircraft is functioning properly perform the maximum rate descent check as follows.

PROCEDURE **TROUBLESHOOTING REFERENCE**

DESCENT AND LOW LEVEL CRUISE

a. Power - 50 to 60'% torque.
b. Propellers - Set 1900 RPM pressure altitude - Above 18, 000 feet.
c. Gear - UP.
d. Flaps- UP.
f. Au-speed - In accordance with figure 5.

WARNING

Immediately reduce airspeed if any flutter, oscillation or vibration is encountered.

*g. Flight controls - Check for any indication of flutter, oscillation, vibration, or malfunction.
*h. Windows and doors - Check for wind noise indicating air leaks.
i. Level off aircraft at 10,000 feet.

*2. Elevator trim - Nose down trim stops will be set as follows.
a. Power levers - Set 100% torque. Do not exceed N_1 or TGT limits.
b. Propeller levers - Set 2000 RPM.
d. Airspeed - 240 KIAS.

PROCEDURE	TROUBLESHOOTING REFERENCE

d. Trim aircraft.
e. Excess nose down trim should be at least 0.9 but not exceed 1.4 trim wheel indicator units.

DESCENT-ARRIVAL

Perform the following checks prior to the final descent for landing

1. Cabin pressurization - Set. Adjust cabin controller dial as required.
2. Ice and rain switches - As required.
3. Recognition lights - ON.
4. Altimeters - Set to current altimeter setting.
5. Flare/chaff dispenser arm-safe switch - SAFE.
6. Flare/chaff dispenser safety pin (electronic module) - Insert.
7. Crew briefing - Complete.

BEFORE LANDING

1. Propeller synchronization switch - OFF.
2. Autofeather switch - ARM.
3. Propeller levers - As required.

PROCEDURE	TROUBLESHOOTING REFERENCE

BEFORE LANDING (CONT)

NOTE

During ILS approach, propellers should be set at 1900 RPM to prevent ILS and glide-slope needle interference.

4. Flap switch - APPROACH, below 198 KIAS.
5. Landing gear control switch - DN, below 180 KIAS.
6. Landing lights - As required.
7. Brake deice - As required.

LANDING

NOTE

Maximum design sink rate below 13,500 pounds gross weight is 600 feet per minute The maximum design sink rate above 13, 500 pounds gross weight is 500 feet per minute

1. Autopilot and yaw damp - Disengaged
2. Gear down indicator lights (3) - Check Illuminated.
3. Propeller levers - HIGH RPM.

*4. Brake operation - Check during landing roll for any tendency to bleed down, drag after release or indicate asymmetrical braking power

PROCEDURE	TROUBLESHOOTING REFERENCE
*5. Propeller reversing - Check as follows: a. During landing utilize maximum reverse power. b. Check for smoothness of operation and equal thrust from engines. *c. Turbine tachometers - Maximum reverse N_1 should be 82 to 88%. Maximum difference between engines should be 2% N_1	E4,5
*6. Oil temperature - Monitor Ground idle limits are 10 to 99°G	
*7. Oil pressure - Monitor. Ground idle limits are 60 PSI minimum.	

GO-AROUND

1. Power - Maximum allowable.
2. Gear- UP.
3. Flaps - UP.
4. Landing lights - OFF.
5. Climb power - Set.
6. Yaw damp - As required.
7. Brake deice - OFF.

AFTER LANDING

Complete the following procedures after the aircraft has cleared the runway:

1. Condition levers - As required
2. Engine autoignition switches - OFF.

PROCEDURE	TROUBLESHOOTING REFERENCE

AFTER LANDING (CONT)

3. Ice and rain switches - OFF.
4. Flap switch - UP.
5. Avionics - As required.

NOTE

Do not turn INS off until after aircraft has been parked. Aircraft must remain stationary for 3 minutes after INS has been turned off.

6. Lights - As required.

ENGINE SHUTDOWN

CAUTION

To prevent sustained loads on rudder shock links, the aircraft should be parked with the nose gear centered.

1. Brake deice - OFF.
2. Parking brake - Set.
3. Landing/taxi lights - OFF.
4. Cabin temperature mode selector switch - OFF.
5. Autofeather switch - OFF.
6. Vent and aft vent blower switches - AUTO.
7. Inverter switches - OFF.

PROCEDURE	TROUBLESHOOTING REFERENCE

*8. Battery condition - Check as required. If BATTERY CHARGE light is illuminated during engine shutdown, monitor battery ammeter (mission control panel), for decreasing current Battery condition is unsatisfactory if BATTERY CHARGE light remains illuminated and charge current falls to decrease between checks.
9. Avionics master switch - OFF.
10. TGT - Check TGT must be 660°C or below for one minute prior to shutdown.
11. Propeller levers - FEATHER.

CAUTION

Monitor TGT during shutdown. If sustained combustion is observed, proceed immediately to ABORT START procedure

12. Condition levers - FUEL CUT-OFF

WARNING

Do not turn EXTERIOR LIGHTS OFF until propeller's rotation has stopped

13. Exterior lights - OFF
14 Master panel lights - OFF
15 Key lock switch - OFF

PROCEDURE	TROUBLESHOOTING REFERENCE

ENGINE SHUTDOWN (CONT)

16. Oxygen system - As required

BEFORE LEAVING AIRCRAFT

1. Wheels - Chocked.
2. Parking brake - As required.

NOTE

Brakes should be released after chocks are in place (ramp conditions permitting).

3. Flight controls - Locked.
4. Standby fuel pumps - Off.
5. Overhead floodlight - OFF.
6. Emergency exit lock - As required.
7. Aft cabin light - OFF.
8. Door light - OFF.

CAUTION

If strong winds are anticipated while the aircraft is unattended, the propellers shall be secured to prevent their windmilling with zero engine oil pressure

*9. Walk-around inspection - Complete. Conduct a thorough walk-around inspection, checking for damage, fluid leaks, and fluid levels. Check that covers, tiedowns, restraints, and chocks are installed as required. E11-13

PROCEDURE	TROUBLESHOOTING REFERENCE

NOTE

A cold oil check is unreliable. 011 should be checked within 10 minutes after stopping engine

*10. Aircraft forms - Complete In addition to established requirements for reporting any system defects, unusual and excessive operation such as hard landings, etc, the flight crew will also make entries on DA Form 2408-13 to indicate when limits in the operator's manual have been exceeded.

11. Aircraft - Check secured. Lock cabin door as required.

SECTION III. TROUBLESHOOTING

General. This section contains troubleshooting information that has been referenced in Section II. This section lists possible conditions, abnormal conditions and indications and probable causes. The information is to be used only as a quick reference and may not be all-encompassing.

TROUBLESHOOTING GUIDE A - STARTING

CONDITION

PROBABLE CAUSE

A1. Both starters inoperative.

a. No power on aircraft
b. Low battery
c. Loose connection or open circuit between battery relay power cabinet.

A2. One starter inoperative.

a. Starter relay inoperative.
b. Poor ground at starter.
c. Defective wiring.
d. Open circuit.
e. Defective starting motor.
f. Defective switch.
g. Defective generator control unit.
h. Current transformer miswired.

A3. Engine slow to start or does not start.

a. Low battery
b. High resistance starter circuit.
c. Defective starter-generator.
d. Turbine dragging

e. Defective generator control unit.
f. Current transformer miswired

A4. Excessive starting RPM.
a. Accessory gearbox input shaft coupling not engaged.
b. Accessory gear drives, bushings or compressor rear hub splines are defective.

A5. Engine fails to light up.
a. Proper engine starting procedure.
b. Ignition system.
(1) No power to ignition exciter
(2) Defective wiring or components
c. Fuel system
(1) Debris or ice in fuel system
(2) Air lock in fuel control unit
(3) Engine driven primary high pressure pump failure

A6. Engine fails or is slow to accelerate to idle N_1 speed.
a. Improper engine starting technique or premature removal of starter from line.
b. Leaks or restrictions on fuel control unit pneumatic system.
c. Leaks in pneumatic line of propeller governor.
d. Fuel control unit contaminated with water or ice, or corroded.

A7. Hot start or delayed light up.
a. Improper starting procedure.
b. Insufficient power from battery or ground power unit.
c. Poor connections on power input lines or starter-generator.

d. Low power to ignition exciter.
e. Defective ignition cable.
f. Defective igniters.
g. Defective Ignition exciter.
h. Bleed air leaking or system in aircraft using bleed air is on.
l. Engine control linkage improperly rigged.
j. Fuel nozzle restrictions.

A8. Engine fails to or is slow to accelerate propeller to idle speed.

a. Propeller oil transfer sleeve binding.

TROUBLESHOOTING GUIDE B - INSTRUMENTS

CONDITION
PROBABLE CAUSE

B1. Airspeed indicator reading remains fixed.
a. Pilot pressure line clogged with ice or debris.
b. Defective indicator.

B2. Vertical velocity indicator inaccurate or inoperative.
a. Static line clogged
b. Leak in line or Instrument case or loose fittings
c. Defective vertical velocity indicator.

B3. Airspeed indicator reads incorrectly or fluctuates excessively.
a. Pilot tube or pressure line partially restricted or leaking.
b. Static port or line clogged or static line leaking.
c. Faulty airspeed indicator.

B4. Magnetic compass inaccurate, sluggish or erratic.
a. Insufficient liquid
b. External magnetic interference
c. Defective compass
d. Windshield heat on

B5. Turn-and-slip indicator inoperative or erratic.
a. Tripped turn-and-slip circuit breaker.
b. Defective turn-and-slip instrument.

B6. Fuel quantity indicator fluctuates or reads low.
a. Defective pins in connector on harness that mates with gage.

b. Compensator immersed in water.
c. Circuit out of calibration.
d. Tank unit(s) out of circuit.
e. Defective pins in connector on fuel probes and wing harness used to connect fuel probes.

B7. Fuel quantity gage pegs down scale against stop.
a. Defective probe.
b. Defective pins on connectors on both gage and probes.
c. Nacelle probe body is making contact with metal braided hose Inside of nacelle tank
d. Defective indicator.

B8. Fuel quantity indicator needle pegs up scale against stop.
a. Defective indicator.

B9. Turbine gas temperature indicator inoperative or indicates inaccurately.
a. Defective or out of adjustment balance resistor
b. Defective turbine gas temperature harness
c. Defective turbine gas temperature indicator

TROUBLESHOOTING GUIDE C - ELECTRICAL

CONDITION
PROBABLE CAUSE

C1. Zero or low voltage indicated.
a. Circuit breaker tripped.
b. Loose connection.
c. Open or shorted field circuit in generator or defective armature.
d. Brushes not contacting commutator.
e. Brushes worn out.
f. Dirty commutator.
g. Defective generator, control unit.

C2. No generator output.
a. Improper connections.
b. Circuit breaker tripped.
c. Open or short circuit.
d. Loss of residual magnetism.
e. Defective generator control switch.
f. Starter switch on.
g. Paralleling circuit open.
h. Defective generator control unit.
I. High resistance field circuit.
j. Shorted field.

C3. Low generator output.
a. Generators not paralleled.
b. Defective generator control unit

C4. Low voltage.
a. Malfunctioning generator control unit.

C5. Volt-loadmeter reads off scale in wrong direction.
- a. Generator field magnetized In wrong direction

C6. Volt-loadmeter does not indicate.
- a. Tripped circuit breaker.
- b. Open volt-loadmeter lead.
- c. Defective volt-loadmeter.

C7. No power indicated with battery master switch ON.
- a. Battery discharged or defective.
- b. Open circuit between battery and master. switch.
- c. Master switch defective.
- d. Defective relay.
- e. Keylock switch off.

C8. Power on with master switch in OFF position.
- a. Master switch defective.
- b. Relay contacts stuck.

C9. Apparent loss of battery capacity.
- a. Cells unbalanced.
- b. Electrolyte level too low.
- c. Charging rate too low in aircraft.
- d. Too little usage or shallow discharges.

C10. Complete failure of battery to operate.
- a. Loose or broken lead.
- b. Loose or disengaged terminals in battery.
- c. Battery not charged.
- d. Cell open internally.

C11. Below normal battery output.

a. Battery switch left ON.
b. Generator control unit set too low.
c. Internal connection links loose.
d. External connector burned or pitted.
e. Defective or reversed cells.
f. Cell case current leakage.

C12. External power fails to energize aircraft.

a. Defective or incorrectly polarized external power source.
b. Defective external power receptacle
c. Defective external power relay
d. Loose or wrong connection In external power circuit.
e. Defective external power overvoltage monitor.
f. APU voltage too high.
g. Defective switch.
h. Circuit breaker tripped.

C13. Landing gear will not retract or extend.

a. Landing gear relay circuit breaker tripped.
b. Landing gear power circuit breaker tripped.
c. Landing gear power safety control circuit breaker tripped.
d. Landing gear power and sense circuit breaker tripped.
e. Landing gear safety power circuit breaker tripped
f. Faulty power pack motor.
g. Faulty power relay.
h. Faulty remote-controlled circuit breaker (RCCB).

i. Defective landing gear control switch.
j. Defective wiring.

C14. Landing gear fails to retract.
a. Safety switch not closing.
b. Pressure switch not closing.
c. Gear selector valve stuck.
d. Circuit is open between the selector valve and the power relay.
e. Time delay circuit opening prematurely.
f. Hand pump handle improperly stowed.
g. Service valve in up position.
h. Defective control switch.

C15. Landing gear fails to extend.
a. Service valve switches faulty
b. Landing gear selector valve stuck in up position.
c. Control switch not providing power to the extend side of selector valve.
d. Defective limit switch.
e. Defective control switch.

C16. Landing gear pump motor continues to run after the gear is retracted, causing the circuit breaker to trip.
a. Pressure switch not opening on high pressure.
b. Low accumulator charge
c. Excessive fluid leakage past the piston seals in the actuators
d. Defective valve in the power pack

C17. Landing gear pump motor continues to run after the gear are extended, causing the circuit breaker to trip.

a. Downlock switches are not opening.
b. Power relay points stuck.
c. Defective limit switch.

C18. Landing gear pump motor continues to run when the gear is extended or retracted, causing the circuit breaker to trip.

a. Weak power pack motor
b. Low voltage to the motor
c. Low fluid level.
d. Blockage in the hydraulic system.

C19. Landing gear pump motor operating longer than 14 seconds in both the extention and retraction modes. The 2-ampere circuit breaker does not trip.

a. Low voltage.

C20. Landing gear pump motor operating longer than 14 seconds in the retract mode, but the 2-ampere circuit breaker does not trip.

a. Faulty time delay PCB and pressure switch

C21.Landing gear pump motor operating longer than 14 seconds in the extended mode, but the 2 ampere circuit breaker does not trip.

a. Downlock switches falling to open and/or the time delay PCB is faulty.

C22. Landing gear LOW FLUID LEVEL light not functioning.

a. Defective lamp.
b. Defective fluid Indicator circuit.

C23. Landing gear circuit breaker trips.

a. Shorted circuit

C24. Landing gear warning horn inoperative when landing gear control switch is in the up position and weight of aircraft is on struts, but operates when a power lever is closed and the gear is retracted.

a. Poor ground at landing gear control switch.
b. Defective wiring between landing gear control switch and landing gear safety switch

C25. Landing gear warning horn inoperative when power lever is closed and landing gear is up.

a. Defective or out of adjustment power lever switch
b. Defective wiring between power lever switches and pedestal terminal board, and between landing gear control switch and stall/landing gear warning horn module.
c. Defective "Q" switch
d. Defective speaker

C26. Landing gear warning horn fails to shut off when landing gear is extended.

a. Defective or out of adjustment down-lock switches

C27. Landing gear down position indicator lights are illuminated with landing gear retracted.

a. Defective or out of adjustment down lock switch
b. Wrong connection in light test circuit.
c. Ground between light and down lock switch

C28. Landing gear down position indicator light inoperative.

a. Defective or out of adjustment down lock switch.

C29. Landing gear handle light is illuminated with gear up and locked.

a. Defective or out of adjustment up-lock switch

C30.Landing gear handle light inoperative.

a. Defective or out of adjustment up-lock or down-lock switch.

b. Defective landing gear control switch.

C31. Flaps fail to extend or retract.

a. Tripped circuit breaker.
b. Defective flap motor.
c. Defective flap control switch.
d. Defective mechanical component in actuator system.
e. Defective wiring.

C32. Flap position indicator inoperative.

a. Tripped circuit breaker.
b. Defective position indicator.
c. Defective position transmitter.
d. Defective wiring.

C33. Pilot tube heater fails to operate.

a. Tripped circuit breaker.
b. Defective heater
c. Defective wiring
d. Defective switch

C34. Stall warning system inoperative.

a. Defective stall warning transducer.
b. Defective stall warning computer
c. Defective wiring
d. Defective stall/landing gear warning horn module
e. Defective speaker.

C35. Stall warning horn sounds continuously.

a. Defective stall warning transducer
b. Defective stall warning test system
c. Defective wiring.

d. Defective stall warning computer

C36. Both inverters inoperative.

a. Defective wiring in inverter system

C37. One inverter inoperative.

a. Tripped inverter circuit breaker (on DC power distribution panel beneath floor).
b. Defective inverter.
c. Loose or corroded ground connection.
d. Defective wiring to inverter.

C38. Battery charge annunciator light inoperative.

a. Defective light bulb
b. Connections on battery shunt loose or corroded
c. Defective battery charge monitor module

C39. One portion of interior lighting or lighting control system inoperative.

a. Defective light circuit board or wheat lights.
b. Defective components in overhead control panel
c. Defective power supply

C40. Fuel crossfeed valve inoperative or FUEL PRESS annunciator light remains illuminated.

a. Defective standby fuel pump.
b. Defective crossfeed valve

C41. Standby fuel pump inoperative.

a. Defective standby pump.
b. Defective switch in fuel management panel.

C42. Pneumatic surface or antenna deice system inoperative.

a. Defective surface deice time delay module
b. Defective deice distributor valve.

c. Defective plumbing.
d. Defective deice boot

C43. Right and left FIRE PULL warning lights do not illuminate in test position of fire protection test switch.
a. Tripped fire detector circuit breaker.
b. Defective fire protection test switch
c. Defective wiring

C44. Engine fire detection system wholly or partially inoperative.
a. Defective fire detector
b. Defective fire protection test switch.

C45. Fire detector circuit breaker trips.
a. Short circuit in **wiring** or components

C46. Left FIRE PULL warning light illuminates in test positions but right FIRE PULL warning light does not.
a. Defective right fire detector
b. Defective wiring between fire warning power circuit breaker and right fire detector

C47. Right FIRE PULL warning light illuminates in test positions but left FIRE PULL warning light does not.
a. Defective left fire detector.
b. Defective wiring between fire warning power circuit breaker and left fire detector

C48. Ventilation blower will not run.
a. Tripped vent blower circuit breaker
b. Defective motor brushes.
c. Defective wiring
d. Defective motor
e. Defective switch

C49. Ventilation blower draws excessive current.
- a. Misaligned or preloaded bearings.
- b. Defective bearings

C50. Ventilation blower runs at reduced speed.
- a. Brushes not seated properly
- b. Switch set to low

C51. Ventilation blower draws excessive current and runs at high speed.
- a. Shorted turns in field windings.

C52. Ventilation blower draws excessive current and speed surges.
- a. Shorted turns in armature.

C53. Ventilation blower has excessive vibration.
- a. Armature out of balance
- b. Squirrel cage fan damaged
- c. Squirrel cage fan out of balance
- d. Defective bearings

C54. Propeller deice inoperative.
- a. Circuit breaker tripped.
- b. Propeller deice switch defective.
- c. Ammeter defective.
- d. Defective propeller deice timer

TROUBLESHOOTING GUIDE D - CAUTION PANEL

CONDITION
PROBABLE CAUSE

D1. Annunciator light (annunciator panel) will not illuminate when press-to-test button is pressed.
- a. Defective fault warning light
- b. Defective annunciator fault detection module
- c. Defective wiring

D2. Master warning or master caution annunciator light will not illuminate for any red or yellow faults.
- a. Defective fault warning light
- b. Defective fault detection module
- c. Defective annunciator control module

D3. Depressing the annunciator press-to-test switch has no effect on fault warning system operation.
- a. Defective switch
- b. Defective circuit breaker
- c. Defective wiring

D4. Dim control does not function properly.
- a. Defective rheostat switch
- b. Defective annunciator control module.

TROUBLESHOOTING GUIDE E - POWER PLANT

CONDITION
PROBABLE CAUSE

E1. LOW IDLE speed is either high or low.
a. LOW IDLE speed improperly adjusted.

E2. HIGH IDLE speed is either high or low.
a. HIGH IDLE speed improperly adjusted.

E3. Low or high torque is observed during torque check.
a. Barrel adjustable stop is improperly adjusted.

E4. Reverse torque, N_1, and propeller RPM is too high or low.
a. Reverse adjusting screw Is improperly adjusted.

E5. Newly rigged engine accelerates faster or slower than opposite engine.
a. Engine rigging, components, or engine is mismatched.

E6. Power levers are not aligned.
a. Fuel control rod Improperly adjusted.

E7. High engine oil pressure.
a. Defective oil pressure indicating system
b. Defective pressure relief valve

E8. Low engine oil pressure.
a. Insufficient oil.
b. Defective oil pressure indicating system.
c. Dirty oil filter
d. Leak in oil lines or oil cooler.
e. Defective pressure relief valve

f. Excessive hot air leakage through faulty heat shielding

E9. Fluctuating engine oil pressure.

a. Insufficient or excess oil
b. Defective oil pressure indicating system
c. Dirty oil filter.
d. Defective pressure relief valve.

E10. High oil temperature.

a. Insufficient oil supply.
b. Defective oil temperature indicating system
c. Excessive idling in feather
d. Restriction in oil cooler.

E11. Oil leak from compressor inlet.

a. Defective preformed packing and plastic ring on oil filter housing.
b. Defective preformed packings on accessory gearbox

E12. Excessive oil discharge from overboard breather.

a. Excess oil in tank
b. Defective preformed packing and plastic ring on oil filter
c. Excessive back pressure in scavenge system due to restrictions in oil scavenge tubes, pump screen or oil-to-fuel heater tubes

E13. Excessive engine oil consumption.

a. Excess oil in tank.
b. Leak or restriction in pressure scavenge oil tubes.
c. Defective preformed packing and plastic ring on oil filter housing.
d. Leakage in oil to fuel heat exchanger.
e. Defective centrifugal breather carbon seal.

f. Defective air seals.

E14. Failure of engine to decelerate.

a. Fuel control unit
b. Disconnected or improperly adjusted linkage

E15. Gas generator overspeed.

a. Defective turbine tachometer system.
b. Sheared or worn fuel control unit splined coupling or drive spline.
c. Defective fuel control unit.

E16. Gas generator uncontrolled acceleration.

a. Sheared or worn fuel control unit splined coupling or drive spline.
b. Defective fuel control unit.

E17. Surge during acceleration.

a. Defective compressor bleed valve.
b. Defective fuel control unit.
c. Compressor damaged.

E18. Slow to accelerate.

a. Possible leak or restriction in Py air bleed. tube or P3 air delivery tube.
b. P3 air filter needs replacing.
c. Improper acceleration adjustment on fuel control unit.
d. Propeller governor out of adjustment.
e. Defective fuel control unit.
f. Defective propeller governor.

E19. Flame out.

a. Fuel supply contaminated with ice, water, or debris.
b. Engine driven high pressure fuel pump

c. Fuel control unit contaminated or corroded
d. Manifold adapter or fuel nozzles restricted

E20. Low power output.
a. Defective indicating system
b. Operating procedures incorrect.
c. Control linkages incorrectly adjusted or disconnected.
d. Propeller governor defective
e. Leaks or restrictions in fuel control unit pneumatic system.
f. Fuel nozzles restricted.

E21. High fuel flow at altitude.
a. Defective indicating system
b. Defective compressor bleed valve

E22. Maximum operating TGT has been exceeded.
a. Faulty instrumentation, thermocouples or wiring.
b. Excessive accessory power being pulled due to failure or overload.
c. Torquemeter system reading low.

E23. TGT limited (turbine temperature is at maximum limit before target torque is reached).
a. Defective instruments, thermocouple, or wiring.
b. Improper operating procedure.
c. Dirty compressor.
d. Excessive accessory power being pulled due to failure or overload.
e. Defective compressor bleed valve.
f. Damaged compressor.
g. Air leaks in engine flanges or fittings.

h. Hot section distress
i. Torquemeter system reading low.

E24. Fluctuating torque indication.
a. Faulty instrumentation system.
b. Defective power turbine governor.
c. Engine driven high pressure pump shaft seal leakage.
d. Defective or out of adjustment propeller. overspeed governor.
e. Defective propeller primary governor.
f. Sticking beta mechanism.

E25. Fluctuating fuel flow.
a. Faulty instrumentation system.
b. Defective power turbine governor.
c. Engine driven high-pressure fuel pump shaft seal leaking.
d. Defective propeller overspeed governor.
e. Sticking beta mechanism.

E26. Fluctuating TGT.
a. Faulty instrumention system.
b. Defective power turbine governor.
c. Defective engine driven high pressure fuel pump shaft seal.
d. Defective or out of adjustment propeller overspeed governor.
e. Defective propeller primary governor.
f. Sticking beta mechanism.

E27. Fluctuating gas generator speed.
a. Faulty instrumentation system
b. Defective power turbine governor

c. Defective engine driven primary high pressure fuel pump shaft seal.
d. Defective or out of adjustment propeller overspeed governor.
e. Defective propeller primary governor.
f. Sticking beta mechanism.

E28. Fluctuating torque and propeller RPM.

a. Defective or out of adjustment propeller overspeed governor.
b. Defective propeller primary governor.
c. Sticking beta mechanism.

E29. Fuel leaking overboard.

a. Fuel cap not seated.
b. Filler cap or preformed packing defective.
c. Fuel transfer pump module defective.
d. Fuel level transmitter defective.

TROUBLESHOOTING GUIDE F - PROPELLERS

CONDITION

PROBABLE CAUSE

F1. Propeller governor system partially or completely inoperative.

a. Defective propeller governor test switch

F2. Propeller governor test system inoperative.

a. Tripped propeller governor test circuit breaker.

b. Defective wiring

c. Defective switch

d. Defective propeller speed reset solenoid.

F3. Propeller governor test system inoperative on one engine.

a. Defective propeller governor system test switch

b. Defective propeller speed reset solenoid

F4. Propeller autofeather system inoperative (propeller autofeather switch in ARM or TEST position).

a. Tripped circuit breaker

b. Defective arming light out relay or feathering relay

c. Defective arc suppression diode on relays or feather dump valve

d. Defective ground blocking diode.

F5. Autofeather circuit breaker trips (autofeather switch in ARM or TEST position).

a. Defective ARM-TEST switch

b. Defective wiring

F6. One autofeather arm light illuminates when power setting is less than 90 percent N_1 (AUTOFEATHER switch in ARM position).

a. Defective or out of adjustment power switch

F7. Neither autofeather arm light illuminates when power levers are advanced (AUTOFEATHER switch in ARM position).

a. Defective autofeather switch

F8. One arm light does not illuminate when power levers are advanced (AUTOFEATHER switch in ARM position).

a. Defective or out of adjustment power switch.

b. Defective No 1 (12 PSI) torque pressure switch

F9. Both arm lights remain illuminated when one power lever is retarded (AUTOFEATHER switch in ARM position).

a. Defective or out of adjustment power switch

F10. Propeller does not start to feather after engine torque falls below 7% (AUTOFEATHER switch in ARM position).

a. Defective No. 2 (6 5 PSI) torque pressure switch on retarded engine

b. Defective autofeather dump valve

F11. One arm light does not illuminate when power levers are advanced to 90 percent N_1 (AUTOFEATHER ARM-TEST switch in TEST position).

a. Defective No. 1 (12 PSI) torque pressure switch.

F12. Both arm lights extinguish when one power lever is retarded (engine torque 7 to 12% on retarded engine, AUTOFEATHER ARM-TEST switch in TEST position).

a. Defective No 2 (6 5 PSI) torque pressure switch on retarded engine

F13. One arm light remains illuminated after torque of one engine falls below 7% on retarded engine, AUTOFEATHER ARM-TEST switch in TEST position).

a. Defective No. 2 (6.5 PSI) torque pressure switch on retarded engine.

b. Defective autofeather dump valve.

F14. Propeller slow to feather.

a. Preformed packing leak at transfer tube or transfer housing.

b. Defective propeller governor.

F15. Propeller slow to unfeather.

a. Defective propeller governor.

TROUBLESHOOTING GUIDE G - HYDRAULIC

CONDITION
PROBABLE CAUSE

G1. Solid pedal, no brakes.
a. Brake linings worn beyond allowable limits

G2. Spongy brakes.
a. Air in brake hydraulic system.

b. Low hydraulic fluid

G3. Unable to hold brake pressure.
a. Leak in brake hydraulic system.

b. Brake cylinder seal leaking.

G4. Brake pedals bottom, no brakes.
a. Broken or leaking hydraulic lines

b. Brake cylinder seal failure.

G5. Parking brake will not hold.
a. Air in brake hydraulic system.

b. Defective parking brake valve

c. Parking brake control out of adjustment.

G6. Brakes grab.
a. Stones or foreign matter locking brake disc.

b. Warped or, bent disc.

G7. Brakes drag.
a. Packing nut or threaded bushing, as applicable, too loose.

G8. Brakes weak.
a. Packing nut or threaded bushing, as applicable, too tight.

TROUBLESHOOTING GUIDE H - FLIGHT CONTROLS

For complete troubleshooting of autopilot system, refer to Sperry manual P/N 15-1146-25.

TROUBLESHOOTING GUIDE I - NOT APPLICABLE

TROUBLESHOOTING GUIDE J - VIBRATIONS

CONDITION
PROBABLE CAUSE

J1. Engine vibration.

a. Propeller damaged or blade angle slipped.

b. Loose engine mounting bracket bolts.

c. Compressor damaged.

d. Turbine damaged.

TROUBLESHOOTING GUIDE K -
COMMUNICATION/NAVIGATION EQUIPMENT

CONDITION
PROBABLE CAUSE

K1. Interphone system: No audio signals heard in headset.
a. No power to audio system.

b. Defective microphone, control wheel microphone switch, or foot microphone switch.

c. Defective headset-microphone cord or jack.

d. Defective microphone jack.

e. Defective audio control panel.

K2. Interphone system: Audio signals can be heard at other headset stations when transmitter selector switches at audio control panels are at different positions and receiver monitor switches are pulled out.
a. Defective audio control panel.

b. Defective wiring.

K3. UHF VOL control has no effect on receiver noise or incoming signal.
a. Defective UHF command set

K4. UHF channeling tone not heard.
a. Defective UHF command set

K5. UHF squelch switch has no effect on receiver noise.
a. Defective UHF command set.

b. Defective static wicks

K6. UHF guard receiver noise not audible.
a. Defective UHF command set

K7. Cannot establish UHF two-way communications.

a. Defective audio distribution channels.
b. Defective antenna or antenna cabling.

K8. Cannot establish VHF two-way communications.
a. Defective audio distribution channels.

b. Defective antenna or cabling.

K9. VHF volume control does not affect received audio level.
a. Defective VHF control panel.

b. Defective antenna or antenna cabling.

K10. HF transmitted or received signal or sidetone not clear.
a. Defective HF receiver-transmitter.

b. Defective antenna cabling.

c. Defective HF control panel.

d. Defective audio control panel.

K11. Course deviation indicator NAV flags remain in view with receiver operating.
a. No reliable navigation signal on frequency selected.

b. Defective VOR receiver.

c. Defective VOR control panel.

d. Defective antenna or cabling.

e. Defective NAV switching relays.

K12. Either pilot's or copilot's course deviation indicator NAV flag remains in view with receiver operating.
a. Defective pilot's or copilot's VOR switch on instrument panel

b. Defective course indicator switching relays

c. Defective course deviation indicator K13. No VOR audio tone heard in headset.

K13. a. Defective VOR receiver.

b. Defective VOR control panel.

c. Defective audio control panel.

K14. Marker beacon indicator light does not illuminate.

a. Defective marker beacon indicator light.

b. No power to receiver.

c. Defective antenna or cabling.

d. Defective marker beacon receiver.

K15. Marker beacon signals not heard in headset.

a. Defective audio control panel

b. Defective marker beacon volume control or sensitivity switch on pedestal extension.

K16. Glideslope flags remain in view when glideslope receiver is operating.

a. Glideslope portion of VOR receiver defective.

b. Defective glideslope antenna or cabling.

c. Defective VOR control panel.

K17. Glideslope flag on one course deviation indicator remains in view when glideslope receiver is operating.

a. Defective pilot's or copilot's NAV select switch on instrument panel.

b. Defective course deviation indicator switching relay.

c. Defective course deviation indicator.

K18. Glideslope indicator on course deviation indicators do not deflect properly.

a. Defective glideslope portion of VOR receiver.

K19. Glideslope indicator on one course deviation indicator does not deflect properly.

a. Defective course deviation indicator.

b. Defective course deviation indicator switching relay.

K20. ADF radio set inoperative.

a. No power to ADF radio set.

K21. No ADF audio heard in headsets and tuning meter does not deflect.

a. Defective ADF receiver.

b. Defective ADF control panel.

c. Defective ADF sense antenna.

K22. Radio magnetic indicator does not indicate magnetic bearing to station with single needle switch set to ADF.

a. Defective ADF receiver.

b. Defective RMI.

c. Defective ADF fixed-loop antenna.

d. Defective ADF-VOR switch on RMI.

e. Defective ADF control panel.

K23. ADF single needle pointer does not return to station bearing.

a. Defective RMI

K24. Quality of ADF reception is poor.

a. Defective ADF control panel.

b. Defective audio control panel.

c. Defective ADF receiver.

K25. Heading on course deviation indicator does not agree with magnetic compass heading of aircraft (corrected for compass deviation).

a. Defective gyro compass set

b. Incorrect compass deviation card.

K26. Copilot's radio magnetic indicator heading does not agree with pilot's horizontal situation indicator heading within two degrees.

a. Defective radio magnetic indicator.

b. Defective horizontal situation indicator.

K27. Pilot's radio magnetic indicator heading does not agree with copilot's horizontal situation indicator heading within two degrees.

a. Defective radio magnetic indicator.

b. Defective horizontal situation indicator.

K28. VOR receiver inoperative.

a. No power to equipment.

b. Defective VOR control panel.

c. Defective VOR receiver.

K29. With VOR receiver operating, course deviation bars on course deviation indicators and radio magnetic indicator needles do not deflect.

a. Defective VOR receiver

b. Defective VOR control panel

c. Defective relays

K30. With VOR receiver operating, course deviation bars on course deviation indicators do not deflect (radio magnetic indicator needles operate properly).

a. Defective NAV select switch on instrument panel.

b. Defective course deviation indicator switching relay.

K31. Radar inoperative.

a. System circuit breaker tripped.

b. Defective radar control-indicator.

c. Defective radar receiver-transmitter.

d. Defective antenna.

K32. Radar antenna does not scan.

a. No power to radar antenna.

b. Defective radar antenna.

K33. No display on radar control indicator.

a. Defective radar control-indicator.

b. Defective radar receiver-transmitter.

c. Defective radar antenna.

K34. Wavy, chopped, or missing range circles or indicator.

a. Defective radar control-indicator.

b. Defective radar receiver-transmitter.

K35. Improper display on radar control-indicator (track line bent folded or does not begin at proper position).

a. Defective radar receiver-transmitter.

b. Defective radar control-indicator.

K36. No targets on radar control-indicator or targets do not move with TILT control.

a. Defective radar control-indicator.

b. Defective radar receiver-transmitter

c. Defective radar antenna.

K37. Radar gain control has no effect on display (ground mapping mode only).

a. Defective radar control-indicator.

K38. Radar TILT control inoperative.

a. Defective radar control indicator.

K39. Radar BRT control inoperative.

a. Defective radar control-indicator.

K40. Radar range does not vary when RANGE switch is changed to various positions.

a. Defective radar control-indicator.

K41. Transponder cannot be interrogated or provides unsatisfactory response.

a. Mode C not set or defective.

b. Encoding altimeter defective.

c. Defective transponder.

d. Defective antenna.

e. Defective wiring.

SECTION IV. SPECIAL PROCEDURES

General. This section contains the special procedures that were referenced in Section II.

***A. PRESSURIZATION SYSTEM.**

Check as follows:

1. Bleed air valve switches (2) - OPEN.
2. After takeoff - Establish a climb.
3. Cabin altimeter - After takeoff the cabin altimeter needle should stabilize at 1550 to 2050 feet and the cabin differential pressure needle should continue climbing. The cabin altimeter needle should remain at 1550 to 2050 feet pressure altitude until the maximum pressure difftial of 6.0± 1 is reached. At this point (approximately 16,600 feet pressure altitude) the cabin altitude should increase while the differential pressure remains constant.
4. Cabin pressurization leak rate - Check within limits as follows:
   a. Level off aircraft when pressure differential reaches 6 0± 1.
   b. Bleed air valve switches (2) - ENVIRO OFF.
   c. Cabin rate-of-climb indicator - Read cabin rate of climb. Cabin rate of climb (cabin pressurization leak rate) should not exceed 2200 feet per minute.
5. Bleed air valve switches (2) - OPEN Reestablish 6.0 ± 1 PSI cabin pressure differential.
6. Left bleed air valve switch - ENVIRO OFF.
7. Slowly retard the right power lever to flight idle. Cabin pressurization should not change or begin a climb.
8. Repeat the above procedure for the left engine.
9. Cabin altitude controller - Set to 10,000 feet pressure altitude

10. Cabin pressurization rate knob. - Set to maximum.
11. Cabin rate of climb indicator - Cabin rate of ascent should be between 1500 and 2500 feet per minute.
12. Cabin pressurization rate knob. - Set to midrange
13. Cabin rate of climb indicator - Cabin rate of descent should be between 350 and 650 feet per minute
14 Cabin pressurization rate knob - Set to minimum
15 Cabin rate of climb indicator - Cabin rate of ascent should be between 50 and 300 feet per minute.
16. Cabin altitude controller - Set to 1800 feet.
17. Cabin rate of climb indicator - Cabin rate of descent should be between 50 and 300 feet.
18. Cabin pressurization rate controller - Set to maximum.
19. Cabin rate of climb indicator - Should indicate a descent of 1500 and 2500 feet per minute.
20. Cabin pressurization rate controller - Set to midposition.
21. Cabin rate of climb indicator - Should indicate a descent of between 350 and 650 feet per minute.
22. Cabin altitude controller - Set to 10,000 feet.
23. Cabin altimeter - Should reach 9750 to 10,250 feet pressure altitude.
24. Reduce airplane altitude toward 10,000 feet pressure altitude to reduce pressure "bump".
25. Cabin pressurization dump switch - Set to DUMP position.
26. Increase aircraft altitude toward 12,000 feet pressure altitude, while holding cabin pressurization-

dump switch to the DUMP position feet per minute.
27. Cabin altitude warning light - Check illuminated at 12,000 to 12,300 feet pressure altitude.
28. Cabin pressurization dump switch - Release.
29. Cabin altitude controller - Set to 1800 feet.
30. Observe cabin descent rate to field elevation.
31. Cabin altitude should attain and remain at 1550 to 2050 feet pressure altitude until the observed altitude is reached by the aircraft.

***B. TRIM AND RIGGING.**

Check as follows:
1. In smooth air, at cruise power, the aircraft will fly hands off, straight and level with the ailerons symmetrically aligned at the trailing edge and the aileron adjustable tab set to zero.
2. For additional trim and rigging checks, refer to maintenance manual, P/N 92-37443-1.

***C. MAXIMUM POWER LEVER POSITION CHECK.**

Engines shall be able to operate within N1 or TGT values at maximum power lever position without exceeding limits, and be off the torque limit at 2000 RPM Check maximum power lever position as follows.

NOTE

The only requirement of the maximum power lever position check is to verify that it is possible to obtain maximum allowable gas generator RPM (N1) prior to reaching the forward stop on the power levers. If during the test, the TGT limit, torque limit or N1 limit is reached prior to reaching the forward stop on the power levers, the check is completed.

1. Altitude - 25,000 feet pressure altitude
2. Propeller levers - Set 2000 RPM
3. Ice vanes – Retracted
4. Bleed air valve switches – OPEN
5. Airspeed - As required.
6. Power levers - Full forward (do not exceed TGT and/or N1 limits). Maximum N1 is 101.5% Maximum TGT is 750°C.

***D. SPEED CHECK AT MAXIMUM CRUISE POWER.**

1. Record the following.
   - *a. Engine serial number
   - *b. Engine hours since new
   - *c. Engine hours since overhaul.
2. Altitude - Establish level flight at 16,000 feet pressure altitude.
3. Propeller levers - Set 2000 RPM.
4. Adjust the opposite engine to maintain 160 KIAS
5. Set engine torque as specified by the engine acceptance graph (figure 6) on the engine to be tested.

NOTE

Aircraft performance is based on obtaining at least chart torque. Any engine must be able to meet the chart torque value without exceeding the TGT of 730°C

6. Allow conditions to stabilize for one minute then record the following for each engine being tested.
   *a. Airspeed
   *b. Pressure altitude
   *c. Free air temperature
   *d. Propeller RPM
   *e. Torque
   *f. N_1
   *g. TGT
7. Repeat for opposite engine.

***E. ENGINE ACCEPTANCE AT MAXIMUM CONTINUOUS POWER.**

NOTE

A new or rebuilt engine operated at the torque value presented in the cruise power charts will show a TGT margin below the maximum cruise limit for the torque value presented in the charts With ice vanes retracted, cruise torque settings shown on the cruise power charts should be obtained without exceeding TGT limits

Speed-power runs shall be made in smooth air to determine consistency with performance figures. Torque settings, fuel flow, and airspeed to be achieved will be determined by reference to maximum cruise speed/engine acceptance charts (figure 6). Cruise torque must be attainable without exceeding the 730°C TGT limit to be acceptable Indicated fuel flow must be

within + 10 and -25 pounds per hour of chart value. Pilot's and copilot's airspeed indicators will agree within ±4 KIAS.

1. Record the following:
   *a. Engine serial number.

   *b. Engine hours since new.

   *c. Engine hours since overhaul.
2. Airspeed - Refer to chart.
3. Altitude - Refer to chart.
4. Power setting - Refer to chart.
5. Propeller levers - Refer to chart.
6. Ice vanes - Retracted.
7. Allow conditions to stabilize for one minute then record the following for each engine being tested:
   *a. Airspeed

   *b. Pressure altitude

   *c. Free air temperature

   *d. Propeller RPM

   *e. Torque

   *f. N_1

   *g. TGT (must not exceed 730°C)

NOTE

For engines that exceed 730°C TGT, engine acceptance at maximum cruise power, must be conducted

8. Repeat for opposite engine.

***F. ENGINE ACCEPTANCE AT MAXIMUM CRUISE POWER.**

NOTE

The engine acceptance at maximum cruise power check needs to be performed only if the TGT observed during the engine acceptance check at maximum continuous power exceeds 730°C

1. Record the following.
   *a. Engine serial number

   *b. Engine hours since new

   *c. Engine hours since overhaul
2. Altitude - Establish level flight at 25,000 feet pressure altitude.
3. Propeller levers - Set 1900 RPM.
4. Adjust the opposite engine to maintain 135 KIAS.
5. Free air temperature - Record.
6. Set engine torque as specified by the maximum cruise speed/engine acceptance chart (figure 6) for the recorded indicated free air temperature, on the engine to be tested.
7. Allow conditions to stabilize for one minute then record the following for each engine being tested:
   *a. Airspeed

   *b. Pressure altitude

   *c. Free air temperature

   *d. Propeller RPM

   *e. Torque

   *f. N_1

   *g. TGT (must not exceed 730°C)

8. Repeat for opposite engine

PROCEDURE	TROUBLESHOOTING REFERENCE

G. AVIONICS FLIGHT CHECKS.

*1 Autopilot flight check - Perform as follows:

Observe that all channels operate positively and smoothly with no oscillation of any flight control.

a. Trim aircraft for straight and level flight.

b. Turn control - Place in center (detent) position.

c. Engage switch - Set to ENG.

d. Check autopilot heading preselection as follows:

(1) Autopilot heading selector (on course deviation indicator) - Set test heading
(2) Heading select switch - indicator (autopilot mode selector panel) - Press on.
(3) Aircraft should automatically turn and roll out on preselected heading

e. Check altitude control and selection as follows:

(1) Pitch thumbwheel (autopilot pitch-turn panel) - Move UP and DN while observing that aircraft and pitch trim indicator respond properly.

f. Check autopilot VOR/ILS operation as follows.
(1) VOR receiver - Set.

PROCEDURE	TROUBLESHOOTING REFERENCE

(2) NAV switch (autopilot mode selector panel) - Press on.

(3) When the aircraft is within 10 degrees of the selected radial it should begin a gradual interception of the radial or glideslope signal.

g. Check autopilot altitude hold function as follows.
(1) Fly aircraft to test altitude.

(2) Altitude hold (ALT) switch-indicator (autopilot mode selector panel) - Press on.

(3) Aircraft should maintain the altitude being flown at the time the ALT hold switch was pressed.

h. Check autopilot indicated airspeed hold function as follows.
(1) Fly aircraft to test airspeed.

(2) Airspeed hold (ALT) switch-indicator (autopilot mode selector panel) - Press on .

(3) Aircraft should maintain airspeed that was being flown at the time IAS hold switch was pressed.

PROCEDURE	TROUBLESHOOTING REFERENCE

G. AVIONICS FLIGHT CHECKS (CONT)

i. Check roll command function of autopilot as follows:

(1) Turn control knob (autopilot pitch-turn control panel) - Turn to L and R and verify that autopilot turns aircraft left or right respectively.

*2. Slaved compass systems - Check that systems agree with known magnetic headings within ±2° and within 3° of each other

*3. Inertial Navigation System Flight Test - Perform as follows:

Satisfactory performance shall be demonstrated by flying over three checkpoints whose latitude and longitude are known, and comparing them with the inertial present position readouts. The aircraft shall establish a low altitude, compatible with aircraft safety and applicable laws and codes of flight, which will allow accurate sighting of ground landmarks. An altitude of 1000 feet over waypoints and 10,000 feet or more when between waypoints is recommended whenever possible.

a. Inertial navigation system - Set up, align, and operate in accordance with TM 55-1510-221-10.

b. TACAN update - Check as follows.

(1) Key 4 - Depress

(2) INSERT/ADVANCE key - Depress Key will dim

PROCEDURE	TROUBLESHOOTING REFERENCE

(3) Right display - Check. Display should read 1--XX4, indicating that the INS is in the TACAN update mode
(4) Data selector (while in flight) - L/L WYPT or UTM WYPT
(5) Keys 7 and 9 - Depress simultaneously. The number of the TACAN station being used for navigation shall flash on and off.
(6) FROM-TO display - Monitor station selection. Only the number of stations eligible for mixing will be displayed. A "0" indicates that none of the 9 stations are eligible for update.

NOTE

Mixing will not take place if TACAN station data is loaded in error or if the ratio of the distance from the station to the aircraft altitude is less than 2 to 1.

(7) INS TACAN range display - Monitor The display shall indicate the range to the station used for update. If no station is being used for update, the display will read all dashes

PROCEDURE	TROUBLESHOOTING REFERENCE

G. AVIONICS FLIGHT CHECKS (CONT)

(8) Data selector - Set to DIS/TIME

(9) Keys 7 and 9 - Depress simultaneously Compare distance to TACAN station shown in the left-hand display with the distance shown on the INS TACAN range display

(10) Mission control panel - Check that INS UPDATE annunciator light is illuminated.

(11) Data selector - Return INS to normal by setting to any position except WYPT or DIS/TIME.

c. Ground track angle and ground speed - Check as follows

(1) Data selector - TK/GS.

(2) Left-hand display - Read correct ground track angle to the nearest tenth of a degree. Compare with course deviation indicator.

(3) Right-hand display - Read correct ground speed to the nearest knot. Compare with airspeed indicator.

d. Heading and drift angle - Check as follows

PROCEDURE	TROUBLESHOOTING REFERENCE

(1) Data selector - HDG/DA

(2) Left-hand display - Read true aircraft heading to the nearest tenth of a degree. Compare with course deviation indicator.

(3) Right-hand display - Read aircraft drift angle to the nearest degree.

(4) Keys 3 and 9 - Depress simultaneously and hold.

(5) Left-hand display - Read magnetic heading to the nearest tenth of a degree. Compare with course deviation indicator (Drift angle will continue to be displayed in the right-hand display.)

(6) Keys 3 and 9 - Release Left-hand display will revert to displaying true heading.

e. Cross track distance and track angle error - Check as follows.

(1) Data selector - XTK/TKE.
(2) Left-hand display - Read cross track distance to the nearest nautical mile.
(3) Right-hand display - Read track angle error to the nearest degree.

PROCEDURE	TROUBLESHOOTING REFERENCE

G. AVIONICS FLIGHT CHECKS (CONT)

f. Latitude and longitude position - Check as follows:

(1) Data selector - L/L POS

(2) Displays - Read present position latitude in the left-hand display and present position longitude in the right-hand display. Both display indications are to a tenth of a minute.

(3) HOLD key - Depress. Key will illuminate. Latitude and longitude displays will freeze at the values which were present when the HOLD key was depressed.

NOTE

While the HOLD key is illuminated, TA-CAN, GPS, and data link updates are inhib-ited

g. Latitude and longitude inertial position - Check as follows:

(1) Data selector - L/L WYPT (HOLD key should still beilluminated).

(2) Left-hand and right-hand displays - Read latitude and longitude of present position to a tenth of a

degree. Compare with values noted in latitude and longitude position check above.

(3) INSERT/ADVANCE key - Depress.

(4) Left-hand and right-hand displays - Read arc-seconds related to present inertial position to the nearest a tenth of a second.

(5) HOLD key - Depress to return to INS normal operation.

h. Magnetic variation - Check as follows:

(1) Keys 3 and 9 - Depress simultaneously.

(2) Right-hand display - Read magnetic variation to a tenth of an arc-minute. Compare with local values.

NOTE

While operating in the NAV mode, magnetic variation is computed when aircraft roll is less than 9° and the magnetic heading input is valid (absence of error code 17)

(3) DATA/SELCTOR - Momentarily set to any position except L/L WYPT to return to normal INS display mode.

PROCEDURE	TROUBLESHOOTING REFERENCE

G. AVIONICS FLIGHT CHECKS (CONT)

i. Distance and Time to Next Waypoint - Check as follows:

(1) Data selector - DIS/TIME

(2) Left-hand display - Read distance to next waypoint to the nearest nautical mile. Compare with TA-CAN readout

(3) Right-hand display - Read time to reach next waypoint at present ground speed to the nearest tenth of a minute. Compare with TACAN readout when tuned to a VORTAC station located at the next waypoint.

j. Distance to any TACAN station - Check as follows.

(1) Data selector - DIS/TIME.

(2) Keys 7 and 9 - Depress simultaneously.

(3) FROM-TO display - Read flashing number of TA-CAN station being used for navigation

(4) Left-hand display - Read distance to the TACAN station to the nearest nautical mile.

(5) Right-hand display - Read time to next waypoint.

PROCEDURE	TROUBLESHOOTING REFERENCE

(6) Left-hand display - Monitor (station number is selected every 30 seconds) and compare with the INS TACAN range display.

k. Wind Speed and direction - Check as follows.

(1) Data selector - WIND.

(2) Left-hand display - Read wind direction to the nearest degree

(3) Right-hand display - Read wind speed to the nearest knot.

l. Desired Track Angle and System Status - Check as follows:

(1) Data selector - DSRTK/STS.

(2) Left-hand display - Read desired track angle to the nearest degree. Compare with course deviation indicator.

(3) Right hand display - Read numbers indicating system status.

PROCEDURE	TROUBLESHOOTING REFERENCE

G. AVIONICS FLIGHT CHECKS (CONT)

NOTE

The first digit from the left indicates "I" for NAV mode. The second and third digits will be blank unless a malfunction code Is indicated. The fourth digit is used for stored heading and shall be blank The fifth digit is decremented at certain time intervals when using TACAN update. This provides an indication of the relative quality of position updating obtained The sixth digit indicates operating mode and will read "4" to indicate TACAN updating

(4) If malfunction codes occur, press and release the TEST switch repeatedly, recording all malfunction codes until the second and third digits again indicate an action or code, or go blank Refer to TM 55-1510-221-10 for code definitions.

(5) WARN lamp - Check dim.

m UTM Position - Check as follows:

(1) Data selector - UTM - POS

(2) Left-hand display - Read northing in kilometers.

(3) Right-hand display - Read zone, then easting in kilometers.

PROCEDURE	TROUBLESHOOTING REFERENCE

(4) HOLD key - Depress and check illuminated. Coordinates in data display shall freeze at values present when Hold key was pressed.

NOTE

While HOLD key is illuminated, TACAN, GPS, and data link updates are inhibited

n. UTM Inertial Position - Check as follows:

(1) Data selector - UTM WYPT (check HOLD key illuminated).

(2) Left-hand display - Read northing in kilometers.

(3) Right-hand display - Read zone and easting in kilometers.

(4) Compare with values from UTM Position procedure.

(5) INSERT/ADVANCE - Depress.

(6) Right-hand display - Read zone and extra precision easting values to the nearest meter.

(7) HOLD key - Depress to return the INS to normal operation HOLD key will dim.

PROCEDURE	TROUBLESHOOTING REFERENCE

G. AVIONICS FLIGHT CHECKS (CONT)

o. Leg Switching - Check as follows:

(1) INS - Set up for manual flyover when approaching waypoint.

(2) ALERT indicator - Monitor (The ALERT monitor will illuminate approximately two minutes before the waypoint is reached.)

(3) Data selector - L/L POS (when approaching waypoint).

(4) HOLD key - Depress when closest to the waypoint.

(5) Present position readout - Record.

(6) Error distance (if any) - Visually estimate between the location at which the HOLD button was pressed and the location of the waypoint.

(7) Compare the frozen INS display of present position with the coordinates of the waypoint, taking into account the visually observed error distance. This position error shall not exceed 1200 feet.

PROCEDURE	TROUBLESHOOTING REFERENCE

(8) HOLD button - Depress to restore the display to normal.

p. Automatic Leg Switching - Check as follows:

(1) ROLL LIM key - 25° (dim) for the first waypoint.

(2) ROLL LIM key - 10° (lighted) for second waypoint.

(3) Check that the aircraft changes course smoothly.

q. Attitude Mode - Check as follows.

(1) Mode selector - ATT after passing the starting point and observing the present position.

(2) Check that INS attitude signals continue to be available by monitoring instruments.

(3) Check that the instruments can operate from other navigation signals not coming from the INS.

*4. Audio control panel and inter phone system - Check each unit as follows: K1-2

a. Interphone functional check:

(1) Receiver selector switches - OFF.

PROCEDURE **TROUBLESHOOTING REFERENCE**

G. AVIONICS FLIGHT CHECKS (CONT)

(2) ICS switch - NORM

(3) Transmitter selector switches on pilot's and copilot's audio control panel - INTPH This will allow the pilot to talk to the copilot by pressing a microphone switch and speaking into microphone or visa-versa from copilot's position.

(4) Microphone switches - Actuate one at a time and speak into appropriate microphone. Side tone should be heard and speech should be heard in other headset.

(5) ICS switch - HOT MIC Crew should be able to converse on intercom without depressing microphone switches.

(6) Volume control - Check for function

b. Receiver and transmitter facilities - Check as follows

(1) Receiver volume controls - Turn all fully counterclockwise.

(2) Receiver switches (audio control panel) - Push on one at a time and turn clockwise to increase volume and increase volume

on appropriate receiver, listening for either radio reception or background noise.

(a) Cycle propeller deice switch from OFF to AUTO and return to OFF.

(b) Cycle electric standby fuel pumps

(3) Pull each receiver switch (on audio control panel) out to the off position and each receiver volume control fully counterclockwise.

(4) Transmitter selector switches (pilot's and copilot's audio control panels) - INTPH.

(5) Audio control panel volume control (pilot's) - Turn fully clockwise. Listen for excessive noise.

(6) Repeat for other audio control panel.

c. Receiver/transmitter selectors - Check as follows:

(1) Transmit and receive on each radio using all microphone switches one at a time.

(2) Repeat entire procedure for each audio control panel.

PROCEDURE	TROUBLESHOOTING REFERENCE

G. AVIONICS FLIGHT CHECKS (CONT)

*5 UHF radio set - Check as follows. K3-7

a. Altitude - 1200 feet above ground level (AGL).

b. Transmitter selector switch - #3 or #5.

c. Function selector switch (UHF command set) - BOTH.

d. Frequency selector switches - Select required test frequencies

e. Mode selector - As required.

f. Volume control - As required.

g. Squelch switch - As required.

h. Fly aircraft to a point 35 nautical miles away from test station.

i. Communicate with test station when 20 miles away and again at 35 miles.

j. At 35 nautical miles maintain communication with test station each 10° while flying a 360° flat turn (not to exceed 5° bank). Communication should be uniformly loud and clear through these tests

k. Repeat procedure for frequencies in low, middle, and high ranges.

*6. VHF radio set - Check as follows: K8-9

a. Altitude - 1000 feet AGL.

PROCEDURE		TROUBLESHOOTING REFERENCE
	b. Transmitter selector switch (audio control panel) - #1 or #2.	
	c. Off-volume control - Turn clockwise, set volume as required.	
	d. Frequency selector - Set desired frequency.	
	e. Fly aircraft to a point 40 nautical miles away from test station.	
	f. At 40 nautical miles, maintain communication with test station each 10° while flying a 360° flat turn (not to exceed 5° bank). Communication should be uniformly loud and clear through these tests.	
	g. Repeat procedure for frequencies in low, middle, and high ranges.	
*7	HF radio set - Check as follows	K10
	a. Transmitter selector switch (audio control panel) - #4.	
	b. Mode selector (HF control panel) - Set desired operating mode.	
	c. Microphone switch - Press momentarily and wait for antenna coupler to tune. A 1000 Hz tone will be heard in the headphones until tuning is complete. Tuning time should not exceed 30 seconds	

PROCEDURE	TROUBLESHOOTING REFERENCE

G. AVIONICS FLIGHT CHECKS (CONT)

d. Establish communications with a ground station at least 150 miles distant on at least three frequencies (one each from the lower, middle, and upper frequency ranges). Establish two-way communications on AM and, when possible, on USB. Obtain signal quality reports from the other station and note received signal quality.

NOTE

The intelligibility of SSB voice operations becomes degraded when the receiver and transmitter differ in frequency by a small amount (approximately 50 Hz) The voice pitch will sound either too high or too low The cause may be either the receiver or transmitter

e. Frequency accuracy - Check as follows:

(1) Station WWV - Select the frequency that provides the best signal. The station broadcasts on 2. 5000, 5.0000, 15.0000, 20.0000, and 25.0000 MHz. The higher the frequency selected, the more accurate the frequency check will be.

PROCEDURE	TROUBLESHOOTING REFERENCE

NOTE

Do not key transmitter when set to WWV

(2) Mode selector - USB.

(3) Listen to the time tick, tone, or voice announcements. The tone is preferable.

*8 ADF radio set - Check as follows: K20-27

a. Mode selector switch - ANT. Tuning meter and frequency indicator should be illuminated Allow sufficient time for warm-up.

b. Range switch - Set to 190 to 400 kHz range.

c. Tune control - Tune in a station and peak the tuning meter.

d. Frequency dial - Note reading under hairline.

e. BFO switch - BFO.

f. Tune control - Adjust for zero beat. The frequency dial should read the same as in step d.

g. BFO switch - OFF.

h. Tune in a low frequency station on each of the other bands (400 to 850 and 850 to 1750 kHz) to insure that band switching is taking place.

PROCEDURE	TROUBLESHOOTING REFERENCE

G. AVIONICS FLIGHT CHECKS (CONT)

i. Retune to a low frequency station of known location.

j. Mode selector switch - ADF The RMI azimuth card should coincide with the aircraft magnetic heading and the bearing pointer should indicate the correct magnetic bearing to station.

k. Loop control - R, fast speed position (full deflection) of the loop control Rotate RMI bearing pointer 90° right and then 90° left of the ADF bearing At both the right and left displaced bearing indication points, reset the loop switch to center. The bearing pointer should return to the original bearing indication at a rate of not less than 25 degrees per second.

l. Mode selector switch - LOOP

m. Loop control - R, slow speed position (half deflection) of the loop control. Rotate the bearing pointer 360° left. Two distinct null positions, 180° from each other should be encountered.

n. Stop the bearing pointer on the null that points away from the station.

o. Mode selector switch - ADF. The bearing pointer should.

PROCEDURE	TROUBLESHOOTING REFERENCE

rotate 180° and again indicate the magnetic bearing to station.

p. Distance range (ADF) - Check as follows:

(1) Mode selector switch - ADF.

(2) Tune control - Tune stations to determine operating range of direction finder. End of effective operating range may be considered to be reached when the RMI bearing needle falls to return to within three degrees of starting bearing when loop is slewed first clockwise and then counterclockwise.

*9. Marker beacon/glideslope receiver - Check as follows. K14-19

a. Marker beacon volume control (pedestal extension) - Rotate rotate full clockwise.

b. NAV A control (pilot's audio control panel) - Push on and turn clockwise to adjust volume. Clear audio signals should be available.

c. Marker beacon sensitivity switch (pedestal extension) - As required.

d. Frequency selectors (VOR control panel) - Select localizer frequency.

PROCEDURE	TROUBLESHOOTING REFERENCE

G. AVIONICS FLIGHT CHECKS (CONT)

e. Course indicator switches (instrument panel) - VOR.

f. Glideslope indicator (course deviation indicators) - Read glideslope indications.

g. Fly an ILS approach monitoring localizer and glideslope indicators.

h. Fly the approach monitoring localizer and glideslope indicators, and marker beacon indicator lights and audio tone for proper function.

i. In horizontal flight over the ground station cone of silence marker, at 10,000 feet above ground level, a position marker beacon indication should be received for a distance of not less than one mile.

j. In horizontal flight over the ground station at any altitude, the duration in miles of marker indication when approaching a point directly over the ground station, shall not be more than 50 percent greater than the duration in miles of marker beacon indication when leaving the point directly over the ground station, and visa-versa.

*10 VOR receiver - Check as follows K11-13,28-30.

PROCEDURE	TROUBLESHOOTING REFERENCE

a. NAV A control (audio control panel) - Depress on and rotate clockwise to set volume.

b. Off/volume control (VOR control panel) - Rotate clockwise to turn set on, and set volume as required.

c. Frequency selectors - Set test frequency.

d. Course indicator switches (instrument panel) - VOR.

e. Fly directly toward a VOR station of known direction and near enough to provide a reliable signal.

f. Rotate course card on course deviation indicators until direction to station is beneath course index. The VOR/ localizer needle should be nearly centered and the to/ from indicator should read to. The red glideslope warning flag should be visible but the VOR/locallzer warning flag should be concealed.

g. Rotate course card until direction to station is beneath reciprocal course index. The VOR/localizer crosspointer should be centered and the to/from indicator should read from.

h. Rotate the course card until the direction to the station is directly below the course index

PROCEDURE	TROUBLESHOOTING REFERENCE

G. AVIONICS FLIGHT CHECKS (CONT)

again and the to/from indicator reads to.

i. Fly a 90° right turn such that the flight path is at a90° angle to the direction to the station. The VOR/localizer needle should deflect noticeably to the left after one or two miles of flight (assuming the station is 25 to 50 miles from the aircraft).

j. VOR range test: Achieve adequate usable reception at 45 miles at 1,250 feet above station antenna altitude.

k. VOR ground-track accuracy test Fly aircraft over a predetermined ground check point. The maximum error shall be ± 3%.

*11. TACAN - Check as follows

a. NAV B control (audio control panel) - Depress on and rotate clockwise to set volume

b. Power switch (TACAN control panel) - ON.

c. Frequency selectors (TACAN control panel) - Set test frequency.

d. Volume control (TACAN control panel) - As required

e. Course indicator switches (instrument panel) - TACAN

PROCEDURE	TROUBLESHOOTING REFERENCE
f. Fly directly toward a TACAN station of known direction and near enough to provide a reliable signal	
g. Rotate course card on course deviation indicators until direction to station is beneath course index. The course deviation indicator needle should be nearly centered and the to/from indicator should read to. The red glideslope warning flag should be visible but the NAV warning flag should be concealed.	
h. Rotate course card until direction to station is beneath reciprocal course index. The course deviation indicator needle should be centered and the to/from indicator should read from.	
i. Rotate the course card until the direction to the station is directly below the course index again and the to/from indicator reads to.	
j. Fly a 90° right turn such that the flight path is at a90° angle to the direction to the station. The course deviation indicator needle should deflect noticeably to the left after one or two miles of flight (assuming the station is 25 to 50 miles from the aircraft).	
k. TACAN range test Achieve adequate usable reception	

PROCEDURE	TROUBLESHOOTING REFERENCE

G. AVIONICS FLIGHT CHECKS (CONT)

at 45 miles at 1,250 feet above station antenna altitude

l. TACAN ground-track accuracy test: Fly aircraft over a predetermined ground check point. The maximum error shall be ± 3%

*m. TACAN distance measuring equipment - Check against known distances (on the ground if possible) using known checkpoints TACAN should indicate known distances to within ±0 5 miles or ±5% of range, whichever is greater.

*12 Transponder set - Check as follows: K41

a. Master control - STBY (allow 2 minute warm up).

b. Master control - NORM.

c. Mode switches - Set test mode.

d. Code selectors - Set test code.

e. Fly aircraft within line of sight of interrogating stations.

f. Contact the facility by radio and request that the aircraft be interrogated and that the reply be checked for satisfactory response

*13 Encoding altimeter - Check as follows.

PROCEDURE	TROUBLESHOOTING REFERENCE

a. Mode C switch (transponder control panel) - ON.

b. Contact ground radar facility and request them to give you their altitude readout. Ground facility altitude readout must agree with aircraft altitude within ±200 feet.

*14 Radar set - Check while airborne as follows: K31-40

a. Function switch - TEST (information will appear after time delay period).

b. BRT control - As required.

c. MODE switches - As required.

d. RANGE switches - 80.

e. 120/60° degree button - 120°.

f. Screen - Verify proper display. Test display consists of two green, two yellow bands, and a red band on a 120° scan. The word TEST will be displayed in upper right corner. Operating mode selected by MODE switches (either MAP, WX, or WXA) has been displayed in lower left corner If WXA has been selected, red band in the test pattern will flash on and off. The range will be displayed in upper right corner beneath the word TEST and appropriate range mark distances will appear along right edge of the

PROCEDURE	TROUBLESHOOTING REFERENCE

G. AVIONICS FLIGHT CHECKS (CONT)

screen. Complete test patterns may be seen only on 80 mile range or higher.

g. Function switch - ON.

h. TILT control - Move up or down to observe targets above or below aircraft. Echo display will change in shape and location only. Weather targets will not change shape or location. Ground targets will not change shape or location. Ground targets are selected as a function of tilt.

i. Antenna stabilization check.

NOTE

The pitch and roll output levels from the vertical gyro are governed by the 115 volt, 400 Hz excitation and, the linearity of the gyro, plus the ability of the gyro to follow the motion of the aircraft The accuracy contributed by the antenna is its ability to respond to the gyro outputs As a result of these factors, the stabilization system accuracy can vary up to $\pm$ 10% of the pitch or roll angle of the aircraft.

(1) Fly to an altitude above 10,000 feet.

(2) MODE switches - WX.

(3) RANGE switches - 120 or 60.

PROCEDURE	TROUBLESHOOTING REFERENCE

(4) STAB OFF switch Push ON.

(5) While flying level (0° pitch, 0° roll), adjust TILT control to obtain a video pattern throughout the upper range marks Note TILT control setting If the inner ring of video is not parallel to the range mark, the error is caused by mechanical displacement of the antenna about the roll axis of the aircraft. Use TILT control to determine exact error Correct on ground, If necessary, before further inflight calibration.

(6) Push off the STAB OFF button to restore stabilization.

(7) Pattern observed in step (5) should not change If the pattern shifts either left or right around the second range marks, ground check leveling of the gyro and accuracy of the horizon indicator. Use TILT control to find exact error

(8) Roll the aircraft 20° right For perfect stabilization, the terrain band should be displayed throughout the third range marks.

PROCEDURE	TROUBLESHOOTING REFERENCE

G. AVIONICS FLIGHT CHECKS (CONT)

(9) If the terrain band shifts to the right around the second range marks, increase tilt angle using TILT control until pattern is displayed throughout the third range marks Note new position of TILT control It should not be more than two degrees above that noted in step (5).

(10) If the terrain band shifts (in step 8) to the left around the second range marks, decrease tilt angle using TILT control until pattern is displayed throughout the third range marks Note new position of TILT control. It should not be more than two degrees below that noted in step (5).

(11) If the differences between steps (10) and (5) or steps (9) and (5) are greater than two degrees, recalibrate roll stabilization circuitry to the gyro using the following procedure.

(a) Reset the TILT control under the flight conditions of step (5) with stab on Then roll the aircraft 20° right.

PROCEDURE	TROUBLESHOOTING REFERENCE

(b) If the pattern shifts to the right around the second range mark, slowly adjust the ROLL TRIM potentiometer until the terrain band is displayed throughout the third range marks Usually a clockwise adjustment is required.

(c) If the pattern shifts to the left around the second range mark, slowly adjust the ROLL TRIM potentiometer until the terrain band is displayed throughout the third range marks Usually a counterclockwise adjustment is required.

(d) If the pattern shifts toward the center of the second and third range marks, there is no roll stabilization

(12) Ground mapping operating procedure: MODE switch MAP.

(13) Standby procedure. function switch STBY

(14) Shutdown procedure Function switch OFF

SECTION V. CHARTS AND FORMS

General. This section contains the necessary charts and forms required to ascertain that the aircraft is performing to established standards and to record readings, pressures, RPM, etc, obtained during maintenance test flight.

RC-12H LIST OF CHARTS

FIGURE NUMBER	TITLE	PAGE NUMBER
1	Rudder Boost Actuation Factors	5-2
2	Propeller Low Pitch Stop	5-3
3	Stall Speeds	5-4
4	Autofeather Time	5-5
5	Airspeeds for Vmo Dive	5-6
6	Maximum Cruise Speed/Engine Acceptance	5-7
7	Maintenance Test Flight Checksheet	5-9

FREE AIR TEMPERATURE	ENGINE SPEED (% N_1)	
	MINIMUM	**MAXIMUM**
More than 35°C	93	96
10° to 35°C 90	95	
Less than 10°C	87	92

The rudder boost should actuate within the values of N speed and free air temperature shown above.

Figure 1. Rudder Boost Actuation Factors

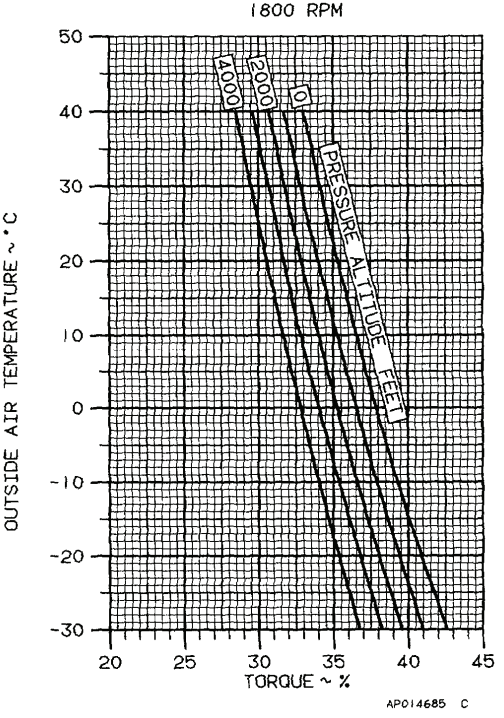

Figure 2. Propeller Low Pitch Stop

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Figure 3. Stall Speeds

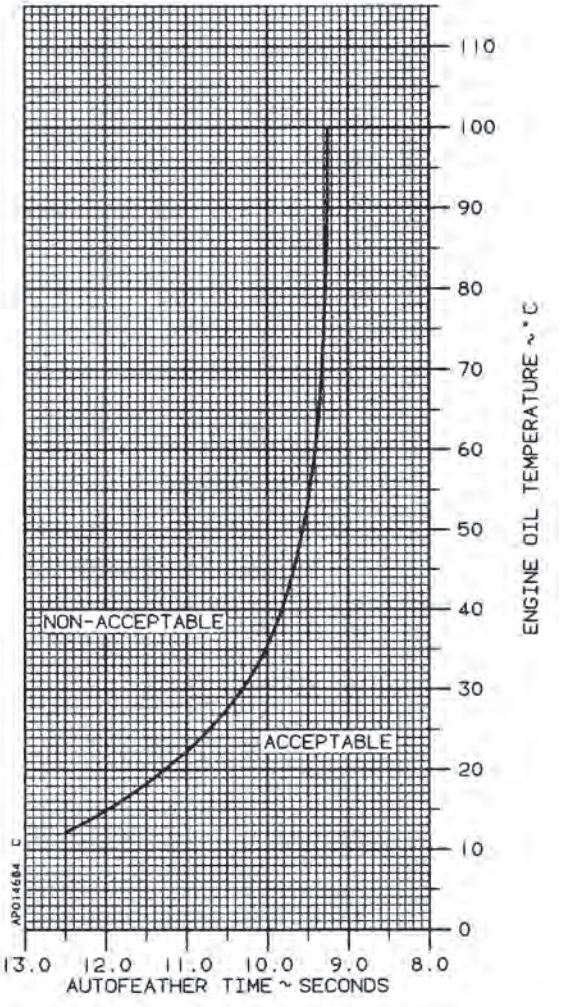

Figure 4. Autofeather Time

PRESSURE ALTITUDE	KIAS
18,000	216
17,000	221
16,000	225
15,000	235
14,000	243
13,000 and below	245

Figure 5. Airspeeds For Vmo Dive

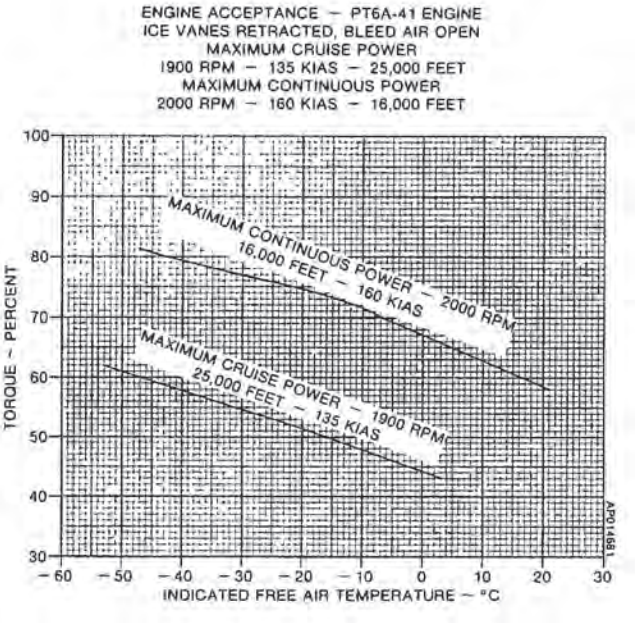

Figure 6. Maximum Cruise Speed/Engine Acceptance

RC-12H MAINTENANCE TEST FLIGHT CHECK SHEET			
PURPOSE OF MTF		FAT	DATE
PILOT	UNIT		
SYMBOLS: √ = SATISFACTORY, X = DEFICIENCY			
PRIOR TO MTF		1. Brakes	
1. Forms and records		2. Flight instruments	
2. Weight and balance		3. Nosewheel steering	
3. Flight readiness inspection		4. Magnetic compass	
4. Lights		ENGINE RUNUP	
5. Standby pumps and firewall valves		1. Parking brake	
6. Fuel quantity indicators		2. Low idle speed	
7. Pitot tubes (2), stall warning vane, heated fuel vents (2), TAS temperature probe		3. Propeller feathering	
		4. Engine acceleration to high idle	
		5. High idle speed	
8. Flaps		6. Brake deice	
9. Seat Belts		7. N_1 speed switch	
10. Emergency equipment		8. Pneumatic pressure	
11. Parachutes		9. Pressurization	
12. Placards and markings		10. Generators and regulators	
13. Trim tabs		11. Inverters	
14. Flight controls		12. Rudder boost	
INTERIOR CHECK		13. Autofeather	
1. Cabin/cargo doors		14. Overspeed governors	
2. Emergency exit		15. Autoignition	
3. Mission cooling ducts		16. Primary governors	
BEFORE STARTING ENGINES		17. Low pitch stop	
1. Parking brake		18. Ice vanes	
2. Oxygen system		DURING TAKEOFF	
3. Magnetic compass		1. Propeller tachometers, L____RPM, R____RPM	
4. Free air temperature gauge		Torque L____%, R____%	
5. Flight instruments		3. TGT L____°C, R____°C	
6. Engine instruments		4. N_1____%, R____%	
7. DC power		5. Oil pressure L____PSI, R____PSI	
8. Annunciator panels		6. Oil temperature L____°C, R____°C	
9. Stall and gear warning		AFTER TAKEOFF	
10. Fire protection		1. Tail boom antenna	
BEFORE TAXIING		2. Wings and nacelles	
1. Automatic flight control system		3. Brake deice	
2. Electric elevator trim		DURING CLIMB	
DURING TAXIING			

Figure 7. Maintenance Test Flight Checksheet (Sheet 1 of 3).

	1. Engine and flight instruments		5. Flap operation
	2. Engine control levers		a. Flap retraction time ____seconds
	3. Vertical speed indicators		b. Flap extension time ____seconds
	4. Surface deice		6. Minimum elevator trim ____KIAS
	5. Antenna deice		7. Autoignition
	6. Propeller deice		8. Propeller feathering
	7. Windshield anti-ice		9. Propeller autofeathering and
	8. Radome anti-ice		unfeathering, time from fuel cutoff to
	9. Waveguide pressurization		rotation stop L____seconds,
	10. Cabin and cockpit ventilation		R____seconds
	11. Air conditioning and heating		10. Landing gear warning horn,
	12. Air conditioning cold operation		N_1 on first hearing horn ____%
	13. Carbon monoxide		11. Landing gear normal operation
■	CRUISE		a. Landing gear extension time
	1. Engine instrument indications		____seconds
	2. Wings and nacelles		b. Landing gear retraction time
	3. Cabin noise level		____seconds
	4. Pilot's alternate static air source		12. Emergency landing gear extension
	5. Propeller synchrophaser	■	DESCENT AND LOW LEVEL CRUISE
	6. Ice vanes		1. Maximum rate (Vmo) descent.
	7. Turn and bank indicators		a. Flight controls
■	LOW SPEED SYSTEMS		b. Windows and doors
	1. Stall speed, stall warning, and stall		2. Excess nose down trim
	characteristics (clean, power off),		LANDING
	____KIAS at warning, ____KIAS at		1. Brake Operation
	stall, roll ____°L or R		2. Propeller reversing, L____%N_1,
	2. Stall speed, stall warning, and stall		R____%N_1
	characteristics (clean, power on),		3. Oil temperature, L____°C,
	____KIAS at warning, ____KIAS at		R____°C
	stall, roll ____°L or R		4. Oil pressure, L____PSI, R____PSI
	3. Stall speed, stall warning, and stall	■	ENGINE SHUTDOWN
	characteristics (gear and flaps down		1. Battery condition
	power off), ____KIAS at warning,	■	BEFORE LEAVING AIRCRAFT
	____KIAS at stall, roll ____°L or R		1. Walkaround inspection
	4. Stall speed, stall warning, and stall		2. Aircraft forms
	characteristics (gear and flaps down,	■	SPECIAL PROCEDURES
	power on), ____KIAS at warning,		1. Pressurization
	____KIAS at stall, roll ____°L or R		

Figure 7. Maintenance Test Flight Checksheet (Sheet 2 of 3).

2. Trim and rigging	L____, R____
3 Maximum power lever position	d Airspeed ____ KIAS
4 Speed check at maximum cruise power	e Pressure altitude ____ feet
a. Engine serial number	f Free air temperature ____°C
L_____, R_____	g. Propeller RPM____
b Engine hours since new	h. Torque L____%, R____%
L____, R____	i N1 L____%, R____%
c Engine hours since overhaul	j. TGT L____°C, R____°C
L____, R____	6. Autopilot flight check
d Airspeed ____KIAS	7. Slaved compass
e Pressure altitude ____ feet	8 Inertial navigation system
f Free air temperature ____°C	9 Audio control panel and interphone
g Propeller RPM ____	10. UHF
h. Torque L____%, R____%	11 VHF
i N1 L____% N1, R____ %N1	12. HF
j. TGT L____°C, R____°C	13. ADF
5 Engine acceptance at maximum cruise power	14. Marker beacon/glideslope
a. Engine serial number	15. VOR
L_____, R_____	16. TACAN
b Engine hours since new	17. TACAN distance measuring equipment
L____, R____	18. Transponder
c Engine hours since overhaul	19 Encoding altimeter
REMARKS	20. Radar

Figure 7. Maintenance Test Flight Checksheet (Sheet 3 of 3).

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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeter = .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 = 38.82 fl. Ounces
1 dekaliter = 10 liters - 2.64 gallons
1 hectoliter - 10 dekaliters = 26.42 gallons
1 kiloliter - 10 hectoliters = 264.18 gallons

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