CHAPTER

76

ENGINE CONTROLS

(CFM56 ENGINES (CFM56-7))

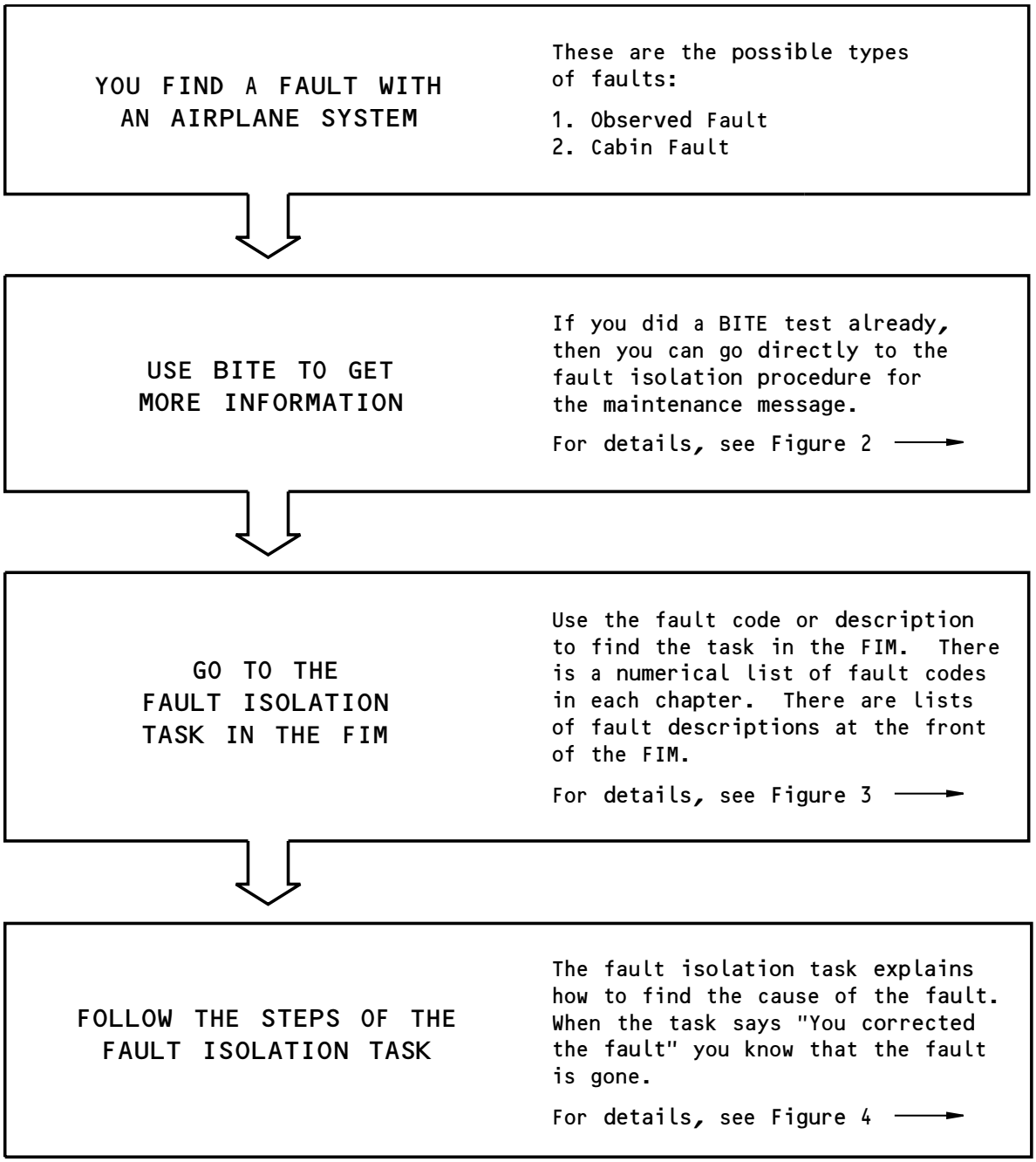
BOEING

737-600/700/800/900
FAULT ISOLATION MANUAL

CHAPTER 76
ENGINE CONTROLS

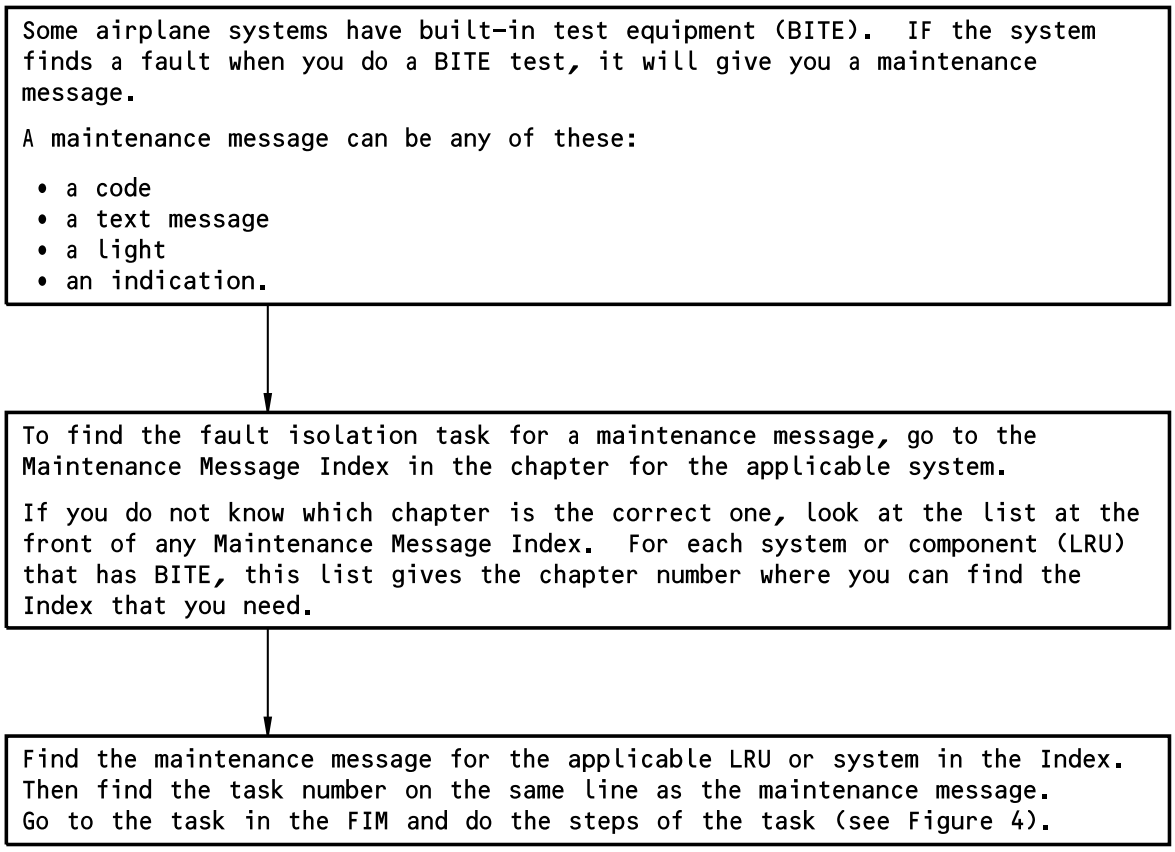
A = Added, R = Revised, D = Deleted, O = Overflow, C = Customer Originated Change

76-EFFECTIVE PAGES



G04902 S0000148576_V1

Basic Fault Isolation Process
Figure 1



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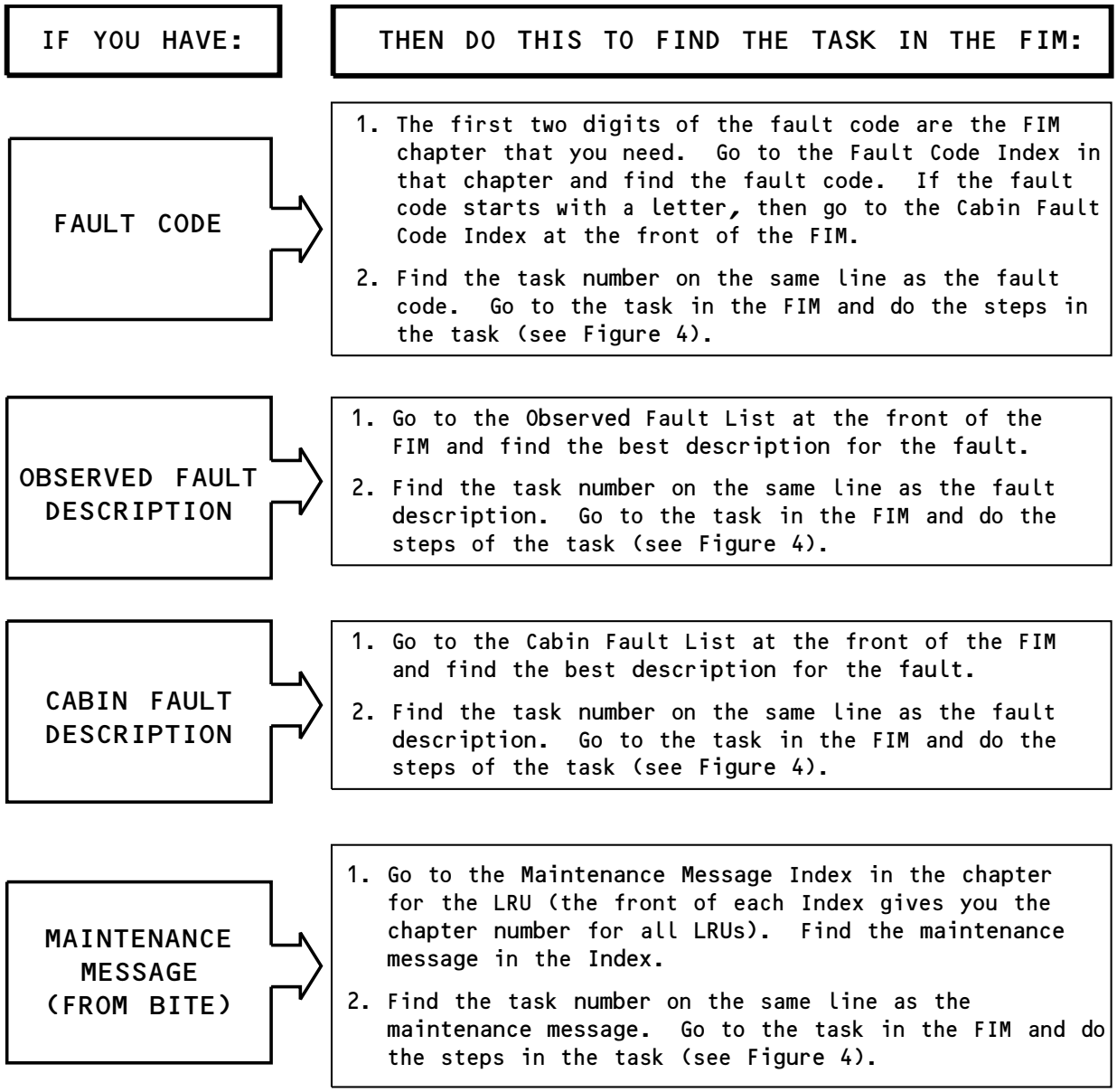
Getting Fault Information from BITE
Figure 2



G04979 S0000148579_V2

Finding the Fault Isolation Task in the FIM
Figure 3

ASSUMED CONDITIONS AT START OF TASK

- External electrical power is ON
- Hydraulic power and pneumatic power are OFF
- Engines are shut down
- No equipment in the system is deactivated

POSSIBLE CAUSES

- The list of possible causes has the most likely cause first and the least likely cause last.
- You can use the maintenance records of your airline to determine if the fault occurred before. Compare the list of possible causes to the past maintenance actions. This will help prevent repetition of the same maintenance actions.

INITIAL EVALUATION PARAGRAPH

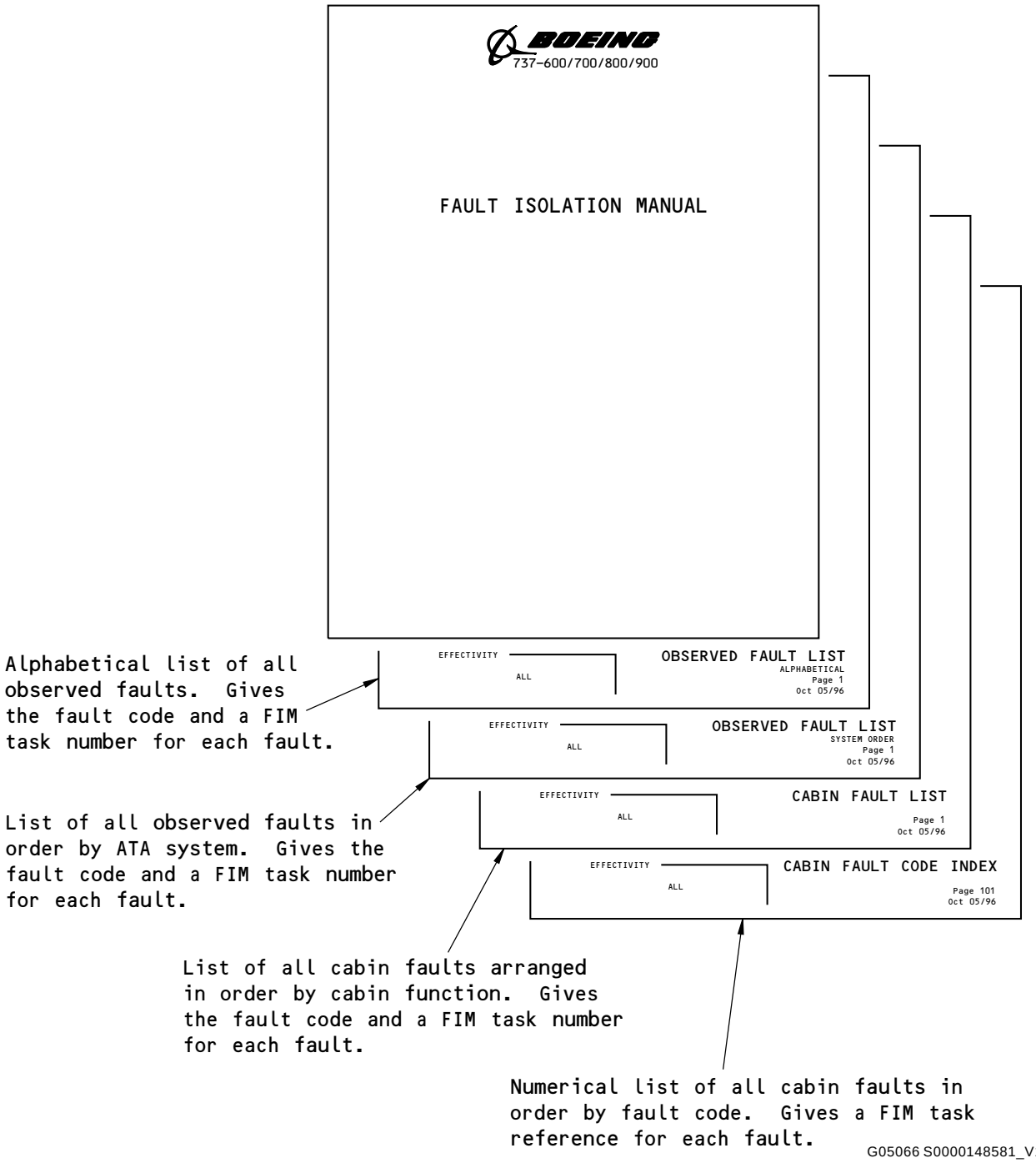
- The primary purpose of the Initial Evaluation paragraph at the start of the task is to help you find out if you can detect the fault right now:
  - If you cannot detect the fault right now, then the task cannot isolate the fault and the Initial Evaluation paragraph will say that there was an intermittent fault.
  - If you have an intermittent fault, you must use your judgement (and follow your airline's policy) to decide which maintenance action to take. Then monitor the airplane to see if the fault happens again on subsequent flights.
- The Initial Evaluation paragraph can also help you find out which Fault Isolation Procedure to use to isolate and correct the fault.

FAULT ISOLATION STEPS

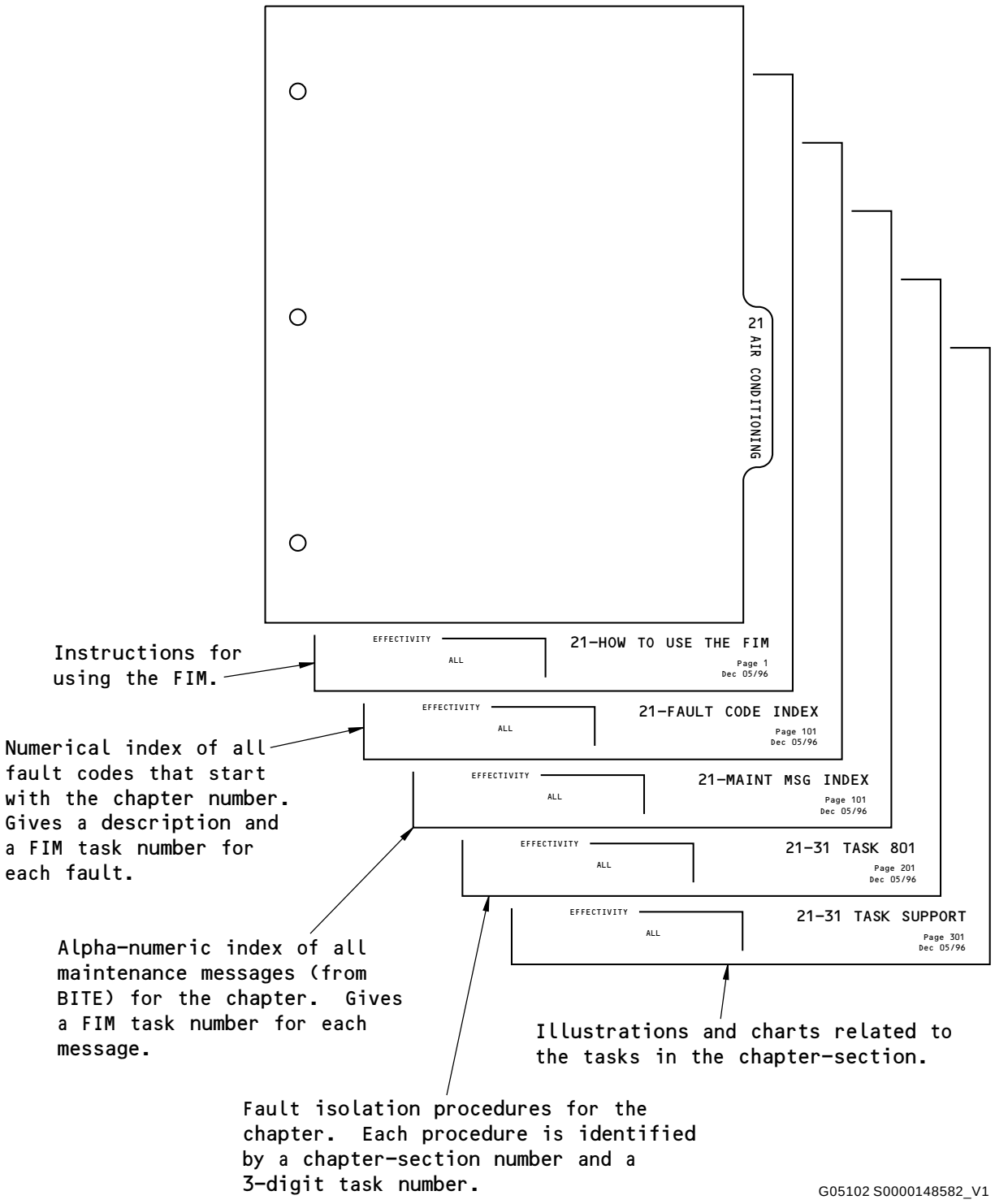
- The FIM task steps are presented in a specified order. The "If... then" statements will guide you along a logical path. But if you do not plan to follow the FIM task exactly, make sure that you read it before you start to isolate the fault. Some FIM procedures start with important steps that have an effect on the other steps in the procedure.
- When you are at the endpoint of the path, the step says "...you corrected the fault." Complete the step and exit the procedure.

G05009 S0000148580_V3

Doing the Fault Isolation Task
Figure 4



Subjects at Front of FIM
Figure 5



Subjects in Each FIM Chapter
Figure 6

FAULT CODE	FAULT DESCRIPTION	GO TO FIM TASK
760 010 00	Forward thrust lever: levers not aligned (staggered) for same N1 on both engines.	76-05 TASK 801
760 020 51	Forward thrust lever: Difficult to move in forward thrust - engine 1.	76-05 TASK 802
760 020 52	Forward thrust lever: Difficult to move in forward thrust - engine 2.	76-05 TASK 802
760 025 51	Forward thrust lever: jammed in forward thrust (no movement) - engine 1.	76-05 TASK 804
760 025 52	Forward thrust lever: jammed in forward thrust (no movement) - engine 2.	76-05 TASK 804
760 030 51	Forward thrust lever: has lost motion, no engine response to thrust lever movement - engine 1.	76-05 TASK 803
760 030 52	Forward thrust lever: has lost motion, no engine response to thrust lever movement - engine 2.	76-05 TASK 803
760 060 51	Reverse thrust lever: Difficult to move in reverse thrust - engine 1.	76-05 TASK 805
760 060 52	Reverse thrust lever: Difficult to move in reverse thrust - engine 2.	76-05 TASK 805
760 065 51	Reverse thrust lever: jammed in reverse thrust (no movement) - engine 1.	76-05 TASK 808
760 065 52	Reverse thrust lever: jammed in reverse thrust (no movement) - engine 2.	76-05 TASK 808
760 070 51	Reverse thrust lever: has lost motion, no Thrust Reverser operation - engine 1.	76-05 TASK 807
760 070 52	Reverse thrust lever: has lost motion, no Thrust Reverser operation - engine 2.	76-05 TASK 807
760 080 51	Reverse thrust lever: has lost motion, no engine response to Thrust Lever movement; Thrust Reverser operates normally - engine 1.	76-05 TASK 806
760 080 52	Reverse thrust lever: has lost motion, no engine response to Thrust Lever movement; Thrust Reverser operates normally - engine 2.	76-05 TASK 806

LRU/SYSTEM	SHORT NAME	CHAPTER
Air Data Inertial Reference System	ADIRS	34
Air Traffic Controller Transponder - 1 (Left)	ATC XPDR - 1 (L)	34
Air Traffic Controller Transponder - 2 (Right)	ATC XPDR - 2 (R)	34
Airborne Vibration Monitor System Signal Conditioner	AVM SIG COND	77
Antiskid Control Unit	ANTISKID	32
Attendant Control Panel	ACP	23
Automatic Direction Finder Receiver - 1	ADF RECVR - 1	34
Automatic Direction Finder Receiver - 2	ADF RECVR - 2	34
Autothrottle System	A/T	22
Auxiliary Power Unit	APU	49
Auxiliary Power Unit Generator Control Unit	APU GCU	24
Bus Power Control Unit	BPCU	24
Cabin Pressure Controller	CAB PRESS CON	21
Cargo Electronic Unit - Forward	CEU - FWD	26
Cargo Electronic Unit - Lower	CEU - LOWER	26
Cargo Electronic Unit - Main Aft	CEU - MAIN AFT	26
Cargo Electronic Unit - Main Forward	CEU - MAIN FWD	26
Common Display System	CDS	31
Compartment Overheat Detection Control Module	WING/BODY OHT	26
Digital Flight Control System	DFCS	22
Distance Measurement Equipment Interrogator	DME INTRROGTR	34
Electrical Meters, Battery, and Galley Power Module	P5-13	24
Electronic Engine Controller - 1	ENGINE - 1	73
Electronic Engine Controller - 2	ENGINE - 2	73
Emergency Locator Transmitter	ELT	23
Engine Accessory Unit	EAU	78
Engine Accessory Unit/TR DEPLOY ENG 1	EAU/TR DPLOY-ENG 1	78
Engine Accessory Unit/TR DEPLOY ENG 2	EAU/TR DPLOY-ENG 2	78
Engine Accessory Unit/TR STOW ENG 1	EAU/TR STOW-ENG 1	78
Engine Accessory Unit/TR STOW ENG 2	EAU/TR STOW-ENG 2	78
Engine and Auxiliary Power Unit Fire Detection Control Module	ENG/APU FIRE	26
Flap/Slat Electronics Unit	FSEU	27
Flight Data Acquisition Unit	FDAU	31
Flight Management Computer System	FMCS	34
Fuel Quantity Indicating System	FQIS	28

LRU/SYSTEM	SHORT NAME	CHAPTER
Generator Control Unit - 1	GCU - 1	24
Generator Control Unit - 2	GCU - 2	24
Ground Proximity Computer	GROUND PROX	34
High Frequency Transceiver	HF XCVR	23
Multi-Mode Receiver	MMR	34
Nitrogen Generation System BITE Display Unit	NGS	47
Pack Flow Temperature Controller	PFTC	21
Pack/Zone Temperature Controller - Left	PACK/ZN CON - L	21
Pack/Zone Temperature Controller - Right	PACK/ZN CON - R	21
Proximity Switch Electronics Unit	PSEU	32
Radio Altimeter Receiver/Transmitter	RADIO ALTIMTR	34
Stall Management Yaw Damper Computer - 1	SMYD - 1	27
Stall Management Yaw Damper Computer - 2	SMYD - 2	27
Traffic Alert and Collision Avoidance System Computer	TCAS COMPUTER	34
VHF Omnidirectional Ranging Marker Beacon Receiver	VOR/MKR RCVR	34
Very High Frequency Transceiver	VHF XCVR	23
Waste Tank Logic Control Module	WASTE TANK	38
Weather Radar Receiver/Transmitter	WEATHER RADAR	34
Window Heat Control Unit - Left Forward	WHCU - L FWD	30
Window Heat Control Unit - Left Side	WHCU - L SIDE	30
Window Heat Control Unit - Right Forward	WHCU - R FWD	30
Window Heat Control Unit - Right Side	WHCU - R SIDE	30

LRU/SYSTEM	MAINTENANCE MESSAGE	GO TO FIM TASK
ENGINE - 1	76-11361 THE START LEVER SIGNALS DISAGREE	76-11 TASK 801
ENGINE - 1	76-11561 THE START LEVER SIGNAL AND DEU1 DATA DISAGREE	76-11 TASK 802
ENGINE - 1	76-11571 THE START LEVER SIGNAL AND DEU2 DATA DISAGREE	76-11 TASK 802
ENGINE - 1	76-21361 THE START LEVER SIGNALS DISAGREE	76-11 TASK 801
ENGINE - 1	76-21561 THE START LEVER SIGNAL AND DEU1 DATA DISAGREE	76-11 TASK 802
ENGINE - 1	76-21571 THE START LEVER SIGNAL AND DEU2 DATA DISAGREE	76-11 TASK 802
ENGINE - 1	76-31361 THE START LEVER SIGNALS DISAGREE	76-11 TASK 801
ENGINE - 1	76-31561 THE START LEVER SIGNAL AND DEU1 DATA DISAGREE	76-11 TASK 802
ENGINE - 1	76-31571 THE START LEVER SIGNAL AND DEU2 DATA DISAGREE	76-11 TASK 802
ENGINE - 2	76-11362 THE START LEVER SIGNALS DISAGREE	76-11 TASK 801
ENGINE - 2	76-11562 THE START LEVER SIGNAL AND DEU1 DATA DISAGREE	76-11 TASK 802
ENGINE - 2	76-11572 THE START LEVER SIGNAL AND DEU2 DATA DISAGREE	76-11 TASK 802
ENGINE - 2	76-21362 THE START LEVER SIGNALS DISAGREE	76-11 TASK 801
ENGINE - 2	76-21562 THE START LEVER SIGNAL AND DEU1 DATA DISAGREE	76-11 TASK 802
ENGINE - 2	76-21572 THE START LEVER SIGNAL AND DEU2 DATA DISAGREE	76-11 TASK 802
ENGINE - 2	76-31362 THE START LEVER SIGNALS DISAGREE	76-11 TASK 801
ENGINE - 2	76-31562 THE START LEVER SIGNAL AND DEU1 DATA DISAGREE	76-11 TASK 802
ENGINE - 2	76-31572 THE START LEVER SIGNAL AND DEU2 DATA DISAGREE	76-11 TASK 802

801. Thrust Levers Not Aligned (Staggered) For Same N1 On Both Engines - Fault Isolation

A. Description

(1) The pilot reports that the thrust levers do not align at the same N1.

B. Possible Causes

(1) The thrust levers

(2) The thrust lever control rods

(3) The thrust lever angle (TLA) resolver.

C. Circuit Breakers

(1) For Engine 1,

(a) These are the primary circuit breakers related to the fault:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

(2) For Engine 2,

(a) These are the primary circuit breakers related to the fault:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

D. Related Data

(1) Component Locator, (Figure 301, Figure 302)

E. Fault Isolation Procedure

(1) Do these steps:

(a) Make sure the left and right engine start switches are set to OFF.

(b) Attach the DO-NOT-OPERATE tags to the start levers.

(2) Do this task: Thrust Lever Angle Resolver Adjustment, AMM TASK 76-11-05-820-801-F00.

(a) If the values for the TLA resolvers are not satisfactory, then do the adjustment for the TLA resolver.

(b) If the values for the TLA resolvers are satisfactory, then continue.

(3) Do this task: Autothrottle BITE Procedure, 22-31 TASK 801.

(a) If a related A/T BITE maintenance message shows, then go to the fault isolation task for the message to correct the fault.

(b) If no related A/T BITE maintenance messages show, then continue.

(4) Do a check for obvious looseness of the thrust levers, and control rod connections to the thrust levers, and the autothrottle brake assembly.

(a) If there is a problem with a thrust lever, replace the thrust lever. These are the tasks:

- Thrust Levers Removal, AMM TASK 76-11-01-010-801-F00
- Thrust levers Installation, AMM TASK 76-11-01-420-801-F00

1) Do the Repair Confirmation at the end of this task.
2) If the Repair Confirmation is not satisfactory, then continue.

(b) If there is a problem with the connections, tighten or replace components as it is necessary.

1) Do the Repair Confirmation at the end of this task.
2) If the Repair Confirmation is not satisfactory, then continue.

F. Repair Confirmation

(1) Do this task: Thrust Lever Angle Resolver Adjustment, AMM TASK 76-11-05-820-801-F00.

(a) If the values for the TLA resolvers are satisfactory, then you corrected the fault.

(2) Remove the DO-NOT-OPERATE tags from the start levers.

——— END OF TASK ———

802. Forward Thrust Lever (Difficult To Move In Forward Thrust) - Fault Isolation

A. Description

(1) The pilot reports that the thrust lever has a higher than usual resistance when it is moved in forward thrust.

B. Possible Causes

(1) The thrust lever
(2) Autothrottle brake assembly
(3) The thrust lever control rod
(4) The autothrottle switchpack assembly control rod
(5) The autothrottle switchpack assembly.
(6) The control stand seal retainers.

C. Circuit Breakers

(1) Not applicable

D. Related Data

(1) Component Locator, (Figure 301, Figure 302)

E. Fault Isolation Procedure

(1) Do these steps:

(a) Make sure the left and right engine start switches are set to OFF.

(b) Attach the DO-NOT-OPERATE tags to the start levers.

(c) Do a check of the control stand lever seals and retainers:

1) Manually move the thrust lever forward and see if the lever and the seal retainer touch:

2) If the seal retainer touches the thrust lever, replace the thrust lever or the seal retainer as necessary:

a) These are the tasks:

- Control Stand Seal, Spacer, and Retainer Removal, AMM TASK 76-11-03-400-801-F00
- Control Stand Seal, Spacer and Retainer Installation, AMM TASK 76-11-03-400-802-F00

b) These are the tasks:
- Thrust Levers Removal, AMM TASK 76-11-01-010-801-F00
- Thrust levers Installation, AMM TASK 76-11-01-420-801-F00

c) Do the repair confirmation at the end of this task.

d) If the Repair Confirmation is not satisfactory, then continue.

3) If the retainer and thrust lever do not touch, then continue.

(d) With another mechanic in the access area forward of the nose landing gear wheel well, do a visual check for the interference problems that follow as you move the thrust lever.

1) Look for unwanted objects or damage to the control rod connections to the thrust lever, the autothrottle brake assembly, and autothrottle switchpack:

2) If you find unwanted objects, remove the unwanted object.

a) Do the repair confirmation at the end of this task.

b) If the repair confirmation is not satisfactory, then continue.

3) If there is a problem with the parts or connections, tighten or replace components as it is necessary.

a) Do the repair confirmation at the end of this task.

b) If the repair confirmation is not satisfactory, then continue.

4) If you do not find a problem, then continue.

(e) Disconnect the control rod to the autothrottle switchpack.

(f) Do these steps to examine the autothrottle brake assembly:

1) Make sure that the thrust lever is at the IDLE position.

2) Attach the force gauge, COM-1557 to the thrust lever.

3) Use the scale to move the thrust lever forward from the IDLE position:

4) If the load is not more than 6.0 pounds (2.71 kilogram), then the thrust lever and the autothrottle brake assembly are satisfactory. Replace the autothrottle switch pack. These are the tasks:
- Autothrottle Switchpack Switch Removal, AMM TASK 76-11-07-020-801-F00
- Autothrottle Switchpack Switch Installation, AMM TASK 76-11-07-400-801-F00

a) Do the repair confirmation at the end of this task.

b) If the Repair Confirmation is not satisfactory, then continue.

5) If the load is more than 6.0 pounds (2.71 kilogram), then continue.

(g) Disconnect the thrust lever control rod from the autothrottle brake assembly.

(h) Move the thrust lever.

1) If you do not have difficulty when you move the thrust lever, then replace the autothrottle brake assembly. These are the tasks:
- Autothrottle Brake Assembly - Removal, AMM TASK 22-31-81-000-801
- Autothrottle Brake Assembly - Installation, AMM TASK 22-31-81-400-801

a) Do the repair confirmation at the end of this task.

b) If the repair confirmation is not satisfactory, then continue.

2) If you have difficulty when you move the thrust lever, then continue.

(i) Do these steps to examine the thrust lever wire bundle inside of the control stand:

1) Remove the applicable side panels on the control stand.
2) Move the thrust lever.
3) If there is binding of the thrust lever wire bundle, adjust the bundle to remove the binding.
   a) Do the repair confirmation at the end of this task.
4) If there is no binding of the thrust lever wire bundle, then replace the thrust lever. These are the tasks:
   - Thrust Levers Removal, AMM TASK 76-11-01-010-801-F00
   - Thrust levers Installation, AMM TASK 76-11-01-420-801-F00

   a) Do the repair confirmation at the end of this task.

F. Repair Confirmation

(1) Do these steps:

(a) Connect the thrust lever control rod to the autothrottle brake assembly and thrust lever (AMM TASK 76-11-01-420-801-F00).

(b) Connect the control rod to the autothrottle switchpack and the autothrottle brake assembly (AMM TASK 76-11-07-400-801-F00).

(c) Move the thrust lever through is normal forward operation.

1) If the difficult movement is gone, then you corrected the fault.

(2) Install the applicable side panels on the control stand.

(3) Remove the DO-NOT-OPERATE tags from the start levers.

——— END OF TASK ———

803. Forward Thrust Lever Has Lost Motion (No Engine Response To Thrust Lever Movement) - Fault Isolation

A. Description

(1) The pilot reports that the thrust lever has lost motion or the engine has no response to the increase of the forward movement of the thrust lever.

B. Possible Causes

(1) The thrust lever

(2) The thrust lever control rod

(3) Autothrottle brake assembly

(4) Autothrottle switch pack assembly.

C. Circuit Breakers

(1) Not applicable

D. Related Data

(1) Component Locator, (Figure 301, Figure 302)

E. Fault Isolation Procedure

(1) Do these steps:

(a) Make sure the left and right engine start switches are set to OFF.

(b) Attach the DO-NOT-OPERATE tags to the start levers.

(c) With another mechanic in the access area forward of the nose landing gear wheel well, examine the components for the correct operation, as you move the thrust lever.

(d) Do a check for the obvious looseness of the thrust lever, the control rod connections to the thrust levers, and the autothrottle brake assembly.

1) Tighten or replace components as it is necessary. These are the tasks:

- Thrust Levers Removal, AMM TASK 76-11-01-010-801-F00
- Thrust levers Installation, AMM TASK 76-11-01-420-801-F00

a) Do the repair confirmation at the end of this task.

b) If the repair confirmation is not satisfactory, then continue.

2) If you do not find a problem, then continue.

(e) Move the thrust lever.

1) If the autothrottle brake assembly is not operated by the thrust lever, then replace the thrust lever. These are the tasks:

- Thrust Levers Removal, AMM TASK 76-11-01-010-801-F00
- Thrust levers Installation, AMM TASK 76-11-01-420-801-F00

a) Do the repair confirmation at the end of this task.

b) If the repair confirmation is not satisfactory, then continue.

2) If the autothrottle brake assembly is operated by the thrust lever, then replace the autothrottle brake assembly. These are the tasks:

- Autothrottle Brake Assembly - Removal, AMM TASK 22-31-81-000-801
- Autothrottle Brake Assembly - Installation, AMM TASK 22-31-81-400-801

a) Do the repair confirmation at the end of this task.

F. Repair Confirmation

(1) Move the thrust lever through its usual forward operation.

(a) If the thrust lever does not have lost motion, then you corrected the fault.

(2) Remove the DO-NOT-OPERATE tags from the start levers.

——— END OF TASK ———

804. Forward Thrust Lever Jammed in Forward Thrust (No Movement) - Fault Isolation

A. Description

(1) The pilot reports that the thrust lever is jammed in a forward thrust position and cannot be moved.

B. Possible Causes

(1) The thrust lever

(2) The thrust lever control rod

(3) The autothrottle switchpack assembly control rod

(4) Autothrottle brake assembly

(5) The autothrottle switchpack assembly.

C. Circuit Breakers

(1) Not applicable

D. Related Data

(1) Component Locator, (Figure 301, Figure 302)

E. Fault Isolation Procedure

(1) Do these steps:

(a) Make sure the left and right engine start switches are set to OFF.

(b) Attach the DO-NOT-OPERATE tags to the start levers.

(c) Do these steps to isolate the problem:

1) Disconnect the control rod connection to the autothrottle brake assembly (AMM TASK 76-11-01-010-801-F00).

(d) Move the thrust lever.

1) If the thrust lever does not move, then do the fault isolation procedure for the control stand below.

2) If the thrust lever moves and there is no problem, then do the fault isolation procedure for the autothrottle below.

F. Fault Isolation Procedure - Control Stand

(1) Do a check for the obvious interference of the thrust levers, and control rod connections to the thrust levers.

(a) Do a check for unwanted objects and damage:

1) If you find unwanted objects, remove the unwanted objects.

a) Do the repair confirmation at the end of this task.

b) If the repair confirmation is not satisfactory, then continue.

2) If there is a problem with the parts or connections, tighten or replace components as it is necessary.

a) Do the applicable steps in the tasks that follow. These are the tasks:

- Thrust Levers Removal, AMM TASK 76-11-01-010-801-F00
- Thrust levers Installation, AMM TASK 76-11-01-420-801-F00

b) Do the repair confirmation at the end of this task.

c) If the repair confirmation is not satisfactory, then continue.

(b) Do a check for binding of the thrust lever wire bundle.

1) If you find interference with the wire bundle, adjust the bundle.

a) Do the repair confirmation at the end of this task.

b) If the repair confirmation is not satisfactory, then continue.

2) If you find no problems, replace the thrust lever. These are the tasks:

- Thrust Levers Removal, AMM TASK 76-11-01-010-801-F00
- Thrust levers Installation, AMM TASK 76-11-01-420-801-F00

G. Fault Isolation Procedure - Autothrottle

(1) Do these checks for the autothrottle brake assembly, the connecting rod, and the autothrottle switchpack:

(a) Do a check for unwanted objects and damage:

1) If you find unwanted objects, remove the unwanted object.

a) Do the repair confirmation at the end of this task.

b) If the repair confirmation is not satisfactory, then continue.

2) If the autothrottle switchpack assembly is damaged, replace the autothrottle switchpack assembly. These are the tasks:

- Autothrottle Switchpack Switch Removal, AMM TASK 76-11-07-020-801-F00
- Autothrottle Switchpack Switch Installation, AMM TASK 76-11-07-400-801-F00

a) Do the repair confirmation at the end of this task.

b) If the repair confirmation is not satisfactory, then continue.

3) If there is a problem with the other parts or connections, tighten or replace components as it is necessary.

a) Do the repair confirmation at the end of this task.

b) If the repair confirmation is not satisfactory, then continue.

(b) Reconnect the thrust lever control rod to the autothrottle brake.

(c) Disconnect the control rod to the autothrottle switchpack and move the thrust lever.

1) If you cannot move the thrust lever, replace the autothrottle brake assembly. These are the tasks:

- Autothrottle Brake Assembly - Removal, AMM TASK 22-31-81-000-801
- Autothrottle Brake Assembly - Installation, AMM TASK 22-31-81-400-801

a) Do the repair confirmation at the end of this task.

b) If the repair confirmation is not satisfactory, then continue.

2) If the movement is satisfactory, replace the autothrottle switchpack. These are the tasks:

- Autothrottle Switchpack Switch Removal, AMM TASK 76-11-07-020-801-F00
- Autothrottle Switchpack Switch Installation, AMM TASK 76-11-07-400-801-F00

a) Do the repair confirmation at the end of this task.

H. Repair Confirmation

(1) Do these steps:

(a) Connect the control rod connection to the autothrottle brake assembly (AMM TASK 76-11-01-420-801-F00).

(b) Connect the control rod connection to the autothrottle switchpack (AMM TASK 76-11-07-400-801-F00).

(c) Move the thrust lever through its full travel.

(d) If the thrust lever moves freely, then you corrected the fault.

(2) Remove the DO-NOT-OPERATE tags from the start levers.

——— END OF TASK ———

805. Reverse Thrust Lever (Difficult To Move In Reverse Thrust) - Fault Isolation

A. Description

(1) The pilot reports that the reverse thrust lever is difficult to move into reverse thrust.

B. Possible Causes

(1) The thrust lever

(2) The thrust lever control rod

(3) Autothrottle brake assembly

(4) The autothrottle switchpack control rod

(5) The autothrottle switchpack.

C. Circuit Breakers

(1) Not applicable

D. Related Data

(1) Component Locator, (Figure 301, Figure 302)

E. Fault Isolation Procedure

(1) Do these steps:

(a) Make sure the left and right engine start switches are set to OFF.

(b) Attach the DO-NOT-OPERATE tags to the start levers.

(c) For Engine 1:

1) Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A
B	4	C01003	ENGINE 1 THRUST REVERSER IND
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	6	C01412	ENGINE 1 THRUST REVERSER INTLK
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	9	C00440	FLIGHT CONTROL AUTO SPEED BRAKE

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
C	18	C01398	LANDING GEAR TAKEOFF WARNING CUTOFF
D	18	C00451	LANDING GEAR AURAL WARN

(d) For Engine 2:

1) Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	9	C00440	FLIGHT CONTROL AUTO SPEED BRAKE
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	6	C01413	ENGINE 2 THRUST REVERSER INTLK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT
C	8	C01004	ENGINE 2 THRUST REVERSER IND

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
C	18	C01398	LANDING GEAR TAKEOFF WARNING CUTOFF
D	18	C00451	LANDING GEAR AURAL WARN

(e) Insert a rod into the autothrottle assembly to move the reverse thrust interlock solenoid latch up off of the autothrottle brake cam.

(f) With another mechanic in the access area forward of the nose landing gear wheel well, do a visual check for the interference problems that follow as you move the reverse thrust lever.

1) Look for unwanted objects or damage to the control rod connections to the thrust lever, the autothrottle brake assembly, and autothrottle switchpack:

2) If you find unwanted objects, remove the unwanted object.

a) Do the repair confirmation at the end of this task.

b) If the repair confirmation is not satisfactory, then continue.

3) If there is a problem with the parts or connections, tighten or replace components as it is necessary.

a) Do the repair confirmation at the end of this task.

b) If the repair confirmation is not satisfactory, then continue.

4) If you do not find a problem, then continue.

(g) Disconnect the control rod to the autothrottle switchpack.

(h) Do these steps to examine the autothrottle brake assembly:

1) Make sure that the thrust lever is at the stow position.

2) Attach the force gauge, COM-1557 to the reverse thrust lever.

3) Use the scale to pull the thrust lever backward from the stow position:

4) If the load is not more than 6.0 pounds (2.71 kilogram), then the thrust lever and the autothrottle brake assembly are satisfactory. Replace the autothrottle switch pack. These are the tasks:

- Autothrottle Switchpack Switch Removal, AMM TASK 76-11-07-020-801-F00
- Autothrottle Switchpack Switch Installation, AMM TASK 76-11-07-400-801-F00

a) Do the repair confirmation at the end of this task.

b) If the Repair Confirmation is not satisfactory, then continue.

5) If the load is more than 6.0 pounds (2.71 kilogram), then continue.

(i) Disconnect the thrust lever control rod from the autothrottle brake assembly.

(j) Move the reverse thrust lever.

1) If you do not have difficulty when you move the thrust lever, then replace the autothrottle brake assembly. These are the tasks:

- Autothrottle Brake Assembly - Removal, AMM TASK 22-31-81-000-801
- Autothrottle Brake Assembly - Installation, AMM TASK 22-31-81-400-801

a) Do the repair confirmation at the end of this task.

b) If the repair confirmation is not satisfactory, then continue.

2) If you have difficulty when you move the thrust lever, then continue.

(k) Do these steps to examine the thrust lever wire bundle inside of the control stand:

1) Remove the applicable side panels on the control stand.

2) Move the thrust lever.

3) If there is binding of the thrust lever wire bundle, adjust the bundle to remove the binding.

a) Do the repair confirmation at the end of this task.

4) If there is no binding of the thrust lever wire bundle, then replace the thrust lever. These are the tasks:

- Thrust Levers Removal, AMM TASK 76-11-01-010-801-F00
- Thrust levers Installation, AMM TASK 76-11-01-420-801-F00

a) Do the repair confirmation at the end of this task.

F. Repair Confirmation

(1) Do these steps:

(a) Connect the control rod connection to the autothrottle brake assembly (AMM TASK 76-11-01-420-801-F00).

(b) Connect the control rod connection to the autothrottle switchpack (AMM TASK 76-11-07-400-801-F00).

(c) Insert a rod into the autothrottle assembly to move the reverse thrust interlock solenoid latch up off of the autothrottle brake cam.

(d) Move the reverse thrust lever through its normal operation, if the reverse thrust lever does not have lost motion, then you corrected the fault.

(e) Remove the rod from the autothrottle assembly.

(2) Do these steps:

(a) Install the applicable side panels on the control stand.

(b) Put the applicable reverse thrust lever in the stow position.

(c) For Engine 1:

1) Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A
B	4	C01003	ENGINE 1 THRUST REVERSER IND
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	6	C01412	ENGINE 1 THRUST REVERSER INTLK
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	9	C00440	FLIGHT CONTROL AUTO SPEED BRAKE

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
C	18	C01398	LANDING GEAR TAKEOFF WARNING CUTOFF

(Continued)

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
D	18	C00451	LANDING GEAR AURAL WARN

(d) For Engine 2:

1) Remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	9	C00440	FLIGHT CONTROL AUTO SPEED BRAKE
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	6	C01413	ENGINE 2 THRUST REVERSER INTLK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT
C	8	C01004	ENGINE 2 THRUST REVERSER IND

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
C	18	C01398	LANDING GEAR TAKEOFF WARNING CUTOFF
D	18	C00451	LANDING GEAR AURAL WARN

(e) Remove the DO-NOT-OPERATE tags from the start levers.

——— END OF TASK ———

806. Reverse Thrust Lever Has Lost Motion (No Engine Response To Thrust Lever Movement - Thrust Reverser Operation Normal) - Fault Isolation

A. Description

(1) The pilot reports that the engine does not respond to movement of the reverse thrust lever.

(a) The operation of the thrust reverser is normal.

(b) When the reverse thrust lever is moved to increase thrust, the engine N1 does not increase.

B. Possible Causes

(1) Autothrottle brake assembly

C. Circuit Breakers

(1) Not applicable

D. Related Data

(1) Component Locator, (Figure 301, Figure 302)

E. Fault Isolation Procedure

(1) Replace the autothrottle brake assembly. These are the tasks:

- Autothrottle Brake Assembly - Removal, AMM TASK 22-31-81-000-801
- Autothrottle Brake Assembly - Installation, AMM TASK 22-31-81-400-801

(a) Do the repair confirmation at the end of this task.

F. Repair Confirmation

(1) Do these steps:

(a) Insert a rod into the autothrottle assembly to move the reverse thrust interlock solenoid latch up off of the autothrottle brake cam.

(b) Move the reverse thrust lever through its normal operation, if the reverse thrust lever does not have lost motion, then you corrected the fault.

(c) Remove the rod from the autothrottle assembly.

——— END OF TASK ———

807. Reverse Thrust Lever Has Lost Motion (No Thrust Reverser Operation) - Fault Isolation

A. Description

(1) The pilot reports that the reverse thrust lever has lost motion.

(a) There is no operation of the thrust reverser.

B. Possible Causes

(1) The thrust lever

(2) The thrust lever control rod

(3) The autothrottle brake assembly.

C. Circuit Breakers

(1) Not applicable

D. Related Data

(1) Component Locator, (Figure 301, Figure 302)

E. Fault Isolation Procedure

(1) Do these steps:

(a) Make sure the left and right engine start switches are set to OFF.

(b) Attach the DO-NOT-OPERATE tags to the start levers.

(c) For Engine 1:

1) Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A
B	4	C01003	ENGINE 1 THRUST REVERSER IND
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	6	C01412	ENGINE 1 THRUST REVERSER INTLK
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	9	C00440	FLIGHT CONTROL AUTO SPEED BRAKE

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
C	18	C01398	LANDING GEAR TAKEOFF WARNING CUTOFF
D	18	C00451	LANDING GEAR AURAL WARN

(d) For Engine 2:

(e) Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	9	C00440	FLIGHT CONTROL AUTO SPEED BRAKE
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	6	C01413	ENGINE 2 THRUST REVERSER INTLK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT
C	8	C01004	ENGINE 2 THRUST REVERSER IND

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
C	18	C01398	LANDING GEAR TAKEOFF WARNING CUTOFF
D	18	C00451	LANDING GEAR AURAL WARN

(2) With another mechanic in the access area forward of the nose lending gear wheel well, do the tasks that follow:

(a) Insert a rod into the autothrottle assembly to move the reverse thrust interlock solenoid latch up off of the autothrottle brake cam.

(b) Move the reverse thrust lever through its full travel, examine the components for the correct operation.

(c) Do a check for the obvious loosness or disconnect of the thrust lever, and control rod connections to the thrust levers, and the autothrottle brake assembly.

1) Tighten or replace components as it is necessary. These are the tasks:

- Thrust Levers Removal, AMM TASK 76-11-01-010-801-F00
- Thrust levers Installation, AMM TASK 76-11-01-420-801-F00

a) Do the repair confirmation at the end of this task.

b) If the repair confirmation is not satisfactory, then continue.

2) If you do not find a problem, then continue.

(d) Move the reverse thrust lever.

1) If the autothrottle brake assembly is not operated by the reverse thrust lever, then replace the thrust lever. These are the tasks:

- Thrust Levers Removal, AMM TASK 76-11-01-010-801-F00
- Thrust levers Installation, AMM TASK 76-11-01-420-801-F00

a) Do the repair confirmation at the end of this task.

2) If the autothrottle brake assembly is operated by the reverse thrust lever, then replace the autothrottle brake assembly. These are the tasks:

- Autothrottle Brake Assembly - Removal, AMM TASK 22-31-81-000-801
- Autothrottle Brake Assembly - Installation, AMM TASK 22-31-81-400-801

a) Do the repair confirmation at the end of this task.

F. Repair Confirmation

(1) Do these steps:

(a) Move the reverse thrust lever through its normal operation, if the reverse thrust lever does not have lost motion, then you corrected the fault.

(b) Remove the rod from the autothrottle assembly.

(2) Do these steps:

(a) Put the applicable reverse thrust lever in the stow position.

(b) For Engine 1:

1) Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A
B	4	C01003	ENGINE 1 THRUST REVERSER IND
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	6	C01412	ENGINE 1 THRUST REVERSER INTLK
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	9	C00440	FLIGHT CONTROL AUTO SPEED BRAKE

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
C	18	C01398	LANDING GEAR TAKEOFF WARNING CUTOFF
D	18	C00451	LANDING GEAR AURAL WARN

(c) For Engine 2:

1) Remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	9	C00440	FLIGHT CONTROL AUTO SPEED BRAKE
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	6	C01413	ENGINE 2 THRUST REVERSER INTLK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT
C	8	C01004	ENGINE 2 THRUST REVERSER IND

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
C	18	C01398	LANDING GEAR TAKEOFF WARNING CUTOFF
D	18	C00451	LANDING GEAR AURAL WARN

(d) Remove the DO-NOT-OPERATE tags from the start levers.

END OF TASK

808. Reverse Thrust Lever Jammed In Reverse Thrust (No Movement) - Fault Isolation

A. Description

(1) The pilot reports that the reverse thrust lever is jammed in the reverse thrust position and cannot be moved back to the stow position.

B. Possible Causes

(1) The thrust lever

(2) The thrust lever control rod

(3) The autothrottle switchpack

(4) Autothrottle brake assembly.

C. Circuit Breakers

(1) Not applicable

D. Related Data

(1) Component Locator, (Figure 301, Figure 302)

E. Fault Isolation Procedure

(1) Do these steps:

(a) Make sure the left and right engine start switches are set to OFF.

(b) Attach the DO-NOT-OPERATE tags to the start levers.

(c) For Engine 1:

1) Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A
B	4	C01003	ENGINE 1 THRUST REVERSER IND
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	6	C01412	ENGINE 1 THRUST REVERSER INTLK
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	9	C00440	FLIGHT CONTROL AUTO SPEED BRAKE

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
C	18	C01398	LANDING GEAR TAKEOFF WARNING CUTOFF
D	18	C00451	LANDING GEAR AURAL WARN

(d) For Engine 2:

1) Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	9	C00440	FLIGHT CONTROL AUTO SPEED BRAKE

(Continued)

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	6	C01413	ENGINE 2 THRUST REVERSER INTLK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT
C	8	C01004	ENGINE 2 THRUST REVERSER IND

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
C	18	C01398	LANDING GEAR TAKEOFF WARNING CUTOFF
D	18	C00451	LANDING GEAR AURAL WARN

(e) Do these steps to find the problem with the reverse thrust lever:

1) Disconnect the control rod connection to the autothrottle brake assembly, do this task: Thrust Levers Removal, AMM TASK 76-11-01-010-801-F00.

2) Move the reverse thrust lever.

a) If the reverse thrust lever moves and there is no problem, then do the fault isolation procedure for the autothrottle below.

b) If the reverse thrust lever does not move, then do the fault isolation procedure for the control stand below.

F. Fault Isolation Procedure - Control Stand

(1) Do a check for the obvious interference of the thrust levers, and control rod connections to the thrust levers and the autothrottle brake assembly.

(a) Do a check of the RTO mechanical mechanism with the reverse lever cam.

1) Do the repair confirmation at the end of this task.

2) If the repair confirmation is not satisfactory, then continue.

(b) Do a check of the reverse thrust lever and control rod for unwanted objects and damage:

1) If you find unwanted objects, remove the unwanted object.

a) Do the repair confirmation at the end of this task.

b) If the repair confirmation is not satisfactory, then continue.

2) If there is a problem with the parts or connections, tighten or replace components as it is necessary. These are the tasks:

- Thrust Levers Removal, AMM TASK 76-11-01-010-801-F00
- Thrust levers Installation, AMM TASK 76-11-01-420-801-F00

a) Do the repair confirmation at the end of this task.

b) If the repair confirmation is not satisfactory, then continue.

3) If you do not find a problem, then continue.

(c) Do a check for binding of the thrust lever wire bundle.

1) If you find interference with the wire bundle, adjust the bundle. These are the tasks:

- Thrust Levers Removal, AMM TASK 76-11-01-010-801-F00
- Thrust levers Installation, AMM TASK 76-11-01-420-801-F00

a) Do the repair confirmation at the end of this task.

b) If the repair confirmation is not satisfactory, then continue.

(d) If you find no problems, replace the thrust lever. These are the tasks:

- Thrust Levers Removal, AMM TASK 76-11-01-010-801-F00
- Thrust levers Installation, AMM TASK 76-11-01-420-801-F00

1) Do the repair confirmation at the end of this task.

G. Fault Isolation Procedure - Autothrottle

(1) Do these checks for the autothrottle brake assembly, the connecting rod, and the autothrottle switchpack:

(a) Do a check of the autothrottle brake assembly, control rod connections, and the autothrottle switchpack for unwanted objects and damage:

1) If you find unwanted objects, remove the unwanted object.

a) Do the repair confirmation at the end of this task.

b) If the repair confirmation is not satisfactory, then continue.

2) If there is a problem with the other parts or connections, tighten or replace components as it is necessary.

a) Do the repair confirmation at the end of this task.

b) If the repair confirmation is not satisfactory, then continue.

3) If the autothrottle switchpack assembly is damaged, replace the autothrottle switchpack assembly. These are the tasks:

- Autothrottle Switchpack Switch Removal, AMM TASK 76-11-07-020-801-F00
- Autothrottle Switchpack Switch Installation, AMM TASK 76-11-07-400-801-F00

a) Do the repair confirmation at the end of this task.

b) If the repair confirmation is not satisfactory, then continue.

4) If you do not find a problem, then continue.

(b) Reconnect the thrust lever control rod to the autothrottle brake.

(c) Disconnect the control rod to the autothrottle switchpack assembly.

(d) Move the reverse thrust lever to do a check of the movement of the autothrottle brake assembly.

1) If you can not move the reverse thrust lever, replace the autothrottle brake assembly. These are the tasks:

- Autothrottle Brake Assembly - Removal, AMM TASK 22-31-81-000-801
- Autothrottle Brake Assembly - Installation, AMM TASK 22-31-81-400-801

a) Do the repair confirmation at the end of this task.

2) If you can move the reverse thrust lever, replace the autothrottle switchpack. These are the tasks:

- Autothrottle Switchpack Switch Removal, AMM TASK 76-11-07-020-801-F00
- Autothrottle Switchpack Switch Installation, AMM TASK 76-11-07-400-801-F00

a) Do the repair confirmation at the end of this task.

H. Repair Confirmation

(1) Do these steps:

(a) Connect the control rod connection to the autothrottle brake assembly (AMM TASK 76-11-01-420-801-F00).

(b) Connect the control rod connection to the autothrottle switchpack (AMM TASK 76-11-07-400-801-F00).

(c) Insert a rod into the autothrottle assembly to move the reverse thrust interlock solenoid latch up off of the autothrottle brake cam.

(d) Move the reverse thrust lever through its normal operation, if the reverse thrust lever does not have lost motion, then you corrected the fault.

(e) Remove the rod from the autothrottle assembly.

(2) Do these steps:

(a) Put the applicable reverse thrust lever in the stow position.

(b) For Engine 1:

1) Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A
B	4	C01003	ENGINE 1 THRUST REVERSER IND
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	6	C01412	ENGINE 1 THRUST REVERSER INTLK
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	9	C00440	FLIGHT CONTROL AUTO SPEED BRAKE

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
C	18	C01398	LANDING GEAR TAKEOFF WARNING CUTOFF
D	18	C00451	LANDING GEAR AURAL WARN

(c) For Engine 2:

1) Remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	9	C00440	FLIGHT CONTROL AUTO SPEED BRAKE
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	6	C01413	ENGINE 2 THRUST REVERSER INTLK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT
C	8	C01004	ENGINE 2 THRUST REVERSER IND

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
C	18	C01398	LANDING GEAR TAKEOFF WARNING CUTOFF
D	18	C00451	LANDING GEAR AURAL WARN

(d) Remove the DO-NOT-OPERATE tags from the start levers.

——— END OF TASK ———

809. X-BLD Indication Displayed Over N2 Indicator during Normal A/C Operations - Fault Isolation

A. Description

(1) X-BLD message illuminates over Engine N2 indicator during normal operations and when engine start lever is in the IDLE or RUN position.

B. Possible Causes

(1) ENG 1 or ENG 2 Start Lever Channel A Relay, R566 or R568

(2) Wires and connectors between the engine start lever relay and the DEU's

(3) DEU 1 or DEU 2, M1808 or M1809

(4) Electronic Engine Control (EEC), M1818

AKS 001-017, 019

(5) ENG 1 (ENG 2) engine start lever Switch Module, M1824 or M1825

AKS 018, 020-999

(6) ENG 1 (ENG 2) engine start lever, S1221 or S1222

AKS ALL

C. Circuit Breakers

(1) For Engine 1:

These are the primary circuit breakers related to the fault:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A
B	1	C01316	ENGINE 1 START LEVER CHAN A
D	5	C01359	DISPLAY DEU 1 PRI

F/O Electrical System Panel, P6-1

Row	Col	Number	Name
D	9	C01362	DISPLAY DEU 2 HOLDUP
D	10	C01361	DISPLAY DEU 1 HOLDUP
D	11	C01360	DISPLAY DEU 2 PRI

(2) For Engine 2:

These are the primary circuit breakers related to the fault:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
D	5	C01359	DISPLAY DEU 1 PRI

F/O Electrical System Panel, P6-1

Row	Col	Number	Name
D	9	C01362	DISPLAY DEU 2 HOLDUP
D	10	C01361	DISPLAY DEU 1 HOLDUP
D	11	C01360	DISPLAY DEU 2 PRI

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	6	C01318	ENGINE 2 START LEVER CHAN A
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

D. Related Data

(1) SSM 76-21-11

(2) SSM 76-21-21

(3) WDM 76-21-11

(4) WDM 76-21-21

E. Fault Isolation Procedure

(1) Prepare for DEU Input Monitoring Test:

(a) For Engine 1:

Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	4	C00359	FUEL SPAR VALVE ENG 1

(b) For Engine 2:

Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2

(2) Do these steps to get access to the DEU Input Monitoring of discretes display on the FMCS CDU:

(a) Push the INIT REF key two times.

(b) Push the INDEX line select key (LSK).

(c) Push the MAINT LSK.

NOTE: This causes the MAINT BITE INDEX to show.

(d) Push the CDS LSK.

NOTE: This causes the CDS BITE INDEX to show.

(e) Push the LSK for DEU 1.

(f) Push the INPUT MONITORING LSK.

NOTE: This causes the CDS DEU 1 MAINT/BITE DISCRETE STATUS MENU to show.

(3) Examine these pin parameters on the Input Monitoring screen for DEU 1:

(a) Do these steps to examine the first channel of DEU 1 for the applicable Engine:

1) For Engine 1:

a) Push the SELECT B LSK.

NOTE: This causes the CDS DEU X MAINT/BITE DISCRETE STATUS, INSERT B screen to show.

2) For Engine 2:

a) Push the SELECT A LSK.

NOTE: This causes the CDS DEU X MAINT/BITE DISCRETE STATUS, INSERT A screen to show.

3) Record the value that shows in column H, row 2.

NOTE: With the engine start lever in the CUTOFF position, the H2 value should be O (open).

4) Move the engine start lever to the IDLE or RUN position.

5) Record the value that shows in column H, row 2.

NOTE: With the engine start lever in the IDLE or RUN position, the H2 value should be G (ground).

6) Move the engine start lever to the CUTOFF position.

(b) Do these steps to examine the second channel of DEU 1:

1) Push the INDEX line select key (LSK) key three times.

NOTE: This will cause the CDS BITE INDEX screen to show.

2) Push the LSK for DEU 1.

3) Push the INPUT MONITORING LSK.

NOTE: This causes the CDS DEU 1 MAINT/BITE DISCRETE STATUS, MENU to show.

4) For Engine 1:

a) Push the SELECT D LSK.

NOTE: This causes the CDS DEU X MAINT/BITE DISCRETE STATUS, INSERT D screen to show.

5) For Engine 2:

a) Push the SELECT E LSK.

NOTE: This causes the CDS DEU X MAINT/BITE DISCRETE STATUS, INSERT E screen to show.

6) Record the value that shows in column H, row 2.

NOTE: With the engine start lever in the CUTOFF position, the H2 value should be O (open).

7) Move the engine start lever to the IDLE or RUN position.

8) Record the value that shows in column H, row 2.

NOTE: With the engine start lever in the IDLE or RUN position, the H2 value should be G (ground).

9) Move the engine start lever to the CUTOFF position.

(4) Examine these pin parameters on the Input Monitoring screen for DEU 2:

(a) Do these steps to examine the first channel of DEU 2 for the applicable Engine:

1) For Engine 1:

a) Push the SELECT B LSK.

NOTE: This causes the CDS DEU X MAINT/BITE DISCRETE STATUS, INSERT B screen to show.

2) For Engine 2:

a) Push the SELECT A LSK.

NOTE: This causes the CDS DEU X MAINT/BITE DISCRETE STATUS, INSERT A screen to show.

3) Record the value that shows in column H, row 2.

NOTE: With the engine start lever in the CUTOFF position, the H2 value should be O (open).

4) Move the engine start lever to the IDLE or RUN position.

5) Record the value that shows in column H, row 2.

NOTE: With the engine start lever in the IDLE or RUN position, the H2 value should be G (ground).

6) Move the engine start lever to the CUTOFF position.

(b) Do these steps to examine the second channel of DEU 2:

1) Push the INDEX line select key (LSK) key three times.

NOTE: This will cause the CDS BITE INDEX screen to show.

2) Push the LSK for DEU 2.

3) Push the INPUT MONITORING LSK.

NOTE: This causes the CDS DEU 2 MAINT/BITE DISCRETE STATUS, MENU to show.

4) For Engine 1:

a) Push the SELECT D LSK.

NOTE: This causes the CDS DEU X MAINT/BITE DISCRETE STATUS, INSERT D screen to show.

5) For Engine 2:

a) Push the SELECT E LSK.

NOTE: This causes the CDS DEU X MAINT/BITE DISCRETE STATUS, INSERT E screen to show.

6) Record the value that shows in column H, row 2.

NOTE: With the engine start lever in the CUTOFF position, the H2 value should be O (open).

7) Move the engine start lever to the IDLE or RUN position.

8) Record the value that shows in column H, row 2.

NOTE: With the engine start lever in the IDLE or RUN position, the H2 value should be G (ground).

9) Move the engine start lever to the CUTOFF position.

(c) Push the INT REF key to end the Input Monitoring test.

(5) Compare the values that you recorded for DEU 1 and DEU 2 with the values in the table below.

Table 201 ENGINE START LEVER POSITION

ENGINE START LEVER POSITION	INSERT B PIN H2 ENG/EEC 1 DEU1 & DEU2	INSERT D PIN H2 ENG/EEC 1 DEU1 & DEU2	INSERT A PIN H2 ENG/EEC 2 DEU1 & DEU2	INSERT E PIN H2 ENG/EEC 2 DEU1 & DEU2
CUTOFF	”O” (O=OPEN)	”O”	”O”	”O”
IDLE or RUN	”G” (G=GROUND	”G”	”G”	”G”

(a) If the Input Monitoring data agrees with the table for the two DEU's, then skip ahead to perform check for 28 VDC to the engine start lever relay.

(b) If the Input Monitoring data disagrees with the table, then continue.

(6) If only one value to one of the DEU's is not in the correct state, then examine and repair the applicable wire between TB3102 and the DEU connector:

Table 202

ENG, DEU and INSERT	TERMINAL BLOCK/PIN		DEU CONNECTORS/PIN
ENG1 AND DEU1 INSERT B	TB3102/PIN YA9	TO	D3973B/PIN H2
ENG1 AND DEU1 INSERT D	TB3102/PIN YA9	TO	D3973D/PIN H2
ENG1 AND DEU2 INSERT B	TB3102/PIN YB9	TO	D3975B/PIN H2
ENG1 AND DEU2 INSERT D	TB3102/PIN YB9	TO	D3975D/PIN H2

Table 202 (Continued)

ENG, DEU and INSERT	TERMINAL BLOCK/PIN		DEU CONNECTORS/PIN
ENG2 AND DEU1 INSERT A	TB3102/PIN YA97	TO	D3973A/PIN H2
ENG2 AND DEU1 INSERT E	TB3102/PIN YA97	TO	D3973E/PIN H2
ENG2 AND DEU2 INSERT A	TB3102/PIN YA99	TO	D3975A/PIN H2
ENG2 AND DEU2 INSERT E	TB3102/PIN YA99	TO	D3975E/PIN H2

(a) If you repaired a wire problem, then do the Repair Confirmation at the end of this task.

1) If the Repair Confirmation is not satisfactory, then continue.

(b) If you do not find a problem with the wiring or the problem continues, then replace the applicable DEU. Thes are the tasks:

- Display Electronics Unit Removal, AMM TASK 31-62-21-000-801
- Display Electronics Unit Installation, AMM TASK 31-62-21-400-801.

1) Do the Repair Confirmation at the end of this task.

a) If the Repair Confirmation is not satisfactory, then replace the EEC, M1818. These are the tasks:

- EEC Removal, AMM TASK 73-21-60-000-801-F00
- EEC Installation, AMM TASK 73-21-60-400-801-F00

b) Do the Repair Confirmation at the end of this task.

(7) If only DEU 2 reports all incorrect values for one of the Engines (“G” on the two inserts instead of “O”, or “O” on the two inserts instead of “G”), then examine and repair the terminal block jumper between these pins:

NOTE: Inserts B and D are for Engine 1, Inserts A and E are for Engine 2.

(a) For Engine 1, terminal block TB3102, jumper between pins YA9 and YB9:

(b) For Engine 2, terminal block TB3102, jumper between pins YA97 and YB99.

1) If you repaired the jumper, then do the Repair Confirmation at the end of this task.

a) If the Repair Confirmation is not satisfactory, then continue.

2) If no problem is found with the jumper or the problem continues, then replace the applicable DEU. These are the tasks:

- Display Electronics Unit Removal, AMM TASK 31-62-21-000-801
- Display Electronics Unit Installation, AMM TASK 31-62-21-400-801.

(8) If all of the values for one of the Engines on the two DEU's is incorrect “(G” on the four inserts instead of “O”, or “O” on the four inserts instead of “G”), then examine and repair the wire terminal block and the applicable engine start lever Ch A relay:

NOTE: Inserts B and D are for Engine 1, Inserts A and E are for Engine 2.

(a) For Engine 1, terminal block TB3102 pin YA9 to relay receptacle D10922 pin C2.

NOTE: Relay receptacle D10922 is in junction box J22.

(b) For Engine 2, terminal block TB3102 pin YA97 to relay receptacle D10926 pin C2.

NOTE: Relay receptacle D10926 is in junction box J24.

1) If you repaired a wire problem, then do the Repair Confirmation at the end of this task.

a) If the Repair Confirmation is not satisfactory, then continue.

(9) Do a check for 28 VDC to the engine start lever relay.

(a) For Engine 1:

Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT
A	5	C01314	ENGINE 1 ALTN PWR CHAN A
B	1	C01316	ENGINE 1 START LEVER CHAN A

(b) For Engine 2:

Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	6	C01318	ENGINE 2 START LEVER CHAN A
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

(c) Remove the engine start lever relay for the applicable Engine:

1) ENG 1 Start Lever Relay, R566 (Ch A).

2) ENG 2 Start Lever Relay, R568 (Ch A).

3) For the applicable Engine:

Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	1	C01316	ENGINE 1 START LEVER CHAN A

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	6	C01318	ENGINE 2 START LEVER CHAN A

(d) Look for 28 VDC and ground at these pins of the applicable relay receptacle:

Table 203

RECEPTACLE D10922 ENG 1 CH A D10926 ENG 2 CH A	ENGINE START LEVER POSITION	PINS	EXPECTED RESULTS
	CUTOFF	X1 TO GROUND	28 VDC
		X2 TO GROUND	CONTINUITY
		Y2 TO GROUND	OPEN CIRCUIT
	IDLE or RUN	Y1 TO GROUND	28 VDC
		Y2 TO GROUND	CONTINUITY
		X2 TO GROUND	OPEN CIRCUIT

(e) If you do not find 28 VDC at pins X1 and Y1, then examine and repair the wires between the relay receptacle and the applicable circuit breaker.

1) Do the Repair Confirmation at the end of this task.

2) If the Repair Confirmation is not satisfactory, the continue.

(f) If you do not find continuity or open circuit (as applicable) at pins Y2 and X2, then examine and repair the wires between the relay receptacle and the applicable engine start lever.

1) Do the Repair Confirmation at the end of this task.

2) If the Repair Confirmation is not satisfactory, the continue.

(g) If the electrical check was in the specified range, then replace the applicable engine start lever relay.

1) Do the Repair Confirmation at the end of this task.

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(10) Replace the applicable engine start lever switch module, M1824 or M1825, these are the tasks:

- Engine Start Brake Assembly Switch Removal, AMM TASK 76-11-11-010-801-F00
- Engine Start Brake Assembly Switch Installation, AMM TASK 76-11-11-420-801-F00

(a) Do the Repair Confirmation at the end of this task.

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(11) Replace the applicable engine start lever, S1221 or S1222, these are the tasks:

- Start Lever Removal, AMM TASK 76-11-02-010-802-F00
- Start Lever Installation, AMM TASK 76-11-02-400-801-F00

(a) Do the Repair Confirmation at the end of this task.

AKS ALL

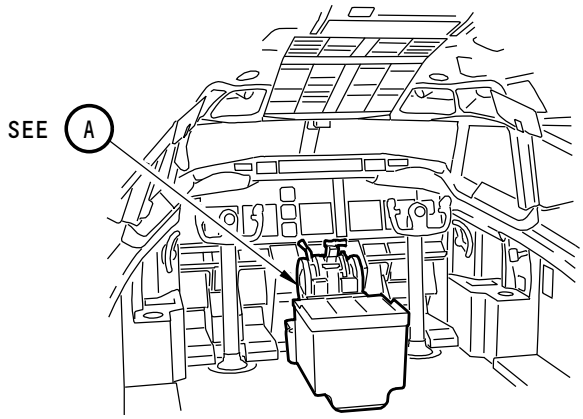
F. Repair Confirmation

(1) Record the steps that you completed to find and repair the fault.

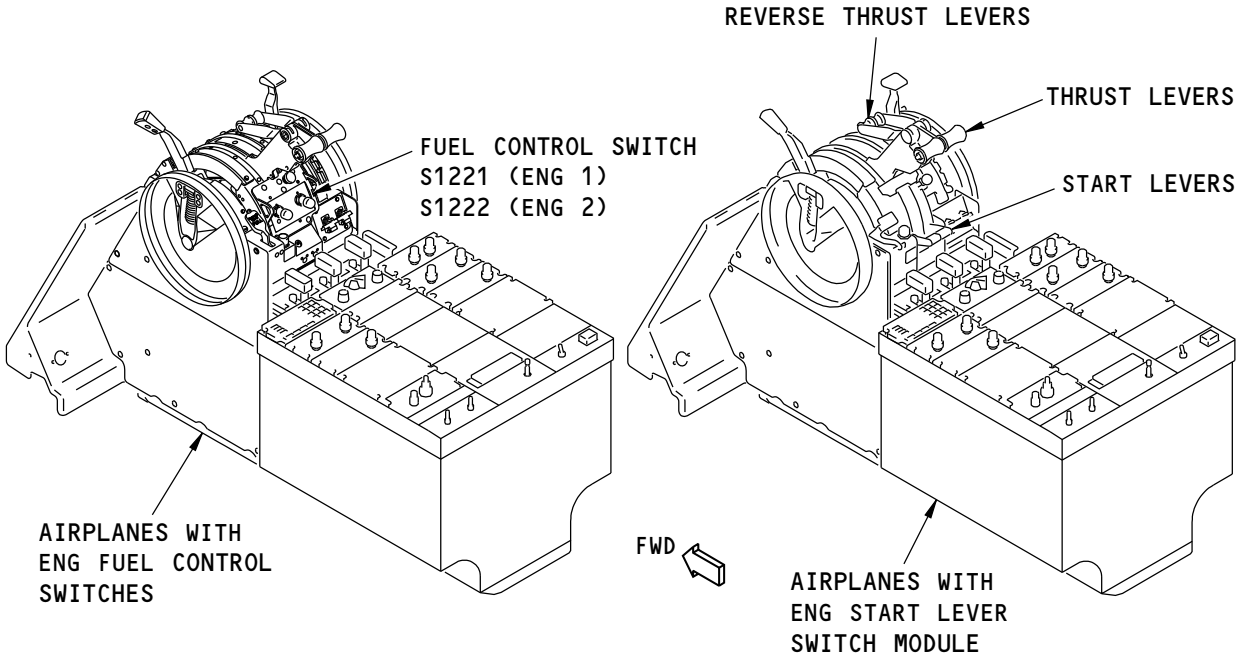
(a) Monitor the airplane on subsequent flights.

(b) If solution is unsatisfactory, then continue the Fault Isolation at the subsequent step.

——— END OF TASK ———

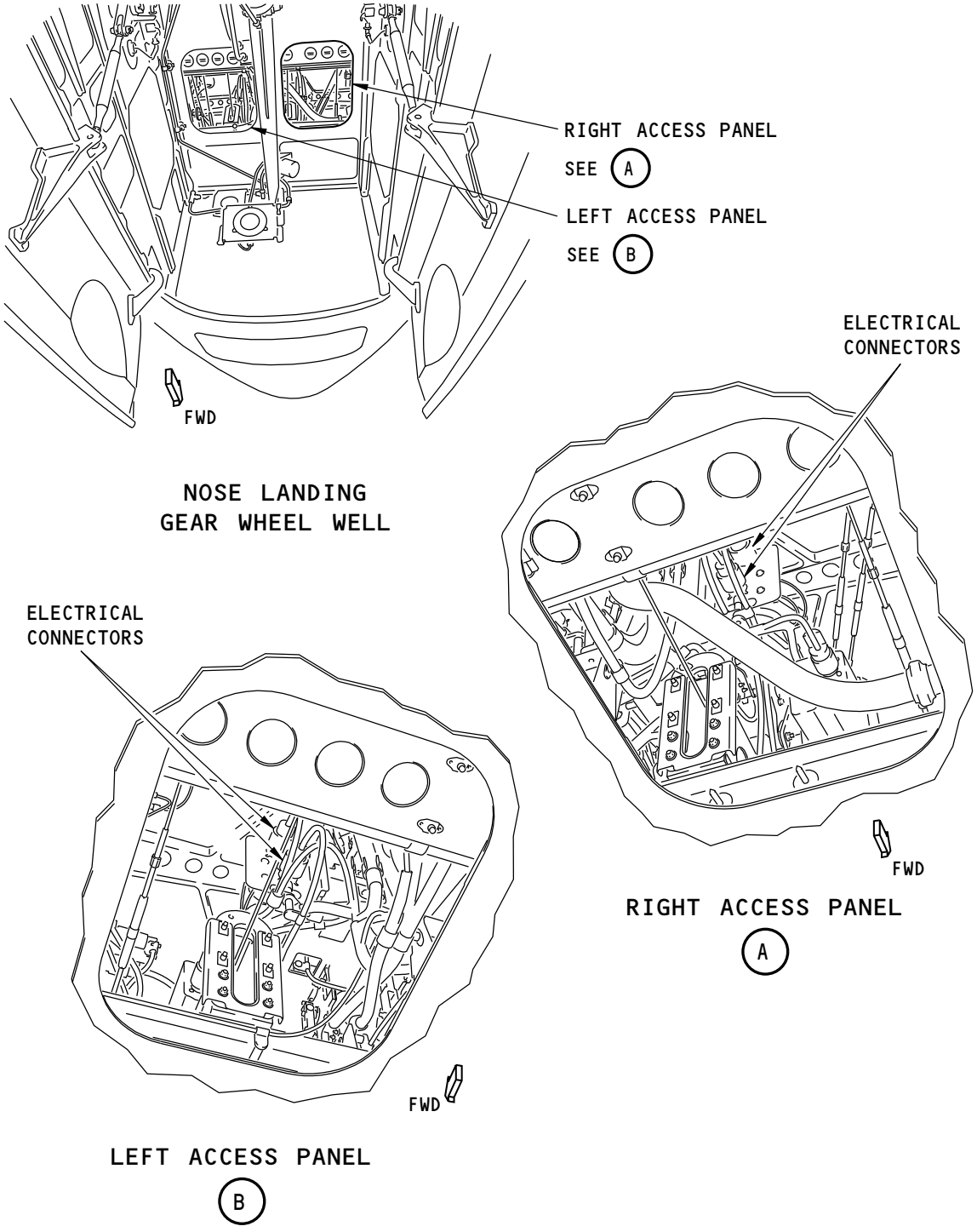


FLIGHT COMPARTMENT



H82521 S0006746198_V2

Control Stand
Figure 301/76-05-00-990-801-F00



H82522 S0006746199_V1

Autothrottle Access
Figure 302/76-05-00-990-802-F00

801. Start Lever Signals Disagree - Fault Isolation

A. Description

(1) This task is for these maintenance message numbers:

(a) 76-11361, 76-11362, 76-21361, 76-21362, 76-31361, and 76-31362.

(2) For the maintenance message 76-X136Y; where X = EEC Channel (1=Channel A, 2=Channel B, 3=Dual Channel), and Y = Engine Position (1=Eng 1, 2=Eng 2), then do the applicable Fault Isolation:

(a) If X=1, then do the Fault Isolation Procedure for channel A.

(b) If X=2, then do the Fault Isolation Procedure for channel B.

(c) If X=1 and 2 (two messages), or X=3, then do the Fault Isolation Procedure for channels A and B.

(3) The EEC senses that the signal from the ENG start lever Ch A relay does not agree with the signal from the ENG start lever Ch B relay.

(4) This maintenance message should show as a dual channel fault.

(a) This fault is reported when the EEC has electrical power.

B. Possible Causes

(1) ENG start lever relay:

(a) ENG 1 start lever relay, R566 (Ch A) or R565 (Ch B)

(b) ENG 2 start lever relay, R568 (Ch A) or R567 (Ch B)

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(2) ENG 1 or ENG 2 engine start lever switch module, M1824 or M1825

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(3) ENG 1 or ENG 2 engine start lever, S1221 or S1222

AKS ALL

(4) Wires and connectors between the EEC and the engine start levers.

(5) EEC, M1818

C. Circuit Breakers

(1) For Engine 1:

(a) These are the primary circuit breakers related to the fault:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A
B	1	C01316	ENGINE 1 START LEVER CHAN A
B	2	C01317	ENGINE 1 START LEVER CHAN B

(2) For Engine 2:

(a) These are the primary circuit breakers related to the fault:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	6	C01318	ENGINE 2 START LEVER CHAN A

(Continued)

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	7	C01319	ENGINE 2 START LEVER CHAN B
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

D. Related Data

(1) Component Locators, (Figure 301, Figure 302)

(2) Simplified Schematics, (Figure 303, Figure 304)

(3) (SSM 73-21-11)

(4) (SSM 76-21-11)

(5) (SSM 76-21-21)

(6) (WDM 73-21-11)

(7) (WDM 73-22-11)

(8) (WDM 76-21-11)

(9) (WDM 76-21-21)

E. Initial Evaluation

(1) Do this task: EEC TEST, AMM TASK 73-21-00-700-804-F00.

(a) If a maintenance message, 73-X1361 or 73-X1362 shows, then do the Fault Isolation Procedure.

(b) If the maintenance message does not show on the FMCS CDU, then do the Fault Isolation Procedure.

1) If the disagreement occurs when the engine start lever is in the IDLE or RUN position the EEC Test can not detect it. An engine operation is necessary to set the fault in the IDLE or RUN position.

F. Fault Isolation Procedure

(1) Prepare for the procedure:

(a) For Engine 1:

1) Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A
B	1	C01316	ENGINE 1 START LEVER CHAN A
B	2	C01317	ENGINE 1 START LEVER CHAN B

(b) For Engine 2:

1) Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	6	C01318	ENGINE 2 START LEVER CHAN A
B	7	C01319	ENGINE 2 START LEVER CHAN B
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

(c) Do this task: Open the Fan Cowl Panels, AMM TASK 71-11-02-010-801-F00.

(2) Do this check for 28 VDC to the engine start lever relay:

(a) Remove the two engine start lever relays for the applicable engine:

1) ENG 1 start lever relay, R566 (Ch A) and R565 (Ch B)

2) ENG 2 start lever relay, R568 (Ch A) and R567 (Ch B)

3) For the applicable engine:

a) Close these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	1	C01316	ENGINE 1 START LEVER CHAN A
B	2	C01317	ENGINE 1 START LEVER CHAN B

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	6	C01318	ENGINE 2 START LEVER CHAN A
B	7	C01319	ENGINE 2 START LEVER CHAN B

(b) Look for 28 VDC and ground at these pins of the applicable relay receptacle:

Table 201

RECEPTACLE D10922 ENG1 CHA D10920 ENG1 CHB D10926 ENG2 CHA D10924 ENG2 CHB	ENGINE START LEVER POSITION	PINS	EXPECTED RESULTS
	CUTOFF	X1 TO GROUND	28 VDC
		X2 TO GROUND	CONTINUITY
		Y2 TO GROUND	OPEN CIRCUIT
	IDLE or RUN	Y1 TO GROUND	28 VDC
		Y2 TO GROUND	CONTINUITY
		X2 TO GROUND	OPEN CIRCUIT

(c) If you do not find 28 VDC at pins X1 and Y1, then examine and repair the wires between the relay receptacle and the applicable circuit breaker.

1) Do the Repair Confirmation at the end of this task.

2) If the Repair Confirmation is not satisfactory, then continue.

(d) If you do not find continuity or open circuit (as applicable) at pins Y2 and X2, then examine and repair the wires between the relay receptacle and the applicable engine start lever switch module.

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1) If you do not find a wire problem, then replace the applicable switch in the engine start lever switch module, M1824 or M1825, these are the tasks:

- Engine Start Brake Assembly Switch Removal, AMM TASK 76-11-11-010-801-F00
- Engine Start Brake Assembly Switch Installation, AMM TASK 76-11-11-420-801-F00

AKS 018, 020-999

2) If you do not find a wire problem, then replace the applicable engine start lever, S1221 or S1222, these are the tasks:

- Start Lever Removal, AMM TASK 76-11-02-010-802-F00
- Start Lever Installation, AMM TASK 76-11-02-400-801-F00

AKS ALL

3) Do the Repair Confirmation at the end of this task.

4) If the Repair Confirmation is not satisfactory, then continue.

(e) If the electrical check was in the specified range, then do these steps and continue:

1) For the applicable engine:

a) Open these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	1	C01316	ENGINE 1 START LEVER CHAN A
B	2	C01317	ENGINE 1 START LEVER CHAN B

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	6	C01318	ENGINE 2 START LEVER CHAN A
B	7	C01319	ENGINE 2 START LEVER CHAN B

2) Install the applicable engine start lever relay:

a) ENG 1 start lever relay, R566 (Ch A) or R565 (Ch B)

b) ENG 2 start lever relay, R568 (Ch A) or R567 (Ch B)

3) For the applicable engine:

a) Close these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	1	C01316	ENGINE 1 START LEVER CHAN A
B	2	C01317	ENGINE 1 START LEVER CHAN B

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	6	C01318	ENGINE 2 START LEVER CHAN A
B	7	C01319	ENGINE 2 START LEVER CHAN B

(3) Examine the electrical connectors on the MW0303 (Ch A) and MW0304 (Ch B) wire harness at the EEC:

(a) Make sure the DP0303 (MW0303, Ch A) and DP0404 (MW0304, Ch B) electrical connectors are correctly connected to the EEC.

(b) Disconnect the DP0303 (MW0303, Ch A) and DP0404 (MW0304, Ch B) electrical connectors from the EEC.

(c) Visually examine the EEC receptacles and wire harness connectors (AMM TASK 70-70-01-200-801-F00).

1) If an EEC receptacle is damaged, then replace the EEC, M1818. These are the tasks:

- EEC Removal, AMM TASK 73-21-60-000-801-F00
- EEC Installation, AMM TASK 73-21-60-400-801-F00

a) Do the Repair Confirmation at the end of this task.

b) If the Repair Confirmation was not satisfactory, then open the circuit breakers above and continue.

2) If a harness connector is damaged, then replace the applicable MW0303 (Ch A) or MW0304 (Ch B) wire harness. These are the tasks:

- Nacelle Wiring Harnesses Removal, AMM TASK 71-51-03-000-801-F00
- Nacelle Wiring Harnesses Installation, AMM TASK 71-51-03-400-801-F00

a) Do the Repair Confirmation at the end of this task.

b) If the Repair Confirmation was not satisfactory, then open the circuit breakers above and continue.

3) If a connector was not correctly connected and no other problem was found, then re-connect the connector and do the Repair Confirmation at the end of this task.

a) If the Repair Confirmation is not satisfactory, then open the circuit breakers above and continue.

(d) If you did not find a problem, then continue.

(4) Do these steps to examine the wires between the EEC and the applicable engine start lever relay:

(a) Examine the resistance at these pins of the electrical connectors:

Table 202

CONNECTOR DP0303 DP0404	ENGINE START LEVER POSITION	PINS	RESISTANCE
	CUTOFF	PINS c TO v	LESS THAN 10 OHMS
	IDLE or RUN	PINS c TO v	GREATER THAN 10 MEGOHMS
		PIN c TO GROUND	GREATER THAN 10 MEGOHMS
		PIN v TO GROUND	GREATER THAN 10 MEGOHMS

(b) If the resistance is in the specified range, then replace the EEC, M1818. These are the tasks:

- EEC Removal, AMM TASK 73-21-60-000-801-F00
- EEC Installation, AMM TASK 73-21-60-400-801-F00

1) Do the Repair Confirmation at the end of this task.

(c) If the resistance is not in the specified range, then continue.

(5) Do these steps to examine the wires between the strut receptacles and the applicable engine start lever relay:

(a) Disconnect the DP0324 (MW0303, Ch A) and DP0460 (MW0304, Ch B) electrical connectors from the strut receptacles.

(b) Examine the resistance at these pins of the strut receptacles:

Table 203

RECEPTACLE	ENGINE START LEVER POSITION	PINS	RESISTANCE
CHANNEL A ENG1 D30224 ENG2 D30424	CUTOFF	PINS 2 TO 3	LESS THAN 10 OHMS
	IDLE or RUN	PINS 2 TO 3	GREATER THAN 10 MEGOHMS
		PIN 2 TO GROUND	GREATER THAN 10 MEGOHMS
		PIN 3 TO GROUND	GREATER THAN 10 MEGOHMS
CHANNEL B ENG1 D30260 ENG2 D30460	CUTOFF	PINS 9 TO 10	LESS THAN 10 OHMS

Table 203 (Continued)

RECEPTACLE	ENGINE START LEVER POSITION	PINS	RESISTANCE
	IDLE or RUN	PINS 9 TO 10	GREATER THAN 10 MEGOHMS
		PIN 9 TO GROUND	GREATER THAN 10 MEGOHMS
		PIN 10 TO GROUND	GREATER THAN 10 MEGOHMS

1) If the resistance is in the specified range, then replace the applicable MW0303 (Ch A) or MW0304 (Ch B) wire harness. These are the tasks:
   - Nacelle Wiring Harnesses Removal, AMM TASK 71-51-03-000-801-F00
   - Nacelle Wiring Harnesses Installation, AMM TASK 71-51-03-400-801-F00
2) Do the Repair Confirmation at the end of this task.

(c) If the resistance is not in the specified range, then examine and repair the wires and connectors between the strut receptacle and the applicable engine start lever relay.
1) If you found and repaired a wire problem, then do the Repair Confirmation at the end of this task.
2) If no wire problem is found, or the problem continues, then replace the applicable engine start lever relay.
   a) Do the Repair Confirmation at the end of this task.

G. Repair Confirmation

(1) Prepare for the procedure:
(a) Make sure that the electrical connectors, DP0303 and DP0404, are connected to the receptacles in the EEC.
(b) Make sure that the electrical connectors, DP0324 and DP0460, are connected to the receptacles in the strut.
(c) Make sure that the engine start lever relays are correctly installed.
1) ENG 1 start lever relay, R566 (Ch A) or R565 (Ch B)
2) ENG 2 start lever relay, R568 (Ch A) or R567 (Ch B)
(d) For Engine 1:
1) Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A
B	1	C01316	ENGINE 1 START LEVER CHAN A
B	2	C01317	ENGINE 1 START LEVER CHAN B

(e) For Engine 2:

1) Remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	6	C01318	ENGINE 2 START LEVER CHAN A
B	7	C01319	ENGINE 2 START LEVER CHAN B
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

(f) Do this task: Close the Fan Cowl Panels, AMM TASK 71-11-02-410-801-F00.

(2) Do one of these two Repair Confirmation Procedures:

(a) If the fault was found with the engine start lever in the CUTOFF position, then do this task: EEC TEST, AMM TASK 73-21-00-700-804-F00

1) If the maintenance message does not show, then you corrected the fault.

2) If solution is unsatisfactory, then continue the Fault Isolation at the subsequent step.

(b) If the fault was not found with the engine start lever in the CUTOFF position, then do this task: Test 13 - Engine Run - EEC BITE Check, AMM TASK 71-00-00-700-808-F00

1) If the maintenance message does not show in Flight Leg 0, then you corrected the fault.

2) If solution is unsatisfactory, then continue the Fault Isolation at the subsequent step.

——— END OF TASK ———

802. Start Lever Signal and the DEU Data Disagree - Fault Isolation

A. Description

(1) This task is for these maintenance message numbers:

(a) 76-11561, 76-11562, 76-21561, 76-21562, 76-31561, or 76-31562; and 76-11571, 76-11572, 76-21571, 76-21572, 76-31571, or 76-31572.

(2) For the maintenance message 76-X156Y or 76-X157Y; where X = EEC Channel (1=Channel A, 2=Channel B, 3=Dual Channel), and Y = Engine Position (1=Eng 1, 2=Eng 2), then do the applicable Fault Isolation:

(a) If X=1, then do the Fault Isolation Procedure for channel A.

(b) If X=2, then do the Fault Isolation Procedure for channel B.

(c) If X=1 and 2 (two messages), or X=3, then do the Fault Isolation Procedure for channels A and B.

(3) The EEC senses that the analog discretes from the start lever relays agree and the digital signal from the DEU does not agree with the analog discretes.

(a) This fault is reported when the EEC has electrical power.

(4) This maintenance message should show as a dual channel fault.

B. Possible Causes

(1) Wires and connectors between the terminal block, TB3102 and the applicable DEU

(2) Wires and connectors between the eng start lever relay and the DEUs

(3) Eng start lever relay, R566 (Eng 1, Ch A), or R568 (Eng 2, Ch A)

(4) EEC, M1818

(5) DEU, M1808 (DEU 1) and M1809 (DEU 2).

C. Circuit Breakers

(1) For Engine 1:

(a) These are the primary circuit breakers related to the fault:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A
B	1	C01316	ENGINE 1 START LEVER CHAN A
B	2	C01317	ENGINE 1 START LEVER CHAN B
D	5	C01359	DISPLAY DEU 1 PRI

F/O Electrical System Panel, P6-1

Row	Col	Number	Name
D	9	C01362	DISPLAY DEU 2 HOLDUP
D	10	C01361	DISPLAY DEU 1 HOLDUP
D	11	C01360	DISPLAY DEU 2 PRI

(2) For Engine 2:

(a) These are the primary circuit breakers related to the fault:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
D	5	C01359	DISPLAY DEU 1 PRI

F/O Electrical System Panel, P6-1

Row	Col	Number	Name
D	9	C01362	DISPLAY DEU 2 HOLDUP
D	10	C01361	DISPLAY DEU 1 HOLDUP
D	11	C01360	DISPLAY DEU 2 PRI

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	6	C01318	ENGINE 2 START LEVER CHAN A
B	7	C01319	ENGINE 2 START LEVER CHAN B
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

D. Related Data

(1) Component Locators, (Figure 301, Figure 302)

(2) Simplified Schematics, (Figure 303, Figure 304)

(3) (SSM 73-24-12)

(4) (SSM 76-21-11)

(5) (SSM 76-21-21)

(6) (WDM 73-22-11)

(7) (WDM 73-24-12)

(8) (WDM 76-21-11)

(9) (WDM 76-21-21)

E. Initial Evaluation

(1) An Initial Evaluation is not recommended.

NOTE: If the disagreement occurs while the start lever is in the IDLE position a test can not detect it. An engine operation is necessary to set the fault in the IDLE position.

F. Fault Isolation Procedure

(1) Do these steps to prepare for the procedure:

(a) For Engine 1:

1) Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	4	C00359	FUEL SPAR VALVE ENG 1

(b) For Engine 2:

1) Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2

(c) Make sure that the two START switches are set to OFF.

1) Attach DO-NOT-OPERATE Tags to the two START switches.

(d) Make sure that the two start levers are in the CUTOFF position.

(2) Do these steps to get access to the DEU Input Monitoring of discretes display on the FMCS CDU:

(a) Push the INIT REF key two times.

(b) Push the INDEX line select key (LSK).

NOTE: This causes the INIT REF INDEX to show.

(c) Push the MAINT LSK.

NOTE: This causes the MAINT BITE INDEX to show.

(d) Push the CDS LSK.

NOTE: This causes the CDS BITE INDEX to show.

(e) Push the line select key for DEU 1.

(f) Push the INPUT MONITORING LSK.

NOTE: This causes the CDS DEU 1 MAINT/BITE DISCRETE STATUS MENU to show.

(3) Examine these pin parameters on the Input Monitoring screen for DEU 1:

(a) Do these steps to examine the first channel of DEU 1 for the applicable engine:

1) For Engine 1:

a) Push the SELECT B LSK.

NOTE: This causes the CDS DEU X MAINT/BITE DISCRETE STATUS, INSERT B screen to show.

2) For Engine 2:

a) Push the SELECT A LSK.

NOTE: This causes the CDS DEU X MAINT/BITE DISCRETE STATUS, INSERT A screen to show.

3) Record the value that shows in column H, row 2.

NOTE: With the start lever in the CUTOFF position, the H2 value should be O (open).

4) Move the start lever to the IDLE position.

5) Record the value that shows in column H, row 2.

NOTE: With the start lever in the IDLE position, the H2 value should be G (ground).

6) Move the start lever to the CUTOFF position.

(b) Do these steps to examine the second channel of DEU 1:

1) Push the INDEX line select key (LSK) key three times.

NOTE: This will cause the CDS BITE INDEX screen to show.

2) Push the LSK for DEU 1.

3) Push the INPUT MONITORING LSK.

NOTE: This causes the CDS DEU 1 MAINT/BITE DISCRETE STATUS MENU to show.

4) For Engine 1:

a) Push the SELECT D LSK.

NOTE: This causes the CDS DEU X MAINT/BITE DISCRETE STATUS, INSERT D screen to show.

5) For Engine 2:

a) Push the SELECT E LSK.

NOTE: This causes the CDS DEU X MAINT/BITE DISCRETE STATUS, INSERT E screen to show.

6) Record the value that shows in column H, row 2.

NOTE: With the start lever in the CUTOFF position, the H2 value should be O (open).

7) Move the start lever to the IDLE position.

8) Record the value that shows in column H, row 2.

NOTE: With the start lever in the IDLE position, the H2 value should be G (ground).

9) Move the start lever to the CUTOFF position.

(4) Examine these pin parameters on the Input Monitoring screen for DEU 2:

(a) Do these steps to examine the first channel of DEU 2:

1) For Engine 1:

a) Push the SELECT B LSK.

NOTE: This causes the CDS DEU X MAINT/BITE DISCRETE STATUS, INSERT B screen to show.

2) For Engine 2:

a) Push the SELECT A LSK.

NOTE: This causes the CDS DEU X MAINT/BITE DISCRETE STATUS, INSERT A screen to show.

3) Record the value that shows in column H, row 2.

NOTE: With the start lever in the CUTOFF position, the H2 value should be O (open).

4) Move the start lever to the IDLE position.

5) Record the value that shows in column H, row 2.

NOTE: With the start lever in the IDLE position, the H2 value should be G (ground).

6) Move the start lever to the CUTOFF position.

(b) Do these steps to examine the second channel of DEU 2:

1) Push the INDEX line select key (LSK) key three times.

NOTE: This will cause the CDS BITE INDEX screen to show.

2) Push the LSK for DEU 1.

3) Push the INPUT MONITORING LSK.

NOTE: This causes the CDS DEU 1 MAINT/BITE DISCRETE STATUS MENU to show.

4) For Engine 1:

a) Push the SELECT D LSK.

NOTE: This causes the CDS DEU X MAINT/BITE DISCRETE STATUS, INSERT D screen to show.

5) For Engine 2:

a) Push the SELECT E LSK.

NOTE: This causes the CDS DEU X MAINT/BITE DISCRETE STATUS, INSERT E screen to show.

6) Record the value that shows in column H, row 2.

NOTE: With the start lever in the CUTOFF position, the H2 value should be O (open).

7) Move the start lever to the IDLE position.

8) Record the value that shows in column H, row 2.

NOTE: With the start lever in the IDLE position, the H2 value should be G (ground).

9) Move the start lever to the CUTOFF position.

(c) Push the INIT REF key to end the Input Monitoring test.

(5) Compare the values that you recorded for DEU 1 and DEU 2 with the values in the table below:

Table 204

START LEVER POSITION	INSERT B PIN H2 ENG/EEC 1 DEU1 & DEU2	INSERT D PIN H2 ENG/EEC 1 DEU1 & DEU2	INSERT A PIN H2 ENG/EEC 2 DEU1 & DEU2	INSERT E PIN H2 ENG/EEC 2 DEU1 & DEU2
CUTOFF	"O" (O=OPEN)	"O"	"O"	"O"
IDLE	"G" (G=GROUND)	"G"	"G"	"G"

(a) If the Input Monitoring data agrees with the table for the two DEUs, then monitor the airplane on a subsequent flight.

NOTE: If you can not find the problem with the Input Monitoring, then it is most likely an intermittent fault.

1) If the problem continues on the subsequent flight, then replace the EEC, M1818. These are the tasks:

- EEC Removal, AMM TASK 73-21-60-000-801-F00
- EEC Installation, AMM TASK 73-21-60-400-801-F00

(b) If the Input Monitoring data disagrees with the table, then continue.

(6) If only one value to one of the DEUs is not in the correct state, then examine and repair the applicable wire between TB3102 and the DEU connector:

Table 205

ENG, DEU, AND INSERT	TERMINAL BLOCK AND PIN		DEU CONNECTORS AND PINS
ENG1 AND DEU1 INSERT B	TB3102 PIN YA9	TO	D3973B PIN H2
ENG1 AND DEU1 INSERT D	TB3102 PIN YA9	TO	D3973D PIN H2
ENG1 AND DEU2 INSERT B	TB3102 PIN YB9	TO	D3975B PIN H2
ENG1 AND DEU2 INSERT D	TB3102 PIN YB9	TO	D3975D PIN H2
ENG2 AND DEU1 INSERT A	TB3102 PIN YA97	TO	D3973A PIN H2
ENG2 AND DEU1 INSERT E	TB3102 PIN YA97	TO	D3973E PIN H2
ENG2 AND DEU2 INSERT A	TB3102 PIN YA99	TO	D3975A PIN H2
ENG2 AND DEU2 INSERT E	TB3102 PIN YA99	TO	D3975E PIN H2

(a) If you repaired a wire problem, then do the Repair Confirmation at the end of this task.

1) If the Repair Confirmation is not satisfactory, then continue.

(b) If you do not find a problem with the wiring or the problem continues, then replace the applicable DEU. These are the tasks:

- Display Electronic Unit Removal, AMM TASK 31-62-21-000-801
- Display Electronic Unit Installation, AMM TASK 31-62-21-400-801

1) Do the Repair Confirmation at the end of this task.

a) If the Repair Confirmation is not satisfactory, then replace the EEC, M1818. These are the tasks:

- EEC Removal, AMM TASK 73-21-60-000-801-F00

- EEC Installation, AMM TASK 73-21-60-400-801-F00

b) Do the Repair Confirmation at the end of this task.

(7) If only DEU 2 reports all incorrect values for one of the engines ("G" on the two inserts instead of "O", or "O" on the two inserts instead of "G"), then examine and repair the terminal block jumper between these pins:

NOTE: Inserts B and D are for Engine 1. Inserts A and E are for Engine 2.

(a) For Engine 1, terminal block TB3102, jumper between pins YA9 and YB9:

(b) For Engine 2, terminal block TB3102, jumper between pins YA97 and YA99.

1) If you repaired the jumper, then do the Repair Confirmation at the end of this task.

a) If the Repair Confirmation is not satisfactory, then continue.

2) If no problem is found with the jumper or the problem continues, then replace the applicable DEU. These are the tasks:

- Display Electronic Unit Removal, AMM TASK 31-62-21-000-801
- Display Electronic Unit Installation, AMM TASK 31-62-21-400-801

a) Do the Repair Confirmation at the end of this task.

(8) If all of the values for one of the engines on the two DEUs is incorrect ("G" on the four inserts instead of "O", or "O" on the four inserts instead of "G"), then examine and repair the wire terminal block and the applicable start lever Ch A relay:

NOTE: Inserts B and D are for Engine 1. Inserts A and E are for Engine 2.

(a) For Engine 1, terminal block TB3102 pin YA9 to relay receptacle D10922 pin C2.

NOTE: Relay receptacle D10922 is in junction box J22.

(b) For Engine 2, terminal block TB3102 pin YA97 to relay receptacle D10926 pin C2.

NOTE: Relay receptacle D10926 is in junction box J24.

1) If you repaired a wire problem, then do the Repair Confirmation at the end of this task.

a) If the Repair Confirmation is not satisfactory, then continue.

2) If you do not find a problem the wiring or the problem continues, then replace the applicable start lever Ch A relay (the most likely LRU from the Possible Causes list), R566 (Eng 1) or R568 (Eng 2).

NOTE: Relay R566 (Eng 1) is in junction box J22 and relay R568 (Eng 2) is in junction box J24.

3) Do the Repair Confirmation at the end of this task.

a) If the Repair Confirmation is not satisfactory, then replace the subsequent LRU from the Possible Causes list.

b) Do the Repair Confirmation at the end of this task.

G. Repair Confirmation

(1) Do these steps to prepare for the procedure:

(a) Make sure that the two start levers are in the CUTOFF position.

(b) For Engine 1:

1) Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	4	C00359	FUEL SPAR VALVE ENG 1

(c) For Engine 2:

1) Remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2

(d) Remove the DO-NOT-OPERATE Tags from the two start switches.

(2) Do one of these two options:

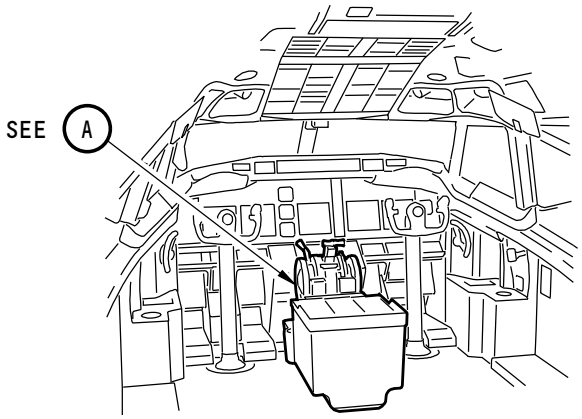
(a) Option 1: Do this task: Test 13 - Engine Run - EEC BITE Check, AMM TASK 71-00-00-700-808-F00

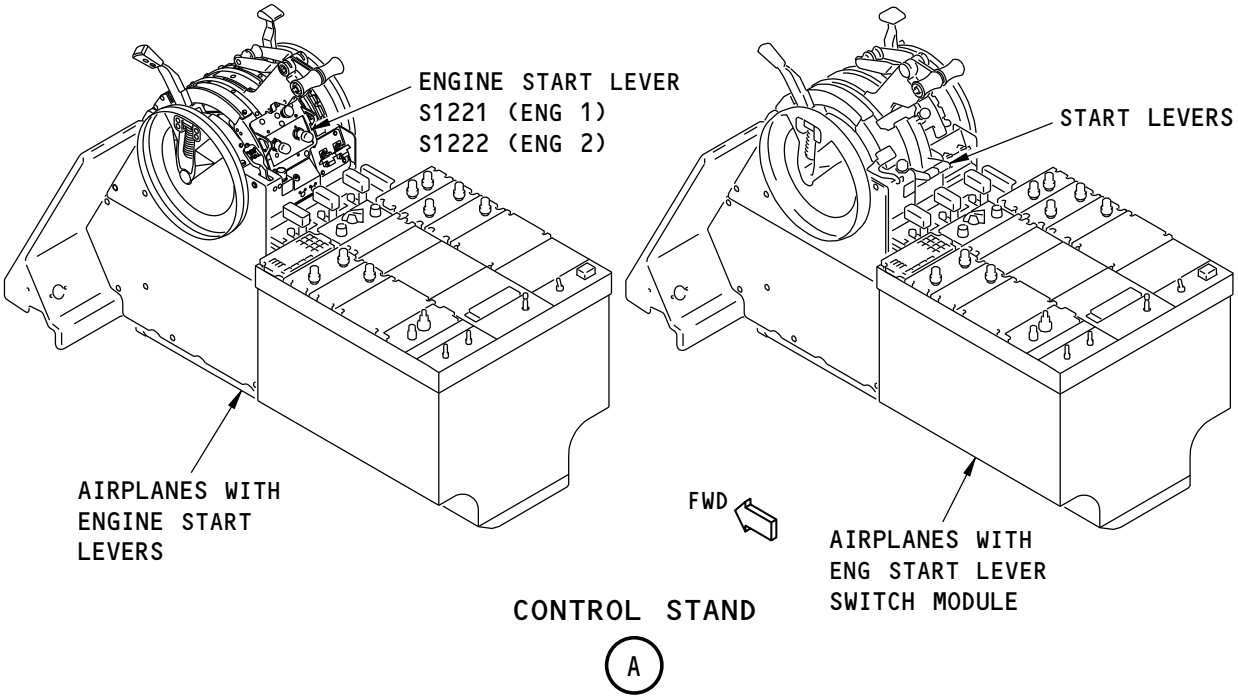
1) If the maintenance message does not show in Flight Leg 0, then you corrected the fault.

(b) Option 2: Record the steps that you completed to correct the fault.

1) Monitor the airplane on subsequent flights.

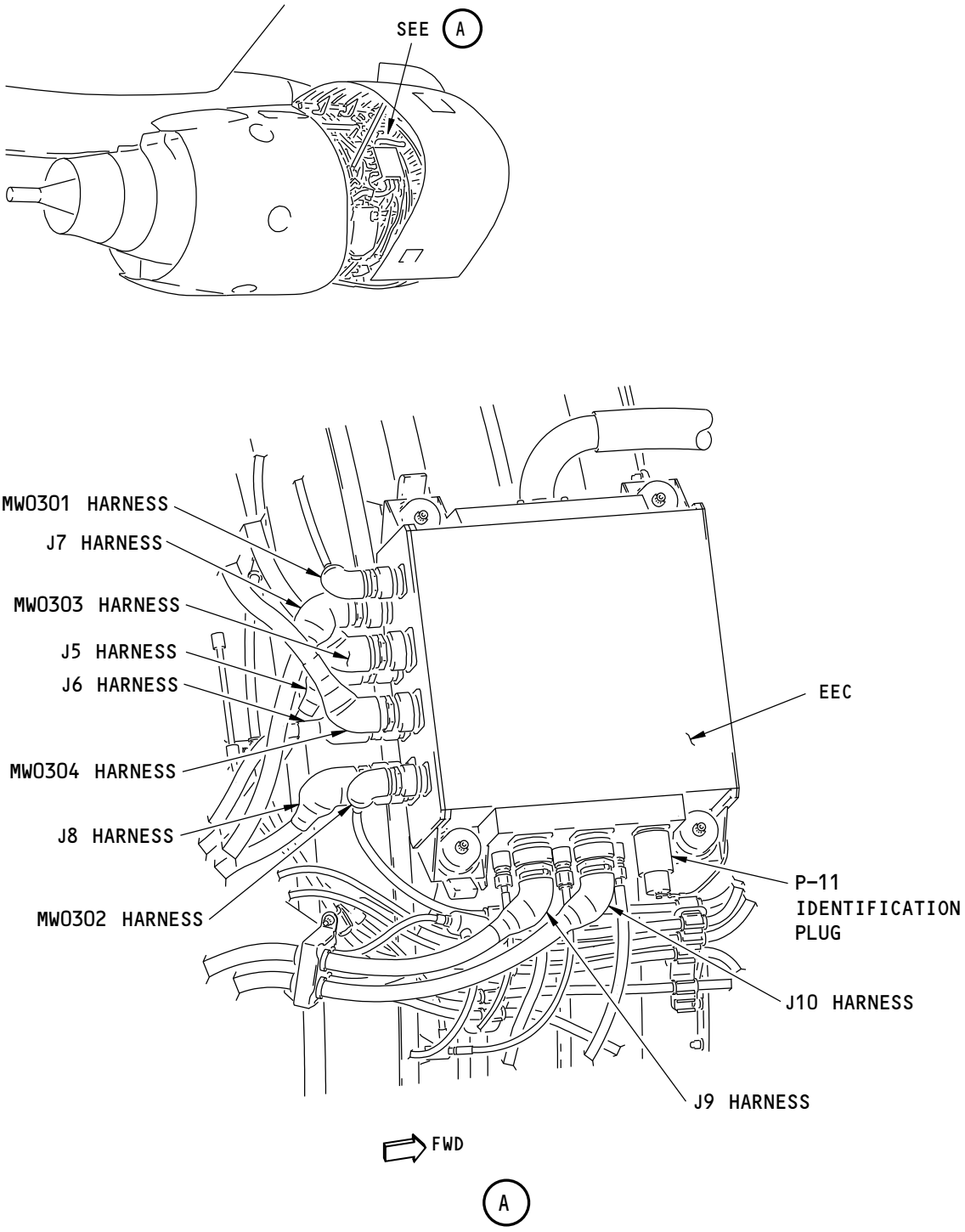
——— END OF TASK ———



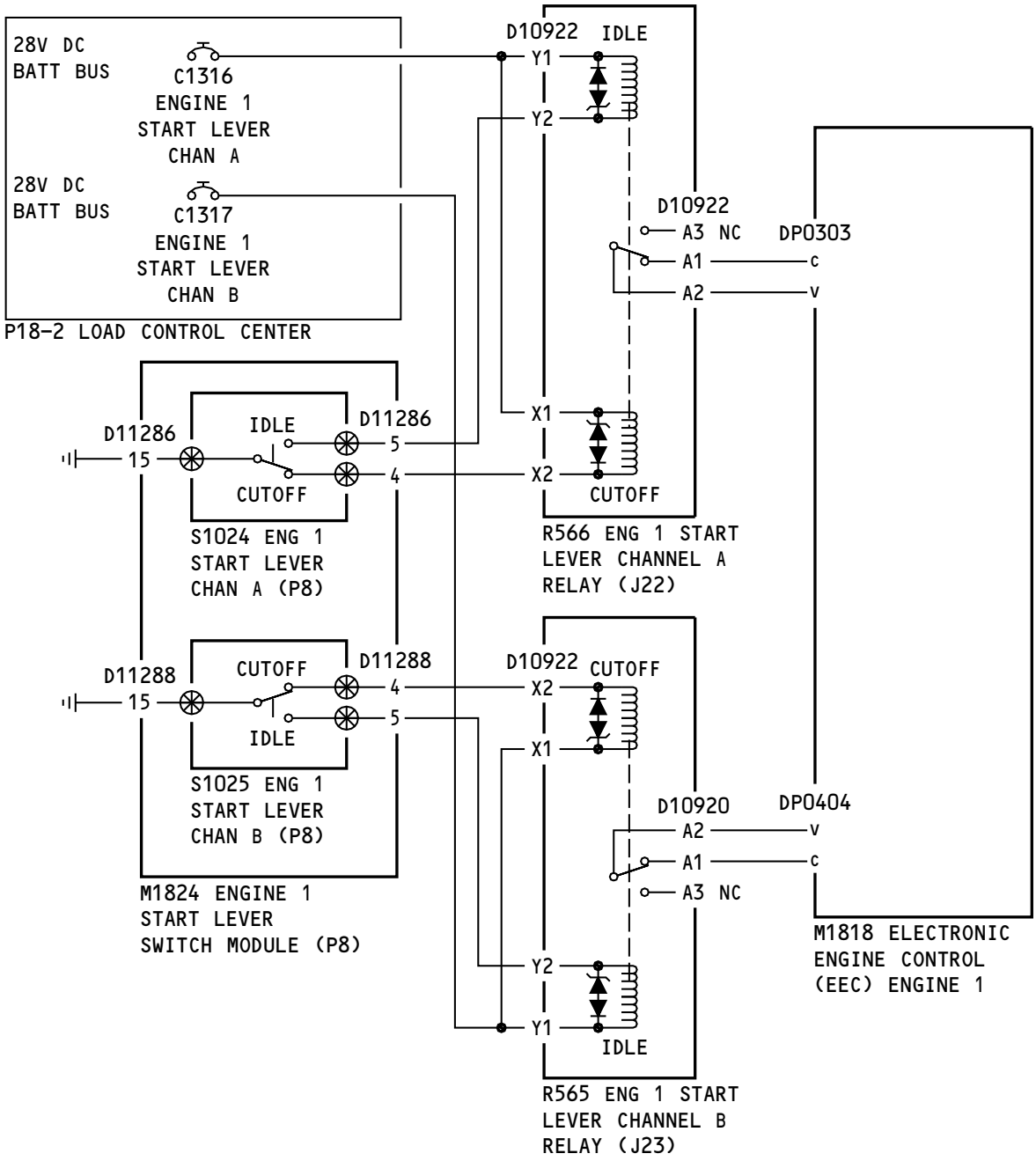


H41870 S0006746211_V3

Start Levers
Figure 301/76-11-00-990-801-F00



Electronic Engine Control (EEC)
Figure 302/76-11-00-990-802-F00

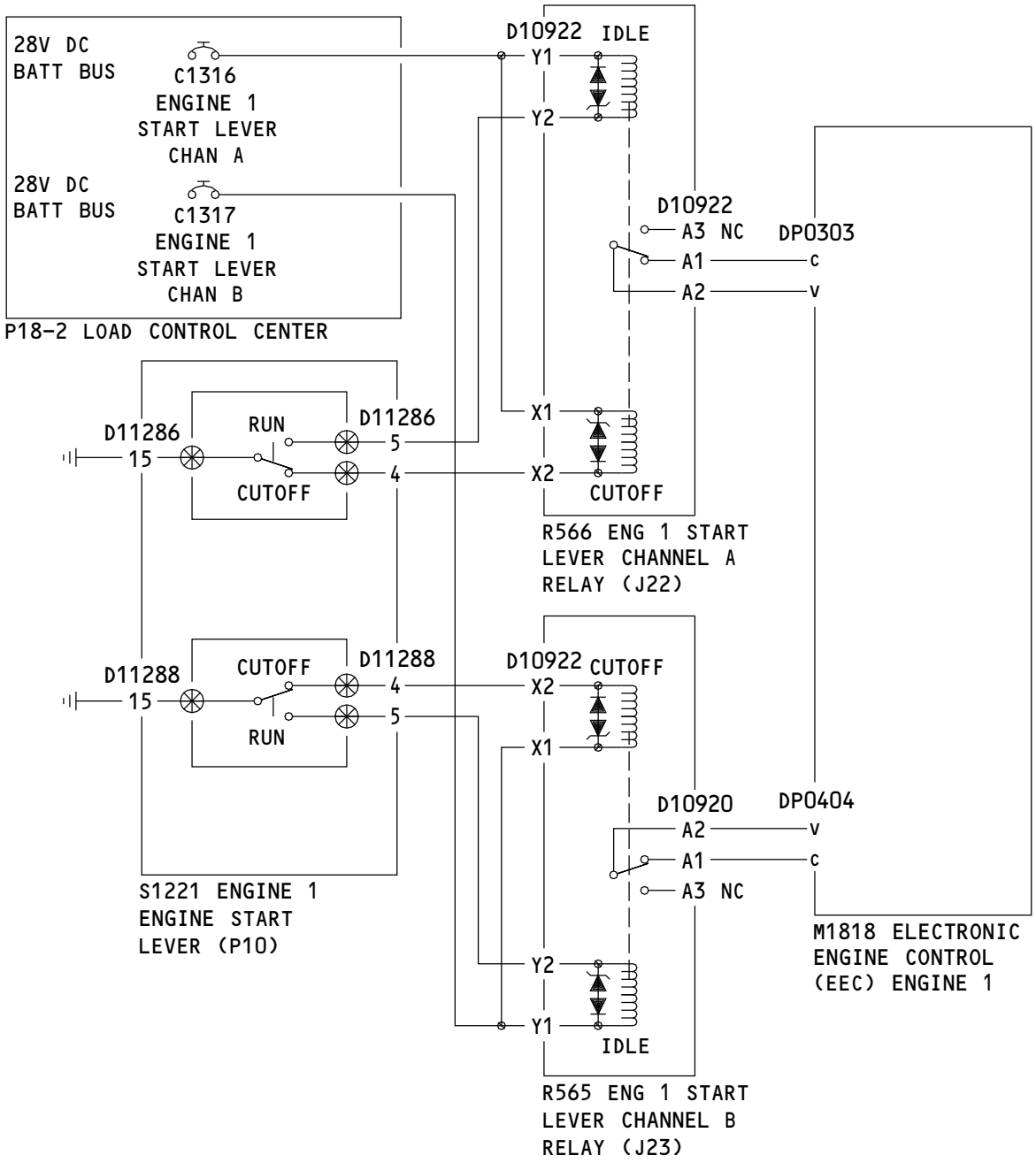


ENGINE 1

NOTE: THE WDM/SSM ADD A DASH TO THE PIN LETTER TO DENOTE A LOWER CASE PIN, SUCH AS A- = a.

H42217 S0006746213_V1

Start Lever/ECC Simplified Schematic
Figure 303/76-11-00-990-803-F00 (Sheet 1 of 4)

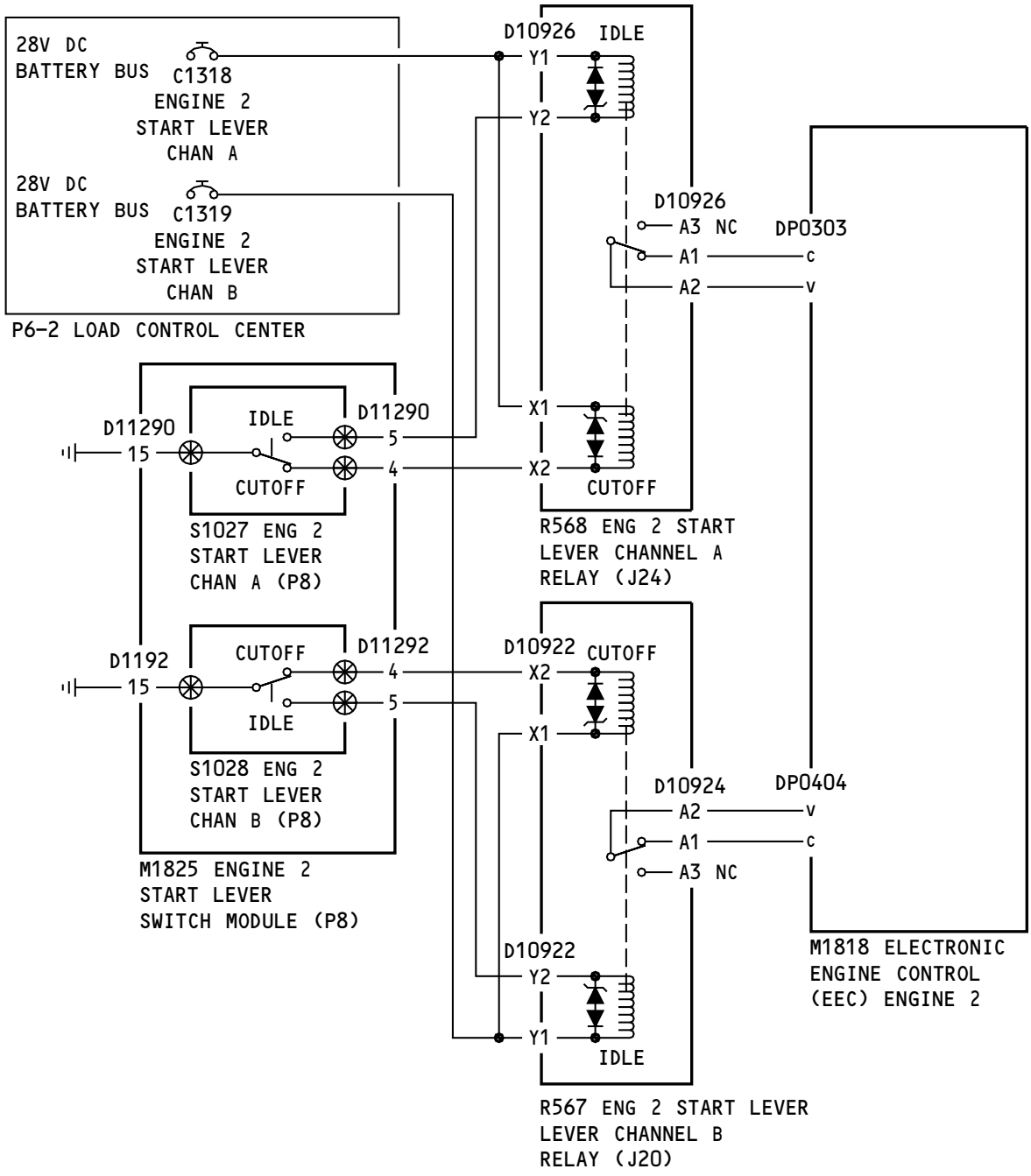


ENGINE 1

NOTE: THE WDM/SSM ADD A DASH TO THE PIN LETTER TO DENOTE A LOWER CASE PIN, SUCH AS A- = a.

2451522 S0000568769_V2

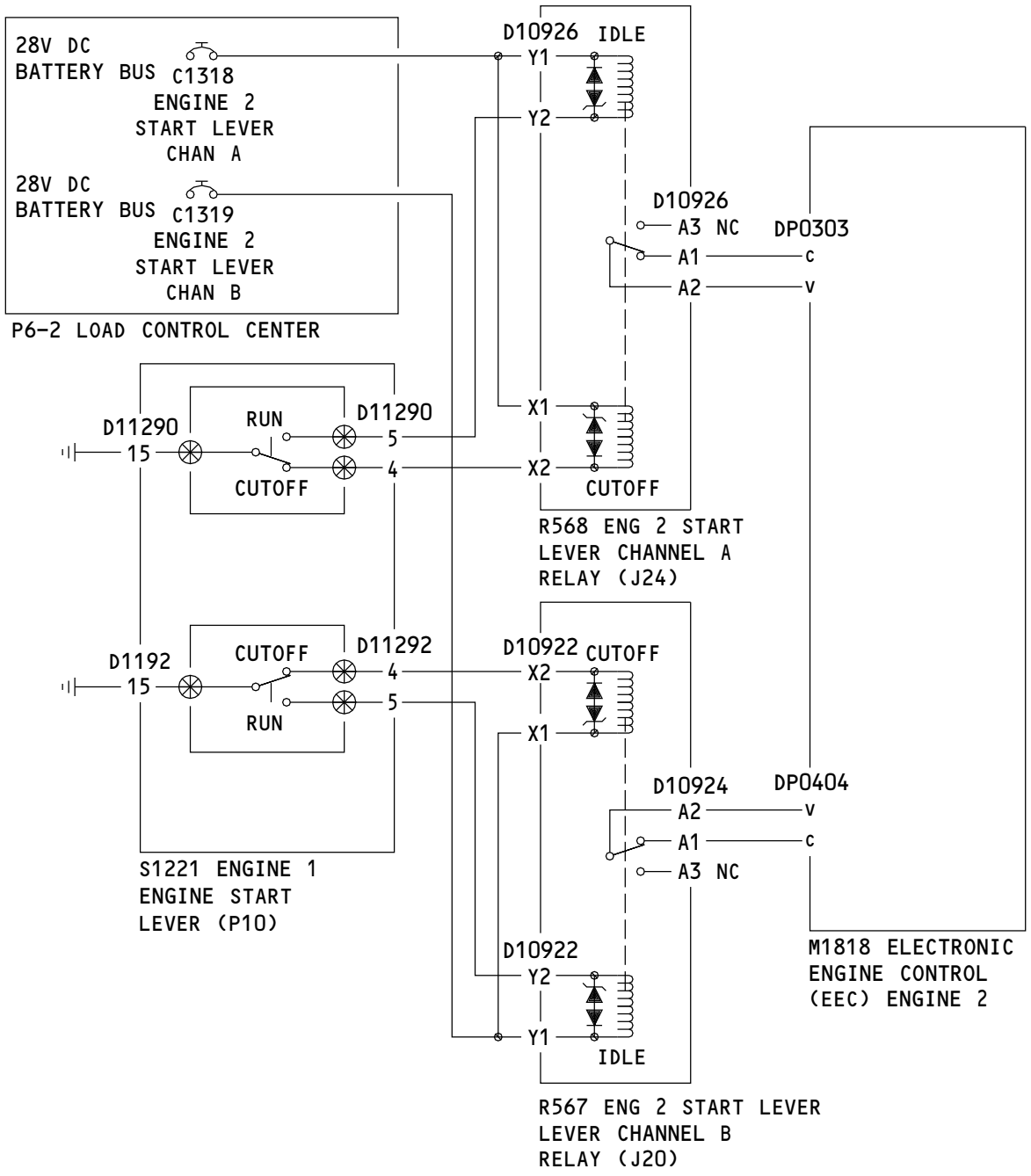
Start Lever/ECC Simplified Schematic
Figure 303/76-11-00-990-803-F00 (Sheet 2 of 4)



NOTE: THE WDM/SSM ADD A DASH TO THE PIN LETTER TO DENOTE A LOWER CASE PIN, SUCH AS A- = a.

H42250 S0006746214_V1

Start Lever/ECC Simplified Schematic
Figure 303/76-11-00-990-803-F00 (Sheet 3 of 4)

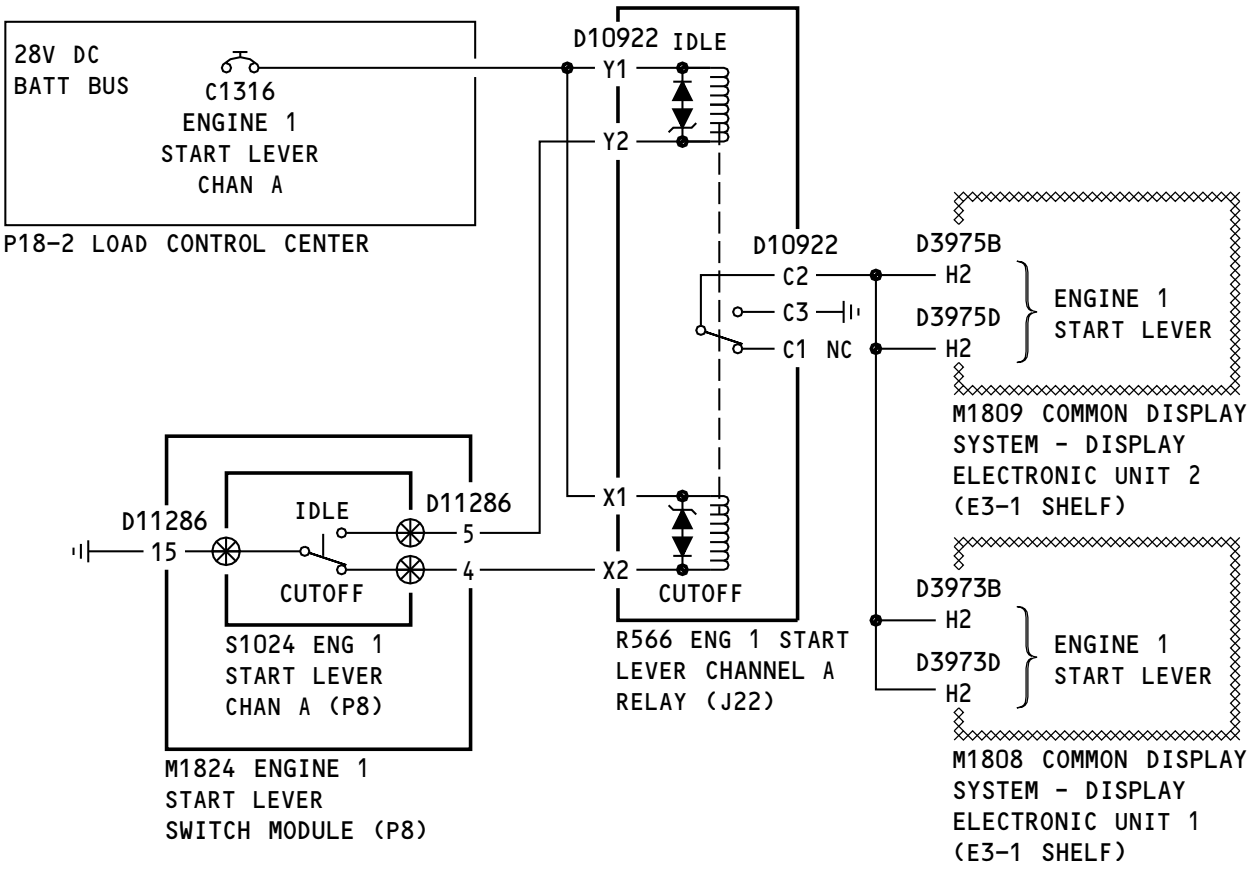


ENGINE 2

NOTE: THE WDM/SSM ADD A DASH TO THE PIN LETTER TO DENOTE A LOWER CASE PIN, SUCH AS A- = a.

2451526 S0000568770_V2

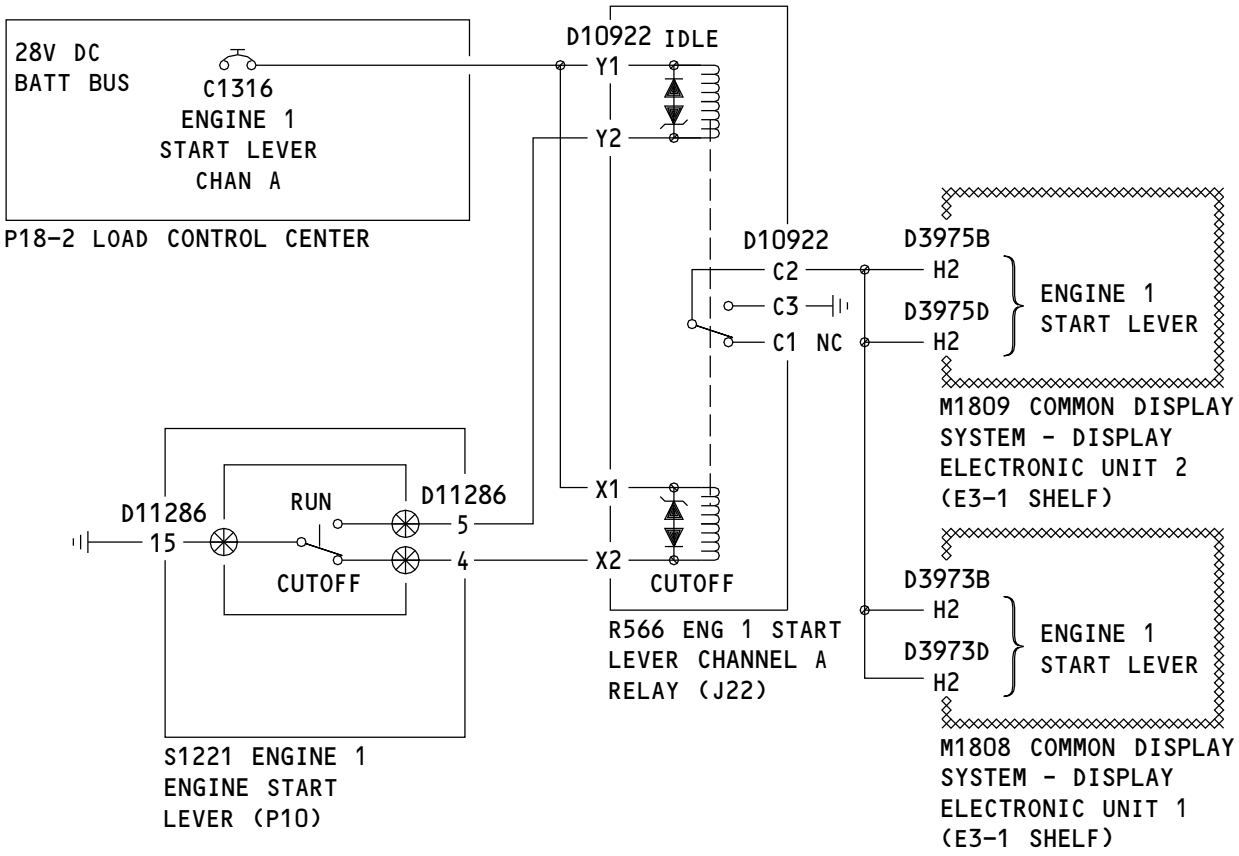
Start Lever/ECC Simplified Schematic
Figure 303/76-11-00-990-803-F00 (Sheet 4 of 4)



ENGINE 1

H42312 S0006746215_V1

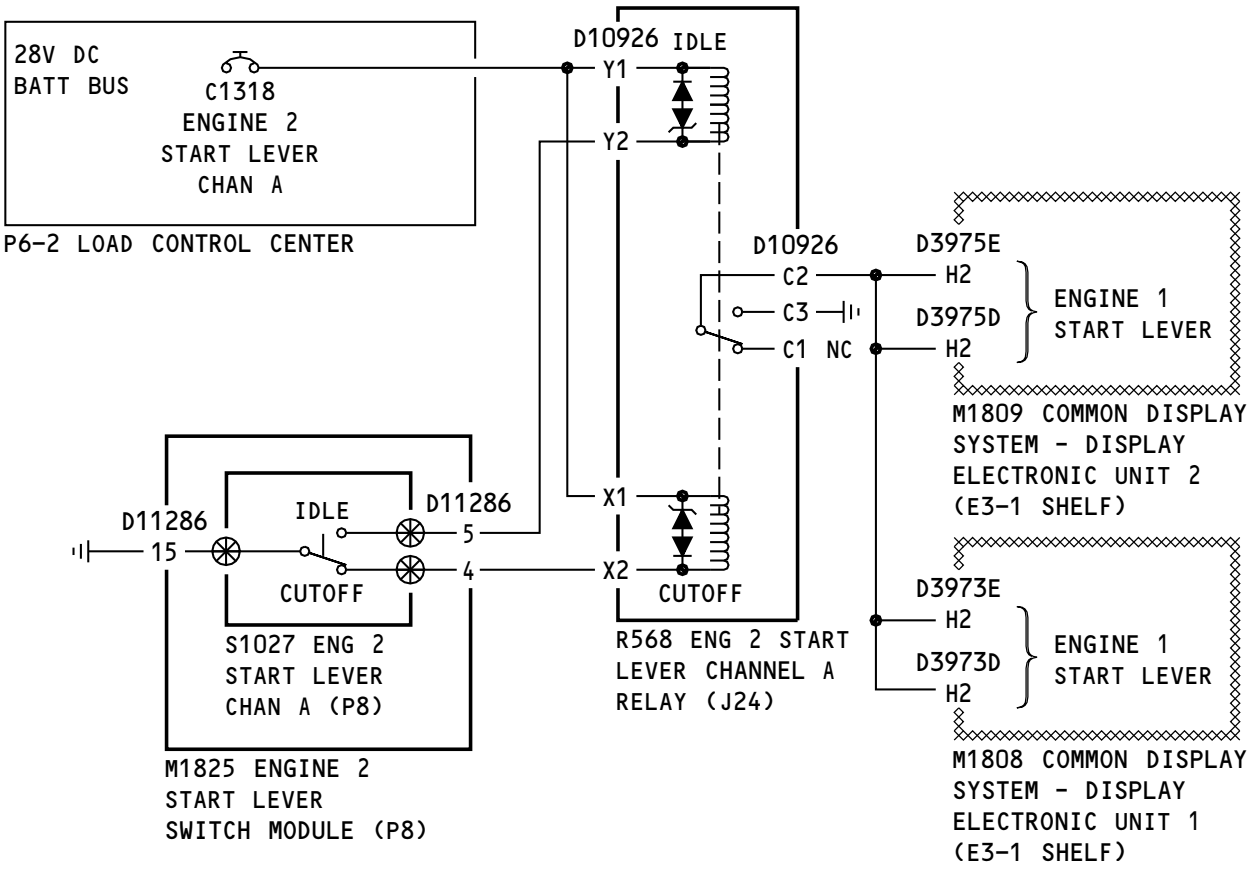
Start Lever/DEU Data Simplified Schematic
Figure 304/76-11-00-990-804-F00 (Sheet 1 of 4)



ENGINE 1

2451534 S0000568771_V2

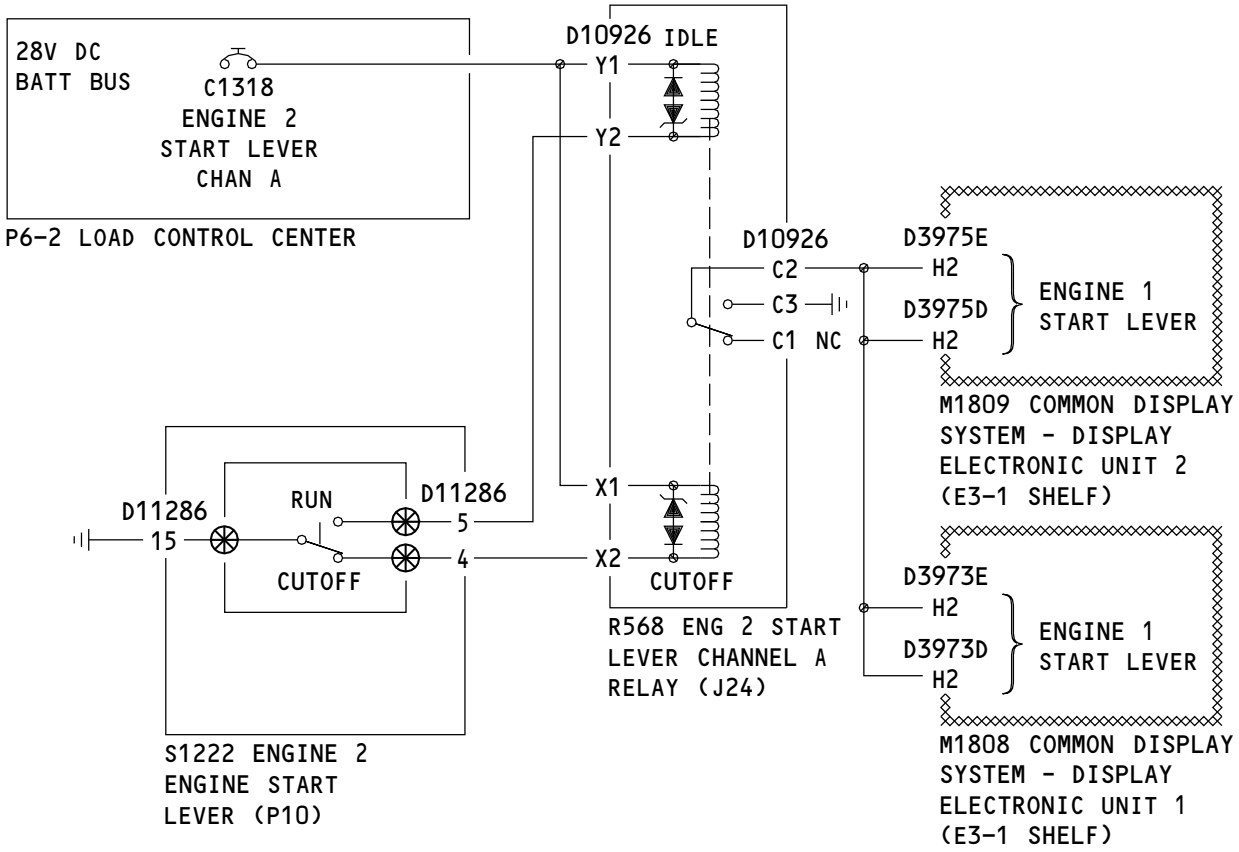
Start Lever/DEU Data Simplified Schematic
Figure 304/76-11-00-990-804-F00 (Sheet 2 of 4)



ENGINE 2

H82876 S0006746216_V1

Start Lever/DEU Data Simplified Schematic
Figure 304/76-11-00-990-804-F00 (Sheet 3 of 4)



ENGINE 2

2451538 S0000568772_V2

Start Lever/DEU Data Simplified Schematic
Figure 304/76-11-00-990-804-F00 (Sheet 4 of 4)