Boeing 737-300/400/500 Aircraft Maintenance Manual

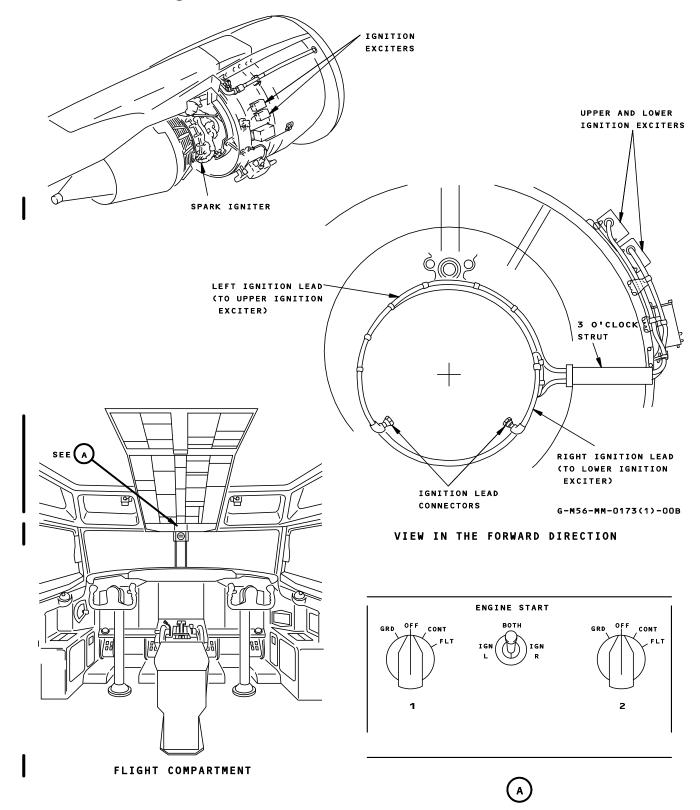
SECTION 74-00: IGNITION SUBJECT 00: IGNITION

74-00-00 PAGE BLOCK 0: DESCRIPTION AND OPERATION (EFFECTIVITY: 001999 ALL)

1. General

- A. The ignition system (Fig. 1) consists of an engine start switch, engine igniter selector switch, 2 high energy ignition exciters or 2 low energy ignition exciters, 2 spark igniters and 2 coaxial shielded ignition leads.
- B. The purpose of the system is to produce an electrical spark to ignite the fuel and air mixture in the engine combustion chamber during the start cycle and to provide continuous ignition during takeoff, landing and operation in adverse weather conditions.
- C. The left, right or the two spark igniters can be selected during the start cycle or for continuous ignition operation.
- D. The ignition system consists of the Ignition Power Supply, 74-11-00; High Tension Distribution, 74-21-00; and Engine Ignition Control, 74-31-00.

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Ignition System Component Location Figure 1

EFFECTIVITY: 001999 ALL Sheet 1 Ignition System Component Location (ME_102625)

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74-00-00 PAGE BLOCK 1: FAULT ISOLATION (EFFECTIVITY: 001999 ALL)

- 1. Trouble Shoot the Engine Ignition System
 - A. Procedure
 - (1) To trouble-shoot the Engine Ignition system, refer to the trouble-shooting diagrams in Chapter 71 (AMM 71-00-40/101).

74-00-00 PAGE BLOCK 5: ADJUSTMENT/TEST (EFFECTIVITY: 001999 ALL)

1. General

A. The ignition system test consists of the operation of the engine ignition system and an operational check of:

the spark igniters

the start lever ignition limit switch

the engine igniter selector switch

the engine start switch.

B. The test applies to each engines. Make sure you do the test in the sequence provided in the procedure.

(TASK: 74-00-00-755-010) (EFFECTIVITY: 001999)

2. Task: Audible Test of the Ignition System

A. References

- (1) AMM 24-22-00/201, Electrical Power-Control
- (2) AMM 71-00-00/201, Power Plant

B. Access

- (1) Location Zones410 No. 1 Power Plant (Left)420 No. 2 Power Plant (Right)
- (2) Access Panels5737L Engine No. 1 Right Fan Cowl Panel5738L Engine No. 1 Left Thrust Reverser5739L Engine No. 1 Right Thrust Reverser5746L Engine No. 1 Left Fan Cowl Panel5837R Engine No. 2 Right Fan Cowl Panel5838R Engine No. 2 Left Thrust Reverser5839R Engine No. 2 Right Thrust Reverser

C. Prepare to Do the Audible Test

(SUBTASK: 74-00-00-865-011) (EFFECTIVITY: 001999)

(1) Supply the electrical power (AMM 24-22-00/201).

(SUBTASK: 74-00-00-865-012) (EFFECTIVITY: 001999)

WARNING: DO NOT DO A CHECK OF THE IGNITION SYSTEM WHEN YOU HAVE ONE OF THE CONDITIONS THAT FOLLOW:

THE AIRPLANE IS IN THE HANGER,

THE AIRPLANE IS NEAR BUILDINGS OR OTHER AIRPLANES THAT ARE WITHIN THE DANGEROUS JET-WAKE AREA FOR THE GROUND IDLE (AMM 71-00-00/201), DURING AIRPLANE FUELING.

MAKE SURE THAT NO PERSONS OR EQUIPMENT ARE IN THE DANGEROUS JET-WAKE AREA FOR THE GROUND IDLE (AMM 71-00-00/201) OF THE APPLICABLE ENGINE. IGNITION VOLTAGE IS VERY DANGEROUS. DO NOT TOUCH THE IGNITER PLUGS, THE ENERGIZED PART OF THE IGNITION EXCITER OR THE LEADS DURING THE OPERATION.

WARNING: USE THE PROCEDURE IN CHAPTER 71 TO OPERATE THE POWER PLANT (AMM 71-00-00/201). IF YOU DO NOT USE THIS PROCEDURE, YOU CAN CAUSE INJURY

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TO PERSONS OR DAMAGE TO EQUIPMENT.

CAUTION:

BEFORE YOU CAN TEST THE IGNITION SYSTEM, DRY MOTOR THE ENGINE TO REMOVE ALL FUEL IN THE ENGINE GAS PATH (AMM 71-00-00/201). FUEL THAT HAS NOT BURNED CAN CAUSE AN INTERNAL ENGINE FIRE OR A TURBINE EXHAUST AREA FIRE.

MAKE SURE N2 DOES NOT TURN WHEN YOU DO THE TEST OF THE IGNITION SYSTEM. IF N2 TURNS, FUEL CAN GO INTO THE COMBUSTION CHAMBER WHEN THE START LEVER IS IN THE IDLE POSITION. AN ACCIDENTAL ENGINE LIGHTUP CAN OCCUR.

(2) Do the procedure to dry motor the engine to remove the remaining fuel from the gas path (AMM 71-00-00/201).

(SUBTASK: 74-00-00-865-013) (EFFECTIVITY: 001999)

- (3) Open these circuit breakers and attach DO-NOT-CLOSE tags:
 - (a) P6 Load Control Center
 - 1 ENG 1 START VALVE
 - 2 ENG 2 START VALVE

(SUBTASK: 74-00-00-865-014) (EFFECTIVITY: 001999)

(4) Make sure that the FUEL VALVE CLOSED (engine fuel shutoff valve) indicator light on the overhead fuel control panel P5 is dim.

<u>NOTE:</u> The position light for the shutoff valve for the engine fuel is bright when the valve is in operation. It is dim when the valve is closed and off when the valve is open.

(SUBTASK: 74-00-00-865-015) (EFFECTIVITY: 001999)

- (5) Make sure these circuit breakers are closed:
 - (a) P6-2 Load Control Center
 - 1 ENG 1 R IGN
 - 2 ENG 1 L IGN
 - 3 ENG 2 R IGN
 - 4 ENG 2 L IGN

(SUBTASK: 74-00-00-015-035) (EFFECTIVITY: 001999)

(6) Open the fan cowl panels (AMM 71-11-02/201).

(SUBTASK: 74-00-00-015-036) (EFFECTIVITY: 001999)

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO PERSONS OR DAMAGE TO THE EQUIPMENT CAN OCCUR.

(7) Open the thrust reverser (AMM 78-31-00/201).

(SUBTASK: 74-00-00-755-019) (EFFECTIVITY: 001999)

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- (8) Do the audible test of the ignition system with the ignitor selector switch in the BOTH position:
 - (a) Put a person near the spark igniter to listen for the igniter plug to fire during this test.
 - (b) Move the start lever for the applicable engine to the IDLE position.
 - (c) Move and hold the applicable ENGINE START switch for the applicable engine to the GRD position.
 - 1 For engine 1, use ENGINE START NO. 1.
 - 2 For engine 2, use ENGINE START NO. 2.
 - (d) Move the selector switch on the ENGINE START module to the BOTH position.
 - (e) Make sure you hear the two engine spark igniters fire.
 - (f) If you cannot hear the sounds from the two spark igniters, do these steps:

<u>NOTE:</u> If there is too much background noise, it is not always possible to hear if one or two spark igniters are in operation.

- (g) For the right ignition system, open this circuit breaker and attach a DO-NOT-CLOSE tag:
 - 1 P6 LOAD CONTROL CENTER
 - a R IGN
- (h) Move the start lever for the applicable engine to the IDLE position.
- (i) Move and hold the applicable ENGINE START switch to the GRD position.
- (j) Move the selector switch on the ENGINE START module to the BOTH position.
- (k) Make sure that the left spark igniter fires.
- (I) For the right ignition system, remove the DO-NOT-CLOSE tag and close this circuit breaker:
 - 1 P6 LOAD CONTROL CENTER
 - a R IGN
- (m) For the left ignition system, open this circuit breaker and attach a DO-NOT-CLOSE tag:
 - 1 P6 LOAD CONTROL CENTER
 - a LIGN
- (n) Move and hold the applicable ENGINE START switch to the GRD position.
- (o) Move the selector switch on the ENGINE START module to the BOTH position.
- (p) Make sure that the right spark igniter fires.
- (q) For the left ignition system, remove the DO-NOT-CLOSE tag and close this circuit breaker:
 - 1 P6 LOAD CONTROL CENTER
 - <u>a</u> LIGN

(SUBTASK: 74-00-00-755-020) (EFFECTIVITY: 001999)

- (9) Do the audible test of the igniton system with the ignitor selector switch in the IGN L and IGN R position:
 - (a) Move the selector switch on the ENGINE START module to the IGN L position.
 - (b) Make sure the left spark igniter fires.
 - (c) Move the selector switch on the ENGINE START module to the IGN R position.
 - (d) Make sure the right spark igniter fires.

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- (e) Move the applicable ENGINE START switch to the CONT position.
 - 1 For engine 1, use ENGINE START NO. 1.
 - 2 For engine 2, use ENGINE START NO. 2.
- (f) Move the selector switch on the ENGINE START module to the IGN L position.
- (g) Make sure the left spark igniter fires.
- (h) Move the selector switch on the ENGINE START module to the IGN R position.
- (i) Make sure the spark right igniter fires.
- (j) Move the applicable ENGINE START switch to the FLT position.
- (k) Make sure the two spark igniters fire.

(SUBTASK: 74-00-00-755-021) (EFFECTIVITY: 001999)

(10)Do the audible test of the igniters for the other engine.

D. Put the Airplane Back to its Usual Condition

(SUBTASK: 74-00-00-865-022) (EFFECTIVITY: 001999)

(1) Move the two ENGINE START switches to the OFF position.

(SUBTASK: 74-00-00-865-023) (EFFECTIVITY: 001999)

(2) Move the two start levers to the CUTOFF position.

(SUBTASK: 74-00-00-865-024) (EFFECTIVITY: 001999)

(3) Make sure that the FUEL VALVE CLOSED (engine fuel shutoff valve) indicator light on the overhead fuel control panel P5 is dim.

NOTE: The position light for the shutoff valve for the engine fuel is bright when the valve is in operation. It is dim when the valve is closed and off when the valve is open.

(SUBTASK: 74-00-00-865-025) (EFFECTIVITY: 001999)

- (4) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
 - (a) P6 Load Control Center
 - 1 ENG 1 START VALVE
 - 2 ENG 2 START VALVE

(SUBTASK: 74-00-00-415-037) (EFFECTIVITY: 001999)

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO PERSONS OR DAMAGE TO THE EQUIPMENT CAN OCCUR.

(5) Close the thrust reverser (AMM 78-31-00/201).

(SUBTASK: 74-00-00-415-038) (EFFECTIVITY: 001999)

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(6) Close the fan cowl panels (AMM 71-11-02/201).

(SUBTASK: 74-00-00-865-026) (EFFECTIVITY: 001999)

- (7) Remove the electrical power (AMM 24-22-00/201).
 - (a) Set the BAT switch on the Electrical Meters Battery and Galley Power Module (P5-13) to the OFF position and install a DO-NOT-OPERATE tag.

(TASK: 74-00-00-715-027) (EFFECTIVITY: 001999)

3. Task: Ignition System Test (Optional)

A. General

 This task includes an optional procedure to use an Ignition Tester for trouble-shooting of the ignition system.

B. Equipment

- (1) Tester Flight Line, Power -to- LiteUnison Industries 7575 Baymeadows Way Jacksonville, FL 32256
- (2) Tester Hand-held Ignition, HIT-1000 (Superseded by Power -to- Lite Flightline Tester)Unison Industries 7575 Baymeadows Way Jacksonville, FI 32256

C. References

- (1) AMM 24-22-00/201, Electrical Power Control
- (2) AMM 71-00-00/201, Power Plant
- (3) AMM 71-11-02/201, Fan Cowl Panels
- (4) AMM 74-11-01/401, Ignition Exciter
- (5) AMM 74-21-01/401, Ignition Lead
- (6) AMM 74-21-02/401, Spark Igniter
- (7) AMM 78-31-00/201, Thrust Reverser System

D. Access

- (1) Location Zones410 No. 1 Power Plant (Left)420 No. 2 Power Plant (Right)
- (2) Access Panels5737L Engine No. 1 Right Fan Cowl Panel5738L Engine No. 1 Left Thrust Reverser5739L Engine No. 1 Right Thrust Reverser5746L Engine No. 1 Left Fan Cowl Panel5837R Engine No. 2 Right Fan Cowl Panel5838R Engine No. 2 Left Thrust Reverser5839R Engine No. 2 Right Thrust Reverser5846R Engine No. 2 Left Fan Cowl Panel

E. Ignition System - Optional Trouble-Shooting with the Tester

<u>NOTE:</u> This procedure is done when there is a problem with the ignition system to find which part of the ignition system is unsatisfactory.

(SUBTASK: 74-00-00-015-028) (EFFECTIVITY: 001999)

(1) Open the fan cowl panels (AMM 71-11-02/201).

(SUBTASK: 74-00-00-015-029) (EFFECTIVITY: 001999)

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO PERSONS

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OR DAMAGE TO THE EQUIPMENT CAN OCCUR.

(2) Open the thrust reverser (AMM 78-31-00/201).

(SUBTASK: 74-00-00-215-030) (EFFECTIVITY: 001999)

- (3) Visually examine the ignition system.
 - (a) Replace all components that are unsatisfactory.
 - (b) Make sure all connections are tight.

(SUBTASK: 74-00-00-715-040) (EFFECTIVITY: 001999)

WARNING: MAKE SURE THAT THE TESTER IS GROUNDED TO THE ENGINE. DO NOT TOUCH THE SENSOR BOX OR THE IGNITION CABLE WHILE THE IGNITION SYSTEM IS ENERGIZED. THE ELECTRICAL DISCHARGE FROM THE IGNITION SYSTEM CAN KILL YOU. IGNITION VOLTAGE IS VERY DANGEROUS. DO NOT TOUCH THE IGNITER PLUGS, THE ENERGIZED PART OF THE IGNITION EXCITER OR THE LEADS DURING OPERATION.

WARNING: DO NOT DO A CHECK OF THE IGNITION SYSTEM WHEN YOU HAVE ANY OF THE CONDITIONS THAT FOLLOW:

THE AIRPLANE IS IN THE HANGAR,

THE AIRPLANE IS NEAR BUILDINGS AND/OR OTHER AIRPLANES THAT ARE WITHIN THE JET-WAKE HAZARD AREA FOR GROUND IDLE (AMM 71-00-00/201), OR DURING AIRPLANE FUELING.

MAKE SURE THAT NO PERSONS OR EQUIPMENT ARE IN THE JET-WAKE HAZARD AREA FOR GROUND IDLE (AMM 71-00-00) OF THE APPLICABLE ENGINE.

- (4) Do the steps that follow to do a test of the ignition lead and the ignition exciter.
 - (a) Disconnect the ignition lead from the spark igniter (AMM 74-21-01/401).

<u>NOTE:</u> Do not touch the end of the ignition lead with your hands or with a dirty cloth. Oil or grease can cause the ignition lead to operate incorrectly.

- (b) Connect the tester to the applicable remote sensor box.
- (c) Refer to the instructions provided with the tester.

<u>NOTE:</u> The sensors have different connections for the different types of cables connectors. Make sure you use the correct ssensor box.

- (d) Do the ignition system test.
 - 1 Refer to the instructions supplied with the tester.

(SUBTASK: 74-00-00-965-042) (EFFECTIVITY: 001999)

(5) If necessary, replace the ignition lead (AMM 74-21-01/401), the ignition exciter (AMM 74-11-01/401), or the spark igniter (AMM 74-21-02/401).

(SUBTASK: 74-00-00-715-043) (EFFECTIVITY: 001999)

(6) Do the operational test of the ignition system.

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