MAINTENANCE TEST FLIGHT MANUAL

ARMY MODEL C-12C, C-12D, AND C-12F AIRCRAFT

This manual supersedes TM 55-1510-218-MTF, 10 October 1984, including all changes.

HEADQUARTERS,
DEPARTMENT OF THE ARMY

19 JUNE 1989

URGENT

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MAINTENANCE TEST FLIGHT MANUAL

ARMY MODEL
C-12C/D/F/U
AIRCRAFT

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TM 55-1510-218-MTF, 19 June 1989 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
2-57 through 2-60	2-57 through 2-60
2-63 through 2-66	2-63 through 2-66
5-9 and 5-10	5-9 and 5-10

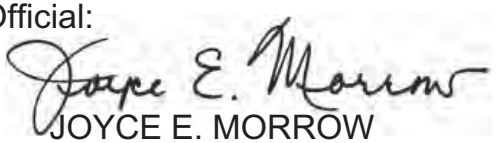
2. Retain this sheet in front of manual for reference purposes.

3. This change incorporates SAFETY OF FLIGHT, OPERATIONAL, RCS CSGLD-1860 (R1), C-12 SERIES AIRCRAFT, STALL WARNING SYSTEM TEST, C-12-04-01 MSG DTG 131200Z APR 04.

By Order of the Secretary of the Army:

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

Official:



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Secretary of the Army
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Distribution:

To be distributed in accordance with the initial distribution number (IDN) 310006, requirements for TM 55-1520-218-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 55-1510-218-10 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.

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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), or DA Form 2028-2 located in the back of the applicable Aircraft Operator's Manual (when using the 2028-2 from the Operator's Manual, ensure the publication number and title reflect this MTF) direct to Commander, US Army Aviation Systems Command, ATTN: AMSAV - MMD, 4300 Goodfellow Blvd., St. Louis, MO 63120. 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 C-12C, C-12D, and C-12F 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 C-12C, C-12D, and C-12F aircraft and in no way supersedes any information contained in TM 55-1510-218-10 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 wiII be as specified in TM 55-1510-218-10.

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 ensure that deficiencies or short-comings that may have developed as a result of the maintenance test flight are detected.

e. Reference. When a maintenance test flight is required to ensure 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 anno-

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

g. An (O) 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 Models C-12C, C-12D, and C-12F aircraft. The requirements contained herein are established to ensure 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. Refer to individual charts in Section V for required aircraft weight at time of test.

*3. Thorough flight readiness inspection in accordance with the requirements contained in TM 55-1510-218-10 - Performed.

4. Special preflight checks:

a. Keylock switch - On

b. Battery switch - On. **C7-11**

PROCEDURE	TROUBLESHOOTING REFERENCE
PRIOR TO MAINTENANCE TEST FLIGHT (CONT)	
*c. Interior, exterior, and annunciator lights - Check.	C45
*d. Fuel control panel- Check the standby pumps and firewall valves as follows to ensure that they are powered through the essential bus:	
(1) Battery switch - OFF.	C4
(2) Standby pump circuit breakers (left and right) - Pull.	
(3) Firewall shutoff valve circuit breakers (left and right) - Pull.	
(4) Firewall shutoff valve switches - Close, (listen for operation).	
(5) Standby pump switches - ON, then listen for operation.	
(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.	
(12) Crossfeed valve switch - OFF.	
*(13) Fuel quantity indicators - Check as follows:	C46, 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 indi-	

PROCEDURE	TROUBLESHOOTING REFERENCE

PRIOR TO MAINTENANCE TEST FLIGHT (CONT)

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

*e Pitot tubes (2), stall warning vane, and heated fuel vents (2) - 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 pilot tube - Check by feel for heat, condition, and free of obstructions. C39

(7) Right pilot tube - Check by feel for heat, condition, and free of obstructions. C30

(8) Right wing heated fuel vent -Check by feel for heat, and condition.

PROCEDURE	TROUBLESHOOTING REFERENCE

(9) Stall warning heat switch - OFF.

(10) Pilot heat switches (2) - OFF.

(11) Heated fuel vent switches (2) - OFF.

*f. Flaps - Check in full down and full up positions.

*g. Battery switch - OFF.

*h. Seat belts - Check for security, and proper conditions.

*i. Emergency equipment - Check that all required emergency equipment is available and that fire extinguishers and first-aid kits have current inspection dates.

*j. Check all interior and exterior placards and markings.

*k. 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.

*l. Flight controls - Check operation and direction. Check movement of control surfaces for direction with movement of cockpit controls. Check for any abnormal friction or obstructions through full range of travel.

PROCEDURE	TROUBLESH00TING REFERENCE

INTERIOR CHECK

1. Cargo/loose equipment - Check secure.

*2. Cabin/cargo doors - Test and lock:

a. Cabin door (C-12C) - Check closed and latched by the following:

(1) Safety arm - Check in position around diaphragm plunger (lift door step).

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

(3) Index marks (green) on rotary cam locks (6) - Check aligned with pointers.

(4) Door open annunciator light - Check for appropriate indication.

b. Cabin door (C-12D and C-12F) - Check closed and latched by the following:

(1) Safety arm - Check in position around diaphragm plunger (lift door step).

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

(3) Scribe lines on rotary cam locks (6) - Check aligned with black lines on upholstery.

(4) Door open annunciator light - Check for appropriate indication.

PROCEDURE	TROUBLESHOOTING REFERENCE

c. 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) Scribe lines on rotary cam locks (4) - Check aligned with green line on gas cylinder and black line on the upholstery.

(3) Lower pin latch handle - Check closed and latched. (Observe through cargo door lower latch handle access cover window.)

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

d. Battery switch - OFF.

e. Cargo door - Check closed and latched.

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

g. Cabin door - Open. Check CABIN DOOR annunciator light extinguished.

h. Battery switch - ON. Check CABIN DOOR annunciator light illuminated.

PROCEDURE	TROUBLESHOOTING REFERENCE

INTERIOR CHECK (CONT)

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

NOTE

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

*3. Emergency exit - Check secure and key removed.

4. 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 - Set (PULL ON CREW READY/SYS READY, C-12C and C-12D, prior to serial number 84-24375, or SYS READY, C-12D after serial number 84-24375 and C-12F).

5. Circuit breakers - Check in.

6. Overhead control panel - Check. C45

a. Light dimming controls - As required.

b. Cabin temperature mode selector switch (C-12C, C-12D and

PROCEDURE	TROUBLESHOOTING REFERENCE

C-12F prior to serial number 86-60084) - OFF.

c. Cabin air mode selector switch (C-12F after serial number 86-60084) - OFF.

d. Ice and rain switches - OFF.

e. Engine anti-ice switches - OFF.

f. Interior light switches - As required.

g. Exterior light switches - As required.

h. Master panel lights switch - As required.

i. Inverted switches - OFF.

j. Avionics master power switch - OFF.

k. Environmental switches - As required.

l. Autofeather switch - OFF.

m. #1 Engine start switches - OFF.

n. Master switch - OFF.

o. #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.

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

PROCEDURE	TROUBLESHOOTING REFERENCE	E

BEFORE STARTING ENGINES (CONT)

9. Clock and map light switches (C-12C, C-12D, and C-12F prior to serial number 86-60084) - OFF.

10. Map light switches (C-12F prior to serial number 86-60084) - OFF.

11. Clocks (C-12C, C-12D, and C-12F prior to serial number 86-60084) - Wind and set.

12. Clocks (C-12F prior to serial number 86-60084) - Set.

CAUTION

Movement of the power levers into REVERSE range while the engines are shut down may result in bending and damage to control linkage.

13. Pedestal controls - Set as follows:

    a. Power levers - IDLE. E 7

    b. Propeller levers -HIGH RPM.

    c. Condition levers - FUEL CUT-OFF.

    d. Flap lever - UP.

    e. Friction locks - Check and set.

14. Pedestal extension (C-12C and C-12D with serial number prior to 84-24375) - Check and set as follows:

    a. Avionics - Set as required.

PROCEDURE	TROUBLESHOOTING REFERENCE

b. Rudder boost switch - ON.

c. Gear alternate extension and ratchet handle - Stowed.

15. Pedestal extension (C-12D with serial number after 84-24357 and C-12F) - Check and set as follows:

a. Avionics - Set as required.

b. Rudder boost switch - On.

c. Cabin pressurization switch - PRESS.

d. Cabin controller - Set (field elevation +500 feet).

e. Rate control -Set (approximately 1 o'clock postion).

f. Cabin pressurization switch - PRESS.

g. Gear alternate extension pump handle - Stowed.

*16. Free air temperature gage - Check condition. Note current reading.

17. Pilots' instrument panel (C-12C and C-12D with serial number prior to 84-24375).

a. VOR switch - No. 1.

b. Compass switch - No. 1.

c. MIC switch - HEADSET.

d. Gyro switch - SLAVE.

*e. Pilot's flight instruments - Check instrument for protective glass, warning flags (10), and static readings.

PROCEDURE	TROUBLESHOOTING REFERENCE

BEFORE STARTING ENGINES (CONT)

f. Radar - OFF.

g. PROP SYN switch - OFF.

*h. Engine instruments - Check for protective glass, range markings, placards, and static readings.

18. Pilots' instrument panel (C-12D with serial number after 84-24375 and C-12F)- Check and set:

a. MIC switch - HEADSET.

b. Compass #1 gyro switch- SLAVE.

*c. Pilot's flight instruments - Check instrument for protective glass, warning flags, and static readings.

d. Radar - OFF.

e. PROP SYN switch

*f. Engine instruments - Check for protective glass, range markings, placards, and static readings.

19. Cabin controller - Set (field elevation +500 feet).

20. Rate control - Set (approximately 1 o'clock position).

21. Cabin pressurization switch - PRESS.

22. Copilot's instrument panel (C-12C and C-12D with serial numbers prior to 84-24375).

PROCEDURE	TROUBLESHOOTING REFERENCE

*a. Copilot's flight instruments - Check instruments for protective glass, warning flags (5), and static readings.

b. Copilot's compass switch - No. 2.

c. Copilot's VOR switch - No.2.

d. Copilot's microphone switch - HEADSET.

e. Copilot's gyro switch - SLAVE.

23. Copilot's instrument panel (C-12D with serial numbers after to 84-24375 and C-12F).

*a. Copilot's flight instruments - Check instruments for protective glass, warning flags, and static readings.

b. Copilot's compass #2 switch - SLAVE.

c. Copilot's microphone switch - HEADSET.

24. Subpanel (C-12C and (C-12D with serial number prior to 84-24375) - Check and set:

a. Fire protection test switch - OFF.

b. Landing, taxi, and recognition lights - OFF.

c. Landing gear control switch - Recheck DN.

d. Pilot's static air source - NORMAL.

PROCEDURE	TROUBLESHOOTING REFERENCE	E

BEFORE STARTING ENGINES (CONT)

NOTE

Do not use alternate static source during takeoff and landing except in an emergency. Pilot's instruments will show a variation in airspeed and altitude.

25. Subpanel (C-12D after serial number 84-24375 and C-12F) - Check and set:
    a. Landing, taxi, and recognition lights - OFF.
    b. Landing gear control switch - Recheck DN.
    c. Pilot's static air source- NORMAL.

NOTE

Do not use alternate static source during takeoff and landing except in an emergency. Pilot's instruments will show a variation in airspeed and altitude.

26. Ice vane handles (#1 and #2) - In.
27. GPU - Connect as required. Check external power annunciator light illuminated. C-12
28. Batter switch - ON.
*29 Annunciator panels (C-12C and C-12D prior to serial number 84-24375) - Test as follows: D1-4
    a. Check illumination of the MASTER CAUTION, MAS-

PROCEDURE	TROUBLESHOOTING REFERENCE
TER, WARNING, No.1 FUEL PRESS, No. 2 FUEL PRESS, L BL AIR FAIL, R BL AIR FAIL, INST AC warning lights and #1 DC GEN, #2 DC GEN, #1 INVERTER, #2 INVERTER and the #1 NO FUEL XFR and #2 NO FUEL XFR (if applicable) caution lights.	
b. Annunciator test switch - Press and hold. Check that all lights in both annunciator panels, FIRE PULL handle lights, marker beacon lights, 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 and release. Both lights should extinguish.	
*30. Annunciator panels (C-12D after serial number 84-24375 and C-12F) - Test as follows:	D1-4
a. Check illumination of the MASTER CAUTION, MASTER WARNING, #1 FUEL PRESS, #2 FUEL PRESS, L BL AIR FAIL, R BL AIR FAIL, and INST AC warning lights; #1 DC GEN, #2 DC GEN, #1 INVERTER, #2 INVERTER, #1 NO FUEL XFR, #2 NO FUEL XFR, CABIN	

PROCEDURE	TROUBLESHOOTING REFERENCE

BEFORE STARTING ENGINES (CONT)

DOOR (if open), and REV NOT READY caution lights.

b. Annunciator test switch - Press and hold. Check that all lights in both annunciator panels, FIRE PULL handle lights, marker beacon lights, 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 and release. Both lights should extinguish.

*31. Stall and gear warning system - Check as follows: C29,40-41

a. Stall and landing gear warning test switch - Lift to STALL WARN TEST postion. Check for warning horn tone and visually check for stall warning vane movement.

b. Stall and landing gear warning horn test switch - Set to LDG GEAR WARN TEST position. Check for warning horn tone and that the red LDG GEAR CONTR handle warning lights (2) illuminated.

*32. Fire protection system (C-12C, C-12D, and C-12F aircraft prior to C-12F serial number 86-60084) - Check as follows: C49-51

PROCEDURE	TROUBLESHOOTING REFERENCE
a. FIRE PROTECTION TEST switch - Rotate switch counterclockwise to check three DETR positions. FIRE PULL handles should illuminate in each position. MASTER WARNING must be reset in each position.	
b. FIRE PROTECTION TEST switch - Rotate switch counterclockwise to check two EXTGH positions. SQUIB OK light, associated EXTGH DISCH caution light, and MASTER CAUTION LIGHT should illuminate in each position.	
*33. Fire protection system (C-12F aircraft after serial number 86-60084) - Check as follows:	
a. ENGINE FIRE PROTECTION TEST switches - Hold switches to DET position, check that FIRE PULL handle warning lights, and MASTER WARNING lights illuminate.	
b. ENGINE FIRE PROTECTION TEST switches - Hold switches to EXT position, check that SQUIB OK annunciator and MASTER WARNING lights illuminate.	

PROCEDURE	TROUBLESHOOTING REFERENCE

FIRST ENGINE START (BATTERY START)

1. Exterior light switches - As required.
2. Strobe beacon lights switch - Off.
3. Propeller - Clear.
4. 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

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 (1 minute minimum).

5. Condition lever (after N_1 RPM stabilizes. 12% minimum) - LOW IDLE.

PROCEDURE **TROUBLESHOOTING REFERENCE**

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 1000ºC 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.

6. TGT and N_1- Monitor. TGT 1000ºC maximum. N_1 52% minimum (C-12C and C-12D), or N_1 56% minimum (C-12F).
7. Oil pressure - Check (60 PSI minimum).
8. Condition lever - HIGH IDLE. Monitor TGT as the condition lever is advanced.
9. Ignition and engine start switch - OFF, after TGT stabilized.
10. Generator switch - RESET, then ON.

SECOND ENGINE START (BATTERY START)

1. First engine generator switch - OFF (after loadmeter reads 50% or less).
2. Propeller - Clear.
3. Ignition and engine start switch - ON. Propeller should begin to rotate and associated IGN ON light should Illuminate. Associated

PROCEDURE	TROUBLESHOOTING REFERENCE

SECOND ENGINE START (BATTERY START) (CONT)

FUEL PRESS light should extinguish.	A1-8
4. Condition lever (after N_1 RPM passes 12% minimum) - LOW IDLE.	
5. First engine generator switch - RESET, then ON.	
6. TGT and N_1 - Monitor. TGT 1000°C maximum, N_1 52% minimum (C-12C and C-12D), or N_1 56% minimum (C-12F).	
7. Oil pressure - Check (60 PSI minimum).	E7-9
8. Ignition and engine start switch - OFF after TGT stabilized.	
9. 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).	
10. Inverter switches - ON. Check INVERTER lights extinguished.	
11. Second engine generator switch - RESET, then ON.	
12. Strobe beacon light switch - DAY or NIGHT as required.	
13. Condition levers - As required.	

PROCEDURE TROUBLESHOOTING REFERENCE

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 (1 minute minimum).

CAUTION

Do not exceed starter limitation of 40 seconds on and 60 seconds 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, 40 seconds maximum).
4. Ignition and engine start switch - OFF.

PROCEDURE	TROUBLESHOOTING REFERENCE

FIRST ENGINE START (GPU START)

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

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 (1 minute minimum).

5. Condition lever (after N_1 RPM stabilizes, 12% minimum) - LOW IDLE.

PROCEDURE	TROUBLESHOOTING REFERENCE

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 engine start, the maximum allowable TGT is 1000ºC 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.

6. TGT and N_1 - Monitor. TGT 1000°C maximum, N_1 52% minimum (C-12C and C-12D). or N_1 56% minimum (C-12F).
7. Oil pressure - Check (60 PSI minimum). E7-9
8. Condition lever - HIGH IDLE. Monitor TGT as the condition lever is advanced. E2
9. Ignition and engine start switch - OFF after TGT stabilized.
10. GPU - Disconnect as required.

CAUTION

Do not turn on generators with GPU connected.

11. Generator switch (GPU disconnected) - RESET, then ON.

PROCEDURE	TROUBLESHOOTING REFERENCE

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.
3. Condition lever (after N_1 RPM passes, 12% minimum) - LOW IDLE. E1,J1
4. TGT and N_1 - Monitor. TGT 1000ºC maximum, N_1 52% minimum (C-12C and C-12D), N_1 56% minimum (C-12F)
5. Oil pressure - Check (60 PSI minimum). E7-9
6. Ignition and engine start switch - OFF after TGT stabilized.
7. Right propeller lever - FEATHER.
8. GPU - Disconnect.
9. Right propeller lever - HIGH RPM. E 2
10. Inverter switches - ON. Check INVERTER lights extinguished. C42-43
11. Generator switches - RESET, then ON.
12. Strobe beacon lights switch - DAY or NIGHT as required.
13. Condition levers - As required.

PROCEDURE	TROUBLESHOOTING REFERENCE

BEFORE TAXIING

1. Bleed air valves - OPEN.

(()) 2. Brake deice - As required. To activate the brake deice system proceed as follows:

   a. Condition levers - HIGH IDLE.

   b. Brake deice switch - DEICE. Check BRAKE DEICE annunciator light illuminated.

NOTE

After brakes have been deiced, the condition levers may be returned to LOW IDLE.

3. Cabin temperature mode selector switch - Set.

NOTE

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

4. Avionics master power switch - ON.

PROCEDURE	TROUBLESHOOTING REFERENCE

BEFORE TAXIING (CONT)

CAUTION

Do not operate the weather radar system in a confined space where the nearest metal is 50 feet or less from the antenna reflector. Scanning such surfaces within 50 feet of the antenna reflector may damage receiver crystals.

5. Avionics - As required.

6. Electric elevator trim switch - On.

*7. Electric elevator trim operation - Check as follows:

   a. Pilot and copilot pitch trim switches - Press to NOSE UP and NOSE DN positions, singularly and in pairs. Check that trim wheel moves in proper direction and operates only when trim switches are pressed in pairs. Any deviation requires that electric elevator trim be turned off and flight conducted using only manual trim.

   b. Pilot and copilot pitch trim switches - Press pilot's switches in the NOSE UP direction and press copilot switches in the NOSE DN direction. Trim system should not work in either direction with the switches held in this position (AP-106). With the SPZ-4000 the trim system should run in the direction

PROCEDURE	TROUBLESHOOTING REFERENCE

commanded by the pilot. Any deviation requires that electric elevator trim be turned off and flight conducted using only manual trim.

c. Trim disconnect switch - Press and check that electric trim disconnects and that ELEV TRIM light extinguishes (C-12C, and C-12D), or ELEV TRIM OFF light illuminates (C-12F).

*8. Autopilot/flight director (AP-106) - Check as follows:

NOTE

Since the pressure of airflow that normally opposes movement of control surfaces is absent during preflight check, it is possible to get a hardover control surface deflection if an autopilot command is allowed to remain active for any appreciable length of time. Move turn knob and pitch thumbwheel only enough to check operation, then return them to the center position.

a. Flight Director (FD) and Radio Magnetic Indicator (RM1) warning flags - Check masked.

b. Heading switch-indicator (Autopilot mode selector panel) - Press.

c. Horizontal Situation Indicator (HSI) - Set heading marker under lubber line.

PROCEDURE	TROUBLESHOOTING REFERENCE

BEFORE TAXIING (CONT)

d. Engage-disengage switch (autopilot mode selector panel)-ENG. Check that controls are stiff.

e. HSI heading marker - Move 10° left and right. Verify that flight director and control wheels respond in the appropriate direction.

f. Autopilot/yaw damp disengage switch (control wheel) - Press. Verify that autopilot disengages and that flight controls are free.

g. Elevator trim switch-indicator (control pedestal extension)-Check on.

h. Autopilot switch (autopilot mode selector control panel)-ENG.

i. Autopilot pitch wheel (autopilot pitch-turn control panel) -Command 5° trim UP. Verify that manual trim wheel moves nose UP and AP trim light indicates UP trim.

j. Autopilot pitch wheel (autopilot pitch-turn control panel)-Command 5° trim DN. Verify that manual trim wheel moves nose DN and AP trim light indicates DN trim.

k. Pitch trim switch - Depress to NOSE DN position and verify that autopilot disengages and A/P TRIM FAIL and MAS-

TER WARNING annunciator lights illuminate.

l. Repeat steps i through k using opposite commands

m. Pilot and copilot pitch trim switches - Press pilot's switches in the NOSE UP direction and press copilot's switches in the NOSE DN direction. Trim system should not work in either direction while the switches held in this postion. Any deviation requires that electric elevator trim be turned off and flight conducted using only manual trim.

n. Autopilot control switch (autopilot mode selector panel)- ENG.

o. HSI heading marker - Move to command a bank on flight director.

p. GO-AROUND switch (left power lever) - Press. Verify that GA annunciator light illminates, autopilot diengages, and that flight director commands a wings level, 7° nose-up attitude.

q. TEST switch switch (pilot's horizon) - Press and verify that attitude display indicates an additional 10° pitch up and 20° right bank.

*9. Autopilot/flight director (SPZ-4000) - Check as follows:

PROCEDURE	TROUBLESHOOTING REFERENCE

BEFORE TAXIING (CONT)

a. Flight director (FD) and radio magnetic indicator (RMI) warning flags - Check masked.

b. Autopilot engage switch (Autopilot control panel) - Depress. Check that AP ENGAGE and YD ENGAGE pushbuttons flash.

c. Autopilot - Overpower in all three individual axes, releasing pressure on the controls after overpowering each axis. Check that the AP ENGAGE and YD ENGAGE are steadily illuminated.

d. Autopilot - Disengage by depressing the AP ENGAGE pushbutton.

e. Control wheel - Set to mid travel.

f. Autopilot engage switch (autopilot control panel) - Depress to engage autopilot and yaw damper. Check that AP ENGAGE and YD ENGAGE pushbuttons on the autopilot control panel illuminate.

g. Elevator trim followup - CHECK as follows:

(1) Control wheel - Hold aft of mid travel. Trim wheel should run nose down after approximately 3 seconds. The TRIM DN annunciator on the autopilot con-

PROCEDURE	TROUBLESHOOTING REFERENCE

troller will illuminate after approximately 8 seconds. The A/P TRIM FAIL and MASTER WARNING annunciators will illuminate after approximately 15 seconds.

(2) Master warning annunciator - Reset.

(3) Control wheel - Hold forward of mid travel. Trim wheel should run nose up after approximately 3 seconds. The TRIM UP annunciator on the autopilot controller will illuminate after approximately 8 seconds. The A/P TRIM FAIL and MASTER WARNING annunciators will illuminate after approximately 15 seconds.

(4) Master warning annunciator - Reset.

h. Overpower check: (left power lever) - Press.

WARNING

If unable to overpower autopilot in any axis, or if autopilot or yaw damper disengages during overpower test, do not use.

PROCEDURE	TROUBLESHOOTING REFERENCE

BEFORE TAXIING (CONT)

(1) Control wheel - Overpower slowly in roll and pitch axis.

(2) Rudder pedals - Overpower slowly in both directions.

i. Autopilot/yaw damp disconnect switch (control wheels) - Depress to second level. Autopilot and yaw damp should disengage and ELECT TRIM OFF annunicator light should illuminate. AP ENG and YD ENG annunciators on instrument panel should flash 5 times.

j. Pilot and copilot pitch trim switches - Press pilot's switches in the NOSE UP direction and press copilot's switches in the NOSE DN direction. The trim system should run in the direction commanded by the pilot. Any deviation requires that electric elevator trim be turned off and flight conducted using only manual trim.

k. Elevator trim control switch - OFF, then ON. ELEC TRIM OFF annunciator light should extinguish.

l. Autopilot engage switch (Autopilot control panel) - Depress. Check that AP ENGAGE and YD ENGAGE pushbuttons flash.

PROCEDURE	TROUBLESHOOTING REFERENCE

m. Autopilot - Overpower in all three individual axes, releasing pressure on the controls after overpowering each axis. Check that the AP ENGAGE and YD ENGAGE are steadily illuminated.

n. Turn knob (autopilot control panel) - Turn left then right. Check that control wheel follows in each applied direction.

o. Pitch thumbwheel (autopilot control panel) - Move UP then DN. Check that elevator trim wheel responds to pitch thumbwheel movements. UP TRIM and DN TRIM annunciator lights may illuminate.

p. Heading marker (pilot's horizontal situation indicator) - Set to aircraft heading.

q. Heading pushbutton (flight director mode selector panel) - Depress to engage HDG mode.

r. Heading marker (pilot's horizontal situation indicator) - Move to command a turn in the left, then the right direction. Check that control wheel moves to turn in the direction commanded.

PROCEDURE	TROUBLESHOOTING REFERENCE

BEFORE TAXIING (CONT)

s. Go-around switch (left power lever) - Depress. Check that autopilot disengages and that flight director commands a 7° nose up, wings level attitude.

*10. Autopilot trim fail system - Check as follows:

a. Autopilot - Engage. Command DN with autopilot pitch thumbwheel and engage AUTO PILOT TRIM TEST switch when elevator trim wheel starts to rotate.

b. Verify that autopilot disengages and AP TRIM FAIL and MASTER WARNING lights illuminate within 10 seconds.

NOTE

The AP TRIM FAIL annunciator light may be extinguished by pressing the AP/YD DISCONNECT button on the control wheel to the first detent.

c. Repeat steps a and b except command nose UP trim.

*11. Altitude alerter - Check as follows:

PROCEDURE TROUBLESHOOTING REFERENCE

NOTE

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

a. Altitude select controller - Set to an altitude of more than 1, 000 feet above the altitude indicated on the pilot's altimeter. Check that pilot's altitude alert annunciator light on the pilot's altimeter is extinguished.

b. Altitude select controller - Set to an altitude of within 1,000 feet above the altitude indicated on the pilot's altimeter. Check that pilot's altitude alert annunciator light on the pilot's altimeter illuminates.

c. Altitude select controller - Set to an altitude of less than 250 feet above the altitude indicated on the pilot's altimeter. Check that pilot's altitude alert annunciator light on the pilot's altimeter is extinguished.

d. Altitude select controller - Set to an altitude of 300 + 50 feet above the altitude indicated on the pilot's altimeter. Check that pilot's altitude alert annunciator light on the pilot's altimeter illuminates.

e. Altitude select controller - Set desired altitude.

PROCEDURE	TROUBLESHOOTING REFERENCE

BEFORE TAXIING (CONT)

12. Avionics - Check and set as required.

13. Taxi clearance - Recieved.

14. Altimeters - Set and check (must be within ± 50 feet of runway altitude when set to tower furnished altimeter setting.

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.

PROCEDURE	TROUBLESHOOTING REFERENCE
*4. Magnetic compass - Check for freedom of movement.	B4

ENGINE RUNUP

1. Nose wheel - Center.

*** 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 55% N_1 (C-12C, C-12D), OR 56 TO 58% N_1 (C-12F).	E1
*4. Propeller feathering - Check as follows:	F13-15

a. Condition lever - LO IDLE.

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

c. Check for proper pedeestal control detent position.

d. Left propeller lever - HIGH RPM.

e. Repeat procedure for right propeller.

PROCEDURE	TROUBLESHOOTING REFERENCE
ENGINE RUNUP (CONT)	
*5. Engine acceleration - Check as follows:	E6,15,30
a. Left power lever - Set 64% N_1, then rapidly move lever to maximum.	
b. Record the time required for N_1 to reach 93.5%.	
c. Left power lever - lmmediately retard to IDLE as N_1 passes through 93.5%. Acceleration time should be 2.5 to 4.0 seconds.	
*6. Engine high idle speed - Check 70 to 73% N_1.	E2
*7 Brake deice system Check as follows:	
a. Power - Set 70% N_1	
b. Left bleed air valve switch - PNEU & ENVIRO OFF.	
c. Right bleed air valve switch - OPEN.	
d. Brake deice switch - Turn on and observe that the BRAKE DEICE ON light is illuminated.	
e. Pnuematic 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 - LO IDLE.

b. Cabin temperature mode selector switch - MANUAL COOL.

d. Right engine condition lever - Advance to increase N_1 to 57 to 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.

e. 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.

PROCEDURE	TROUBLESHOOTING REFERENCE

ENGINE RUNUP (CONT)

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.

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.

PROCEDURE	TROUBLEOOTING REFERENCE

g. Cabin pressurization switch - TEST (hold).

g. Left bleed air control valve switch - OPEN.

h. Cabin climb indicator - Check for descent indication within 10 to 15 seconds, then release test switch.

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

k. Left and right bleed air valve switches - OPEN.

l. Cabin altitude indicator - Set to planned cruise altitude plus 500 feet (if this setting does not result in a CABIN ALT indication of at least 500 feet over takeoff field pressure altitude. adjust as required).

m. Rate control - Set.

n. Cabin pressure dump switch - Set to PRESS position.

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

a. Positive charging rate.

b. 27.5 to 29.0 volts.

c. A load indication not exceeding 0.85.

PROCEDURE	TROUBLESHOOTING REFERENCE
ENGINE RUNUP (CONT)	
d. Turn generators on one at a time to ensure 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 - Check voltage between 110 and 120 volts and frequency between 390 and 410 Hz.	C42-43
* 13. 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) 16 to 21% torque, check right AUTOFEATHER light extinguished.	
(2) At 9 to 14% torque, check left AUTOFEATHER light extinguished (propeller starts to feather).	
e. Left power lever - Set approximately 22% torque.	

PROCEDURE	TROUBLESHOOTING REFERENCE
f. Repeat steps b, c, and d for right engine.	
g. Advance each power lever to above 85 to 90% N_1 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.	
*14. 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.	
d. Left propeller governor test switch - Release. Propeller RPM should increase.	
e. Left engine power lever IDLE.	
f. Repeat steps (b) through (c) for right engine.	

PROCEDURE	TROUBLESHOOTING REFERENCE

ENGINE RUNUP (CONT)

*15. Rudder boost - Check as follows:

a. Rudder boost switch - ON.

b. left engine power lever IDLE.

c. Condition levers - LO IDLE.

d. Right engine power lever - Advance until rudder boost moves right rudder in. The rudder boost system should activate within the values of N_1 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.

* 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 for PT6A-41 engine or figure 3 for PT6A-42 engine.

c. Propeller lever - HIGH RPM (full forward).

d. Power levers - Set 1800 RPM.

*e. Torquemeter - Read and record torque.

f. Power lever - IDLE.

g. Torque reading taken in step e. must equal the corrected torque read from figure 2 or 3 in step b. within ±2% torque.

h. Repeat procedure for other engine. The difference in torque readings between left and right engines should not be greater than 4%.

*19. Ice vanes - Check as follows.

a. Power levers - Set 1800 RPM.

b. Ice vane switches to EXTEND. Verify torque drop, and illumination of ICE VANE EXT light.

PROCEDURE	TROUBLESHOOTING REFERENCE

ENGINE RUNUP (CONT)

c. Ice vane switches - RETRACT. Verify return to original torque, and ICE VANE light extinguished.

20. Power levers - IDLE.

BEFORE TAKEOFF

1. Propeller synchronization switch - OFF.
2. Autofeather switch - ARM.
3. Bleed air valve switches - OPEN.
4. Ice and rain switches - As required.
5. Beacon - As required (day or night).
6. Fuel control panel - Check fuel quantity and switch positions.
7. Flight and engine instruments - Check for normal indications.
8. Cabin controller - Set.
9. Annunciator panels - Check (note indications).
10. Propeller levers - HIGH RPM.
11. Friction locks - Set.
12. Flaps - As required.
13. Trim - Set.
14. Avionics - Set.
15. Flight controls - Check.
16. Departure briefing - Complete.

PROCEDURE	TROUBLESHOOTING REFERENCE

LINE UP

1. Altitude alerter (C-12D serials 84-24375 thru 84-24380 and C-12F aircraft) - Set as required.
2. Transponder - As required.
3. Engine autoignition switch - ARM.
4. Condition levers - LOW IDLE.
5. Lights - As required.
6. Brake deice system - Check as follows when required:

NOTE

Do not activate brake deice system above 15°C FAT.

a. Brake deice switch - ON.

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

DURING TAKEOFF

*I. 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 end right propellers. then the lower of the two values shall be 2000 RPM. The maximum difference between the reading of the indicators shall be 20 RPM. **E28**

PROCEDURE	TROUBLESHOOTING REFERENCE

DURING TAKEOFF (CONT)

*2. Engine instruments - Check that the following instrument indications are within normal operating limitations:	E15-20
*a. Torque	E28
*b. TGT	B9,E22, 24,27
*c. N_1	E27
*d. Oil pressure	E8,9
*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 extened pedestal to preclude inducing spatial disorientation.

1. Landing gear control switch - UP.

NOTE

Listen for unusual noises during landing gear retraction.

2. Map switch - UP.
3. Landing lights - Off.
4. Climb power - Set.

PROCEDURE	TROUBLESHOOTING REFERENCE
5. Propeller synchronization switch - As required.	
6. Yaw damp switch - As required.	
7. Autofeather switch - As required.	
8. Cabin pressurization - Check.	
*9. Wings and nacelles - Check for fuel and oil leaks.	E29
*10. Brake deice system - Check as follows:	
a. BRAKE DEICE ON annunciator light - Check extinguished within approximately 10 minutes of landing gear retraction.	
b. Brake deice 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.	
d. Brake deice 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,C44
*2. Engine control levers - Check for alignment.	
*3. Vertical speed indicators - Check normal operation against altimeter as follows:	B2

PROCEDURE	TROUBLESHOOTING REFERENCE
DURING CLIMB (CONT)	
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 deicing system - Check as follows:	
a. Surface deicer switch - SINGLE CYCLE AUTO. Surface boots should inflate and auto matically deflate for one cycle. Wing boots should stay inflated for 6 seconds. and tail boots should stay inflated for 4 seconds.	
b. Surface deicer switch - Hold to DEICE MANUAL position. Roots should stay inflated until switch is released.	
c. Surface deicer switch - Release. Check boots visually to see that they are sucked down flat after use.	
*5. Propeller deice system - Check as follows:	C60
a. Propeller deice switch - Set to AUTO position.	
b. Propeller deicer ammeter - Monitor for 14 to 18 amperes	

PROCEDURE	TROUBLESHOOTING REFERENCE

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 to INNER position and note a .05 increase in each loadmeter indication.

*6. 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.

*7. Cabin and cockpit ventilation system - Check the following items for flow of air, binding controls and the capability of being shut off by its own control.

a. Eyeball cold air vents.

b. Pilot's and copilot's air vents.

c. Windshield defroster ducts.

d. Main cabin air ducts.

*8. Air conditioning and healing system - Check as follows: C54-59

a. Cabin temperature mode selector switch - MAN COOL or MAN HEAT.

PROCEDURE	TROUBLESHOOTING REFERENCE

DURING CLIMB (CONT)

b. Manual temperature control switch - Hold to INCREASE position for one minute. Observe an increase in cabin temperature.

c. Manual tempemture 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.

NOTE

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

9. Pressurization and oxygen system - Check as required (Section IV).

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

CRUISE

1. Power - Set.

*2. Engine instrument indications - Check all engine instruments for normal indications. E21,25

PROCEDURE	TROUBLESHOOTING REFERENCE
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. Ensure 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. ICC vane control circuit breakers (2) - Pull.

h. Airspeed - 160 KIAS.

i. #1 and #2 ice vane switches - EXTEND.

j. #1 and #2 vane fail annunciator lights (yellow) - Check illuminated within 10 to 18 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.

I. #1 and #2 vane fail annunciator lights (yellow) - Check extinguished.

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

PROCEDURE	TROUBLESHOOTING REFERENCE

CRUISE (CONT)

n. #1 and #2 ice vane switches - RETRACT.

o. #1 and #2 vane fail annunciator lights (yellow) - Check illuminated within 10 to 18 seconds after ice vane switch actuation.

p. Manual engine ice vane controls - Push in to retract:

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

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. Power - Set to obtain 160 KIAS.

b. Bank - Establish a coordinated standard rate turn.

c. Timing - Maintain turn for 1 minute. Heading change shall be 180 ± 10°.

d. Repeat procedure for opposite turn direction.

16. Avionics - Check in flight as required (Section IV).

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 2-58.3) 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 4, knots above the stall speed IAW fig. 1 page 2-58.3.

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:

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 145 KIAS (Make no further pitch trim adjustments).

PROCEDURE **TROUBLESHOOTING REFERENCE**

WARNING

If the aircraft reaches an airspeed 4 KTS above the stall speed IAW fig. 1 page 2-58.3 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 4 knots above the published stall speed specified in fig. 1 page 2-58.3.

* 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 114 KIAS (Make no further pitch trim adjustments).

PROCEDURE **TROUBLESHOOTING REFERENCE**

LOW SPEED SYSTEMS CHECK (CONT)

WARNING

If the aircraft reaches an airspeed 4 KTS above the stall speed IAW fig. 1 page 2-58.3 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 4 knots above the published stall speed specified in fig. 1 page 2-58.3.

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

3. Step deleted.

4. Step deleted.

POWER OFF STALL SPEED TABLE				
WEIGHT	**STALL SPEEDS**		**WARNING HORN**	
	VS	VSO	VS	VSO
11,000	94	72	98 - 106	76 - 84
11,300	95	73	99 - 107	77 - 85
11,500	96	73	100 - 108	77 - 85
11,800	97	74	101 - 109	78 - 86
12,000	97	74	101 - 109	78 - 86
12,300	98	74	102 - 110	78 - 86
12,500	98	75	102 - 110	79 - 87

Figure 1. Stall Speed

i. Step deleted.

j. Step deleted.

k. Step deleted.

l. Step deleted.

m. Step deleted.

n. Step deleted.

* 5. Flap operation - Check as follows: **C37-38**

a. Airspeed - Reduce to 199 KIAS or below.

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

c. Airspeed - Reduce to 143 KIAS (C-12C), 154 KIAS (C-12D), 157 (C-12F), 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 - 143 KIAS (C-12C), 154 KIAS (C-12D), or 157 KIAS (C-12F).

(2) Flaps - UP.

f. Step deleted.

PROCEDURE **TROUBLESHOOTING REFERENCE**

LOW SPEED SYSTEMS CHECK (CONT)

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

(4) Airspeed - 143 KIAS (C-12C), 154 KIAS (C-12D).or 157 KIAS (C-12F).

(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 82 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.

PROCEDURE	TROUBLESHOOTING REFERENCE
c. Respective IGN ON annunciator light should illuminate at 16 to 21% torque.	
d. Power - Establish cruise power with autoignition armed.	
e. Right engine condition lever - Rapidly retard to IDLE CUT-OFF for 3 seconds. then return to LO 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:	F13-15
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.	

PROCEDURE	TROUBLESHOOTING REFERENCE

LOW SPEED SYSTEMS CHECK (CONT)

f. 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.

g. Engine restart.

(1) Cabin temperature mode selector switch (C-12C, C-12D and C-12F prior to serial number 86-60084) - As required.

(2) Cabin air mode selector switch (C-12F after serial number M-6084) - As required.

(3) Electrical load - Reduce to minimum.

(4) Fire pull handle - In.

(5) Power lever - IDLE.

(6) Condition lever - FUEL CUTOFF.

(7) TGT (operating engine) - 700°C or less.

(8) Ignition and engine start switch - ON.

(9) Condition lever - LOW IDLE.

PROCEDURE	TROUBLESHOOTING REFERENCE

(10) TGT - 1000°C, 5 seconds maximum.

(11) Ignition and engine start switch - OFF at 50% N1.

(12) Generator switch - RESET. then ON.

(13) Engine cleanup - Perform if engine restart is unsuccessful.

(14) Cabin temperature mode selector switch (C-12C, C-12D and C-12F prior to serial number 86-60084) - OFF.

(15) Cabin air mode selector switch (C-12F after serial number 86-60084) - OFF.

(16) Autoignition switch -ARM.

h. Propeller lever - Move out of feather. Propeller tachometer must reach 1000 RPM in 30 seconds or less.

i. Propellers - Synchronized.

j. Power - As required.

k. Repeat procedure for opposite engine.

*11. Propeller autofeathering system and propeller unfeathering – Check as follows: **F13-15**

a. Climb power - Set (N1 above 92%).

PROCEDURE	TROUBLESHOOTING REFERENCE

LOW SPEED SYSTEMS CHECK (CONT)

b. Autofeather switch - ARM.

c. Airspeed - 120 KIAS.

d. Propeller levers - Set 2000 RPM.

e. Condition lever (engine to be feathered) - IDLE CUTOFF.

*f. Record the time from fuel cut-off until propeller rotation stops. Autofeather time is a function of oil temperature as shown in figure 8. (Propeller is considered to be feathered when the blades are individually visible to the human eye, but the propeller is still rotating.)

NOTE

For proper autofeather operation propeller must stop completely.

g. 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.

h. Engine restart.

PROCEDURE	TROUBLESHOOTING REFERENCE

(1) Cabin temperature mode selector switch (C-12C, C-12D) and C-12F prior to serial number 86-60084) -OFF.

(2) Cabin air mode selector switch (C-12F after serial number 86-60084) - OFF.

(3) Electrical load – Reduce to minimum.

(4) Fire pull handle - In.

(5) Power lever – IDLE.

(6) Propeller lever – FEATHER.

(7) Condition lever – FUEL CUTOFF.

(8) TGT (operating engine) – 700°C or less.

(9) Ignition and engine start switch - ON.

(10) Condition lever – LOW IDLE.

(11) TGT - 1000°C. 5 seconds maximum.

(12) Ignition and engine start switch- OFF at 50% N1.

(13) Generator switch - RESET, then ON.

(14) Engine cleanup - Perform if engine restart is unsuccessful.

(15) Cabin temperature mode selector switch (C-12C, C-12D and (C-12F prior to serial number 86-60084) - As required.

PROCEDURE	TROUBLESHOOTING REFERENCE

LOW SPEED SYSTEMS CHECK (CONT)

(16) Cabin air mode selector switch (C-12F after serial number 86-60084) - As required.

(17) Autoignition switch – ARM.

i. Propeller - Unfeather.

j. Propellers - Synchronized.

k. Power - As required.

l. Repeat procedure for other engine.

*12. Landing gear warning horn - Check as follows: **C29-32**

a. Power levers - Retard slowly, individually, until landing gear warning horn first sounds.

*b. Turbine tachometers - Read N1 on first hearing landing gear warning horn. The landing gear warning horn must sound when power lever(s) are retarded below 79 to 81% N1 and airspeed is below 140 KIAS or when the flaps are extended beyond the approach position (40%) regardless of power lever(s) position.

c. Power lever(s) - Advance past 79 to 81% N1. Landing gear warning horn should be armed again.

*13. Landing gear normal operation - Check as follows: **C13-36**

PROCEDURE	TROUBLESHOOTING REFERENCE

a. Airspeed - 181 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 - 163 KIAS.

g. Landing gear control switch - UP.

*h. Landing gear retraction time - Record (7 seconds maximum).

i. Landing gear handle lights (red) - Check illuminated while gear is in transit.

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

*14. Emergency landing gear extension system (mechanical, C-12C and C-120 prior to aircraft serial number 84-24375) - Check operation and condition as follows:

a. Airspeed - 130 KIAS.

PROCEDURE	TROUBLESHOOTING REFERENCE

LOW SPEED SYSTEMS CHECK (CONT)

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

c. Landing gear control switch - DN.

d. Landing gear alternate engage handle - Lift and turn clockwise to the stop (one quarter turn).

e. Alternate landing gear extension handle - Pump. The lever actuates a double-acting ratchet and requires little effort to operate. About 70 complete strokes of the lever will be required to lower and lock the gear.

f. Gear down indicator lights (3) Monitor. Stop pumping ratchet when gear down indicator lights are illuminated.

CAUTION

As full extension is approached, proceed cautiously, and stop when the green lights come on, or resistance is felt in the handle. Further movement of the handle could damage the driving mechanism and impair subsequent retraction.

*15. Emergency landing gear extension system (hydraulic, C-12D after aircraft serial number 84-24375, and C-12F) - Check operation and condition as follows:

PROCEDURE	TROUBLESHOOTING REFERENCE

a. Airspeed - Below 181 KIAS.

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

c. Landing gear control switch - DN.

d. Alternate landing gear extension hand pump handle - Pump. About 80 complete strokes of the lever will be requited to lower and lock the gear.

e. Gear down indicator lights (3) Monitor. Stop pumping when gear down indicator lights are illuminated.

DESCENT AND LOW LEVEL CRUISE

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

a. Power - 50 to 60% torque.

b. Propellers - Set 1900 RPM.

c. Pressure altitude - Above 18. 000 feet.

d. Gear - UP.

e. Flaps - UP.

f. Airspeed - In accordance with figure 6.

PROCEDURE	TROUBLESHOOTING REFERENCE

DESCENT AND LOW LEVEL CRUISE (CONT)

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.

c. Airspeed - 250 KIAS.

d. Trim aircraft.

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

PROCEDURE	TROUBLESHOOTING REFERENCE

DESCENT

NOTE

Cabin pressure controller should be adjusted prior to starting descent.

BEFORE LANDING

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

NOTE

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

4. Flap switch - APPROACH, below 199 KIAS.
5. Landing gear control switch - DN. below 181 KIAS.
6. Landing lights switch - As required.
7. Brake deice - As required.

LANDING

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

PROCEDURE	TROUBLESHOOTING REFERENCE

LANDING (CONT)

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

*5. Propeller reversing - Check as follows: E3.5

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.

*6. Oil temperature - Monitor. Ground idle limits are 10 to 99°C.

*7. Oil pressure - Monitor. Ground idle limits arc 60 PSI minimum.

GO-AROUND

1. Power - As required.
2. Landing gear control switch - UP.
3. Flap switch - UP.
4. Landing lights - OFF.
5. Climb power - Set.
6. Yaw damp - As required.
7. Brake deice - OFF.

PROCEDURE TROUBLESHOOTING REFERENCE

AFTER LANDING

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

1. Condition levers - As required.
2. Engine autoignition switches OFF.
3. Ice and rain switches - OFF.
4. Flap switch - UP.
5. Avionics - As required.
6. Lights - As required.

ENGINE SHUTDOWN

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. Overhead floodlight - As required.
5. Cabin temperature mode selector switch - OFF.
6. Autofeather switch - OFF.
7. Vent and aft vent blower switches - AUTO.
8. Inverter switches - OFF.

PROCEDURE	TROUBLESHOOTING REFERENCE

ENGINE SHUTDOWN (CONT)

*9. Battery condition - Check as required. If BATTERY CHARGE light is illuminated during engine shutdown, turn BAIT switch OFF momentarily and note Loadmeter reading. Alter 90 seconds. momentarily turn switch OFF again and note loadmeter reading. Battery condition is unsatisfactory if BATTERY CHARGE light remains illuminated and charge current fails to decrease between checks.

10. Avionics master switch - OFF.

11. TGT - Check. TGT must be 660°C or below for one minute prior to shutdown.

12. Propeller levers - FEATHER.

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

13. Condition levers - FUEL CUT-OFF.

PROCEDURE TROUBLESHOOTING REFERENCE

WARNING

Do not turn exterior lights off until propeller's rotation has stopped.

14. Exterior lights - OFF.
15. Master panel lights - OFF.
16. Key lock switch - OFF.
17. 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. Windows - As required. Do not leave passenger windows in polarized (dark) position.
6. Overhood floodlight - OFF.
7. Emergency exit lock - As required.
8. Galley power switches - OFF.
9. Aft cabin light - OFF.
10. Door light - OFF.

PROCEDURE	TROUBLESHOOTING REFERENCE

BEFORE LEAVING AIRCRAFT (CONT)

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.

*11.	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.	E-11-13
*12.	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.	
13.	Aircraft - Check secured, lock cabin door as required.	

SECTION III. TROUBLESHOOTING

General. This section contains troubleshooting information that has been referenced in Section II checklist. 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. Circuit breaker tripped in starter switch circuit.

b. Battery relay inoperative.

c. Low battery.

d. Loose connection or open circuit between battery relay and left starter relay.

A2. One starter inoperative.

a. Starter relay inoperative.

b. Poor ground at starter.

c. Open circuit.

d. Defective starting motor.

e. Switch defective.

A3. Engine slow to start or does not start.

a. Low battery.

b. Generator field grounding relay or generator field grounding disconnect relay defective

c. High resistance starter circuit.

d. Defective starter-generator.

e. Turbine dragging.

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. Improper 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.

i. 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

PBOBABLE CAUSE

B1. Airspeed indicator reading remains fixed.

a. Pitot pressure line clogged with ice or debris.

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. Pitot 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. 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. Needle probe body is making contact with metal braided hose inside of nacelle tank.

d. Defective component on printed circuit board.

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

a. Defective component on printed circuit board.

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 voltage regulator.

C2. No generator output.

a. Improper connections.

b. Circuit breaker tripped.

c. Open circuit.

d. Loss of residual magnetism.

e. Defective generator control switch.

f. Starter switch on.

g. Generator over-voltage circuit defective.

h. Paralleling circuit open.

i. Defective voltage regulator.

j. High resistance field circuit.

k. Shorted field.

C3. Low generator output.

a. Generators not paralleled.

C4. Low voltage.

a. Malfunctioning voltage regulator.

C5. Volt-loadmeter reads off scale in wrong direction.

a. Generator field magnetized in wrong direction.

b. Generator leads reversed.

C6. Volt-loadmeter does not indicate.

a. Tripped circuit breaker.

b. Open volt-loadmeter lead.

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.

C8. Power on with master switch in OFF position.

a. Master switch defective.

b. Relay contacts stuck.

C9. Apparent loss or 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. Voltage regulator 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.

C-13. Landing gear (mechanical) will not retract or extend.

a. Circuit breaker tripped in control or motor circuit.

b. Loose motor ground connection.

c. Open circuit.

C-14. Landing gear (hydraulic) 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).

C15. Landing gear (mechanical) will extend but will not retract.

a. Open circuit between landing gear switch and control relay.

b. Up solenoid of control relay inoperative.

c. Open circuit between control relay and up winding in motor.

C16. Landing gear (hydraulic) 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.

C17. Landing gear (mechanical) will retract but will not extend.

a. Open circuit.

b. Down limit switch inoperative.

c. Open circuit between control relay and down winding of motor.

C18. Landing gear (hydraulic) 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.

C19. Landing gear (mechanical) circuit breaker trips.

a. Grounded control circuit.

b. Grounded motor circuit.

c. Mechanical defect in gear causing overload.

C20. Landing gear (hydraulic) 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.

C21. Landing gear (hydraulic) 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.

C22. Landing gear (hydraulic) 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.

C23. Landing gear (hydraulic) pump motor operating longer than 23 seconds in both the extension and retraction modes. The 2-ampere circuit breaker does not trip.

a. Low voltage.

C24. Landing gear (hydraulic) pump motor operating longer than 23 seconds in the retract mode, but the 2-ampere circuit breaker does not trip.

a. Faulty time delay PCB and pressure switch.

C25. Landing gear (hydraulic) pump motor operating longer than 23 seconds in the extended mode but the 2 ampere circuit breaker does not trip.

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

C26. Landing gear (hydraulic) low fluid level light not functioning.

a. Defective lamp.

b. Defective fluid indicator circuit.

C27. Landing gear (hydraulic) circuit breaker trips.

a. Shorted circuit.

C28. Landing gear (mechanical) operation noisy.

a. Loose chain.

b. Broken gear door linkage.

c. Worn actuator bearings.

C29. Landing gear (Mechanical) warning horn inoperative.

a. Defective warning horn.

b. Power lever switch out of adjustment.

c. Defective landing gear control switch.

d. Defective safety switch.

e. Defective wiring.

C30. Landing gear (mechanical) warning born 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, fire warning horn relay and landing gear safety switch.

C31. Landing gear (mechanical) 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 horn relay.

C32. Landing gear (mechanical) warning horn fails to shut off when landing gear is extended.

a. Defective or out of adjustment down-lock switches.

C33. Landing gear (mechanical) 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.

C34. Landing gear (mechanical) down position indicator light inoperative.

a. Defective or out of adjustment down lock switch.

C35. Landing gear (mechanical) handle light is illuminated with gear up and locked.

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

C36. Landing gear (mechanical) handle light inoperative.

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

b Defective landing gear control switch.

C37. Flaps fail to extend or retract.

a. Tripped cicuit breaker.

b. Defective flap motor.

c. Defective flap control switch.

d. Defective mechanical component in actuator system.

e. Defective wiring.

C38. Flap position indicator inoperative.

a. Tripped circuit breaker.

b. Defective position indicator.

c. Defective position transmitter.

d. Defective wiring.

C39. Pitot tube heater fails to operate

a. Tripped circuit breaker.

b. Defective heater.

c. Defective wiring.

C40. Stall warning system inoperative.

a. Defective stall warning switch.

b. Defective stall warning horn.

c. Defective wiring.

C41. Stall warning horn sounds continuously.

a. Defective stall warning switch.

b. Defective stall warning test system.

c. Defective wiring.

C42. Both inverters inoperative.

a. Tripped inverter circuit breakers (on DC power distribution panel beneath floor).

b. Defective inverter select switch.

c. Defective wiring in inverter system.

C43. One inverter inoperative.

a. Tripped inverter circuit breaker (on DC power distribution panel beneath floor).

b. Tripped generator fault circuit breaker.

c. Defective current limiter.

d. Defective inverter.

e. Defective inverter power relay.

f. Loose or corroded ground connection.

g. Defective wiring to inverter.

C44. Battery charge annunciator light inoperative.

a. Defective light bulb.

b. Connections on current detector loose or corroded.

c. Defective current detector printed circu. board assembly.

C45. 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.

C46. Fuel crossfeed valve inoperative or fuel fail light remains illuminated.

a. Defective standby fuel pump.

b. Defective crossfeed valve.

C47. Standby fuel pump inoperative.

a. Defective standby pump relay.

b. Defective switch in fuel management panel

c. Defective fuel pressure switch.

C48. Pnuematic surface deicer system inoperative.

a. Defective surface deicer control relay.

C49. Right and left FIRE PULL warning lights do not illuminate in my test position of fire protection test switch.

a. Tripped fire detector circuit breaker.

b. Defective fire protection test switch.

c. Defective wiring.

C50. Engine fire detection system wholly or partially inoperative.

a. Defective flame detector.

b. Defective fire protection test switch.

C51. Fire detector circuit breaker trips.

a. Short circuit in wiring or components.

C52. Left FIRE PULL warning light illuminates in all test positions but right FIRE PULL warning light does not.

a Defective right fire detection control amplifier.

b. Defective wiring between fire warning power circuit breaker and right control amplifier.

C53. Right FIRE PULL warning light illuminates in all test positions but left FIRE PULL warning light does not.

a. Defective left fire detection control amplifier.

b. Defective wiring between fire warning power circuit breaker and left control amplifier.

C54. Ventilation blower will not run.

a. Tripped vent blower circuit breaker.

b. Defective motor brushes.

c. Defective wiring.

C55. Ventilation blower draws excessive current.

a. Misaligned or preloaded bearings.

b. Defective bearings.

C56. Ventilation blower runs at reduced speed.

a. Brushes not seated properly.

C57. Ventilation blower draws excessive current and runs it high speed.

a. Shorted turns in field windings.

C58. Ventilation blower draws excessive current and speed surges.

a. Shorted turns in armature.

C59. Ventilation blower has excessive vibration.

a. Armature out of balance.

b. Squirrel cage fan damaged.

c. Squirrel cage fan out of balance.

C60. Propeller deicer inoperative.

a. Circuit breaker tripped.

b. Propeller deice switch defective.

c. Ammeter defective.

TROUBLESHOOTING GUIDE D - CAUTION PANEL

CONDITION

PROBABLE CAUSE

D1. Placard light (annunciator panel) will not illuminate when press-to-test button is pressed.

a. Defective placard Iight.

D2. Fault warning light will not illuminate for any red faults.

a. Defective fault warning light.

b. Defective fault warning light resistor.

c. Defective annunciator control box.

D3. Depressing the press-to-test switch has no effect on fault warning system operation.

a. Defective switch.

b. Defective annunciator control box.

D4. Dim control does not function properly.

a. Defective rheostat.

b. Defective dim bias resistor.

c. Defective annunciator control box.

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 tube.

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. Leak or restriction in fuel control unit sense tubes.

b. Fuel control contaminated with ice or corrosion.

c. Defective fuel control unit.

d. Leaking bleed air valve.

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 as 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. Torque meter 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 instrumentation 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 relay defective.

d. Fuel level transmitter defective.

E30. 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.

TROUBLESHOOTlNG GUIDE F - PROPELLERS

CONDlTION

PROBABLE CAUSE

F1. Propeller governor system partially or wholly inoperative.

a. Defective blocking diode on propeller governor test switch.

b. Defective propeller governor test panel.

c. Defective arc suppression capacitor or diode on propeller reset or governor test solenoid.

F2. Propeller governor test system inoperative.

a. Tripped propeller governor test circuit breaker.

b. Defective wiring.

F3. Propeller governor test system inoperative on one engine.

a. Defective propeller governor system test switch.

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

CONDITION

PROBABLE CAUSE

For complete troubleshooting of autopilot system, refer to Collins manual P/N 523-0764802-00111A.

TROUBLESHOOTlNG 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

K1. Interphone system: No audio signals heard in headsets.

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 selecto switches at audio control panel are at different positions.

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 flag (pilot's indicator) or VOR LOC flag (copilot's indicator) 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 (pilot's indicator) or VOR LOC flag (copilot's indicator) remain 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.

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 off/volume control on audio control panel.

e. Defective marker beacon receiver.

K15. Marker beacon signals not heard in headset.

a. Defective audio control panel.

b. Defective marker beacon off/volume control or sensitivity switch on audio control panel.

K16. Glideslope off 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 off flag on one course deviation indicator remains in view when glideslope receiver is operating.

a. Defective pilot's or copilot's VOR 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 or double needle switch to ADF.

a. Defective ADF receiver.

b. Defective RMI.

c. Defective ADF fixed-loop antenna.

d. Defective ADF-VOR switch on RMI.

c. 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 radio magnetic indicator heading within two degrees.

a. Defective radio magnetic indicator.

K27. VOR receiver inoperative.

a. No power to equipment.

b. Defective VOR control panel.

c. Defective VOR receiver.

K28. 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.

K29. With VOR receiver operating, course deviation bars on course deviation indicators do not deflect (radio magnetic indicator needles operate properly).

a. Defective VOR switch on instrument panel.

b. Defective course deviation indicator switching relay.

K30. Radar inoperative.

a. System circuit breaker tripped.

b. Defective radar control-indicator.

c. Defective radar receiver-transmitter.

K31. Radar antenna does not scan.

a. No power to radar antenna.

b. Defective radar antenna.

K32. No display on radar control indicator.

a. Defective radar control-indicator.

b. Defective radar receiver-transmitter.

c. Defective radar antenna.

K33. Wavy, chopped or missing range cirlces or indicator.

a. Defective radar control-indicator.

b. Defective radar receiver-transmitter.

K34. 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.

K35. No targets on control-indicator or targets do not move with TILT control.

a. Defective radar control-indicator.

b. Defective radar receiver-transmitter.

c. Defective radar antenna.

K36. Radar gain control has no effect on display.

a. Defective radar control-indicator.

K37. Radar TILT control inoperative.

a. Defective radar control indicator.

K38. Radar BRT control inoperative.

a. Defective radar control-indicator.

K39. Radar range does not vary when RANGE switch is changed to various positions.

a. Defective radar control-indicator.

K40. Transponder cannot be interrogated or provides unsatisfactory response.

a. Mode C not set or defective.

b. Encoding altimeter defective.

SECTION IV. SPECIAL PROCEDURES

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

***A. Pressurization and Oxygen 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 selected altitude ±250 feet and the cabin differential pressure needle should continue climbing. The cabin altimeter needle should remain at selected altitude until the maximum pressure differential 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.
   a. Cabin pressurization leak rate - Check within limits as follows:
   b. Level off aircraft when pressure differential reaches 60±.1.
   c. Bleed air valve switches (2) - ENVIRO OFF.
* 4. Cabin rate-of-climb indicator - Read and record 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 and record the minimum N_1 speed that the Right engine must be operated at to maintain the cabin pressure differential at 6.0+1. N_1 should not exceed 85%. and the minimum desirable N_1 is 80%.
8. Left bleed air valve switch - OPEN.
9. Right bleed air valve switch - ENVIRO OFF.

* 10. Slowly retard the left power lever and record the minimum N_1 speed that the left engine must be operated at to maintain the cabin pressure differential at 6.0±1. N_1 should not exceed 85%. and the minimum desireable N_1 is 80%.

11. Right bleed air valve switch - OPEN.

12. Cabin altitude controller - Set to 10,000 feet pressure altitude.

13. Cabin pressurization rate knob - Set to maximum.

* 14. Cabin rate of climb indicator - Read and record. Cabin rate of descent should be between 1500 and 2500 feet per minute.

15. Cabin pressurization rate knob - Set to mid-range.

* 16. Cabin rate of climb indicator - Read and record cabin rate of descent. Cabin rate of descent should be between 350 and 650 feet per minute.

17. Cabin pressurization rate knob - Set to minimum.

* 18. Cabin rate of climb indicator - Read and record cabin rate of descent. Cabin rate of descent should be between 50 and 300 feet per minute.

19. Cabin altitude controller - Set.

* 20. Cabin rate of climb indicator - Read and record cabin rate of descent. Cabin rate of descent should be between 50 and 350 feet per minute.

21. Cabin pressurization rate knob - Set to maximum.

* 22. Cabin rate of climb indicator - Read and record cabin rate of descent. Cabin rate of descent should be between 1500 and 2500 feet per minute.

23. Cabin pressurization rate knob - Set to mid-range.

* 24. Cabin rate of climb indicator - Read and record cabin rate of descent. Cabin rate of descent should be between 350 and 650 feet per minute.

25. Cabin altitude controller - Set to 10,000 feet.

26. Cabin pressurization rate control - Set to a comfortable rate of climb.

* 27. Cabin altitude indicator - Read and record altitude. Altitude should reach 9750 to 10,250 feet pressure altitude.

28. Aircraft altitude - 10,000 feet.

29. Cabin pressurization dump switch - DUMP.

30. Aircraft altitude - Increase toward 12,500 feet pressure altitude.

* 31. Cabin altitude warning annunciator light - Check that it illuminates between 12,000 and 12,500 feet pressure altitude.

* 32. Oxygen system - Check that automatic deployment of masks occurs between 12,000 and 12, 500 feet pressure altitude (C-12D).

* 33. Cabin lights - Check that they automatically illuminate between 12,000 and 12,500 feet pressure altitude.

34. Cabin pressurization dump switch - PRESS.

35. Cabin altitude controller - Set to field elevation.

36. Descend toward field altitude.

* 37. Cabin altitude indicator - Check that cabin altitude attains and remains at field elevation ±250 feet until the altitude set in the cabin altitude controller is reached by the aircraft.

* 38. Oxygen system (after landing) - Check each mask for function and condition.

***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 N_1 or TGT limits at maximum power lever position, and be off the torque limit, at 2000 propeller 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 (N_1) with the power levers in the full forward position. If during the test the TGT temperature limit or N_1 limit is obrained prior to reaching maximum N_1, 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 N_1 limits). For PT6A-41 engine maximum N_1 is 101.5% and maximum TGT is 750°C. For PT6A-42 engine maximum N_1 is 101.5% and maximum TGT is 800°C.

***D. Speed Check at Maximum Cruise 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, if cruise torque settings shown on the cruise power charts should be obtained without exceeding TGT limits.

Sped-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 power and speed charts (figure 9 through 14).

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. FAT - Refer to chart.
5. Power setting - Refer to chart.
6. Propeller RPM - Refer to chart.
7. Ice vanes - Retracted.
8. Aircraft weight - Refer to chart.

NOTE

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

***E. Engine Acceptance (C-12C and C-12D).**

1. Record the following
   - *a. Engine serial number.
   - *b. Engine hours since new.
   - *c. Engine hours since overhaul.
2. Propeller levers - Set 1900 RPM.
3. Ice vanes - Retract.
4. Bleed air valve switches - OPEN.
5. Electrical load - 0.5% or less per engine.
6. Altitude - Refer to applicable chart.
7. Set engine torque as specified by the engine acceptance graph (figure 13 or 14) on the engine to be tested.
8. Adjust the opposite engine to maintain 175 KIAS.

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 750°C.

9. 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. TGT
   - *e. Propeller RPM
   - *f. Torque
   - *g. N_1

10. Repeat for opposite engine.

***F. Engine Acceptance at Maximum Continuous Power (C-12F).**

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 15) 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 780°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. TGT

   *e. Propeller RPM

   *f. Torque

   * g . N_1

7. Repeat for opposite engine.

***G. Engine Acceptance at Maximum Cruise Power (C-12F).**

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 780°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 attitude.
3. Propeller levers - Set 1900 RPM.
4. Adjust the opposite engine to maintain 175 KIAS.
5. Free air temperature - Record.
6. Set engine torque as specified by the engine acceptance graph (figure 15) 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. TGT (must not exceed 780°C)
   *e. Propeller RPM

*f. Torque

*g. N_1

8. Repeat for opposite engine

H. Avionics Flight Checks.

PROCEDURE	TROUBLESHOOTING REFERENCE
* 1. VLF/omega navigation system flight test - Perform as follows:	

A triangular test flight shall be performed Sastisfactory performance shall be demonstrated by flying over three checkpoints whose latitude and longitude are known, and comparing them with the VLF/omega coordinate 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 is recommended whenever possible.

a. VLF/Omega navigation system - Set up and operate in accordance with TM 55-1510-218-10.

b. Insert the coordinates of two distant ground checkpoints and point of departure. Distances between pound check--points should be far enough apart to provide a 1 hour triangular closed course.

c. Fly the triangular course and monitor the navigation instruments for proper operation.

*d. Record the distances from the known ground checkpoints to the corresponding waypoint location provided by the VLF/Omega navigation system. Maximum permissible along-track or cross-track error for each checkpoint is 1.75 statute miles.

PROCEDURE	TROUBLESHOOTING REFERENCE
*2. Flight management system (KNS-660) flight test - Perform as follows:	

A triangular test flight shall be performed. Satisfactory performance shall be demonstrated by flying over three checkpoints whose latitude and longitude are known, and comparing them with the flight management system coordinate readouts. The aircraft shall establish a low altitude, compatible with aircraft safe ty and applicable Laws and Codes of Flight which will allow accurate sighting of ground landmarks. An altitude of 1000 feet is recommended whenever possible.

a. Flight management system - Set up and operate in accordance with TM 55-1510-218-10.

b. Insert the coordinates of two distant ground checkpoints and point of departure. Distances between ground checkpoints should be far enough apart to provide a 1 hour triangular closed course.

c. Fly the triangular course and monitor the navigation instruments for proper operation.

d. Check the operation of the system in the RNAV ENR mode, and verify the operation of each sensor (BLEND, VOR, TACAN, VLF/OMEGA, and GPS) as appropriate.

e. Using the RNAV APP mode perform an RNAV approach.

PROCEDURE	TROUBLESHOOTING REFERENCE

AVIONICS FLIGHT CHECKS (CONT)

f. Record the distances from the known ground checkpoints to the corresponding waypoint location provided by the flight management system. Maximum permissible along-track or cross-track error for each checkpoint is 175 stature miles in the RNAV ENR mode. The maximum permissible error at the missed ap proach point for an RNAV approach is 0.35 statute mile.

*3. 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:

(I) 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.

PROCEDURE	TROUBLESHOOTING REFERENCE

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.

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

(3) When the aicraft 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 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.

PROCEDURE	TROUBLESHOOTING REFERENCE
AVIONICS FLIGHT CHECKS (CONT)	
h. Check autopilot indicated airspeed hold function as follows:	
(1) Fly aircraft to test airspeed.	
(2) Airspeed hold 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.	
i. Check roll command function of autopilot as follows:	
(I) Turn control knob (autopilot pitch-turn control panel) - Turn to L and R and verify that autopilot turns aircraft left or right respectively.	
*4. Audio control panel and interphone system - Check each unit as follows:	K1-2
a. Interphone functional check:	
(1) Receiver selector switches - OFF.	
(2) Transmitter selector switches on pilot's and copilot's audio control panel - INTPH. This will allow the pilot to talk to the copilot by passing a microphone switch and speaking into microphone or	

visa-versa from copilot's position.

(3) 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.

(4) 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) - Turn on (up) one at a time and increase volume of 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) Return each receiver switch (on audio control panel) to the off (down) position and each receiver volume control fully counterclockwise.

PROCEDURE	TROUBLESHOOTING REFERENCE

AVIONICS FLIGHT CHECKS (CONT)

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

(5) Receiver interphone switch (pilot's audio control panel) - INTPH (up).

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

(7) Interphone switch (pilot's audio control panel) - Off (down).

(8) 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.

*5. UHF radio set (AN/ARC-164).

Check as follows:

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

b. Transmitter selector switch. UHF.

PROCEDURE	TROUBLESHOOTING REFERENCE
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 he uniformly loud and clear through these tests.	
k. Repeat procedure for frequencies in low, middle, and high ranges.	
*6. VHF radio set (VHF-20B).	K8-9
Check as follows:	
a. Altitude - 1000 feet AGL.	
b. Transmitter selector switch (audio control panel) - VHF.	
c. Off-volume control - Turn clockwise, set volume as required.	

PROCEDURE	TROUBLESHOOTING REFERENCE
AVIONICS FLIGHT CHECKS (CONT)	
d. Frequency selector - Set desired frequency.	
c. 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 (nor 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. VHF radio set (KTR-908).	K8-9
Check as follows:	
a. Altitude - 1000 feet AGL.	
b. Avionics master switch (overhead control panel) - ON.	
c. Off, volume, test knob - Turn clockwise out of detent, then depress to turn off automatic squelch circuit. Continue turning knob clockwise until background noise is heard in headphones or speaker, assuring that receiver is operating, then set audio volume to desired level. Depress knob again to return unit to automatic squelch control.	
d. Channel pushbutton switch - As required.	

PROCEDURE	TROUBLESHOOTING REFERENCE
c. Tuning knobs - Set test frequency or channel.	
f. VHF 1 or VHF 2 receiver audio switch (audio control panel) - On (up).	
g. Volume control - Adjust as required.	
h. Transmitter selector switch (audio control panel) - VHF 1 or VHF 2.	
i. Microphone jack selector switch (instrument panel) - As required.	
j. Microphone switch - Depress, then speak into microphone.	
k. Fly aircraft to a point 40 nautical miles away from test station.	
1. 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.	
m. Repeat procedure for frequencies in low, middle and high ranges.	
*8. HF radio set (718U-5).	K10
Check as follows:	
a. Transmitter selector switch (audio control panel) - HF.	

PROCEDURE	TROUBLESHOOTING REFERENCE

AVIONICS FLIGHT CHECKS (CONT)

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.

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 AND LSB. 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

PROCEDURE	TROUBLESHOOTING REFERENCE
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.	

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. While listening, alternately switch from USB to LSB. The signal should have the same pitch in both modes. If there is a difference, inform maintenance personnel.

*9. HF radio set (KHF-950). K20-26

Check as follows:

a. Transmitter selector switch (audio control panel) - HF.

b. HF receiver audio selector switch (audio control panel) - on (up).

c. Frequency/channel switch (HF control panel) - FREQ (out position).

PROCEDURE	TROUBLESHOOTING REFERENCE

AVIONICS FLIGHT CHECKS (CONT)

d. Mode selector switch (HF control panel) - Set emission mode (USB, LSB, or AM).

e. Tuning knobs - Set desired frequency, then stow cursor.

f. Antenna coupler - Tune (depress microphone switch).

g. 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 AND LSB. Obtain signal quality reports from the other station and note received signal quality.

h. Clarifier control - PULL ON and adjust as required if operating in the SSB emission mode.

PROCEDURE	TROUBLESHOOTING REFERENCE

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. The clarifier control is used to slightly shift the receiver-generated frequency to match the frequency of the signal being received.

i. 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.

NOTE

Do not key transmitter when set to WWV.

(2) Mode selector switch - USB.

PROCEDURE	TROUBLESHOOTING REFERENCE

AVIONICS FLIGHT CHECKS (CONT)

(3) Listen to the time tick, tone, or voice announcements. The tone is preferable. While listening, alternately switch from USB to LSB. The signal should have the same pitch in both modes. If there is a difference, inform maintenance personnel.

*10. Microwave landing system (MLZ-910).

Check as follows:

a. Avionics master switch (overhead control panel) - ON.

b. MLS receiver audio switch (audio control panel) - On (up).

c. Off. volume control - Turn clockwise out of detent. then continue turning clockwise until desired audio volume is reached.

d. Test switch - Depress and observe that all indicator lights illuminate and that self-test procedure takes place as follows:

(1) All MLS controller indicator lamps will remain illuminated and all three digital displays will read all 8's for as long as the

PROCEDURE	TROUBLESHOOTING REFERENCE

TEST switch is held depressed.

(2) The morse code letter B (-...) will be heard when course deviation indicators and glide slope pointers are deflected by the built-in test equipment.

(3) Course deviation indicators and glide slope pointers will be centered and flags will be in view.

(4) Glide slope pointers will move up two dots, course deviation indicators will move left two dots, and flags will move out of view.

(5) Course deviation indicators and glide slope pointers will be centered and flags will be in view.

(6) Glide slope pointers will move down two dots, course deviation indicators will move right two dots, and flags will move out of view.

(7) This test sequence will last 11 seconds.

e. Tuning knobs - Set channel number and elevation angle.

f. Automatic switch - As required.

PROCEDURE	TROUBLESHOOTING REFERENCE
AVIONICS FLIGHT CHECKS (CONT)	
g. Pilot's or copilot's HSI MLS pushbutton switch-indicator (instrument panel) - Depress on. Check illuminated.	
h. Fly an MLS approach monitoring azimuth (localizer) and elevation (glideslope) indicaton for proper function.	
*11. ADF radio set (DF 203).	K20-26
Check as follows:	
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 ensure that	

PROCEDURE	TROUBLESHOOTING REFERENCE

band switching is taking place.

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 gearing 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 gearing pointer 360° left. Two distinct null positions, 180° from each other should be encountered.

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

PROCEDURE	TROUBLESHOOTING REFERENCE

AVIONICS FLIGHT CHECKS (CONT)

o. Mode selector switch - ADF. The bearing pointer should 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 tinder. End of effective operating range may be considered to be reached when the RMI bearing needle fails to return to within three degrees of starting bearing when loop is stewed first clockwise and then counterclockwise.

*12. ADF radio set (KDF-806). K20-26

Check as follows:

a. Avionics master switch (overhad control panel) - ON.

b. Off, volume, test knob - Turn clockwise out of detent, then depress to turn off automatic squelch circuit. Continue turning knob clockwise until background noise is heard in headphones or speaker. assuring that receiver is operating, then set audio volume to de-

PROCEDURE	TROUBLESHOOTING REFERENCE

sired level. Depress knob again to return unit to automatic squelch control.

c. Number 1 or number 2 ADF receiver audio monitor switch (radio control panel) - On (up).

d. Mode switch - Set operating mode as required.

e. Tuning knobs - Set test frequency or channel.

f. Volume control - AS required.

g. RMI switch - AS required. Monitor ADF indicator needle for proper operation.

h. Determine the magnetic bearing from a landmark to the ADF station.

i. Fly the aircraft over this landmark on the magnetic heading determined above.

j. Relative bearing should agree with aircraft magnetic heading within ±4°.

*13. VOR/glideslope/marker beacon receiver. K11-19

Check as follows:

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

b. Frequency selectors - Set test frequency.

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

PROCEDURE	TROUBLESHOOTING REFERENCE

AVIONICS FLIGHT CHECKS (CONT)

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

e. 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/localizer warning flag should be concealed.

f. 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.

g. Rotate the course card until the direction to the station is directly below the course index again and the to/from indicator reads to.

h. Fly a 90° right turn such that the flight path is at a 90° 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).

PROCEDURE	TROUBLESHOOTING REFERENCE

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

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

*k. Glideslope/marker beacon function - Check as follows:

(1) Marker beacon off/ volume control (pilot's audio control panel) - On, rotate full clockwise.

(2) Marker beacon sensitivity switch (pilot's audio control panel) - As required.

(3) Frequency selectors (VOR control panel) - select localizer frequency.

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

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

(6) VOR receiver switch (audio control panel) - On (up).

(7) Volume control - Adjust. Clear audio signals should be available.

PROCEDURE	TROUBLESHOOTING REFERENCE

AVIONICS FLIGHT CHECKS (CONT)

(8) Fly an ILS approach monitoring localizer and glideslope indicators.

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

(10) 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.

(11) 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.

*14. TACAN - Check as follows:

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

PROCEDURE	TROUBLESHOOTING REFERENCE

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.

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 direaction 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.

PROCEDURE	TROUBLESHOOTING REFERENCE
AVIONICS FLIGHT CHECKS (CONT)	
j. Fly a 90° right turn such that the flight path is at a 90° 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 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%.	
*15. TACAN distance measuring equipment.	K11-13,27-29
Check against known distances (on the ground if possible) using known checkpoints). DME should indicate known distances to within +0.5 miles or ±5% of range. whichever is greater.	
*16. Transponder set (AN/APX-100).	K40
Check as follows:	
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.	

PROCEDURE	TROUBLESHOOTING REFERENCE

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.

*17. Encoding altimeter.

Check as follows:

a. Mode C switch (transponder control panel) - Check on (up).

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.

18. Radar set (RDR 1200). K30-39

Check while airborne as follows:

NOTE

During the first five seconds after turning the system on, a distinct noise and/or vibration may occur in the antenna. This is the normal sound of the stepping drive motor waiting for the strobe line to catch up for synchronization.

a. Turn on procedure: Mode switch - TEST.

b. Initial control settings:

(1) Wx/GAIN control - Wx.

PROCEDURE	TROUBLESHOOTING REFERENCE

AVIONICS FLIGHT CHECKS (CONT)

(2) Scan/stab selector - 120°.

(3) Antenna tilt control - 0°.

(4) BRT control - As required for best display.

c. Preflight test procedure:

(1) After approximately 70 seconds. the test pattern should appear. then check for the following items:

d. There should be five equally spaced range marks.

e. Amber fault lamp should be illuminated.

f. There should be no “noise” appearing on the display.

g. There should be two distinct brightness levels appearing on the screen.

h. Starting at the lower center of the display, there should be five bands extending outward. They should be:

(1) Light shading.

(2) lntermediate shading.

(3) Dark or contour arca.

(4) lntermediate shading.

(5) Light shading.

i. Strobe line (antenna position) should move across the indicator screen through the full

PROCEDURE	TROUBLESHOOTING REFERENCE
120° without jumping Absence of the strobe line indicates that the antenna is not operating.	
j. Scan/stab switch - HOLD position. Strobe line should disappear and the test pattern display should freeze on the indicator.	
k. Scan/stab switch - 60°. Scan area should now be limited to 60°. Strobe line should reap pear and sweep ±30° about the aircraft centerline.	
l. Scan/stab switch - 120°.	
m. Mode selector - 25.	
n. Wx/GAIN control - Wx.	
o. Antenna tilt control - +4°.	
p. BRT control - As desired. Amber fault lamp should be extinguished, indicating satisfactory transmitter power and satisfactory receiver gain.	
q. Antenna tilt control - Vary between 0°. and+ 15° and note that close-in "ground clutter" appears at lower tilt settings and any local moisture-laden weather appears at higher tilt settings.	

PROCEDURE	TROUBLESHOOTING REFERENCE
AVIONICS FLIGHT CHECKS (CONT)	
r. Weather observation procedure:	
(1) Antenna tilt control - Adjust until weather pattern is displayed. Include the areas above and below the rainfall areas to obtain a complete display.	
(2) Mode switch - As required.	
(3) GAIN control - Rotate counterclockwise until dark holes begin to disappear. Less intense targets will disappear first.	
*19. Radar set (APN-215(V)).	K30-39
Check while airborne as follows:	
a. Turn on procedure: Function switch - TEST (information will appear after time delay period).	
b. Initial adjustments:	
(1) BRT control - As required.	
(2) MODE switches - As required.	
(3) RANGE switches - 80.	
(4) 120/60° degree button - OFF.	
(5) TILT control - Move up or down to observe targets above or below aircraft.	

PROCEDURE	TROUBLESHOOTING REFERENCE
	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.
c. Test procedure: Observe screen for proper display. Test display consists of two green, two yellow, 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 becn selected, red band in the test pattern will flash on and off. Range will be displayed in up per right comer beneath TEST and appropriate range mark distances will appear along right edge of screen. Complete test patterns may be seen only 80 mile range or higher. Flying level at an altitude of 8,000 to 10,000 feet will allow mapping of ground targets to a range of approximately 100 miles.	
d. Antenna stabilization check:	

PROCEDURE	TROUBLESHOOTING REFERENCE

AVIONICS FLIGHT CHECKS (CONT)

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 ±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.

(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 nec-

PROCEDURE	TROUBLESHOOTING REFERENCE
essary, before further in-flight 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 Ieveling 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.	
(9) If the terrain band shifts to the right around the second range marks, increase lilt 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).	

PROCEDURE	TROUBLESHOOTING REFERENCE
AVIONICS FLIGHT CHECKS (CONT)	

(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.

(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.

PROCEDURE	TROUBLESHOOTING REFERENCE

(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.

*20. Weather radar and multifunction display (650) - Check as follows:

a. Mode control - Off.

b. Gain control - Preset position.

c. Tilt control - +15 degrees.

d. Avionics master switch (overhead control panel) - ON.

c. Mode control (MFD radar control unit) - STBY.

PROCEDURE TROUBLESHOOTING REFERENCE

AVIONICS FLIGHT CHECKS (CONT)

NOTE

When power is first applied, the radar will be in WAIT for 45 seconds to allow the magnetron to warm up.

f. Weather/map switch - WX.

g. Range switches - As required.

h. Check radar for returns, noise on scope, and for stabilized operation.

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.

LIST OF CHARTS

FIGURE NUMBER	TITLE	PAGE NUMBER
1	Rudder Boost Actuation Factors	5-3
2	Propeller Low Pitch Stop PT6A-41 . . .	5-5
3	Propeller Low Pitch Stop PT6A-42 . . .	5-7
4	Stall Speeds	5-9
5	Autofeather Time	5-11
6	Airspeeds for Vmo Dive	5-13
7	Maximum Cruise Power, C-12C. FT6A-41	5-15
8	Maximum Cruise Power, C-12D, FT6A-41	5-17
9	Maximum Cruise Power, C-12F. PT6A-42	5-19
10	Maximum Cruise Speed, C-12C. PT6A-41	5-21
11	Maximum Cruise Speed. C-12D. PT6A-41	5-23

LIST OF CHARTS (CONT)

12 Maximum Cruise Speed, C-12F, PT6A-42 5-25

13 Engine Acceptance, C-12C, PT6A41 . . 5-27

14 Engine Acceptance, C-12D, PT6A-41 . 5-29

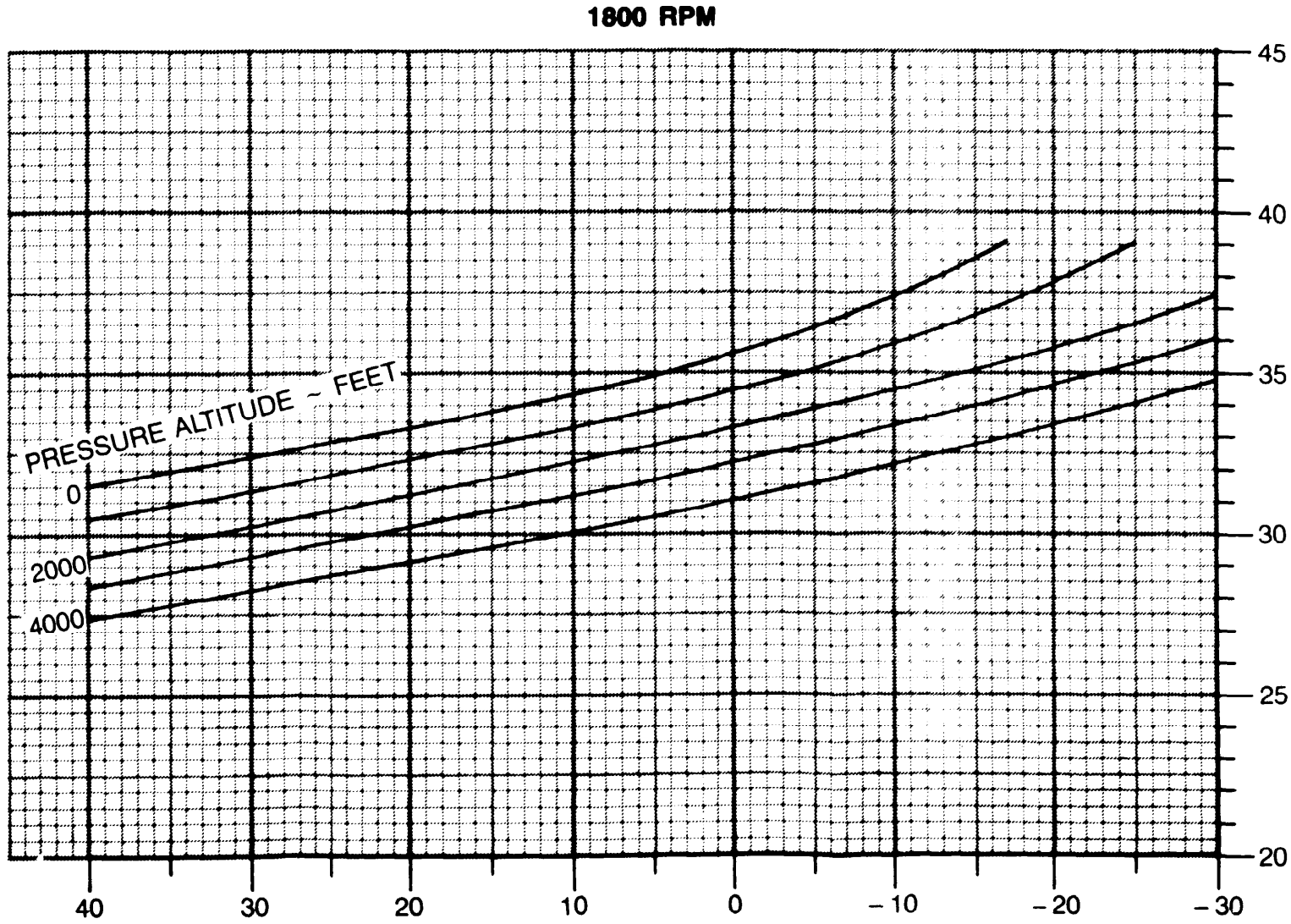
15 Engine Acceptance, C-12F, PT6A-42 . . 5-31

16 Maintenance Test Flight Checksheet . .5-33

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

The rudder boost should actuate within the values of N_1 speed and free air temperature shown above.

Figure 1. Rudder Boost Actuation Factors



Read pressure altitude from aircraft's altimeter after setting to 29.92 in. Hg.

Figure 2. Propeller Low Pitch Stop. PT6A-41

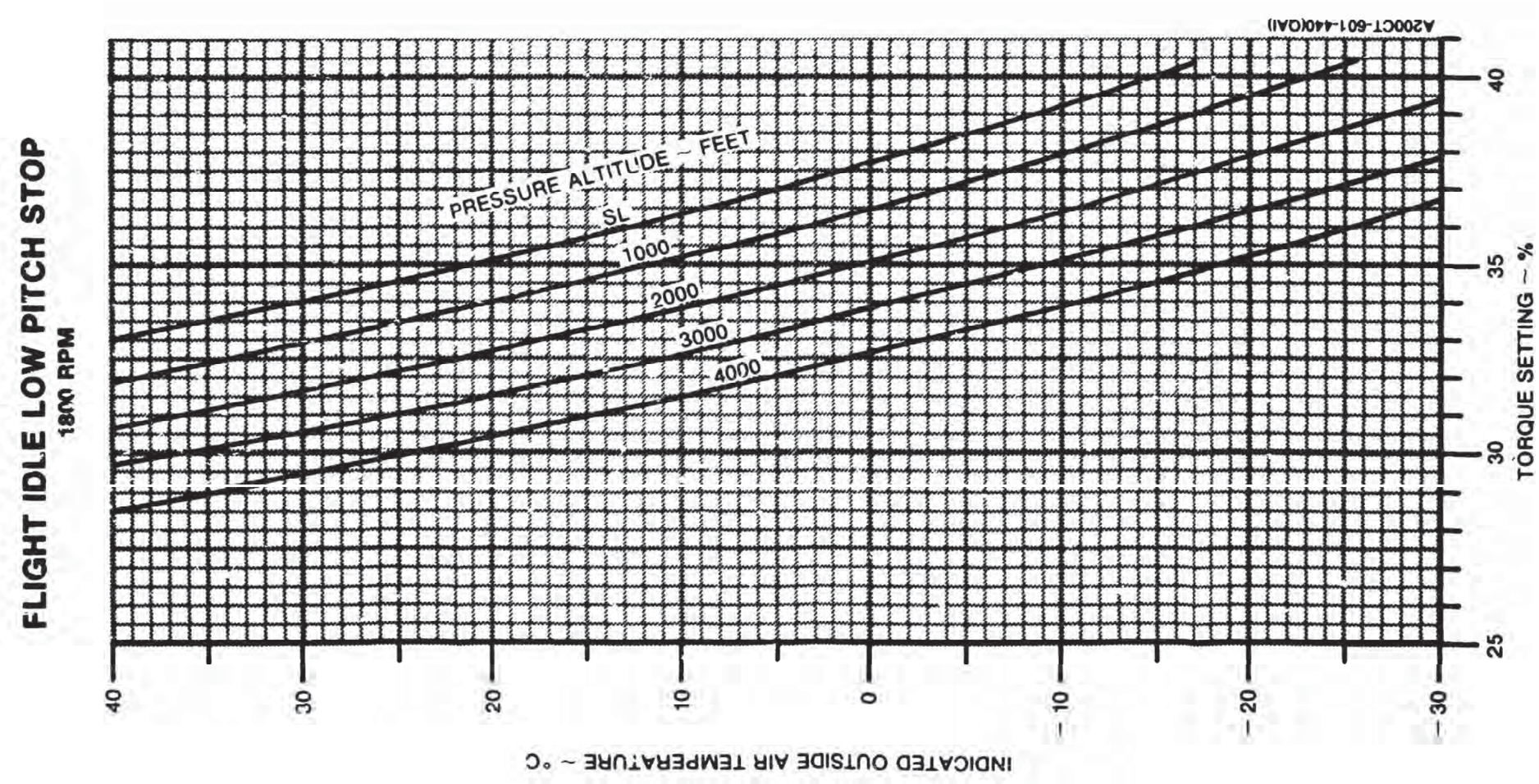


Figure 3. Propeller Low Pitch Stop PT6A-42

THIS FIGURE HAS BEEN DELETED.

Figure 4. Stall Speeds.

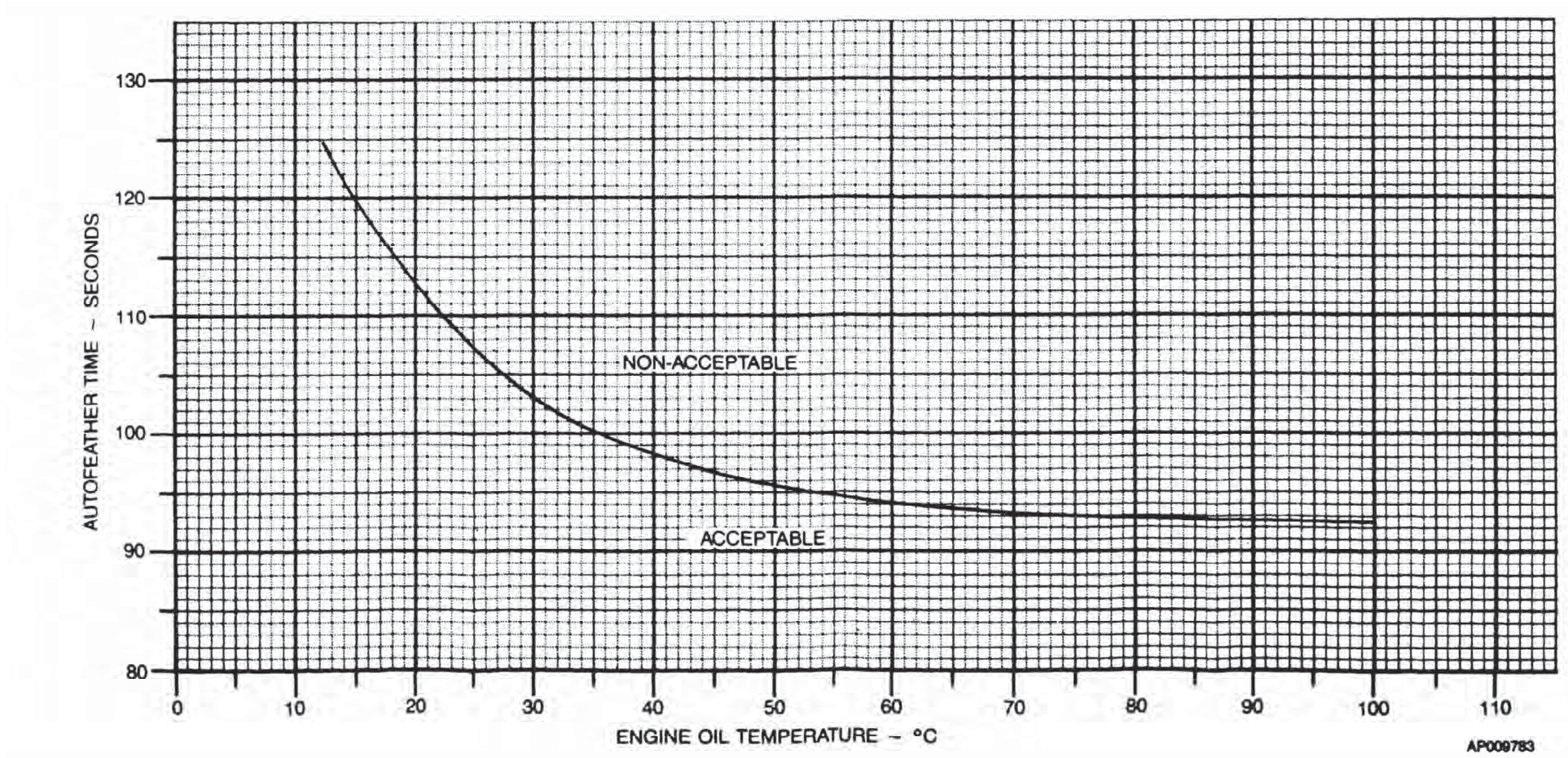


Figure 5. Autofeather Time

PRESSURE ALTITUDE	KIAS
18,000	247
17,000	251
16,000	257
15,000 and below	260

Figure 6. Airspeeds for Vmo Dive

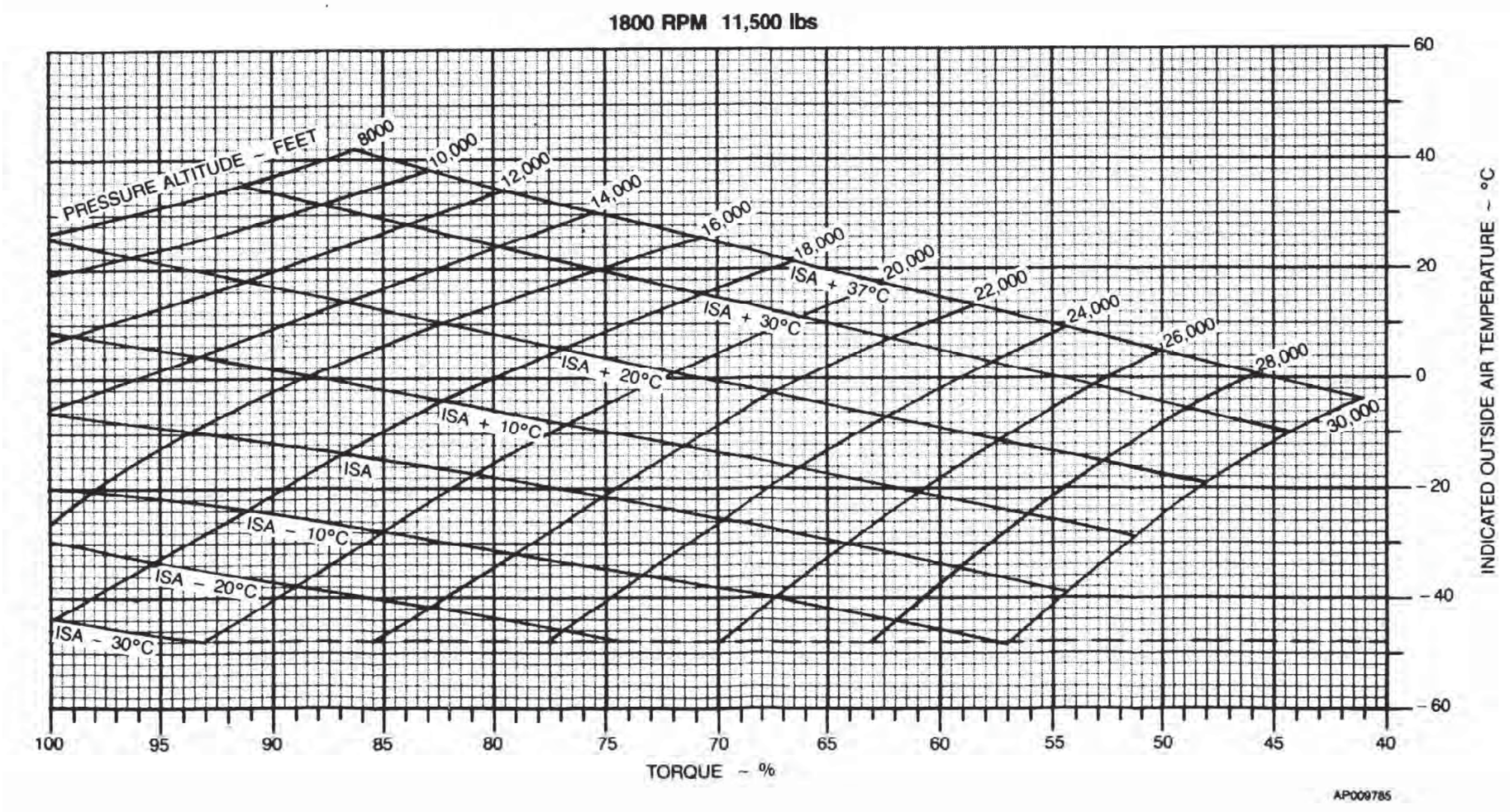


Figure 7. Maximum Cruise Power, C-12C, PT6A-41

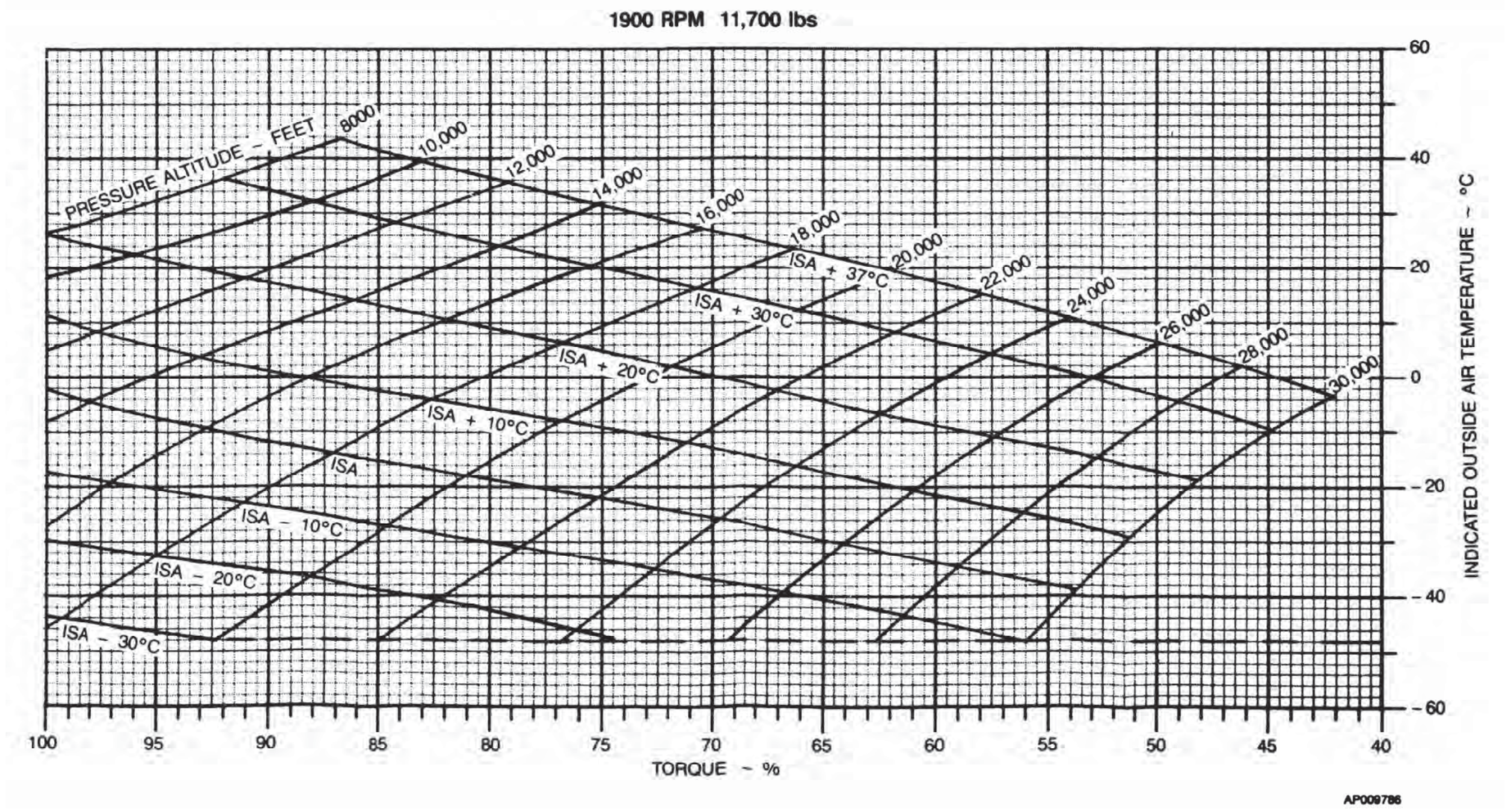


Figure 8. Maximum Cruise Power, C-12D, PT6A-41

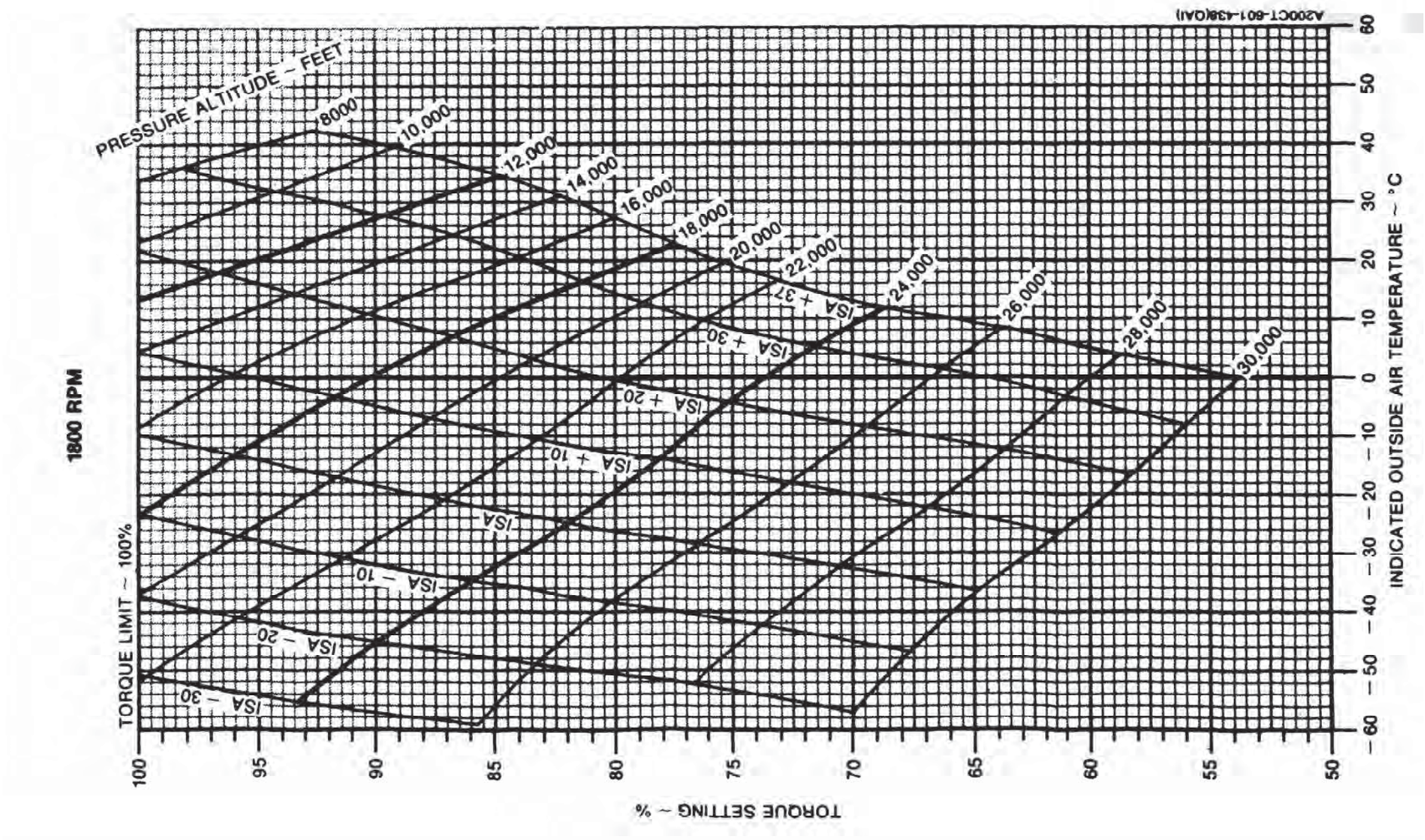


Figure 9. Maximum Cruise Power, C-12F, PT6A-42

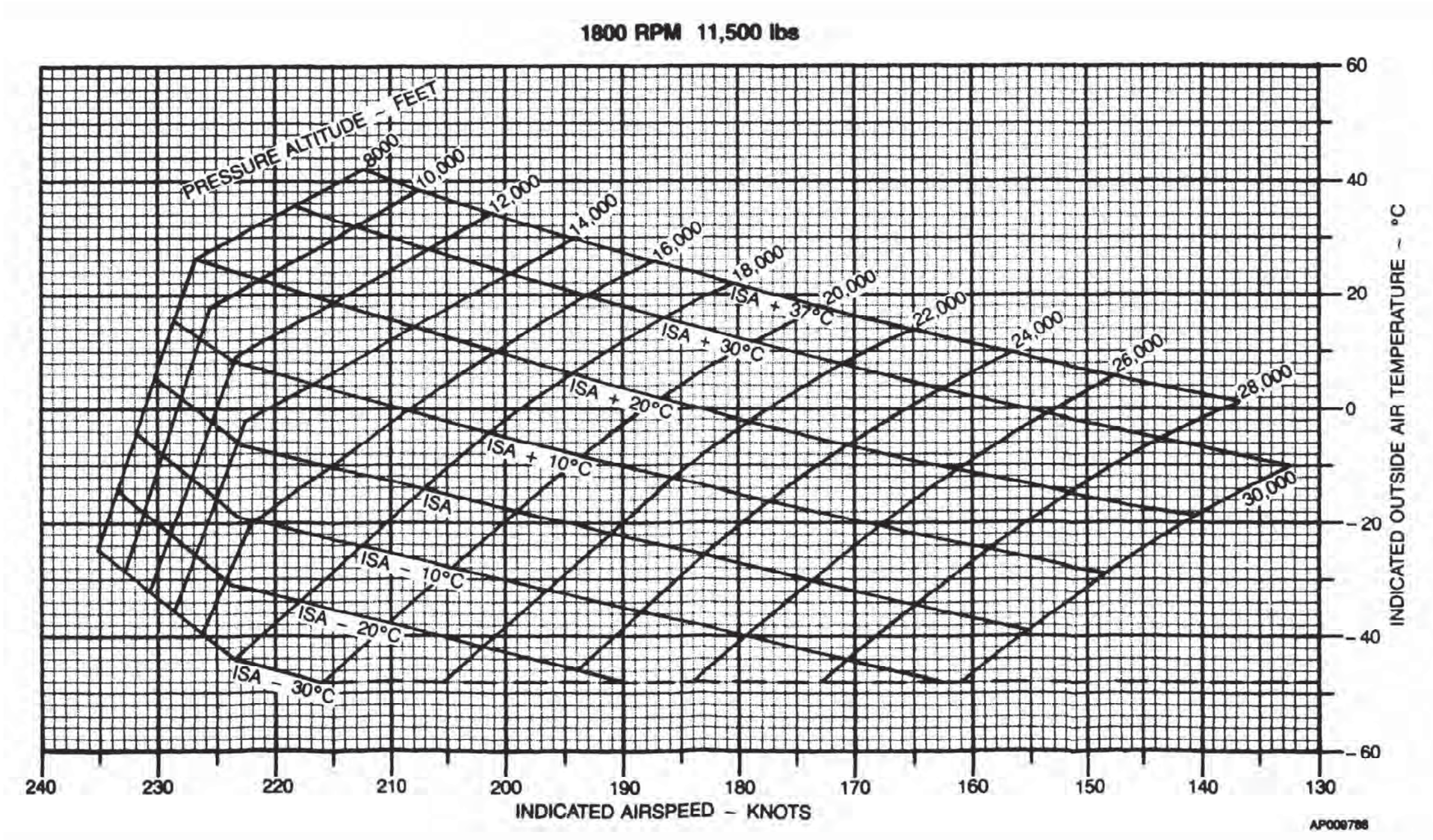


Figure 10. Maximum Cruise Speed, C-12C, PT6A-41

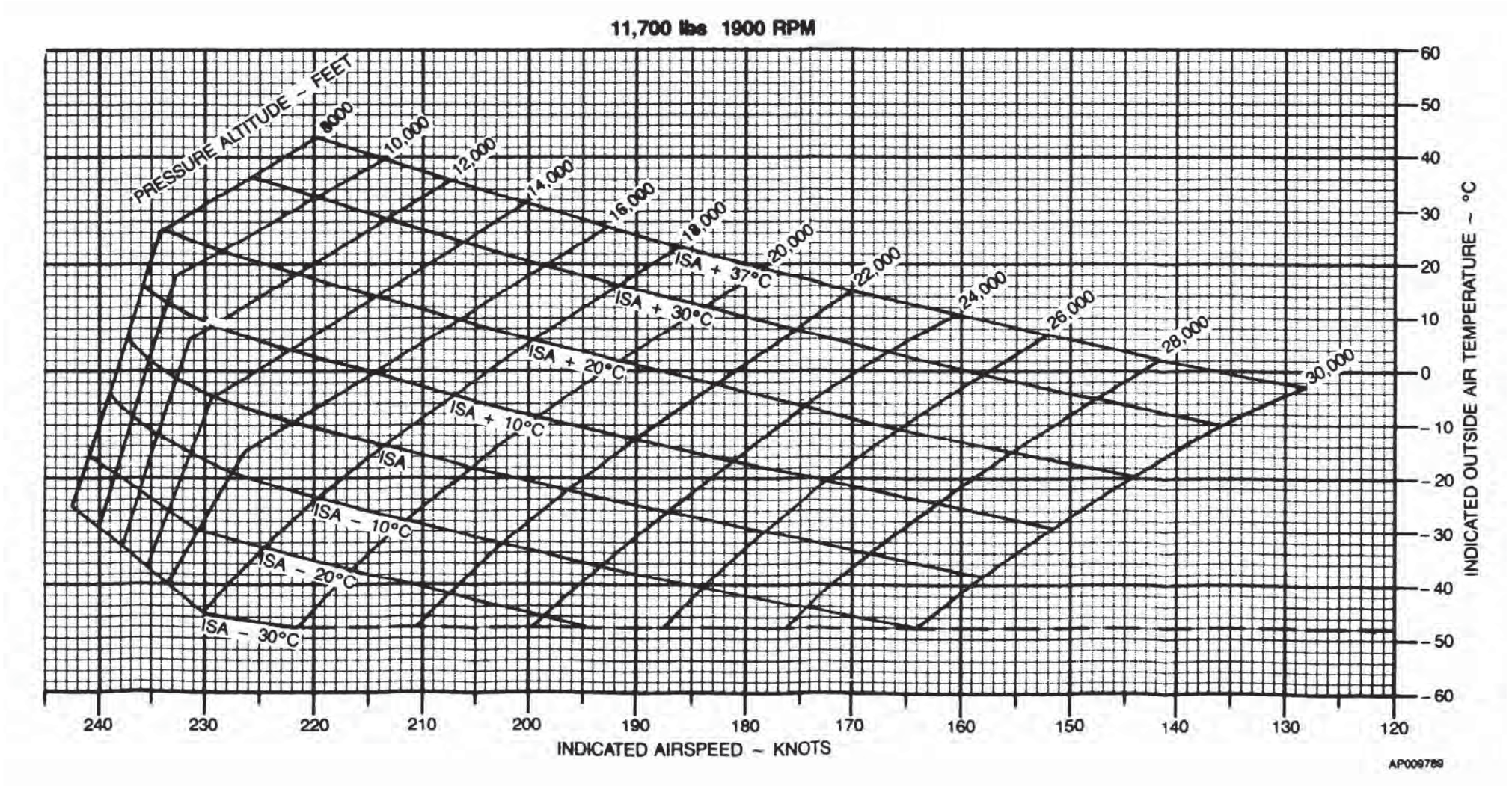


Figure 11. Maximum cruise Speed, C-12D, PT6A-41

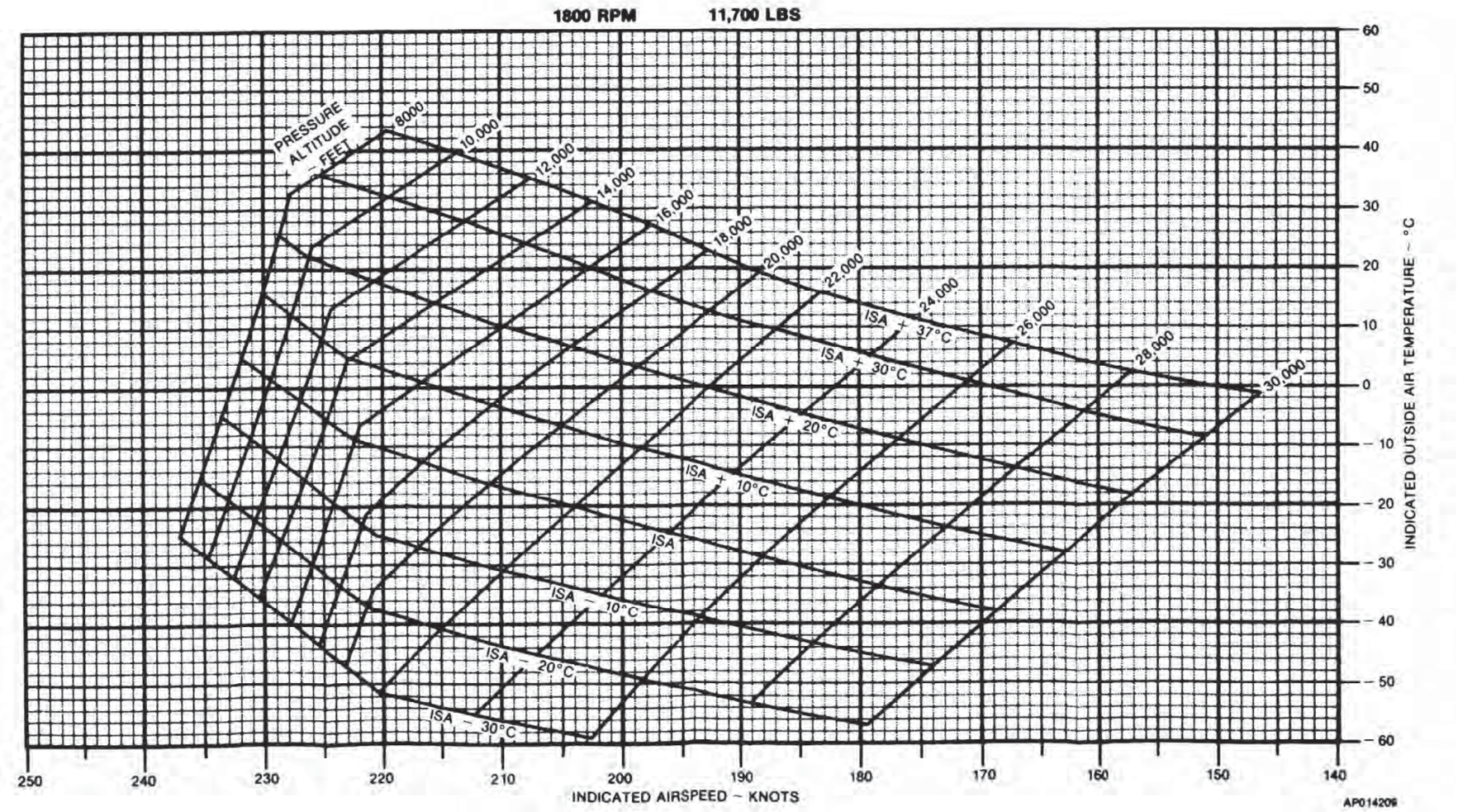


Figure 12. Maximum Cruise Speed, C-12F, PT6A-42

1900 RPM - 175 KIAS
ICE VANES RETRACTED, BLEED AIR OPEN

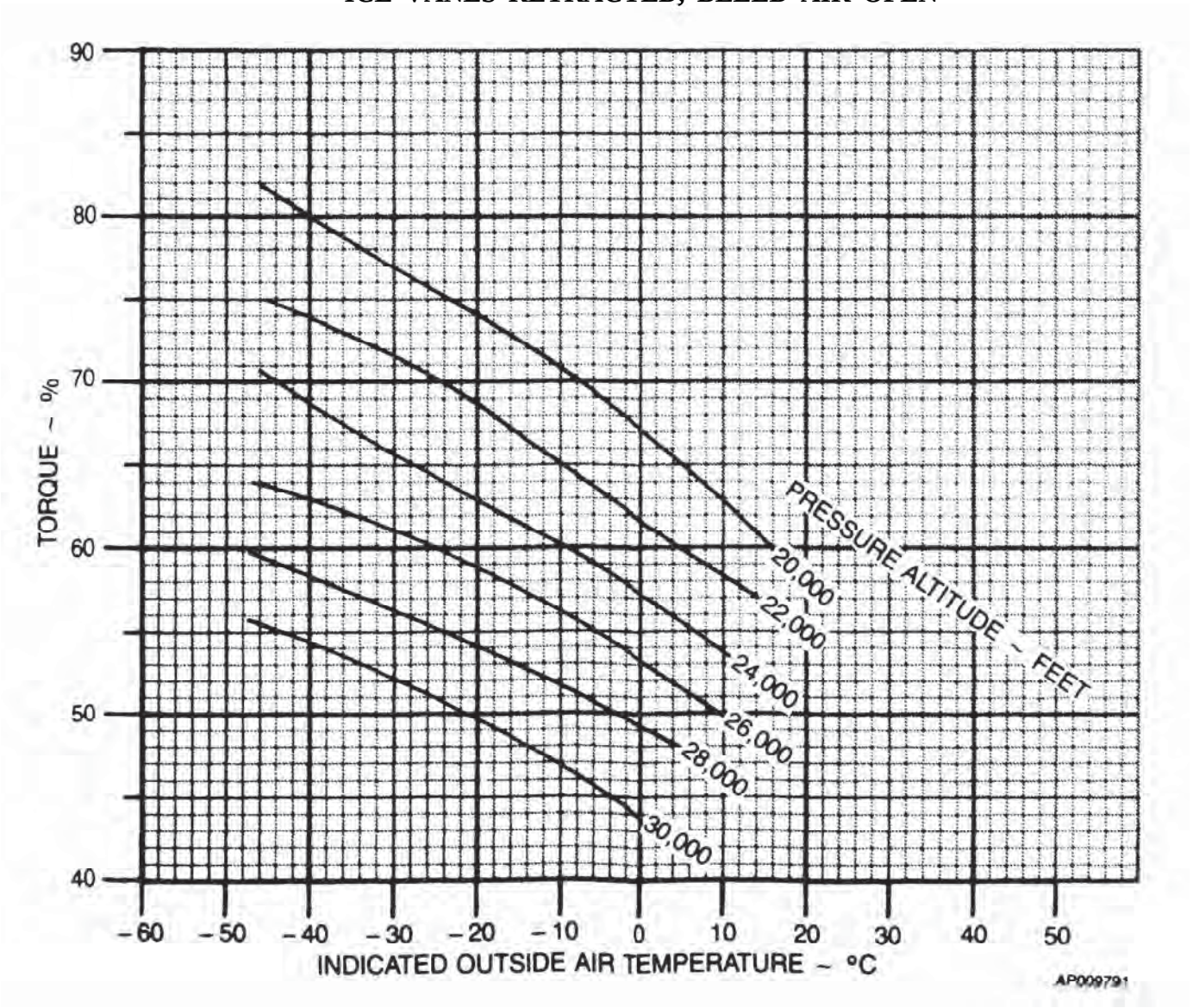


Figure 13. Engine Acceptance, C-12C, PT6A-41

1900 RPM - 175 KIAS
ICE VANCES RETRACTED, BLEED AIR OPEN

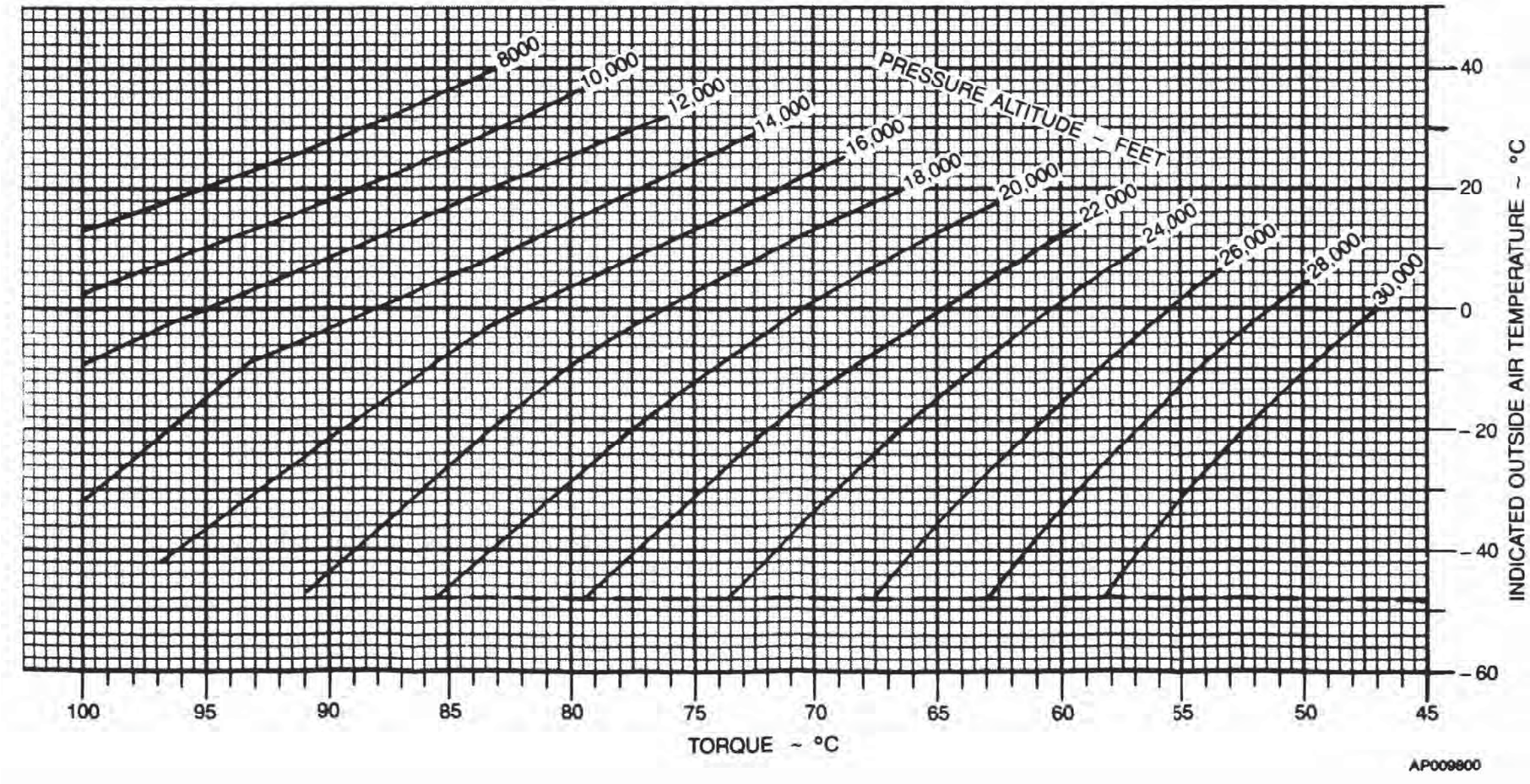


Figure 14. Engine Acceptance, C-12D, PT6A-41

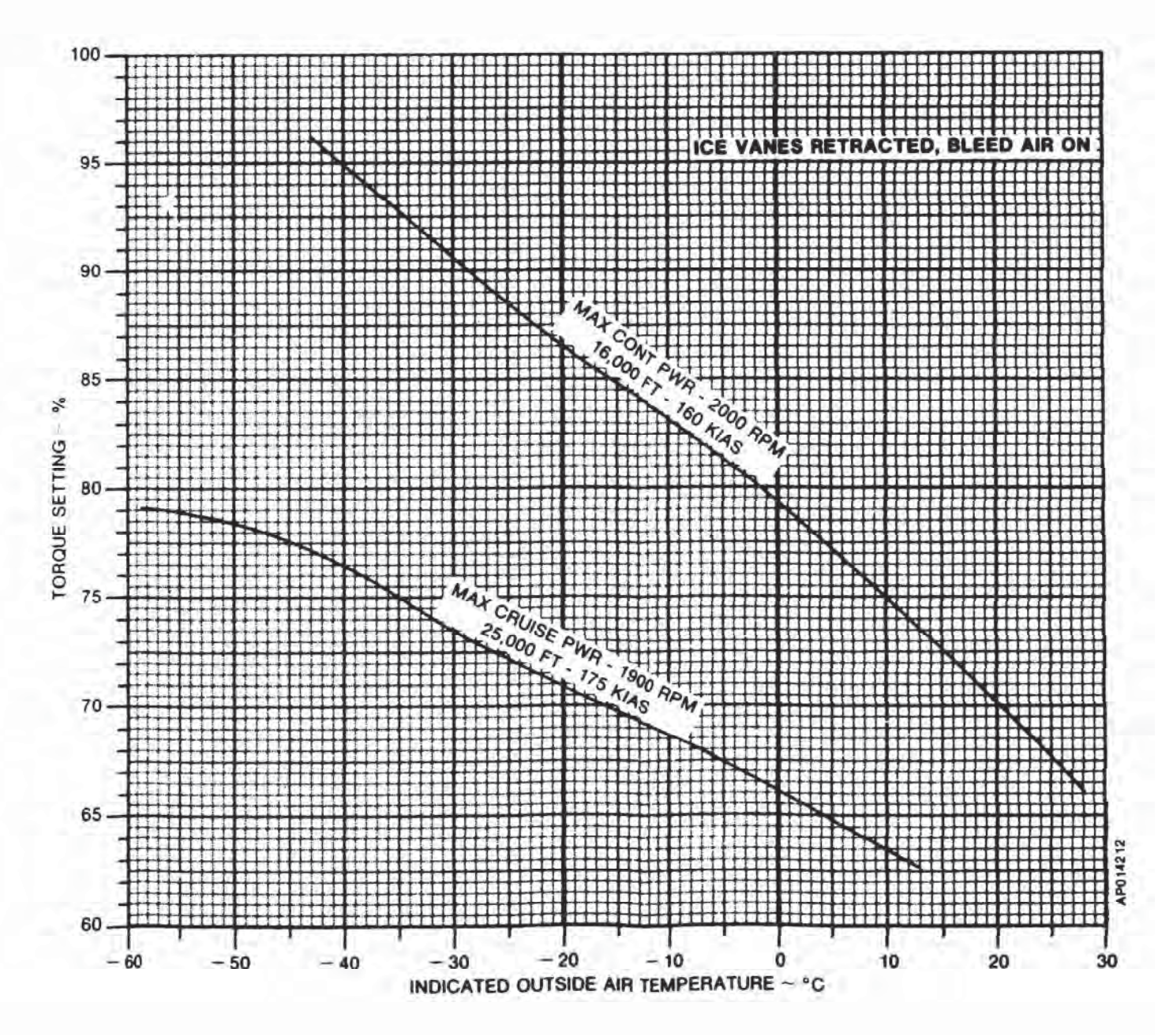


Figure 15. Engine Acceptance, C-12F. PT6A-42

C-12C/D/F MAINTENANCE TEST FLIGHT CHECK SHEET			
PURPOSE OF MTF	FAT		DATE
PILOT		UNIT	
SYMBOLS: ✓ = SATISFACTORY, X = DEFICIENCY			

■	PRIOR TO MTF		2. Engine control levers
	1. Forms and records		3. Vertical speed indicators
	2. Weight and balance		4. Surface deice
	3. Flight readiness inspection		5. Propeller deice
	4. Lights		6. Windshield anti-ice
	5. Standby pumps and firewall valves		7. Cabin and cockpit ventilation
	6. Fuel quantity indicators		8. Air conditioning and heating
	7. Pitot tubes (2), stall warning vane, heated fuel vents (2)		9. Carbon monoxide
	8. Flaps	■	CRUISE
	9. Seat belts		1. Engine instrument indications
	10. Emergency equipment		2. Wings and nacelles
	11. Placards and markings		3. Cabin noise level
	12. Trim tabs		4. Pilot's alternate static air source
	13. Flight controls		5. Propeller synchrophaser
■	INTERIOR CHECKS		6. Ice vanes
	1. Cabin/cargo doors		7. Turn and bank indicators
	2. Emergency exit	■	LOW SPEED SYSTEMS
■	BEFORE STARTING ENGINES		1. Stall speed, stall warning, and stall characteristics (clean, power off), _____ KIAS at warning, KIAS at stall, roll _____ °L or R
	1. Parking brake		2. Stall speed, stall warning, and stall characteristics (clean, power on), _____ KIAS at warning, KIAS at stall, roll _____ °L or R
	2. Oxygen system		3. Stall speed, stall warning, and stall characteristics (gear and flaps down, power off), _____ KIAS at warning, _____ KIAS at stall, roll _____ °L or R.
	3. Magnetic compass		4. Stall speed, stall warning, and stall characterisitcs (gear and flaps down, power on), _____ KIAS at warning, _____ KIAS at stall, roll _____ °L or R.
	4. Free air temperature gauge		5. Flap operation
	5. Pilot's flight instruments		a. Flap retraction time _____ seconds
	6. Engine instruments		b. Flap extension time _____ seconds
	7. Copilot's flight instruments		6. Minimum elevator trim _____ KIAS
	8. Annunciator panels		7. Autoignition
	9. Stall and gear warning		8. Propeller feathering
	10. Fire protection		9. Propeller autofeathering and unfeathering, time from fuel cutoff to rotation stop _____ seconds
■	BEFORE TAXIING		10. Landing gear warning horn, N_1 on first hearing horn _____ %
	1. Electric elevator trim operation		11. Landing gear normal operation
	2. Autopilot/flight director		a. Landing gear extension time _____ seconds
	3. Autopilot trim fail		b. Landing gear retraction time _____ seconds
	4. Altitude alerter		12. Emergency landing gear extension
■	DURING TAXIING	■	DESCENT AND LOW LEVEL CRUISE
	1. Brakes		1. Maximum rate (Vmo) descent:
	2. Flight instruments		a. Flight controls
	3. Nosewheel steering		b. Windows and doors
	4. Magnetic compass		2. Excess nose down trim
■	ENGINE RUNUP	■	LANDING
	1. Parking brake		1. Brake operation
	2. Low idle speed		2. Propeller reversing, L _____ % N_1, R _____ % N_1
	3. Propeller feathering		3. Oil temperature, L _____ °C, R _____ °C
	4. Engine acceleration		4. Oil pressure L _____ PSI, R _____ PSI
	5. High idle speed	■	ENGINE SHUTDOWN
	6. Brake deice		1. Battery condition
	7. N_1 speed switch	■	BEFORE LEAVING AIRCRAFT
	8. Pneumatic pressure		1. Walkaround inspection
	9. Pressurization		2. Aircraft forms
	10. Generators and regulators		
	11. Inverters		
	12. Autofeather		
	13. Overspeed governors		
	14. Rudder boost		
	15. Autoignition		
	16. Primary governors		
	17. Low pitch stop		
	18. Ice vanes		
■	DURING TAKEOFF		
	1. Propeller tachometers, L _____ RPM, R _____ RPM		
	2. Torque		
	3. TGT		
	4. N_1		
	5. Oil pressure		
	6. Oil temperature		
■	AFTER TAKEOFF		
	1. Wings and nacelles		
	2. Brake deice		
■	DURING CLIMB		
	1. Engine and flight instruments		

Figure 16. Maintenance Test Flight Checksheet (Sheet 1 of 2)

■	SPECIAL PROCEDURES		17. TACAN
	1. Pressurization and oxygen system		18. TACAN distance measuring equipment
	a. Cabin leak rate: rate of		19. Transponder
	climb ft/min		20. Encoding altimeter
	b. Minimum N1 that right engine		21. Radar
	must be operated at to		22. Multifunction display
	maintain pressurization.	■	REMARKS
	%		
	c. Minimum N1 that left engine		
	must be operated at to		
	maintain pressurization.		
	%		
	d. Cabin pressurization (altitude		
	controller set to 10,000 feet)		
	1) Rate knob set to minimum,		
	Cabin descent rate FPM		
	2) Rate knob set to mid-range,		
	cabin descent rate FPM		
	3) Rate knob set to maximum,		
	cabin descent rate FPM		
	e. Cabin pressurization (altitude		
	controller set to 1800 feet)		
	1) Rate knob set to minimum,		
	cabin descent rate FPM		
	2) Rate knob set to mid-range,		
	cabin descent rate FPM		
	3) Rate knob set to maximum,		
	cabin descent rate FPM		
	f. Altitude controller set to 10,000		
	feet, cabin altitude feet		
	g. Cabin altitude warning annunciator		
	light		
	h. Oxygen system deployment		
	i. Cabin lights, automatic		
	illumination		
	j. Cabin altitude attains and		
	retains field elevation		
	k. Oxygen system, functional check		
	of masks after landing		
	2. Trim and rigging		
	3. Maximum power lever position		
	4. Speed check at maximum cruise power		
	a. Engine serial number		
	b. Engine hours since new		
	c. Engine hours since overhaul		
	d. Airspeed		
	e. Pressure altitude		
	f. Free air temperature		
	5. Engine acceptance (if required)		
	a. Engine serial number		
	b. Engine hours since new		
	c. Engine hours since overhaul		
	d. Airspeed		
	e. Pressure altitude		
	f. Free air temperature		
	g. TGT		
	h. Propeller RPM		
	i. Torque		
	j. N1		
	6. VLF/omega		
	7. Flight management system		
	8. Autopilot		
	9. Audio control panel and interphone		
	10. UHF		
	11. VHF		
	12. HF		
	13. MLS		
	14. ADF		
	15. VOR		
	16. Glideslope/marker beacon		

Figure 16. Maintenance Test Flight Checksheet (Sheet 2 of 2)

By Order of the Secretary of the Army:

CARL E. VUONO
General, United States Army
Chief of Staff

Official:

WILLIAM J. MEEHAN II
Brigadier General. United States Army
The Adjutant General

DISTRIBUTION:

To be distributed in accordance with DA Form 12-31, MTF Maintenance requirements for C-12C, Airplane, Cargo, and C-12D, Airplane, Cargo.

The Metric System and Equivalents

Linear Measure

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

Weights

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

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.82 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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