

SWA ALL

**This task is for  
reference only.  
The tooling  
listed in this task  
is not used for  
the event.**

### Aircraft Maintenance Manual

## Switch Test and Cleaning

(Figure 502)

**NOTE:** ETOPS SIGNIFICANT SYSTEM TASK. If this task is accomplished on an ETOPS aircraft, ETOPS procedures must be followed, including restrictions associated with Dual Maintenance. (Refer to MPM Chapter 46.)

#### A. General

- (1) This procedure is designed to detect an accumulation of debris and residue on low current electrical connections, which inhibit circuit conductivity and to help identify switches with mechanical repeatability issues.
- (2) This Predictive Maintenance & Enhanced Troubleshooting (PMET) procedure is optional and the results are for evaluation purposes only. No action is required as a result of this inspection if a flight deck effect or other observed fault does not exist. The recommendations are made to show Boeing's best practices to make sure that maximum aircraft reliability is reached. If a flight deck effect or other observed fault exists, it must be corrected with accepted procedures.

#### B. References

Reference	Title
53-14-01-020-801	Nose Wheel Well Access Panels - Removal (P/B 401)
53-14-01-420-801	Nose Wheel Well Access Panels - Installation (P/B 401)

## *Preliminary Requirements*

#### C. Tools/Equipment

**NOTE:** When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
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DO NOT USE AFTER: 09 Mar 2025

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SPL-22886

Test Set - Auto Throttle Switchpack (ATSP)

**737-700, -800**

Part #: C76003-1 Supplier: 81205

#### D. Location Zones

<b>Zone</b>	<b>Area</b>
112	Area Forward of Nose Landing Gear Wheel Well
113	Area Above and Outboard of Nose Landing Gear Wheel Well - Left
114	Area Above and Outboard of Nose Landing Gear Wheel Well - Right
211	Flight Compartment - Left
212	Flight Compartment - Right

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**E. Access Panels**


<b>Number</b>	<b>Name/Location</b>
112A	Forward Access Door

**Procedure**

**F. Prepare for the Test**

SUBTASK 76-11-07-860-032-F00

(1) If not already done, do these steps to prepare the airplane:



**WARNING** MAKE SURE THAT YOU OPEN THE CIRCUIT BREAKERS FOR THE WEATHER RADAR SYSTEM. THE FORWARD MOVEMENT OF A THRUST LEVER CAN CAUSE THE AUTOMATIC OPERATION OF THE SYSTEM. THE OPERATION OF THIS SYSTEM CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

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

**F/O Electrical System Panel ,P6-1**

<b>Row</b>	<b>Col</b>	<b>Number</b>	<b>Name</b>
D	13	C00120	WEATHER RADAR RT

**F/O Electrical System Panel ,P6-2**

<b>Row</b>	<b>Col</b>	<b>Number</b>	<b>Name</b>
B	9	C00440	FLIGHT CONTROL AUTO SPEED BRAKE

**F/O Electrical System Panel ,P6-3**

<b>Row</b>	<b>Col</b>	<b>Number</b>	<b>Name</b>
A	16	C01345	LANDING GEAR AUTOBRAKE BITE CONT 2
A	18	C00583	LANDING GEAR AUTOBRAKE BITE CONT 1
C	18	C01398	LANDING GEAR TAKEOFF WARNING CUTOFF
D	18	C00451	LANDING GEAR AURAL WARN

(b) For Engine 1, do this step:

Open these circuit breakers and install safety tags:

**CAPT Electrical System Panel ,P18-2**

<b>Row</b>	<b>Col</b>	<b>Number</b>	<b>Name</b>
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

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#### CAPT Electrical System Panel ,P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	6	C00148	ANTI-ICE & RAIN ENG 1 & WING CONT

- (c) For Engine 2, do this step:  
Open these circuit breakers and install safety tags:

#### CAPT Electrical System Panel ,P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	6	C00149	ANTI-ICE & RAIN ENGINE 2 CONTROL

#### F/O Electrical System Panel ,P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
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

- (d) Make sure that the applicable thrust lever is at the IDLE stop and reverse thrust lever is stowed.  
(e) To gain access to the forward parts of the left or right switchpack, open this access panel:

<u>Number</u>	<u>Name/Location</u>
112A	Forward Access Door

- (f) Remove the applicable top panel in the nose wheel well (TASK 53-14-01-020-801).

SUBTASK 76-11-07-010-010-F00

- (2) If not already done, do these steps to disconnect the applicable switchpack connectors:  
(a) For the left switchpack, disconnect the electrical connectors D11128P and D11130P.  
(b) For the right switchpack, disconnect the electrical connectors D11132P and D11134P.

SUBTASK 76-11-07-480-001-F00

- (3) Connect the test set, SPL-22886.  
(a) Connect the applicable harness (Engine 1/2) to the test set.  
(b) Connect the harness to switchpack connectors that were removed previously.

**NOTE:** Keep the test set in the flight deck and put the cable through the number 2 window for easier testing.

- (c) Connect the test set to a 115/120 VAC, 60/400 HZ power source.

#### G. Switch Repeatability Test

SUBTASK 76-11-07-860-033-F00

- (1) Do these steps to show engine test menu on the Flight Management Computer System (FMCS) Control Display Unit (CDU):  
(a) Make sure that the applicable engine thrust lever and reverse thrust lever is at the IDLE stop.  
(b) Get access to the FMCS CDU in the flight compartment.  
(c) Press the INIT REF key to show the PERF INIT screen on the FMCS CDU.  
(d) Push these Line Select Key (LSK)s on the FMCS CDU:  
1) INDEX.

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### 2) MAINT.

NOTE: This LSK causes the MAINT BITE INDEX screen to show.

### 3) ENGINE.

NOTE: This LSK causes the ENGINE/EXCEED BITE INDEX screen to show.

### 4) ENGINE X for the applicable resolver.

NOTE: This LSK causes the ENGINE X BITE TEST MAIN MENU to show. Also, the ENGINE X LSK automatically applies power to the EEC and causes the EEC to initialize. The CDU will show INITIALIZING EEC X, and EEC SORTING FAULT HISTORY DATA for a short time, just before the ENGINE X BITE TEST MAIN MENU shows.

SUBTASK 76-11-07-860-034-F00

### (2) Do these steps to show the Thrust Lever Resolver Angle (TRA) values for the Engine X thrust lever:

#### (a) Push the INPUT MONITORING LSK.

NOTE: This will cause the CAUTION SCREEN OF INPUT MONITORING to show.

#### (b) Push the CONTROL LOOPS LSK.

NOTE: This will cause screen 1 of the CONTROL LOOPS to show.

#### (c) Push the NEXT PAGE key two times.

NOTE: This will cause screen 3 of the CONTROL LOOPS to show.

#### (d) Push the TRA LSK on screen 3 of the CONTROL LOOPS.

NOTE: This causes the TRA for channels A and B, of Engine X, to show.

NOTE: The data for the channel that is in control will show first.

SUBTASK 76-11-07-750-001-F00

### (3) Do these steps for the switch repeatability test.

#### (a) Move the applicable thrust lever and reverse thrust lever until the TRA value that shows on the CDU is in the range shown in Table 503.

#### (b) Using the test set, SPL-22886, and Table 503, test each switch.

1) Turn the test set, SPL-22886, on with the POWER switch

2) Place the LOAD SELECT switch in the "TEST" position.

#### (c) Record the VOLTMETER reading for each switch and each contact pair (NO/NC) in Table 503.

NOTE: The VOLTMETER will display volts DC in mV. The reading .003 is read as 3mV.

1) Observe the TRA and move the Throttle Lever close to the TRANSITION point switch you are testing.

2) Move the INDICATORS SELECT switch for the switch you are testing to the "LED" position.

3) Take note of which contact pair LED is illuminated.

4) Move the INDICATORS SELECT switch for the switch you are testing to the "METER" position.

5) Record the voltage observed on the voltmeter in Table 503 for that contact pair under "VALUE 1"

6) Move the INDICATORS SELECT switch for the switch you are testing to the "LED" position

7) Slowly move the throttle toward the TRANSITION point, until the other contact pair LED illuminates.

8) Move the INDICATORS SELECT switch for the switch you are testing to the "METER" position.

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- 9) Wait a minimum of 10 seconds.
- 10) Record the voltage observed on the voltmeter in Table 503 under "VALUE 1"
- 11) Move the INDICATORS SELECT switch for the switch you are testing back to the "LED" position.
- 12) Slowly move the throttle lever the opposite way until the LED illuminates.
- 13) Move the INDICATORS SELECT switch for the switch you are testing to the "METER" position.
- 14) Wait a minimum of 10 seconds.
- 15) Record the voltage observed on the voltmeter in Table 503 under "VALUE 2".
- 16) Move the INDICATORS SELECT switch for the switch you are testing to the "LED" position.
- 17) Slowly move the throttle lever the opposite way until the LED illuminates.
- 18) Move the INDICATORS SELECT switch for the switch you are testing to the "METER" position.
- 19) Wait a minimum of 10 seconds.
- 20) Record the voltage observed on the voltmeter in Table 503 under "VALUE 2".
- 21) Calculate the delta between VALUE 1 and VALUE 2.
- 22) If there is a +/- 2 mV delta between VALUE 1 and VALUE 2, or the meter indication did not stabilize in 10 seconds, do the cleaning procedure.
- 23) Repeat the above steps for each switch you test.

**Table 503/76-11-07-993-812-F00 Switch Reliability Test**

SWITCH SELECT	CONTACT PAIR	TRA	TRANSITION	VALUE 1 mV	VALUE 2 mV	Delta of VALUE 1 and VALUE 2	SYSTEM
S1	NC	8.00-42.00	42.00-46.00				Landing Gear Warning
S1	NO	46.00-82.00	42.00-46.00				Automatic Ground Speedbrake
S2	NC	8.00-42.00	42.00-46.00				Autobrake
S2	NO	NOT USED					
S3	NC	8.00-42.00	42.00-46.00				Autobrake
S3	NO	NOT USED					
S4	NC	34.00-82.00	30.00-34.00				T/R Sync Lock
S4	NO	8.00-30.00	30.00-34.00				T/R Sync Lock
S5	NC	34.00-30.00	30.00-34.00				T/R Arm
S5	NO	8.00-30.00	30.00-34.00				T/R Arm
S6	NC	34.00-82.00	30.00-34.00				T/R Stow

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S6	NO	NOT USED					
S7	NC	NOT USED					
S7	NO	62.00–82.00	58.00–62.00				LE Ground Wing Anti-Ice
S8	NC	8.00–51.00	51.00–55.00				Weather Radar
S8	NO	55.00–82.00	51.00–55.00				Takeoff Warning and Landing Gear Warning
S9	NC	8.00–62.00	62.00–66.00				Takeoff Warning
S9	NO	NOT USED					

SUBTASK 76-11-07-750-002-F00

(4) Switch contact cleaning procedure using the test set, SPL-22886.

(a) Prepare for the cleaning.

- 1) Place the LOAD SELECT switch in the TEST position.
- 2) Move the SWITCH SELECT to the switch you would like to clean.
- 3) Move the INDICATORS SELECT switch of your switch to the LED position.
- 4) Using the TRA values Table 503, move the throttle lever until the contact pair LED of the switch you cleaning illuminates.

(b) Contact cleaning procedure.

- 1) Move the LOAD SELECT switch in the CLEAN position, the CLEAN LED should illuminate.
- 2) With the LOAD SELECT switch in the CLEAN position, clean the switch as follows:
  - a) Observe the NO and NC LED's for the switch you are testing.
  - b) Slowly move the throttle lever until the opposite LED illuminates.
    - <1> Hold the throttle lever at this position for 5 seconds.
  - c) Slowly move the throttle lever back in the other direction until the original LED illuminates.
    - <1> Hold the throttle lever at this position for 5 seconds.
  - d) Repeat this process 3 more times.

3) Repeat the contact cleaning procedure of all switches that fail the switch repeatability test.

(c) Move the LOAD SELECT switch back to the TEST position.

(d) Perform the Switch Repeatability Test on the switch(s) you cleaned.

SUBTASK 76-11-07-750-003-F00

(5) Do this step for the switch evaluation.

(a) The maximum voltage reading should not exceed 50 mV.

- 1) If a 50mV reading is observed after the cleaning procedure, it is recommended to replace the switchpack assembly at the next convenient maintenance opportunity.

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- (b) If the switch does not pass the second repeatability test, there is a mechanical defect in the switch, and it should be replaced at the next convenient maintenance opportunity.

**H. Put the Airplane Back to Its Usual Condition**

SUBTASK 76-11-07-080-001-F00

- (1) Remove the test set, SPL-22886.
  - (a) Remove the applicable harness from the switchpack connectors.
  - (b) Remove the applicable harness (Engine 1/2) from the test set.

SUBTASK 76-11-07-410-006-F00

- (2) If not already done, do these steps to connect the applicable switchpack connectors:
  - (a) For the left switchpack, connect the electrical connectors D11128P and D11130P.
  - (b) For the right switchpack, connect the electrical connectors D11132P and D11134P.

SUBTASK 76-11-07-410-007-F00

- (3) If not already done, do these steps:
  - (a) Install the applicable top panel in the nose wheel well panel (TASK 53-14-01-420-801).
  - (b) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
112A	Forward Access Door

- (c) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel ,P6-1**

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	13	C00120	WEATHER RADAR RT

**F/O Electrical System Panel ,P6-2**

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	9	C00440	FLIGHT CONTROL AUTO SPEED BRAKE

**F/O Electrical System Panel ,P6-3**

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	16	C01345	LANDING GEAR AUTOBRAKE BITE CONT 2
A	18	C00583	LANDING GEAR AUTOBRAKE BITE CONT 1
C	18	C01398	LANDING GEAR TAKEOFF WARNING CUTOFF
D	18	C00451	LANDING GEAR AURAL WARN

- (d) For Engine 1, do this step:  
 Remove the safety tags and close these circuit breakers:

**CAPT Electrical System Panel ,P18-2**

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	4	C01003	ENGINE 1 THRUST REVERSER IND
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	6	C01412	ENGINE 1 THRUST REVERSER INTLK



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B            7            C01266            ENGINE 1 THRUST REVERSER SYNC LOCK

**CAPT Electrical System Panel ,P18-3**

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	6	C00148	ANTI-ICE & RAIN ENG 1 & WING CONT

(e) For Engine 2, do this step:

Remove the safety tags and close these circuit breakers:

**CAPT Electrical System Panel ,P18-3**

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	6	C00149	ANTI-ICE & RAIN ENGINE 2 CONTROL

**F/O Electrical System Panel ,P6-2**

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
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

**Figure 502 Switch Test and Cleaning**

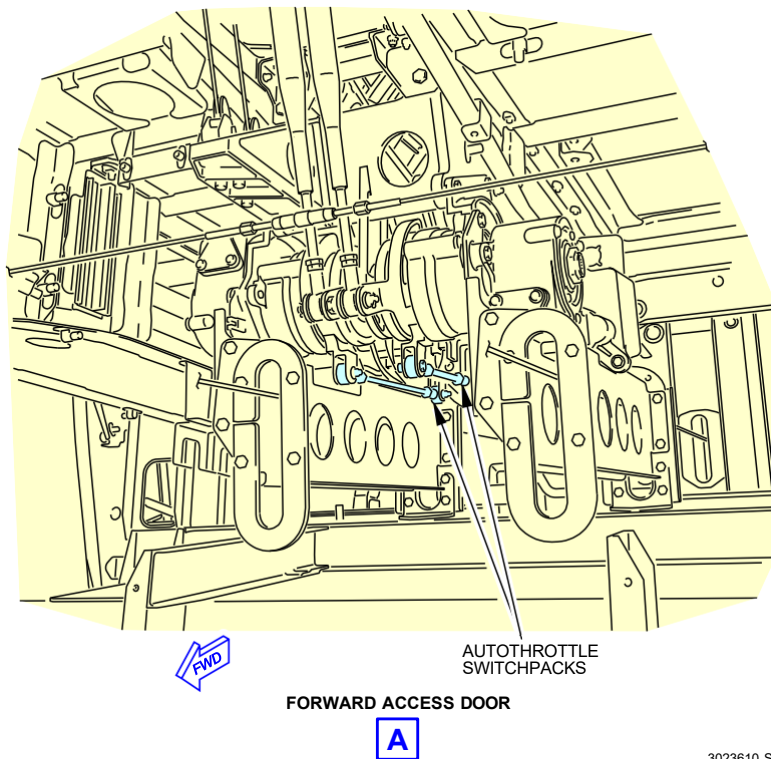
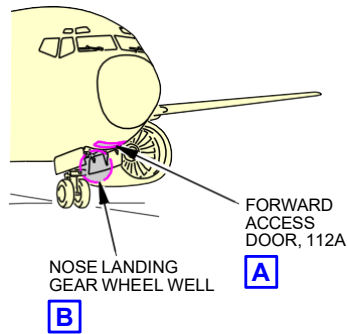
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- Sheet 2
- Sheet 3
- Sheet 4
- Sheet 5
- Sheet 6
- Sheet 7

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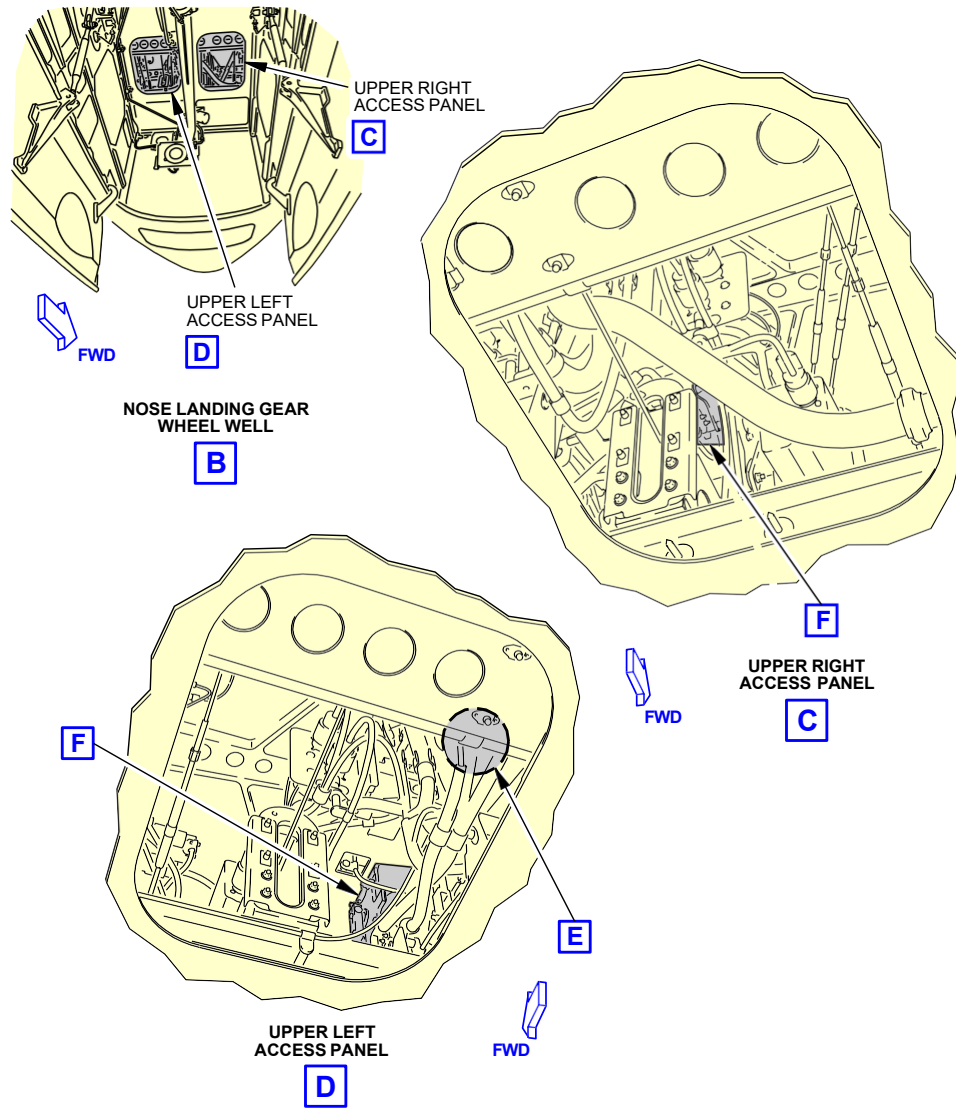
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Switch Test and Cleaning  
Figure 502/76-11-07-990-810-F00 (Sheet 1)  
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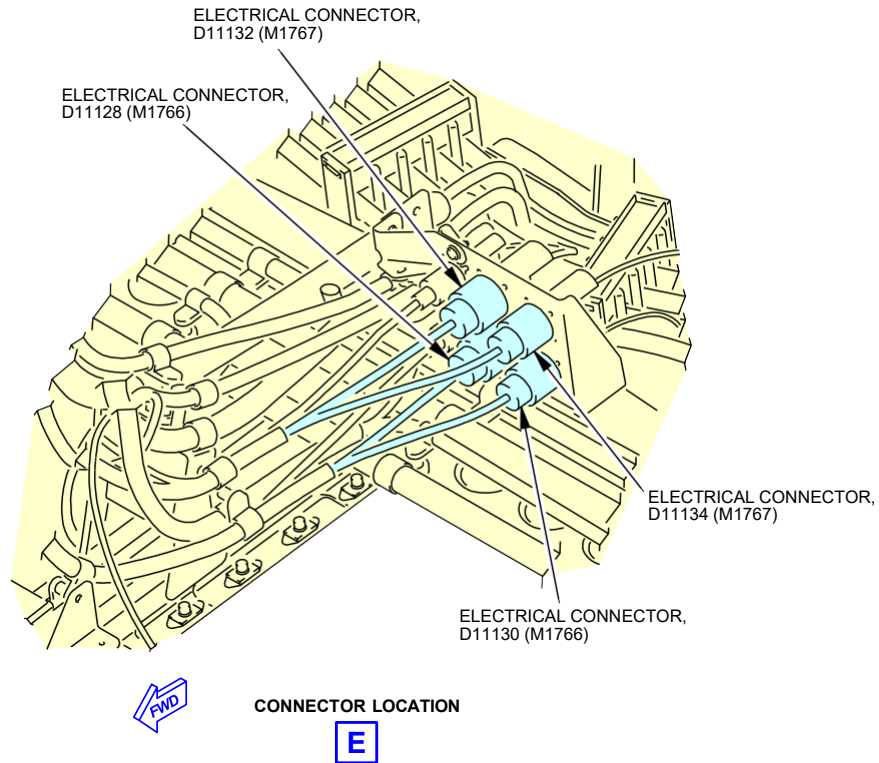
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Switch Test and Cleaning  
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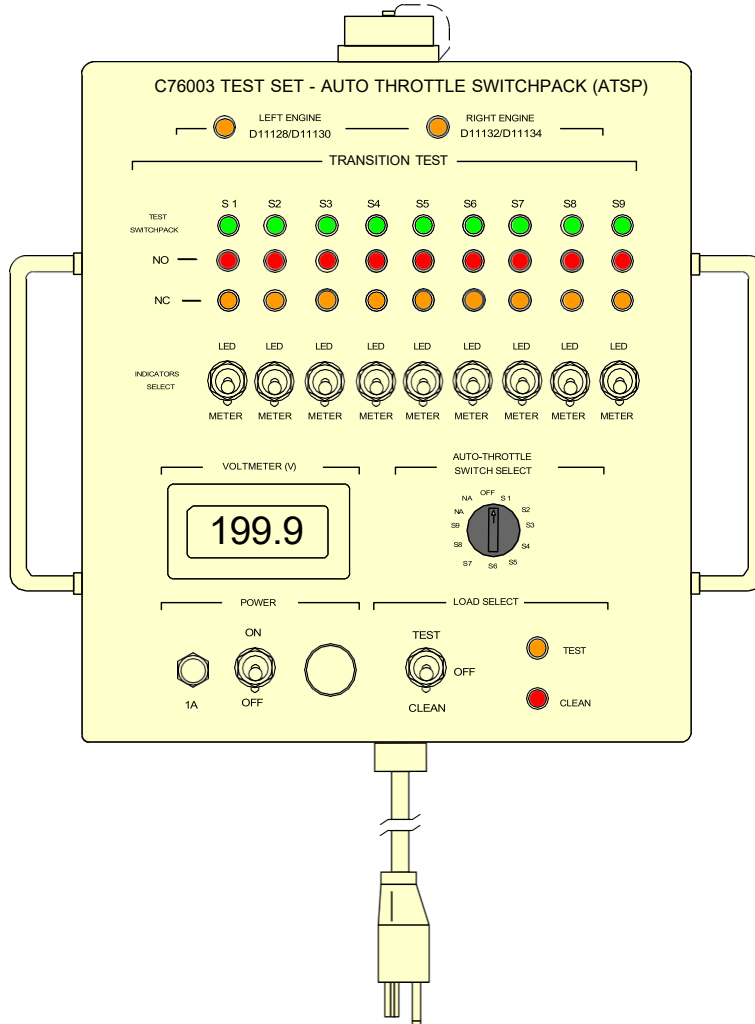
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Switch Test and Cleaning  
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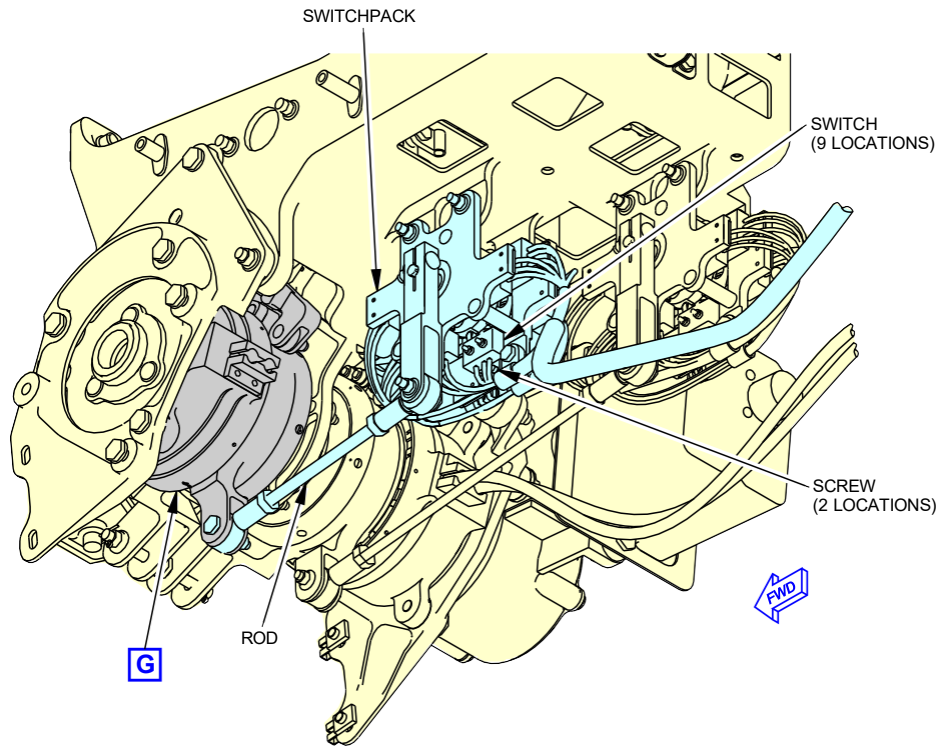
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Switch Test and Cleaning  
Figure 502/76-11-07-990-810-F00 (Sheet 4)  
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AUTOTHROTTLE SWITCHPACK  
(EXAMPLE)

**F**

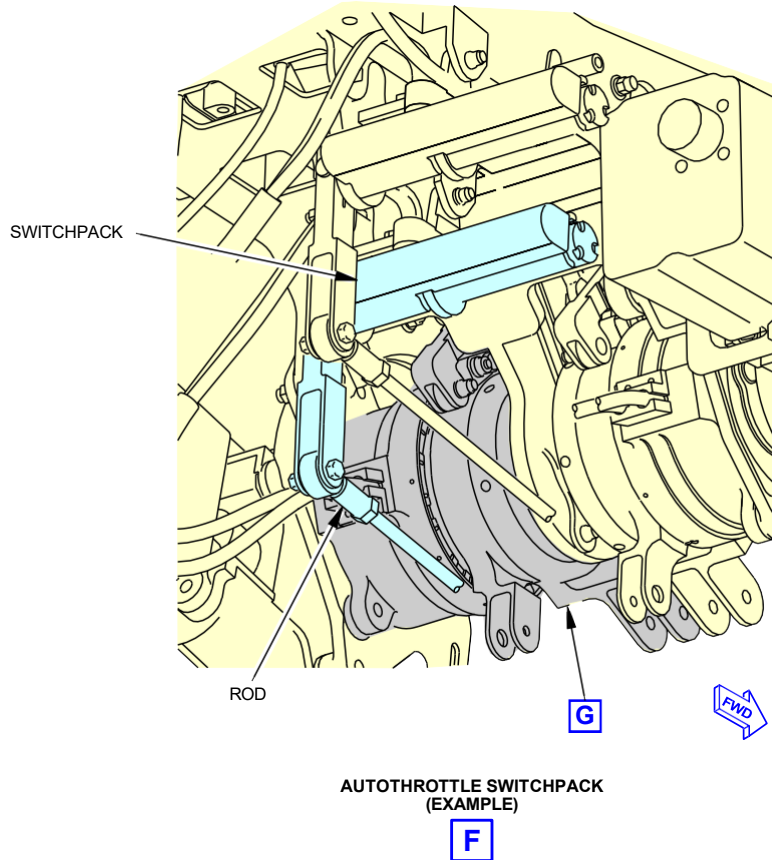
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Switch Test and Cleaning  
Figure 502/76-11-07-990-810-F00 (Sheet 5)  
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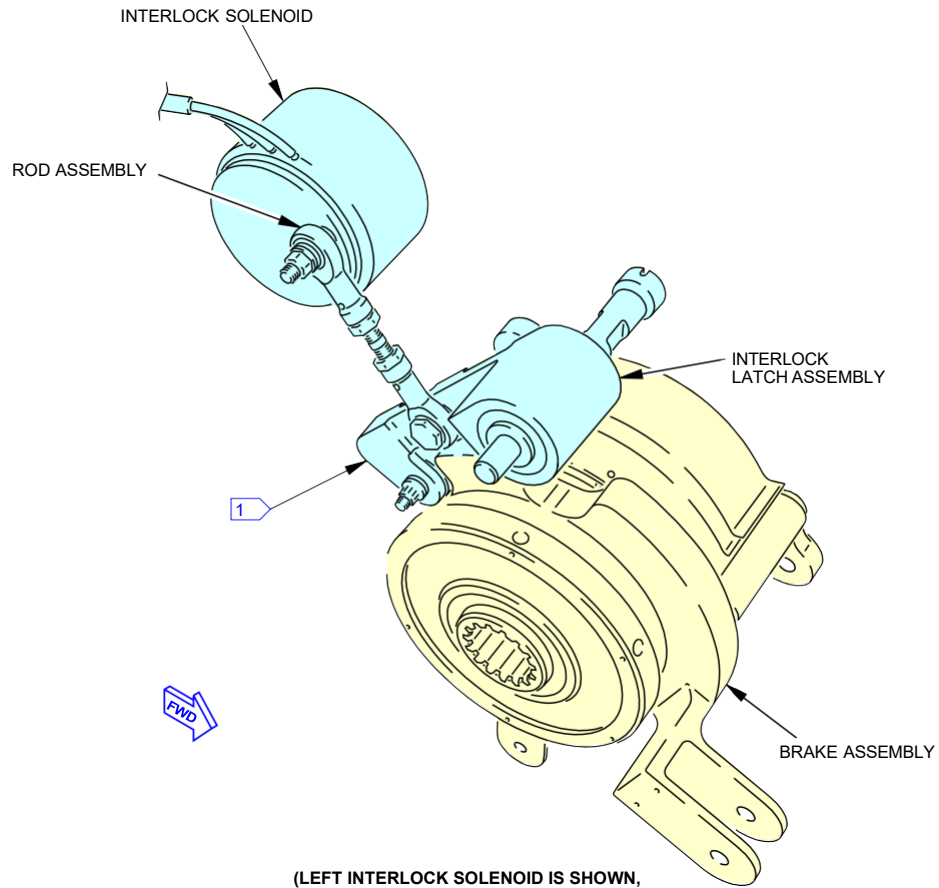
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Switch Test and Cleaning  
Figure 502/76-11-07-990-810-F00 (Sheet 6)  
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(LEFT INTERLOCK SOLENOID IS SHOWN,  
RIGHT INTERLOCK SOLENOID IS OPPOSITE)

**G**

**1** USE A BUNGEE CORD OR TIE WRAP TO TEMPORARILY HOLD THIS END OF THE LATCH UP AND CLEAR OFF THE AUTO THROTTLE BRAKE CAM.

3023663 S0000795551\_V1

Switch Test and Cleaning  
Figure 502/76-11-07-990-810-F00 (Sheet 7)  
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