# **CHAPTER**

28

**FUEL** 



## CHAPTER 28 FUEL

Subject/Page	Date	COC	Subject/Page	Date	COC	Subject/Page	Date	COC
28-EFFECTIV	E PAGES		28-21 TASKS	(cont)		28-21 TASKS	(cont)	
1 thru 3	JUN 15/2016		R 217	Jun 15/2016		O 253	Jun 15/2016	
4	BLANK		R 218	Jun 15/2016		O 254	Jun 15/2016	
28-HOW TO U	ISE THE FIM		R 219	Jun 15/2016		28-22 TASKS		
1	Feb 15/2013		R 220	Jun 15/2016		201	Oct 15/2015	
2	Feb 15/2013		R 221	Jun 15/2016		202	Oct 15/2015	
3	Feb 15/2013		R 222	Jun 15/2016		O 203	Jun 15/2016	
4	Feb 15/2013		R 223	Jun 15/2016		O 204	Jun 15/2016	
5	Feb 15/2013		R 224	Jun 15/2016		O 205	Jun 15/2016	
6	Feb 15/2013		R 225	Jun 15/2016		O 206	Jun 15/2016	
28-FAULT COI	DE INDEX		R 226	Jun 15/2016		O 207	Jun 15/2016	
101	Feb 15/2013		R 227	Jun 15/2016		O 208	Jun 15/2016	
R 102	Jun 15/2016		R 228	Jun 15/2016		O 209	Jun 15/2016	
103	Feb 15/2015		R 229	Jun 15/2016		O 210	Jun 15/2016	
104	Feb 15/2013		R 230	Jun 15/2016		O 211	Jun 15/2016	
28-MAINT MS	G INDEX		R 231	Jun 15/2016		O 212	Jun 15/2016	
101	Oct 15/2015		O 232	Jun 15/2016		O 213	Jun 15/2016	
R 102	Jun 15/2016		O 233	Jun 15/2016		O 214	Jun 15/2016	
103	Oct 15/2013		O 234	Jun 15/2016		O 215	Jun 15/2016	
104	Feb 15/2013		O 235	Jun 15/2016		O 216	Jun 15/2016	
28-21 TASKS			O 236	Jun 15/2016		O 217	Jun 15/2016	
R 201	Jun 15/2016		R 237	Jun 15/2016		O 218	Jun 15/2016	
R 202	Jun 15/2016		R 238	Jun 15/2016		O 219	Jun 15/2016	
R 203	Jun 15/2016		O 239	Jun 15/2016		O 220	Jun 15/2016	
O 204	Jun 15/2016		O 240	Jun 15/2016		O 221	Jun 15/2016	
O 205	Jun 15/2016		O 241	Jun 15/2016		O 222	Jun 15/2016	
O 206	Jun 15/2016		O 242	Jun 15/2016		O 223	Jun 15/2016	
O 207	Jun 15/2016		O 243	Jun 15/2016		O 224	Jun 15/2016	
O 208	Jun 15/2016		O 244	Jun 15/2016		O 225	Jun 15/2016	
O 209	Jun 15/2016		O 245	Jun 15/2016		O 226	Jun 15/2016	
O 210	Jun 15/2016		O 246	Jun 15/2016		O 227	Jun 15/2016	
O 211	Jun 15/2016		O 247	Jun 15/2016		O 228	Jun 15/2016	
O 212	Jun 15/2016		R 248	Jun 15/2016		O 229	Jun 15/2016	
O 213	Jun 15/2016		R 249	Jun 15/2016		O 230	Jun 15/2016	
O 214	Jun 15/2016		R 250	Jun 15/2016		O 231	Jun 15/2016	
O 215	Jun 15/2016		R 251	Jun 15/2016		O 232	Jun 15/2016	
R 216	Jun 15/2016		O 252	Jun 15/2016		O 233	Jun 15/2016	

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

## **28-EFFECTIVE PAGES**



## CHAPTER 28 FUEL

Subject/Page	Date	COC	Subject/Page	Date	COC	Subject/Page	Date	COC
28-22 TASKS	(cont)		28-22 TASKS	(cont)		28-22 TASKS	(cont)	
O 234	Jun 15/2016		O 270	Jun 15/2016		O 298.8	Jun 15/2016	
O 235	Jun 15/2016		O 271	Jun 15/2016		O 298.9	Jun 15/2016	
O 236	Jun 15/2016		O 272	Jun 15/2016		O 298.10	BLANK	
O 237	Jun 15/2016		O 273	Jun 15/2016		D 298.11	Jun 15/2016	
O 238	Jun 15/2016		O 274	Jun 15/2016		D 298.12	Jun 15/2016	
O 239	Jun 15/2016		O 275	Jun 15/2016		D 298.13	Jun 15/2016	
O 240	Jun 15/2016		O 276	Jun 15/2016		D 298.14	Jun 15/2016	
O 241	Jun 15/2016		O 277	Jun 15/2016		D 298.15	Jun 15/2016	
O 242	Jun 15/2016		O 278	Jun 15/2016		D 298.16	Jun 15/2016	
O 243	Jun 15/2016		O 279	Jun 15/2016		D 298.17	Jun 15/2016	
R 244	Jun 15/2016		O 280	Jun 15/2016		D 298.18	Jun 15/2016	
R 245	Jun 15/2016		O 281	Jun 15/2016		D 298.19	Jun 15/2016	
R 246	Jun 15/2016		O 282	Jun 15/2016		D 298.20	BLANK	
R 247	Jun 15/2016		O 283	Jun 15/2016		28-25 TASKS		
R 248	Jun 15/2016		O 284	Jun 15/2016		201	Feb 15/2015	
R 249	Jun 15/2016		O 285	Jun 15/2016		202	Feb 15/2013	
R 250	Jun 15/2016		O 286	Jun 15/2016		R 203	Jun 15/2016	
R 251	Jun 15/2016		O 287	Jun 15/2016		204	Feb 15/2015	
R 252	Jun 15/2016		O 288	Jun 15/2016		205	Oct 15/2014	
R 253	Jun 15/2016		O 289	Jun 15/2016		206	Oct 15/2014	
R 254	Jun 15/2016		O 290	Jun 15/2016		207	Oct 15/2015	
R 255	Jun 15/2016		O 291	Jun 15/2016		208	Oct 15/2015	
R 256	Jun 15/2016		O 292	Jun 15/2016		O 209	Jun 15/2016	
R 257	Jun 15/2016		O 293	Jun 15/2016		O 210	Jun 15/2016	
R 258	Jun 15/2016		O 294	Jun 15/2016		O 211	Jun 15/2016	
R 259	Jun 15/2016		O 295	Jun 15/2016		212	BLANK	
R 260	Jun 15/2016		O 296	Jun 15/2016		28-41 TASKS		
R 261	Jun 15/2016		R 297	Jun 15/2016		201	Jun 15/2013	
R 262	Jun 15/2016		R 298	Jun 15/2016		202	Feb 15/2013	
R 263	Jun 15/2016		R 298.1	Jun 15/2016		203	Oct 15/2013	
O 264	Jun 15/2016		R 298.2	Jun 15/2016		204	Feb 15/2013	
O 265	Jun 15/2016		O 298.3	Jun 15/2016		205	Feb 15/2013	
O 266	Jun 15/2016		O 298.4	Jun 15/2016		206	Feb 15/2015	
O 267	Jun 15/2016		O 298.5	Jun 15/2016		O 207	Jun 15/2016	
O 268	Jun 15/2016		O 298.6	Jun 15/2016		R 208	Jun 15/2016	
O 269	Jun 15/2016		O 298.7	Jun 15/2016		R 209	Jun 15/2016	

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

## **28-EFFECTIVE PAGES**



## CHAPTER 28 FUEL

Subject/Page	Date	COC	Subject/Page	Date	COC	Subject/Page	Date	COC
28-41 TASKS	(cont)		28-41 TASKS	(cont)				
O 210	Jun 15/2016		O 246	Jun 15/2016				
R 211	Jun 15/2016		O 247	Jun 15/2016				
O 212	Jun 15/2016		O 248	Jun 15/2016				
O 213	Jun 15/2016		O 249	Jun 15/2016				
O 214	Jun 15/2016		O 250	Jun 15/2016				
R 215	Jun 15/2016		O 251	Jun 15/2016				
R 216	Jun 15/2016		O 252	Jun 15/2016				
217	Oct 15/2015		O 253	Jun 15/2016				
R 218	Jun 15/2016		O 254	Jun 15/2016				
O 219	Jun 15/2016		R 255	Jun 15/2016				
O 220	Jun 15/2016		R 256	Jun 15/2016				
R 221	Jun 15/2016		O 257	Jun 15/2016				
R 222	Jun 15/2016		O 258	Jun 15/2016				
O 223	Jun 15/2016		O 259	Jun 15/2016				
O 224	Jun 15/2016		R 260	Jun 15/2016				
O 225	Jun 15/2016		R 261	Jun 15/2016				
R 226	Jun 15/2016		O 262	Jun 15/2016				
R 227	Jun 15/2016		O 263	Jun 15/2016				
O 228	Jun 15/2016		O 264	Jun 15/2016				
R 229	Jun 15/2016		O 265	Jun 15/2016				
O 230	Jun 15/2016		O 266	Jun 15/2016				
O 231	Jun 15/2016		28-43 TASKS					
O 232	Jun 15/2016		201	Oct 15/2013				
O 233	Jun 15/2016		O 202	Jun 15/2016				
R 234	Jun 15/2016		O 203	Jun 15/2016				
O 235	Jun 15/2016		204	BLANK				
O 236	Jun 15/2016							
O 237	Jun 15/2016							
O 238	Jun 15/2016							
O 239	Jun 15/2016							
O 240	Jun 15/2016							
O 241	Jun 15/2016							
O 242	Jun 15/2016							
O 243	Jun 15/2016							
O 244	Jun 15/2016							
O 245	Jun 15/2016							

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

## **28-EFFECTIVE PAGES**



YOU FIND A FAULT WITH AN AIRPLANE SYSTEM

These are the possible types of faults:

- 1. Observed Fault
- 2. Cabin Fault

USE BITE TO GET MORE INFORMATION

If you did a BITE test already, then you can go directly to the fault isolation procedure for the maintenance message.

For details, see Figure 2

GO TO THE FAULT ISOLATION TASK IN THE FIM

Use the fault code or description to find the task in the FIM. There is a numerical list of fault codes in each chapter. There are lists of fault descriptions at the front of the FIM.

For details, see Figure 3 -

FOLLOW THE STEPS OF THE FAULT ISOLATION TASK

The fault isolation task explains how to find the cause of the fault. When the task says "You corrected the fault" you know that the fault is gone.

For details, see Figure 4 ──►

G04902 S0000148576\_V1

Basic Fault Isolation Process Figure 1

AKS ALL

28-HOW TO USE THE FIM

Page 1 Feb 15/2013



Some airplane systems have built-in test equipment (BITE). If the system finds a fault when you do a BITE test, it will give you a maintenance message.

A maintenance message can be any of these:

- a code
- a text message
- a light
- an indication.

To find the fault isolation task for a maintenance message, go to the Maintenance Message Index in the chapter for the applicable system.

If you do not know which chapter is the correct one, look at the list at the front of any Maintenance Message Index. For each system or component (LRU) that has BITE, this list gives the chapter number where you can find the Index that you need.

Find the maintenance message for the applicable LRU or system in the Index. Then find the task number on the same line as the maintenance message. Go to the task in the FIM and do the steps of the task (see Figure 4).

G04950 S0000148578\_V1

Getting Fault Information from BITE Figure 2

AKS ALL

28-HOW TO USE THE FIM

Page 2 Feb 15/2013



IF YOU HAVE:

THEN DO THIS TO FIND THE TASK IN THE FIM:

FAULT CODE

- 1. The first two digits of the fault code are the FIM chapter that you need. Go to the Fault Code Index in that chapter and find the fault code. If the fault code starts with a letter, then go to the Cabin Fault Code Index at the front of the FIM.
- 2. Find the task number on the same line as the fault code. Go to the task in the FIM and do the steps in the task (see Figure 4).

OBSERVED FAULT DESCRIPTION

- 1. Go to the Observed Fault List at the front of the FIM and find the best description for the fault.
- 2. Find the task number on the same line as the fault description. Go to the task in the FIM and do the steps of the task (see Figure 4).

CABIN FAULT DESCRIPTION

- 1. Go to the Cabin Fault List at the front of the FIM and find the best description for the fault.
- 2. Find the task number on the same line as the fault description. Go to the task in the FIM and do the steps of the task (see Figure 4).

MAINTENANCE MESSAGE (FROM BITE)

- 1. Go to the Maintenance Message Index in the chapter for the LRU (the front of each Index gives you the chapter number for all LRUs). Find the maintenance message in the Index.
- 2. Find the task number on the same line as the maintenance message. Go to the task in the FIM and do the steps in the task (see Figure 4).

G04979 S0000148579\_V2

Finding the Fault Isolation Task in the FIM Figure 3

AKS ALL

## 28-HOW TO USE THE FIM

Page 3 Feb 15/2013



#### 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 <u>intermittent fault</u>.
  - 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

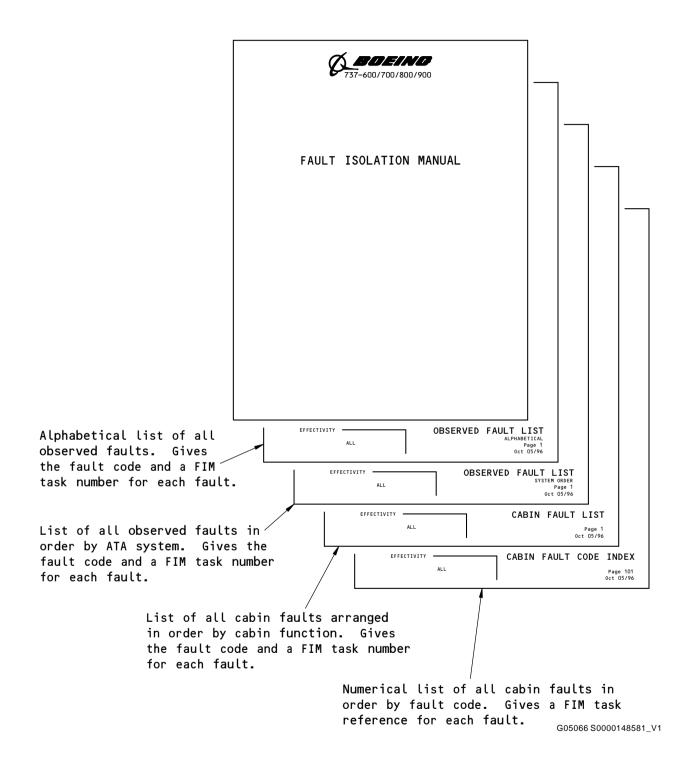
EFFECTIVITY AKS ALL

28-HOW TO USE THE FIM

Page 4 Feb 15/2013



## **FAULT ISOLATION MANUAL**

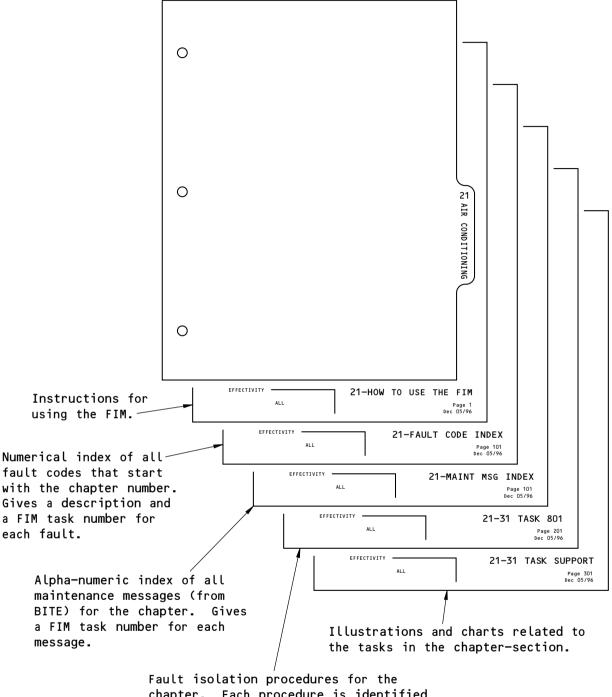


Subjects at Front of FIM Figure 5

28-HOW TO USE THE FIM - EFFECTIVITY · **AKS ALL** 

> Page 5 Feb 15/2013 D633A103-AKS





Fault isolation procedures for the chapter. Each procedure is identified by a chapter-section number and a 3-digit task number.

G05102 S0000148582\_V1

Subjects in Each FIM Chapter Figure 6

AKS ALL 28-HOW TO USE THE FIM

Page 6 Feb 15/2013



FAULT CODE	FAULT DESCRIPTION	GO TO FIM TASK
282 010 01	Refuel quantity indicator: blank - tank no. 1.	28-21 TASK 804
282 010 02	Refuel quantity indicator: blank - tank no. 2.	28-21 TASK 804
282 010 43	Refuel quantity indicator: blank - center tank.	28-21 TASK 804
282 010 48	Refuel quantity indicator: blank - all tanks.	28-21 TASK 804
282 011 01	Refuel quantity indicator: Display is not correct with switch at TEST GAGES - tank no. 1.	28-21 TASK 802
282 011 02	Refuel quantity indicator: Display is not correct with switch at TEST GAGES - tank no. 2.	28-21 TASK 802
282 011 43	Refuel quantity indicator: Display is not correct with switch at TEST GAGES - center tank.	28-21 TASK 802
282 011 48	Refuel quantity indicator: Display is not correct with switch at TEST GAGES - all tanks.	28-21 TASK 802
282 012 01	Refuel quantity indicator: Shows Ind FAIL - tank no. 1.	28-21 TASK 805
282 012 02	Refuel quantity indicator: Shows Ind FAIL - tank no. 2.	28-21 TASK 805
282 012 43	Refuel quantity indicator: Shows Ind FAIL - center tank.	28-21 TASK 805
282 012 48	Refuel quantity indicator: Shows Ind FAIL - all tanks.	28-21 TASK 805
282 013 01	Refuel quantity indicator: shows ARINC error message - tank no. 1.	28-21 TASK 817
282 013 02	Refuel quantity indicator: shows ARINC error message - tank no. 2.	28-21 TASK 817
282 013 43	Refuel quantity indicator: shows ARINC error message - center tank.	28-21 TASK 817
282 013 48	Refuel quantity indicator: shows ARINC error message - all tanks.	28-21 TASK 817
282 015 01	Refuel quantity indicator: flashes - tank no. 1.	28-21 TASK 816
282 015 02	Refuel quantity indicator: flashes - tank no. 2.	28-21 TASK 816
282 015 43	Refuel quantity indicator: flashes - center tank.	28-21 TASK 816
282 020 01	Refuel valve light: light does not go off after pressing the press-to-test switch - tank no. 1.	28-21 TASK 806
282 020 02	Refuel valve light: light does not go off after pressing the press-to-test switch - tank no. 2.	28-21 TASK 806
282 020 43	Refuel valve light: light does not go off after pressing the press-to-test switch - center tank.	28-21 TASK 806
282 020 48	Refuel valve light: light does not go off after pressing the press-to-test switch - all tanks.	28-21 TASK 806
282 030 01	Refuel valve position indicator light does not come on with valves selected open and refueling manifold pressurized - tank no. 1.	28-21 TASK 807
282 030 02	Refuel valve position indicator light does not come on with valves selected open and refueling manifold pressurized - tank no. 2.	28-21 TASK 807

AKS ALL

**28-FAULT CODE INDEX** 

Page 101 Feb 15/2013



	FAULT CODE	FAULT DESCRIPTION	GO TO FIM TASK
	282 030 43	Refuel valve light: light does not come on with valves selected open and refueling manifold pressurized - center tank.	28-21 TASK 807
	282 030 48	Refuel valve light: light does not come on with valves selected open and refueling manifold pressurized - all tanks.	28-21 TASK 807
	282 040 00	Refueling: Refueling (all) is prevented.	28-21 TASK 808
	282 050 00	Refueling: fuel spill at surge tank.	28-21 TASK 801
ı	282 051 00	Refueling: Fuel Tank Auto-Shutoff is inoperative.	28-21 TASK 801
	282 070 01	Refueling: Valve does not close with switch at CLOSED - tank no. 1.	28-21 TASK 806
	282 070 02	Refueling: Valve does not close with switch at CLOSED - tank no. 2.	28-21 TASK 806
	282 070 43	Refueling: Valve does not close with switch at CLOSED - center tank.	28-21 TASK 806
	282 070 48	Refueling: Valve does not close with switch at CLOSED - all tanks.	28-21 TASK 806
	282 080 00	Refueling panel light: light does not come on with ground power on the airplane.	28-21 TASK 810
	282 100 01	Fuel tank: unwanted fuel transfer from a main tank to the center tank - from tank 1.	28-21 TASK 803
	282 100 02	Fuel tank: unwanted fuel transfer from a main tank to the center tank - from tank 2.	28-21 TASK 813
	282 101 00	Fuel transfer (migration): Unwanted fuel transfer from the center tank to the No. 1 tank.	28-21 TASK 814
	282 102 00	Fuel transfer (migration): Unwanted fuel transfer from the center tank to the No. 2 tank.	28-21 TASK 815
	282 110 00	Crossfeed VALVE OPEN light: Stays on bright when the crossfeed selector is moved to the on position.	28-22 TASK 807
	282 120 00	Crossfeed VALVE OPEN light: Stays on bright when the crossfeed selector is moved to the off position.	28-22 TASK 807
	282 125 00	Crossfeed VALVE OPEN light: does not come on bright when the valve is in transit.	28-22 TASK 808
	282 130 43	LOW PRESSURE light for the fuel pump: light on - center tank, left pump.	28-22 TASK 801
	282 140 43	LOW PRESSURE light for the fuel pump: light on - center tank, right pump.	28-22 TASK 802
	282 150 01	LOW PRESSURE light for the fuel pump: light on - no. 1 aft fuel pump.	28-22 TASK 803
	282 150 02	LOW PRESSURE light for the fuel pump: light on - no. 2 aft fuel pump.	28-22 TASK 805
	282 160 01	LOW PRESSURE light for the fuel pump: light on - no. 1 fwd and aft fuel pumps.	28-22 TASK 803

EFFECTIVITY -

**28-FAULT CODE INDEX** 

Page 102 Jun 15/2016



FAULT CODE	FAULT DESCRIPTION	GO TO FIM TASK
282 160 02	LOW PRESSURE light for the fuel pump: light on - no. 2 fwd and aft fuel pumps.	28-22 TASK 805
282 170 01	LOW PRESSURE light for the fuel pump: light on - no. 1 fwd fuel pump.	28-22 TASK 804
282 170 02	LOW PRESSURE light for the fuel pump: light on - no. 2 fwd fuel pump.	28-22 TASK 806
282 180 51	SPAR VALVE CLOSED light: slow to go from bright to dim when start lever moved to CUTOFF - engine 1.	28-22 TASK 809
282 180 52	SPAR VALVE CLOSED light: slow to go from bright to dim when start lever moved to CUTOFF - engine 2.	28-22 TASK 810
282 190 51	SPAR VALVE CLOSED light: slow to go from bright to off when start lever moved to IDLE - engine 1.	28-22 TASK 809
282 190 52	SPAR VALVE CLOSED light: slow to go from bright to off when start lever moved to IDLE - engine 2.	28-22 TASK 810
282 200 51	SPAR VALVE CLOSED light: Stays on bright when start lever moved to CUTOFF - engine 1.	28-22 TASK 809
282 200 52	SPAR VALVE CLOSED light: Stays on bright when start lever moved to CUTOFF - engine 2.	28-22 TASK 810
282 210 51	SPAR VALVE CLOSED light: Stays on bright when start lever moved to IDLE - engine 1.	28-22 TASK 809
282 210 52	SPAR VALVE CLOSED light: Stays on bright when start lever moved to IDLE - engine 2.	28-22 TASK 810
282 240 51	SPAR VALVE CLOSED light: does not come on bright when the valve is in transit - engine 1.	28-22 TASK 811
282 240 52	SPAR VALVE CLOSED light: does not come on bright when the valve is in transit - engine 2.	28-22 TASK 812
282 251 00	Fuel suction feed: engine does not continue running the full five minutes during Engine Fuel Suction Feed Operational Test.	28-22 TASK 819
282 301 01	Fuel tank: boost pump circuit breaker open - No. 1 tank, aft pump.	28-22 TASK 814
282 301 02	Fuel tank: boost pump circuit breaker open - No. 2 tank, aft pump.	28-22 TASK 816
282 301 43	Fuel tank: boost pump circuit breaker open - center tank, left pump.	28-22 TASK 817
282 302 01	Fuel tank: boost pump circuit breaker open - No. 1 tank, forward pump.	28-22 TASK 813
282 302 02	Fuel tank: boost pump circuit breaker open - No. 2 tank, forward pump.	28-22 TASK 815
282 302 43	Fuel tank: boost pump circuit breaker open - center tank, right pump.	28-22 TASK 818
282 303 00	Fuel tank: DC fuel pump circuit breaker open.	28-25 TASK 803

AKS ALL

**28-FAULT CODE INDEX** 

Page 103 Feb 15/2015



FAULT CODE	FAULT DESCRIPTION	GO TO FIM TASK
282 311 41	LOW PRESSURE light for the fuel pump: light does not come on during boost pump auto-shutoff functional test - center tank, left pump.	28-22 TASK 820
282 311 42	LOW PRESSURE light for the fuel pump: light does not come on during boost pump auto-shutoff functional test - center tank, right pump.	28-22 TASK 821
282 312 41	LOW PRESSURE light for the fuel pump: light comes on, but not in the specified time (15 +/-2 seconds) during boost pump auto-shutoff functional test - center tank, left pump.	28-22 TASK 820
282 312 42	LOW PRESSURE light for the fuel pump: light comes on, but not in the specified time (15 +/-2 seconds) during boost pump auto-shutoff functional test - center tank, right pump.	28-22 TASK 821
284 010 01	Fuel quantity indication, flight compartment: fluctuates or is too high or too low - no. 1 tank.	28-41 TASK 814
284 010 02	Fuel quantity indication, flight compartment: fluctuates or is too high or too low - no. 2 tank.	28-41 TASK 814
284 010 43	Fuel quantity indication, flight compartment: fluctuates or is too high or too low - center tank.	28-41 TASK 814
284 020 01	Fuel quantity indication, flight compartment: error or blank - no. 1 tank.	28-41 TASK 813
284 020 02	Fuel quantity indication, flight compartment: error or blank - no. 2 tank.	28-41 TASK 813
284 020 43	Fuel quantity indication, flight compartment: error or blank - center tank.	28-41 TASK 813
284 020 48	Fuel quantity indication, flight compartment: error or blank - all tanks.	28-41 TASK 813
284 022 00	Fuel quantity indication, flight compartment: CONFIG message shows.	28-41 TASK 820
284 023 00	Fuel quantity indication, flight compartment: IMBAL message shows.	28-41 TASK 820
284 024 00	Fuel quantity indication, flight compartment: LOW message shows.	28-41 TASK 820
284 030 00	Fuel temperature indicator: does not operate correctly.	28-43 TASK 801
284 101 00	FQIS BITE INOP message: Shows on CDU.	28-41 TASK 819

EFFECTIVITY -

**28-FAULT CODE INDEX** 

Page 104 Feb 15/2013



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

AKS ALL

28-MAINT MSG INDEX

Page 101 Oct 15/2015



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

AKS ALL

## **28-MAINT MSG INDEX**

Page 102 Jun 15/2016



LRU/SYSTEM	MAINTENANCE MESSAGE	GO TO FIM TASK
FQIS	28-41001 NO FMC DATA ON FQIS 6	28-41 TASK 812
FQIS	28-41002 PROCESSOR FAULT	28-41 TASK 809
FQIS	28-41101 1 OR MORE TANK UNIT OPEN	28-41 TASK 818
FQIS	28-41102 TANK UNIT LO-Z OPEN/GND	28-41 TASK 802
FQIS	28-41103 TANK UNIT SHORT/>FULL	28-41 TASK 803
FQIS	28-41104 TANK UNIT LO RESISTANCE	28-41 TASK 804
FQIS	28-41105 HI-Z OP/SHORT TO SHIELD	28-41 TASK 816
FQIS	28-41106 COMPENSATOR LO-Z OP/GND	28-41 TASK 805
FQIS	28-41107 COMPENSATOR SHORTED	28-41 TASK 806
FQIS	28-41108 COMPENSATOR DATA BAD	28-41 TASK 807
FQIS	28-41109 PROCESSOR FAILED	28-41 TASK 808
FQIS	28-41110 PROCESSOR FAULT	28-41 TASK 809
FQIS	28-41111 PROGRAM PINS INVALID	28-41 TASK 811
FQIS	28-41113 PROGRAM PINS INVALID	28-41 TASK 811
FQIS	28-41114 PROCESSOR FAULT	28-41 TASK 809
FQIS	28-41115 ARINC OUTPUT BUS FAILED	28-41 TASK 810
FQIS	28-41201 1 OR MORE TANK UNIT OPEN	28-41 TASK 818
FQIS	28-41202 TANK UNIT LO-Z OPEN/GND	28-41 TASK 802
FQIS	28-41203 TANK UNIT SHORT/>FULL	28-41 TASK 803
FQIS	28-41204 TANK UNIT LO RESISTANCE	28-41 TASK 804
FQIS	28-41205 HI-Z OP/SHORT TO SHIELD	28-41 TASK 816
FQIS	28-41206 COMPENSATOR LO-Z OP/GND	28-41 TASK 805
FQIS	28-41207 COMPENSATOR SHORTED	28-41 TASK 806
FQIS	28-41208 COMPENSATOR DATA BAD	28-41 TASK 807
FQIS	28-41209 PROCESSOR FAILED	28-41 TASK 808
FQIS	28-41210 PROCESSOR FAULT	28-41 TASK 809
FQIS	28-41211 PROGRAM PINS INVALID	28-41 TASK 811
FQIS	28-41213 PROGRAM PINS INVALID	28-41 TASK 811
FQIS	28-41214 PROCESSOR FAULT	28-41 TASK 809
FQIS	28-41215 ARINC OUTPUT BUS FAILED	28-41 TASK 810
FQIS	28-41301 1 OR MORE TANK UNIT OPEN	28-41 TASK 818
FQIS	28-41302 TANK UNIT LO-Z OPEN/GND	28-41 TASK 802
FQIS	28-41303 TANK UNIT SHORT/>FULL	28-41 TASK 803
FQIS	28-41304 TANK UNIT LO RESISTANCE	28-41 TASK 804
FQIS	28-41305 HIZ OPEN/SHORT TO SHIELD	28-41 TASK 816

AKS ALL

## **28-MAINT MSG INDEX**

Page 103 Oct 15/2013



LRU/SYSTEM	MAINTENANCE MESSAGE	GO TO FIM TASK
FQIS	28-41306 COMPENSATOR LO-Z OP/GND	28-41 TASK 805
FQIS	28-41307 COMPENSATOR SHORTED	28-41 TASK 806
FQIS	28-41308 COMPENSATOR DATA BAD	28-41 TASK 807
FQIS	28-41309 PROCESSOR FAILED	28-41 TASK 808
FQIS	28-41310 PROCESSOR FAULT	28-41 TASK 809
FQIS	28-41311 PROGRAM PINS INVALID	28-41 TASK 811
FQIS	28-41313 PROGRAM PINS INVALID	28-41 TASK 811
FQIS	28-41314 PROCESSOR FAULT	28-41 TASK 809
FQIS	28-41315 ARINC OUTPUT BUS FAILED	28-41 TASK 810

**28-MAINT MSG INDEX** 

Page 104 Feb 15/2013

- EFFECTIVITY -

AKS ALL



#### 801. Fuel Spill at Surge Tank or Fuel Tank Auto-Shutoff Inoperative - Fault Isolation

#### A. Description

- (1) Fuel spills out of the fuel vent at one of the surge tanks during the refueling operation.
- (2) (SDS SUBJECT 28-21-00)

#### B. Possible Causes

- (1) Fueling float switch, S574 (No. 1 tank), S576 (center tank), or S578 (No. 2 tank)
- (2) Fueling shutoff valve, V44 (No. 1 tank), V45 (No. 2 tank), or V46 (center tank)
- (3) Airplane is not level
- (4) NGS float valve in the center tank has failed open.

#### C. Circuit Breakers

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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	3	C00032	FUEL FUELING CONT
Α	4	C01441	FUEL FUELING IND
Α	5	C00398	FUEL QTY 2
Α	6	C00397	FUEL QTY 1

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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
Ε	15	C01680	NGS ALT PWR

#### D. Related Data

- (1) (SSM 28-44-11)
- (2) (WDM 28-44-11)

#### E. Initial Evaluation

(1) Make sure the airplane has a ground attitude of 1.14 degrees nose-down pitch and 0.0 degree roll.

NOTE: This attitude permits you to put the maximum quantity of fuel in the tanks.

- (2) Make sure the shutoff valves are clean. If necessary do the following task:
  - Fueling Shutoff Valve Maintenance Practices, AMM TASK 28-21-51-100-801
- (3) Obey all precautions for pressure refueling (AMM TASK 12-11-00-650-801).
- (4) Put a 20 gallon (76 liter) container, STD-1158 under each of the surge tanks.
- (5) Do the pressure refueling procedure for the center tank only. To do it, do this task: Pressure Refuel Procedure, AMM TASK 12-11-00-650-802.
  - (a) Make sure the other two fueling shutoff valves are closed.
  - (b) Monitor the fuel quantity in the center tank.
  - (c) Make sure automatic shutoff occurs (the VALVE POSITION LIGHT goes off and all fuel flow stops) before the fuel quantity increases to approximately 30,000 lb (13,608 kg).

AKS ALL

28-21 TASK 801



- (d) If automatic shutoff does not occur, then do the Fault Isolation Procedure below for the center tank.
- (e) If automatic shutoff occurs as expected, then continue.
- (6) Transfer fuel from the center tank to the No. 1 tank until automatic shutoff occurs. To do it, do this task: Tank to Tank Fuel Transfer. AMM TASK 28-26-00-650-802.
  - (a) Make sure automatic shutoff occurs (the No. 1 tank VALVE POSITION LIGHT goes off and all fuel flow stops) before the fuel quantity in the No. 1 tank increases to approximately 9000 lb (4082 kg).
  - (b) If automatic shutoff does not occur, then do the Fault Isolation Procedure below for the No. 1 tank.
  - (c) If automatic shutoff occurs as expected, then continue.
- (7) Transfer fuel from the center tank to the No. 2 tank until automatic shutoff occurs. To do it, do this task: Tank to Tank Fuel Transfer, AMM TASK 28-26-00-650-802.
  - (a) Make sure automatic shutoff occurs (the No. 2 tank VALVE POSITION LIGHT goes off and all fuel flow stops) before the fuel quantity in the No. 2 tank increases to approximately 9000 lb (4082 kg).
  - (b) If automatic shutoff does not occur, then do the Fault Isolation Procedure below for the No. 2 tank.
  - (c) If automatic shutoff occurs as expected, then there was an intermittent fault.
    - NOTE: It is possible that the fault was caused by an unusual airplane attitude during the refueling operation or by fuel expansion.

#### F. Fault Isolation Procedure

- (1) If the VALVE POSITION LIGHT for the fueling shutoff valve did not go off, then do these steps:
  - (a) Replace the fueling float switch for the applicable tank, S574 (No. 1 tank), S576 (center tank), or S578 (No. 2 tank).

These are the tasks:

Float Switch Removal, AMM TASK 28-21-71-020-801,

Float Switch Installation, AMM TASK 28-21-71-400-802.

- (b) Examine the mounting bracket for the fueling float switch to see if it is bent or at the incorrect level.
  - 1) Repair the mounting bracket if it is necessary.
- (c) Do the Repair Confirmation at the end of this task.
- (2) Do a check of the NGS float valve in the center tank.

NOTE: It is possible that the NGS float valve in the center tank has failed open.

(a) If the float valve has failed open, then replace the float valve.

These are the tasks:

Float Valve Removal, AMM TASK 47-21-02-000-801,

Float Valve Installation, AMM TASK 47-21-02-420-801.

- (b) Do the Repair Confirmation at the end of this task.
- (3) If the applicable VALVE POSITION LIGHT is off, then do these steps:
  - (a) Push the VALVE POSITION LIGHT to make sure it is OK.

NOTE: The lights are "press-to-test".

AKS ALL

28-21 TASK 801



- (b) Replace the VALVE POSITION LIGHT if it does not come on when you push it.
- (c) If the VALVE POSITION LIGHT is OK, then replace the applicable fueling shutoff valve.

These are the tasks:

Fueling Shutoff Valve Removal, AMM TASK 28-21-51-000-801,

Fueling Shutoff Valve Installation, AMM TASK 28-21-51-400-801.

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

### G. Repair Confirmation

- (1) Obey all precautions for pressure refueling (AMM TASK 12-11-00-650-801).
- (2) Put a 20 gallon (76 liter) container, STD-1158 under each of the surge tanks.
- (3) Do the pressure refueling procedure for the applicable tank. To do it, do this task: Pressure Refuel Procedure, AMM TASK 12-11-00-650-802.
  - (a) Make sure the other two fueling shutoff valves are closed.
  - (b) Monitor the fuel quantity in the applicable tank.
  - (c) Make sure automatic shutoff occurs (the VALVE POSITION LIGHT goes off and all fuel flow stops) before the fuel quantity increases to its full capacity (approximately 30,000 lb (13,608 kg) for the center tank, 9000 lb (4082 kg) for the No. 1 or No. 2 tank).
    - 1) If the automatic shutoff occurs, then you corrected the fault.
- (4) If solution is unsatisfactory, then continue the Fault Isolation Procedure at the subsequent step.
- (5) Set all of the refuel valve switches to the CLOSE position.
- (6) Stop the fuel truck pump.
- (7) Disconnect the fuel hose nozzle.
- (8) Disconnect the bonding cable that you connected between the fueling source and the airplane.
- (9) If there is some unwanted fuel at the refuel station, remove the unwanted fuel.
- (10) Close this access panel:

Number Name/Location

621GB Refuel Access Panel - Slat Station 143.27

- (11) Disconnect the ground cables for the fuel truck.
- (12) Disconnect the ground cables for the airplane.
- (13) Remove electrical power if it is not necessary for other tasks (AMM TASK 24-22-00-860-812).

——— END OF TASK ———

## 802. Refuel Quantity Indicator Displays Incorrectly When Test Switch is Pressed - Fault Isolation

#### A. Description

- (1) You push the FUELING INDICATION TEST SWITCH, S160 on the P15 Fueling Control Panel to the TEST GAGES position and one or more or the indicators does not enter the test mode as expected (all segments alternating on then off at two second intervals). If one of the indicators shows Ind FAIL, this shows an internal fault in the applicable indicator. The indicators can also be blank or show one or more missing segments. If the SWITCH is held for more than twenty (20) seconds, the test stops automatically and the indicators go back to indicating mode.
- (2) (SDS SUBJECT 28-41-00)

AKS ALL

28-21 TASKS 801-802



#### B. Possible Causes

- (1) Refuel Quantity Indicator, N193 (No. 1 tank), N194 (No. 2 tank), or N195 (center tank)
- (2) The FUELING INDICATION TEST SWITCH, S160
- (3) The wiring in the P15 Panel

#### C. Circuit Breakers

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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	3	C00032	<b>FUEL FUELING CONT</b>
Α	4	C01441	FUEL FUELING IND
Α	5	C00398	FUEL QTY 2
Α	6	C00397	FUEL QTY 1

#### D. Related Data

- (1) (SSM 28-44-11)
- (2) (WDM 28-44-11)

#### E. Initial Evaluation

(1) Open this access panel:

<u>Number</u>	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

- (2) Set the FUELING INDICATION TEST SWITCH on the P15 Fueling Control Panel to the TEST GAGES position.
  - (a) On each of the refuel quantity indicators do a check to see if all segments on the display come on for approximately two seconds and then go off for two seconds alternately until the FUELING INDICATION TEST SWITCH is released.

NOTE: If the SWITCH is held for more than twenty (20) seconds, the test stops automatically and the indicators go back to indicating mode.

- (b) If all segments on each display do not come on for approximately two seconds and then go off for approximately two seconds, then do the Fault Isolation Procedure below.
- (c) If all segments on each display come on for approximately two seconds and then go off for approximately two seconds, then there was an intermittent fault.

#### F. Fault Isolation Procedure

**AKS ALL** 

- Do this check of the wiring:
  - (a) Remove the refuel quantity indicator, N193 (No. 1 tank), N194 (No. 2 tank), or N195 (center tank). To remove it, do this task: Refuel Quantity Indicator Removal, AMM TASK 28-41-61-000-801.
  - (b) For tank No. 1, do these voltage checks:
    - 1) Do a check for 28 VDC between pin 24 and pin 19 (ground) of connector D11318.
    - Do a check for 28 VDC between pin 24 and pin 23 (ground) of connector D11318.
    - 3) If there is not 28 VDC at pin 24, then do these steps:
      - Repair the wiring from pin 24 on connector D11318 to pin 21 on connector D4578 on the P15 refueling panel.

28-21 TASK 802



- b) Re-install the refuel quantity indicator, N193. To install it, do this task: Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801.
- c) Do the Repair Confirmation at the end of this task.
- (c) For tank No. 2, do these voltage checks:
  - 1) Do a check for 28 VDC between pin 24 of connector D11320 and pin 19 (ground).
  - 2) Do a check for 28 VDC between pin 24 of connector D11320 and pin 23 (ground).
  - 3) If there is not 28 VDC at pin 24, then do these steps:
    - a) Repair the wiring from pin 24 on connector D11320 to pin 21 on connector D4578 on the P15 refueling panel.
    - b) Re-install the refuel quantity indicator, N194. To install it, do this task: Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801.
    - c) Do the Repair Confirmation at the end of this task.
- (d) For the center tank, do these voltage checks:
  - Do a check for 28 VDC between pin 24 and pin 19 (ground) of connector D11322.
  - 2) Do a check for 28 VDC between pin 24 and pin 23 (ground) of connector D11322.
  - 3) If there is not 28 VDC at pin 24, then do these steps:
    - a) Repair the wiring from pin 24 on connector D11322 to pin 21 on connector D4578 on the P15 refueling panel.
    - b) Re-install the refuel quantity indicator, N195. To install it, do this task: Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801.
    - c) Do the Repair Confirmation at the end of this task.
- (e) If there is 28 VDC at pin 24, then continue.
- (2) Do this check of the FUELING INDICATION TEST SWITCH:
  - (a) For tank No. 1, do a check for a short circuit between these pins of connector D11318:
    - 1) Do a check for a short circuit between pin 2 and pin 19 of connector D11318.
    - 2) Do a check for a short circuit between pin 2 and pin 23 of connector D11318.
    - 3) If there is a short circuit from pin 2 to pin 19 or from pin 2 to pin 23, then do these steps:
      - a) Replace the FUELING INDICATION TEST SWITCH, S160.
      - b) Re-install the refuel quantity indicator, N193. To install it, do this task: Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801.
      - c) Do the Repair Confirmation at the end of this task.
  - (b) For tank No. 2, do a check for a short circuit between these pins of connector D11320:
    - Do a check for a short circuit between pin 2 and pin 19 of connector D11320.
    - 2) Do a check for a short circuit between pin 2 and pin 23 of connector D11320.
    - 3) If there is a short circuit from pin 2 to pin 19 or from pin 2 to pin 23, then do these steps:
      - a) Replace the FUELING INDICATION TEST SWITCH, S160.
      - Re-install the refuel quantity indicator, N194. To install it, do this task: Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801.
      - c) Do the Repair Confirmation at the end of this task.

28-21 TASK 802

**EFFECTIVITY** 



- (c) For the center tank, do a check for a short circuit between these pins of connector D11322:
  - 1) Do a check for a short circuit between pin 2 and pin 19 of connector D11322.
  - 2) Do a check for a short circuit between pin 2 and pin 23 of connector D11322.
  - 3) If there is a short circuit from pin 2 to pin 19 or from pin 2 to pin 23, then do these steps:
    - a) Replace the FUELING INDICATION TEST SWITCH, S160.
    - b) Re-install the refuel quantity indicator, N195. To install it, do this task: Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801.
    - c) Do the Repair Confirmation at the end of this task.
- (d) If there is not a short circuit from pin 2 to pin 19 or from pin 2 to pin 23, then continue.
- (3) Do this check of the FUELING INDICATION TEST SWITCH:
  - (a) Push and hold the FUELING INDICATION TEST SWITCH in the TEST GAGES position.
  - (b) For tank No. 1, with the FUELING INDICATION TEST SWITCH in the TEST GAGES position, do a check for an open circuit between these pins of connector D11318:
    - 1) Do a check for an open circuit between pin 2 and pin 19 of connector D11318.
    - 2) Do a check for an open circuit between pin 2 and pin 23 of connector D11318.
    - 3) If there is an open circuit from pin 2 to pin 19 or from pin 2 to pin 23, then do these steps:.
      - a) Release the FUELING INDICATION TEST SWITCH.
      - b) Replace the FUELING INDICATION TEST SWITCH, S160.
      - c) Re-install the refuel quantity indicator, N193. To install it, do this task: Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801.
      - d) Do the Repair Confirmation at the end of this task.
  - (c) For tank No. 2, with the FUELING INDICATION TEST SWITCH in the TEST GAGES position, do these checks for an open circuit between these pins of connector D11320:
    - 1) Do a check for an open circuit between pin 2 and pin 19 of connector D11320.
    - 2) Do a check for an open circuit between pin 2 and pin 23 of connector D11320.
    - 3) If there is an open circuit from pin 2 to pin 19 or from pin 2 to pin 23, then do these steps:.
      - a) Release the FUELING INDICATION TEST SWITCH.
      - b) Replace the FUELING INDICATION TEST SWITCH, S160.
      - c) Re-install the refuel quantity indicator, N194. To install it, do this task: Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801.
      - d) Do the Repair Confirmation at the end of this task.
  - (d) For the center tank, with the FUELING INDICATION TEST SWITCH in the TEST GAGES position, do a check for an open circuit between these pins of connector D11322:
    - 1) Do a check for an open circuit between pin 2 and pin 19 of connector D11322.
    - 2) Do a check for an open circuit between pin 2 and pin 23 of connector D11322.
    - 3) If there is an open circuit from pin 2 to pin 19 or from pin 2 to pin 23, then do these steps:.
      - a) Release the FUELING INDICATION TEST SWITCH.

AKS ALL 28-21 TASK 802



- b) Replace the FUELING INDICATION TEST SWITCH, S160.
- Re-install the refuel quantity indicator, N195. To install it, do this task: Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801.
- d) Do the Repair Confirmation at the end of this task.
- (e) If there is not an open circuit from pin 2 to pin 19 or from pin 2 to pin 23, then continue.
- (4) Install a new refuel quantity indicator, N193 (tank No. 1), N194 (tank No. 4), or N195 (center tank). To install it, do this task: Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801.
  - (a) Do the Repair Confirmation at the end of this task.

### G. Repair Confirmation

- (1) Set the FUELING INDICATION TEST SWITCH on the P15 Fueling Control Panel to the TEST GAGES position.
  - (a) On each of the refuel quantity indicators, make sure all segments on the display come on for approximately two seconds and then go off for two seconds alternately until the FUELING INDICATION TEST SWITCH is released.
    - NOTE: If the SWITCH is held for more than twenty (20) seconds, the test stops automatically and the indicators go back to indicating mode.
  - (b) If all segments on each display come on for approximately two seconds and then go off for approximately two seconds, then you corrected the fault.
  - (c) Close this access panel:

Number Name/Location
621GB Refuel Access Panel - Slat Station 143.27



#### 803. Unwanted Fuel Transfer from the No. 1 Tank to the Center Tank - Fault Isolation

#### A. Description

- (1) Fuel moved from the No. 1 tank to the center tank without a commanded fuel transfer.
- (2) Unwanted particles (debris) in the fuel tank is a common cause of unwanted fuel transfer. Even small particles can cause a valve not to seal correctly. This can cause a large quantity of fuel to transfer. Note that debris in the fuel tank can cause leakage in more than one valve at a time.
- (3) Problems with the fuel scavenge system can also cause unwanted transfer from the No. 1 tank to the center tank.
- (4) (SDS SUBJECT 28-21-00)

#### B. Possible Causes

- (1) Unwanted particles (debris) in the fuel tank
- (2) Leakage in the fuel scavenge system
- (3) Leakage in one of the boost pumps
- (4) Leakage in the engine fuel-feed manifold
- (5) Leakage in the fueling manifold
- (6) Leakage in the tank wall (Rib No. 5)

28-21 TASKS 802-803

AKS ALL

· EFFECTIVITY ·

Page 207 Jun 15/2016



#### C. Initial Evaluation

- (1) Transfer all of the fuel from the center tank and the No. 2 tank into the No. 1 tank. To do this, do this task: Tank to Tank Fuel Transfer, AMM TASK 28-26-00-650-802
- (2) Drain the center tank down to the level of the sumps. To do this, do this task: Drain the Fuel from the Sumps after Defueling, AMM TASK 12-11-00-650-804.

NOTE: It is helpful if the airplane is as close as possible to the nominal attitude, roll = 0 degrees, pitch = -1.14 degrees, as specified in (AMM TASK 12-11-00-650-804).

- (a) Wait for the fuel to stop draining from the sump completely.
- (b) Leave the center tank sump drain open (as a diagnostic tool).
- (3) Fill the No. 1 tank to its full capacity.
- (4) Make sure the crossfeed valve is closed.
- (5) Monitor the center tank sump drain for 5 minutes with no boost pumps operating.
  - (a) Note the drip rate (if any) from the center tank sump drain with all boost pumps off.
    - 1) If a large fuel quantity drains out of the center tank sump drain, close the center tank sump drain and monitor the center tank fuel quantity.
- (6) Set the L FWD and the L AFT boost pumps to ON.
- (7) Monitor the center tank sump drain for 5 minutes with the two boost pumps operating.
  - (a) Note the drip rate (if any) from the center tank sump drain with all boost pumps off.
    - 1) If a large fuel quantity drains out of the center tank sump drain, close the center tank sump drain and monitor the center tank fuel quantity.
- (8) If fuel does not drip from the center tank sump drain under any conditions, then there was an intermittent fault.
- (9) If fuel drips from the center tank sump drain, then do the Fault Isolation Procedure below.

#### D. Fault Isolation Procedure

NOTE: You must do the steps in the Initial Evaluation before you do these steps.

- (1) Do these steps to look for leakage in the fuel scavenge system and in the output tubing of the L FWD boost pump:
  - (a) Set the L FWD PUMP switch, on the P5 Overhead Panel, to the ON position.
  - (b) Let the pump operate for 15 minutes.
  - (c) Monitor the center tank sump drain (still open) for drops of fuel.
    - 1) If a large fuel quantity drains out of the center tank sump drain, close the center tank sump drain and monitor the center tank fuel quantity.
  - (d) Monitor the No. 1 tank fuel quantity to see if it decreases.
  - (e) Set the L FWD PUMP switch, on the P5 Overhead Panel, to the OFF position.
  - (f) If fuel started to drip from the center tank sump drain or if the drip rate increased while the L FWD PUMP was on, then do these steps:
    - Do this task: Nozzle Assembly of the Fuel Scavenge Jet Pump Removal, AMM TASK 28-22-17-020-801.
    - 2) Examine the nozzle of the fuel scavenge jet pump for unwanted particles (debris).
      - a) If you find unwanted particles on the nozzle of the fuel scavenge jet pump, do these steps:

AKS ALL

28-21 TASK 803



<u>WARNING</u>: OBEY THE FUEL TANK ENTRY PRECAUTIONS. FAILURE TO OBEY THE FUEL TANK ENTRY PRECAUTIONS CAN CAUSE INJURY OR DAMAGE.

- b) Prepare to go into the fuel tank. To do this, do this task: Purging and Fuel Tank Entry, AMM TASK 28-11-00-910-802.
- c) Do this task: Fuel Scavenge Jet Pump Removal, AMM TASK 28-22-17-000-801.
- d) Examine the fuel scavenge jet pump for unwanted particles.
  - NOTE: Do a careful check for particles that keep the outlet check valve open.
- e) If it is necessary, install a new fuel scavenge jet pump. To do this, do this task: Fuel Scavenge Jet Pump Installation, AMM TASK 28-22-17-400-801
- f) Do this task: Fuel Scavenge Float-Operated Shutoff Valve Removal, AMM TASK 28-22-16-000-801.
- g) Examine the float-operated shutoff valve for unwanted particles.
  - <u>NOTE</u>: Do a careful check for particles that keep the valve open.
- h) If it is necessary, install a new float-operated shutoff valve. To do this, do this task: Fuel Scavenge Float-Operated Shutoff Valve Installation, AMM TASK 28-22-16-400-801
- i) If it is necessary, replace the applicable couplings in the fuel scavenge system.
   These are the tasks:
  - Fuel Line, Fitting and Coupling Removal, AMM TASK 28-22-15-000-801, Fuel Line, Fitting and Coupling Installation, AMM TASK 28-22-15-400-801.
- j) Do the Repair Confirmation at the end of this task.
- 3) If there is no indication of unwanted particles on the fuel scavenge nozzle, do a check for leakage at these locations in the tank:
  - a) The fuel scavenge jet pump
  - b) The couplings of the fuel scavenge tubing
  - The engine fuel feed tubing and couplings downstream of the L FWD boost pump
  - d) If you find problems, repair the problems that you find. Do the Repair Confirmation at the end of this task.
- (g) If fuel did not start to drip from the center tank sump drain and the drip rate did not increase while the L FWD PUMP was on, then continue:
- (2) Do these steps to look for leakage in the output tubing for the LAFT boost pump:
  - (a) Set the LAFT PUMP switch, on the P5 Overhead Panel, to the ON position.
  - (b) Let the pump operate for 15 minutes.
  - (c) Monitor the center tank sump drain (still open) for drops of fuel.
    - 1) If a large fuel quantity drains out of the center tank sump drain, close the center tank sump drain and monitor the center tank fuel quantity.
  - (d) Monitor the No. 1 tank fuel quantity to see if it decreases.
  - (e) Set the LAFT PUMP switch, on the P5 Overhead Panel, to the OFF position.
  - (f) If fuel started to drip from the center tank sump drain or if the drip rate increased while the LAFT PUMP was on, then do these steps:

AKS ALL

28-21 TASK 803



WARNING: OBEY THE FUEL TANK ENTRY PRECAUTIONS. FAILURE TO OBEY THE FUEL TANK ENTRY PRECAUTIONS CAN CAUSE INJURY OR DAMAGE.

- 1) Prepare to go into the fuel tank. To do this, do this task: Purging and Fuel Tank Entry, AMM TASK 28-11-00-910-802.
- Pressurize the engine fuel-feed manifold to 4 psig. To do this, do this task: Engine Fuel Feed Manifold - Leak Test, AMM TASK 28-22-15-710-801.
  - NOTE: Do the steps in (AMM TASK 28-22-15-710-801) but only pressurize to 4 psig.
- 3) Do a check for leakage in the engine fuel feed tubing and couplings downstream of the LAFT boost pump.
- 4) If you find problems, repair the problems that you find.
- 5) Do the Repair Confirmation at the end of this task.
- (g) If fuel did not start to drip from the center tank sump drain and if the drip rate did not increase while the LAFT PUMP was on, then continue.
- (3) Do these steps to examine the boost pumps for indications of leakage:

WARNING: OBEY THE FUEL TANK ENTRY PRECAUTIONS. FAILURE TO OBEY THE FUEL TANK ENTRY PRECAUTIONS CAN CAUSE INJURY OR DAMAGE.

- (a) Prepare to go into the fuel tank. To do this, do this task: Purging and Fuel Tank Entry, AMM TASK 28-11-00-910-802.
- (b) Examine the boost pump discharge check valves for the center tank. To do this, do this task: Discharge Check Valve Removal, AMM TASK 28-22-71-000-801.
- (c) If there are indications of leakage, then repair the problems that you find.
  - 1) Do the Repair Confirmation at the end of this task.
  - 2) If the Repair Confirmation is not OK, then continue.
  - ) If there are no indications of leakage, then continue.
- (4) Do these steps to look for indications of leakage in the fueling manifold and the fuel-feed manifold:

WARNING: OBEY THE FUEL TANK ENTRY PRECAUTIONS. FAILURE TO OBEY THE FUEL TANK ENTRY PRECAUTIONS CAN CAUSE INJURY OR DAMAGE.

- (a) Do this task: Purging and Fuel Tank Entry, AMM TASK 28-11-00-910-802.
- (b) Pressurize the engine fuel-feed manifold and the fueling manifold to 4 psig. To do this, do this task: Engine Fuel Feed Manifold Leak Test, AMM TASK 28-22-15-710-801.
  - NOTE: Do the steps in (AMM TASK 28-22-15-710-801) but open the defuel valve and only pressurize to 4 psig.
- (c) Do an inspection of the full length of the fueling manifold and the couplings of the fuel-feed manifold for indications of leakage.
  - 1) Listen for air leakage or use soap solution if it is necessary.
- (d) If you find leakage, repair the problem that you find. To do it, do this task: Fuel Line, Fitting and Coupling Removal, AMM TASK 28-22-15-000-801.
  - 1) Do the Repair Confirmation at the end of this task.
    - a) If the Repair Confirmation is not OK, then continue.
- (e) If you do not find leakage, then continue.

AKS ALL 28-21 TASK 803



- (5) Examine the fuel tank sealant on Rib No. 5 (the tank wall between the center tank and the No. 1 tank) for indication of leakage.
  - (a) If you find indications of leakage, repair the bad sealant. To do it, do this task: Repair of Sealant Leaks in the Fuel Tank Structure, AMM TASK 28-11-00-300-803.
  - (b) Do the Repair Confirmation at the end of this task.

### E. Repair Confirmation (Recommended)

- (1) Close the fuel tanks that you opened to do the leak detection. To do it, do this task: Purging and Fuel Tank Entry, AMM TASK 28-11-00-910-802.
- (2) Close the center tank sump drain valve if it is open.
- (3) Do these steps to make sure there is no unwanted fuel transfer:
  - (a) Transfer all of the fuel out of the center tank. To do it, do this task: Tank to Tank Fuel Transfer, AMM TASK 28-26-00-650-802.
  - (b) Fill the No. 1 and the No. 2 tank with fuel. To do it, do this task: Pressure Refuel Procedure, AMM TASK 12-11-00-650-802.
  - (c) Let the airplane stand for four hours.
    - Monitor the center tank fuel quantity for indications of fuel transfer to the center tank.
    - 2) If there is no fuel in the center tank after the four hours, then you corrected the fault.

### F. Repair Confirmation (alternative)

- (1) Close the fuel tanks that you opened to do the leak detection. To do it, do this task: Purging and Fuel Tank Entry, AMM TASK 28-11-00-910-802.
- (2) Close the center tank sump drain valve if it is open.
- (3) If there is no indication of unwanted fuel transfer on subsequent flights, then you corrected the fault.

#### ——— END OF TASK ———

#### 804. Refuel Quantity Indicator Is Blank - Fault Isolation

#### A. Description

- (1) One or all of the refuel quantity indicators is blank when it would usually show the fuel quantity in the applicable tank.
- (2) (SDS SUBJECT 28-21-00)
- (3) (SDS SUBJECT 28-41-00)

#### B. Possible Causes

EFFECTIVITY '

**AKS ALL** 

- (1) Fuel Quantity Indicating System (FQIS) in-tank wire harness
- (2) FQIS tank unit or compensator
- (3) Refuel quantity indicator, N193 (tank No. 1), N194 (tank No. 2), N195 (center tank)
- (4) Wiring to the refuel quantity indicator.
- (5) Fuel quantity processor unit (FQPU), M1827

28-21 TASKS 803-804



#### C. Circuit Breakers

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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	3	C00032	<b>FUEL FUELING CONT</b>
Α	4	C01441	FUEL FUELING IND
Α	5	C00398	FUEL QTY 2
Α	6	C00397	FUEL QTY 1

#### D. Related Data

- (1) (SSM 28-44-11)
- (2) (WDM 28-44-11)

#### E. Initial Evaluation

(1) Open this access panel:

<u>Number</u>	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

- (2) Make sure the refueling panel floodlights are on.
  - (a) If the refueling panel floodlights are not on, then do this task: Fueling Station Flood Light Does Not Come On Fault Isolation, 28-21 TASK 810.
  - (b) If the refuel quantity indicator is blank, then do the Fault Isolation Procedure below.
  - (c) If the refuel quantity indicator is not blank, then there was an intermittent fault.

### F. Fault Isolation Procedure

**AKS ALL** 

- (1) Do this check of the refuel quantity indicator:
  - (a) Set the FUELING INDICATION TEST SWITCH to the TEST GAGES position.
  - (b) On each of the refuel quantity indicators do a check to see if all segments on the display come on for approximately two seconds and then go off for two seconds alternately until the FUELING INDICATION TEST SWITCH is released.

NOTE: If the SWITCH is held for more than twenty (20) seconds, the test stops automatically and the indicators go back to indicating mode.

- (c) If all segments on each display do not come on for approximately two seconds and then go off for approximately two seconds, then, do this task: Refuel Quantity Indicator Displays Incorrectly When Test Switch is Pressed - Fault Isolation, 28-21 TASK 802.
- (d) If all segments on each display come on for approximately two seconds and then go off for approximately two seconds, then continue.
- (2) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - (a) If the FQIS BITE test shows a maintenance message, then do the corrective action for that message.
    - 1) Look at the refuel indicators to see if they show the fuel quantity correctly.
    - 2) If the refuel indicators show the fuel quantity correctly, then you corrected the fault.
      - If it is necessary, do this task: Pressure Refuel Procedure, AMM TASK 12-11-00-650-802

EFFECTIVITY 28-21 TASK 804



b) Close this access panel:

Number Name/Location

621GB Refuel Access Panel - Slat Station 143.27

- 3) If the refuel indicators do not show the fuel quantity correctly, then continue.
- (b) If the FQIS BITE test does not show a maintenance message, then continue.
- (3) Do this check of the wiring:
  - (a) Remove the refuel quantity indicator, N193 (tank No. 1), N194 (tank No. 2), or N195 (center tank). To remove it, do this task: Refuel Quantity Indicator Removal, AMM TASK 28-41-61-000-801.
  - (b) For tank No. 1, do these voltage checks for 28 VDC between these pins of connector D11318:
    - 1) Do a check for 28 VDC between pin 24 and pin 19 (ground) of connector D11318
    - 2) Do a check for 28 VDC between pin 24 and pin 23 (ground) of connector D11318
    - 3) If there is 28 VDC at pin 24, then do these steps:
      - a) Install a new refuel quantity indicator, N193. To install it, do this task: Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801.
      - b) Look at the refuel quantity indicators to see if they show the fuel quantity correctly.
      - c) If the refuel quantity indicators show the fuel quantity correctly, then you corrected the fault.
    - 4) If there is not 28 VDC at pin 24, then do these steps:
      - a) Repair the wiring from pin 24 on connector D11318 to pin 21 on connector D4578 on the P15 refueling panel.
      - b) Re-install the refuel quantity indicator, N193. To install it, do this task: Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801
      - c) Look at the refuel quantity indicators to see if they show the fuel quantity correctly.
      - d) If the refuel quantity indicators show the fuel quantity correctly, then you corrected the fault.
  - (c) For tank No. 2, do a check for 28 VDC between these pins of connector D11320:
    - 1) Do a check for 28 VDC between pin 24 and pin 19 (ground) of connector D11320
    - 2) Do a check for 28 VDC between pin 24 and pin 23 (ground) of connector D11320
    - 3) If there is 28 VDC at pin 24, then do these steps:
      - a) Install a new refuel quantity indicator, N194. To install it, do this task: Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801.
      - b) Look at the refuel quantity indicators to see if they show the fuel quantity correctly.
      - If the refuel quantity indicators show the fuel quantity correctly, then you corrected the fault.
    - 4) If there is not 28 VDC at pin 24, then do these steps:
      - a) Repair the wiring from pin 24 on connector D11320 to pin 21 on connector D4578 on the P15 refueling panel.

AKS ALL

28-21 TASK 804



- b) Re-install the refuel quantity indicator, N194. To install it, do this task: Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801
- c) Look at the refuel quantity indicators to see if they show the fuel quantity correctly.
- d) If the refuel quantity indicators show the fuel quantity correctly, then you corrected the fault.
- (d) For the center tank, do a check for 28 VDC between these pins of connector D11322:
  - Do a check for 28 VDC between pin 24 and pin 19 (ground) of connector D11322
  - 2) Do a check for 28 VDC between pin 24 and pin 23 (ground) of connector D11322
  - 3) If there is 28 VDC at pin 24, then do these steps:
    - a) Install a new refuel quantity indicator, N195. To install it, do this task: Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801.
    - b) Look at the refuel quantity indicators to see if they show the fuel quantity correctly.
    - If the refuel quantity indicators show the fuel quantity correctly, then you
      corrected the fault.
  - 4) If there is not 28 VDC at pin 24, then do these steps:
    - a) Repair the wiring from pin 24 on connector D11318 to pin 21 on connector D4578 on the P15 refueling panel.
    - Re-install the refuel quantity indicator, N193. To install it, do this task: Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801
    - c) Look at the refuel quantity indicators to see if they show the fuel quantity correctly.
    - d) If the refuel quantity indicators show the fuel quantity correctly, then you corrected the fault.
- (e) If it is necessary, do this task: Pressure Refuel Procedure, AMM TASK 12-11-00-650-802.
- (f) Close this access panel:

Number Name/Location
621GB Refuel Access Panel - Slat Station 143.27

----- END OF TASK -----

### 805. Refuel Quantity Indicator Shows Ind FAIL - Fault Isolation

#### A. Description

- (1) A refuel quantity indicator shows Ind FAIL on the display instead of the correct fuel quantity.
- (2) (SDS SUBJECT 28-21-00)
- (3) (SDS SUBJECT 28-41-00)

#### B. Possible Causes

- (1) Refuel quantity indicator, N193 (tank No. 1), N194 (tank No. 2), N195 (center tank)
- (2) Refuel quantity indicator electrical connector, D11318 (tank No. 1), D11320 (tank No. 2), D11322 (center tank)

AKS ALL

28-21 TASKS 804-805



- C. Related Data
  - (1) SSM 28-44-11
  - (2) WDM 28-44-11
- D. Fault Isolation Procedure
  - (1) Open this access panel:

<u>Number</u>	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

- (2) Do this check of the electrical connector:
  - (a) Remove the refuel quantity indicator, N193 (tank No. 1), N194 (tank No. 2), or N195 (center tank) (AMM TASK 28-41-61-000-801).
  - (b) Examine the applicable electrical connector for damage or corrosion (WDM 28-44-11).
    - 1) Repair all damage that you find.
  - (c) For tank No. 1, do these continuity checks between these pins of connector D11318:
    - 1) Do a check for continuity between these pins (WDM 28-44-11):

D11318	D11318
pin 6	pin 15
pin 8	pin 15
pin 14	pin 15
pin 7	pin 16

- 2) If there is not continuity between these pins, then repair the connector.
- 3) If there is continuity, then replace the tank No. 1 refuel quantity indicator (AMM TASK 28-41-61-400-801).
- (d) For tank No. 2, do these continuity checks between these pins of connector D11320:
  - 1) Do a check for continuity between these pins (WDM 28-44-11):

D1132	0	D11320
pin 6		pin 7
pin 6		pin 14
pin 7		pin 14
pin 8		pin 15
pin 8		pin 16
pin 15		pin 16

- 2) If there is not continuity between these pins, then repair the connector.
- 3) If there is continuity, then replace the tank No. 2 refuel quantity indicator (AMM TASK 28-41-61-400-801).
- (e) For the center tank, do these continuity checks between these pins of connector D11322:
  - 1) Do a check for continuity between these pins (WDM 28-44-11):

28-21 TASK 805

· EFFECTIVITY



D11322	D11322
pin 6	pin 15
pin 7	pin 15
pin 14	pin 15
pin 8	pin 16

- 2) If there is not continuity between these pins, then repair the connector.
- 3) If there is continuity, then replace the center tank refuel quantity indicator (AMM TASK 28-41-61-400-801).
- (3) If it is necessary, do this task: Pressure Refuel Procedure, AMM TASK 12-11-00-650-802.
- (4) Close this access panel:

<u>Number</u>	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

----- END OF TASK -----

## 806. VALVE POSITION LIGHT for the Fueling Shutoff Valve Does Not Go Off When The Valve Switch Is Set To CLOSED - Fault Isolation

#### A. Description

- (1) The VALVE POSITION LIGHT for a fueling shutoff valve does not go off when you set the switch for that valve to the CLOSED position.
- (2) (SDS SUBJECT 28-21-00)

### B. Possible Causes

- (1) Fueling shutoff valve, V44 (tank No. 1), V45 (tank No. 2), or V46 (center tank)
- (2) Switch for the fueling shutoff valve, S157 (tank No. 1), S158 (tank No. 2), or S159 (center tank)

#### C. Circuit Breakers

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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	3	C00032	FUEL FUELING CONT
Α	4	C01441	FUEL FUELING IND
Α	5	C00398	FUEL QTY 2
Α	6	C00397	FUEL QTY 1

#### D. Related Data

- (1) (SSM 28-44-11)
- (2) (WDM 28-44-11)

#### E. Initial Evaluation

(1) Open this access panel:

<u>Number</u>	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

(2) Make sure the shutoff valves are clean. If necessary do the following task:

AKS ALL

28-21 TASKS 805-806



- Fueling Shutoff Valve Maintenance Practices, AMM TASK 28-21-51-100-801
- (3) Make sure all of the fueling shutoff valve switches are in the CLOSED position.
- (4) Do this check of the VALVE POSITION LIGHT for the fueling shutoff valve:
  - (a) Set the applicable switch for the fueling shutoff valve to OPEN.
  - (b) Make sure the applicable VALVE POSITION LIGHT comes on.
  - (c) Set the applicable switch for the fueling shutoff valve to CLOSED.
  - (d) Do a check to see if the applicable VALVE POSITION LIGHT goes off.
    - 1) If the VALVE POSITION LIGHT does not go off, then do the Fault Isolation Procedure below.
    - 2) If the VALVE POSITION LIGHT goes off, then there was an intermittent fault.

#### F. Fault Isolation Procedure

- (1) Do this check for electrical power to the fueling shutoff valve:
  - (a) For tank No. 1, do these steps:
    - 1) Disconnect the electrical connector D890 from the fueling shutoff valve that shows the problem.
    - 2) Set the switch for the fueling shutoff valve for the No. 1 tank to the OPEN position.
    - 3) Do a check for 28 VDC from pins 3 and 2 (ground) of the connector D890.
    - 4) Set the switch for the fueling shutoff valve for the No. 1 tank to the CLOSED position.
    - 5) Do a check for 0 VDC between pins 3 and 2 of D890.
    - 6) If there is 0 VDC between pins 3 and 2 with the switch set to CLOSED, then do these steps:
      - a) Replace the fueling shutoff valve, V44.

These are the tasks:

Fueling Shutoff Valve Removal, AMM TASK 28-21-51-000-801,

Fueling Shutoff Valve Installation, AMM TASK 28-21-51-400-801.

- b) Do the Repair Confirmation at the end of this task.
- 7) If there is not 0 VDC between pins 3 and 2 of D890, then continue.
  - a) Re-connect connector D890 to the fueling shutoff valve.
- (b) For tank No. 2, do these steps:
  - 1) Disconnect the electrical connector D894 from the fueling shutoff valve that shows the problem.
  - 2) Set the switch for the fueling shutoff valve for the No. 2 tank to the OPEN position.
  - 3) Do a check for 28 VDC from pins 3 and 2 (ground) of the connector D894.
  - 4) Set the switch for the fueling shutoff valve for the No. 2 tank to the CLOSED position.
  - 5) Do a check for 0 VDC between pins 3 and 2 of D894.
  - 6) If there is 0 VDC between pins 3 and 2 with the switch set to CLOSED, then do these steps:
    - a) Replace the fueling shutoff valve V45.

These are the tasks:

AKS ALL

28-21 TASK 806



Fueling Shutoff Valve Removal, AMM TASK 28-21-51-000-801, Fueling Shutoff Valve Installation, AMM TASK 28-21-51-400-801.

- b) Do the Repair Confirmation at the end of this task.
- 7) If there is not 0 VDC between pins 3 and 2 of D894, then continue.
  - a) Re-connect connector D894 to the fueling shutoff valve.
- (c) For the center tank, do these steps:
  - 1) Disconnect the electrical connector D892 from the fueling shutoff valve that shows the problem.
  - 2) Set the switch for the fueling shutoff valve for the center tank to the OPEN position.
  - 3) Do a check for 28 VDC from pins 3 and 2 (ground) of the connector D892.
  - 4) Set the switch for the fueling shutoff valve for the center tank to the CLOSED position.
  - 5) Do a check for 0 VDC between pins 3 and 2 of D892.
  - 6) If there is 0 VDC between pins 3 and 2 with the switch set to CLOSED, then do these steps:
    - a) Replace the fueling shutoff valve V46.

These are the tasks:

Fueling Shutoff Valve Removal, AMM TASK 28-21-51-000-801,

Fueling Shutoff Valve Installation, AMM TASK 28-21-51-400-801.

- b) Do the Repair Confirmation procedure at the end of this task.
- 7) If there is not 0 VDC between pins 3 and 2 of D892, then continue.
  - a) Re-connect connector D892 to the fueling shutoff valve.
- (2) Replace the applicable switch for the fueling shutoff valve, S157 (tank No. 1), S158 (tank No. 2), or S159 (center tank).
  - (a) Do the Repair Confirmation at the end of this task.

### G. Repair Confirmation

- (1) Do this check of the VALVE POSITION LIGHT for the fueling shutoff valve:
  - (a) Set the applicable switch for the fueling shutoff valve to OPEN.
  - (b) Make sure the applicable VALVE POSITION LIGHT comes on.
  - (c) Set the applicable switch for the fueling shutoff valve to CLOSED.
  - (d) Make sure the applicable VALVE POSITION LIGHT goes off.
    - 1) If the indication light goes off, then you corrected the fault.
- (2) If solution is unsatisfactory, then continue the Fault Isolation Procedure at the subsequent step.

——— END OF TASK ———				
	 ENID	OF T	V G K	

## 807. Fueling Shutoff Valve Position Indicator Light Does not Come ON when the Valve Switch is set to OPEN - Fault Isolation

#### A. Description

(1) The VALVE POSITION LIGHT for the Fueling Shutoff Valve shows that the valve solenoid is energized. The Fueling Shutoff Valve is enabled to open when more than 6 psi of fuel pressure is supplied.

AKS ALL

28-21 TASKS 806-807



- (2) The VALVE POSITION LIGHT does not necessarily show that the Fueling Shutoff Valve is open.
  - (a) For each Fueling Shutoff Valve, the applicable VALVE POSITION LIGHT must come ON when the applicable valve switch is set to the OPEN position and the applicable fuel tank is not full.
  - (b) The VALVE POSITION LIGHT will not come ON if the applicable tank is full.

#### B. Possible Causes

- (1) Tank 1 (2, CTR) Fueling Shutoff Valve, V44 (V45, V46)
- (2) Tank 1 (2, CTR) Fueling Shutoff Valve Control Switch, S157 (S158, S159)
- (3) Tank 1 (2, CTR) Refuel Float Switch, S574 (S578, S576)
- (4) Tank 1 (2, CTR) VALVE POSITION LIGHT Light, L282 (L283, L284)
- (5) Tank 1 (2, CTR) Fuel Quantity Indicator, N193 (N194, N195)
- (6) Wiring

#### C. Circuit Breakers

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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	3	C00032	FUEL FUELING CONT
Α	4	C01441	FUEL FUELING IND
Α	5	C00398	FUEL QTY 2
Α	6	C00397	FUEL QTY 1

#### D. Related Data

- (1) SDS SUBJECT 28-21-00
- (2) SSM 28-44-11
- (3) WDM 28-44-11

#### E. Initial Evaluation

(1) Open this access panel:

<u>Number</u>	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

- (2) Make sure the shutoff valves are clean. If necessary do the following task:
  - Fueling Shutoff Valve Maintenance Practices, AMM TASK 28-21-51-100-801
- (3) Make sure that the floodlights for the Fueling Control Panel are ON.
  - (a) If the floodlights for the Fueling Control Panel are not ON, then, do this task: Fueling Station Flood Light Does Not Come On - Fault Isolation, 28-21 TASK 810.
  - (b) If the floodlights for the Fueling Control Panel are ON, then continue.
- (4) Make sure that the applicable tank for the Fueling Shutoff Valve with the problem is not full.
- (5) Do this check of the VALVE POSITION LIGHT Indication Light:
  - (a) Set the applicable Fueling Shutoff Valve Control Switch to OPEN.
  - (b) Make sure that the applicable VALVE POSITION LIGHT comes ON.

AKS ALL



- If the VALVE POSITION LIGHT does not come ON, then do the Fault Isolation Procedure below.
- 2) If the VALVE POSITION LIGHT comes ON, then there was an intermittent fault.

#### F. Fault Isolation Procedure

- (1) Do this check of the VALVE POSITION LIGHT for the Fueling Shutoff Valve:
  - (a) Push the applicable VALVE POSITION LIGHT that shows the fueling valve position and make sure that it comes ON.
    - NOTE: The lights are PUSH-TO-TEST.
  - (b) If the light does not come ON, then replace the applicable Tank 1 (Tank 2, CTR Tank) VALVE POSITION LIGHT, L282 (L283, L284).
  - (c) If the light comes ON, then continue.
- (2) Do these steps to do a check of the wiring in the Wing Refuel Panel and the Fuel Quantity Indicators, N193, N194, and N195 (WDM 28-44-11):
  - (a) For the Tank 1, do these steps:
    - 1) With the switch set to OPEN, do a continuity check from pin 1 to pin 12 on connector D4578P on the Wing Refuel Panel.
    - 2) If there is no continuity from pin 1 to pin 12, then remove the Tank 1 Fuel Quantity Indicator. This is the task: Refuel Quantity Indicator Removal, AMM TASK 28-41-61-000-801.
      - Do a continuity check from pin 11 on connector D11318 to pin 1 on connector D4578P.
        - <1> If there is no continuity, repair the wiring.
        - <2> Install the Fuel Quantity Indicator again. This is the task: Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801.
        - <3> Do the Repair Confirmation at the end of this task.
      - Do a continuity check from pin 10 on connector D11318 to pin 12 on connector D4578P.
        - <1> If there is no continuity, replace the switch S157.
        - <2> If the problem continues, repair the related wiring.
        - <3> Install the Fuel Quantity Indicator again. This is the task: Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801.
        - <4> Do the Repair Confirmation at the end of this task.
      - c) On the Tank 1 Fuel Quantity Indicator, do a continuity check from pin 10 to pin
         11 on the connector at the rear of the indicator.
        - <1> If there is no continuity, install a new Fuel Quantity Indicator, N193. This is the task: Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801
        - <2> Do the Repair Confirmation at the end of this task.
    - 3) If there is continuity from pin 1 to pin 12, then continue.
  - (b) For Tank 2, do these steps:
    - 1) With the switch set to OPEN, do a continuity check from pin 7 to pin 12 on connector D4578P on the Wing Refuel Panel.

AKS ALL



- If there is no continuity from pin 7 to pin 12, then remove the Fuel Quantity Indicator for the Center Tank, N194. This is the task: Refuel Quantity Indicator Removal, AMM TASK 28-41-61-000-801.
  - Do a continuity check from pin 11 on connector D11320 to pin 7 on connector D4578P.
    - <1> If there is no continuity, repair the wiring.
    - <2> Install the Fuel Quantity Indicator again. This is the task: Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801.
    - <3> Do the Repair Confirmation at the end of this task.
  - Do a continuity check from pin 10 on connector D11320 to pin 12 on connector D4578P.
    - <1> If there is no continuity, replace switch S158.
    - <2> If the problem continues, repair the related wiring.
    - <3> Install the Fuel Quantity Indicator again. This is the task: Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801.
    - <4> Do the Repair Confirmation at the end of this task.
  - On the Tank 2 Fuel Quantity Indicator, do a continuity check from pin 10 to pin
     11 on the connector at the rear of the indicator.
    - <1> If there is no continuity, install a new Fuel Quantity Indicator, N194. This is the task: Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801.
    - <2> Do the Repair Confirmation at the end of this task.
- 3) If there is continuity from pin 7 to pin 12, then continue.
- (c) For the Center Tank, do these steps:
  - With the switch set to OPEN, do a continuity check from pin 14 to pin 12 on connector D4578P on the Wing Refuel Panel.
  - If there is no continuity from pin 14 to pin 12, then remove the CTR Tank Fuel Quantity Indicator, N195. This is the task: Refuel Quantity Indicator Removal, AMM TASK 28-41-61-000-801.
    - Do a continuity check from pin 11 on connector D11322 to pin 14 on connector D4578P.
      - <1> If there is no continuity, repair the wiring.
      - <2> Install the Fuel Quantity Indicator again.
      - <3> Do the Repair Confirmation at the end of this task.
    - Do a continuity check from pin 10 on connector D11322 to pin 12 on connector D4578P.
      - <1> If there is no continuity, replace switch S159.
      - <2> If the problem continues, repair the related wiring.
      - <3> Install the Fuel Quantity Indicator again. This is the task: Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801.
      - <4> Do the Repair Confirmation at the end of this task.
    - c) On the Center Tank Fuel Quantity Indicator, do a continuity check from pin 10 to pin 11 on the connector, at the rear of the indicator.

AKS ALL



- <1> If there is no continuity, install a new Fuel Quantity Indicator, N195. This is the task: Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801
- <2> Do the Repair Confirmation at the end of this task.
- 3) If there is continuity from pin 14 to pin 12, then continue.
- (3) Do this check for electrical power to the Fueling Shutoff Valve (WDM 28-44-11):
  - (a) For Tank 1, do these steps:
    - 1) Disconnect the electrical connector D890 from the Fueling Shutoff Valve.
    - 2) Disconnect electrical connector D4578J from the Wing Refuel Panel.
    - 3) Do a continuity check as follows:

	Wing Refuel
Refuel Valve	Panel
D890	D4578J
pin 3	pin 8

- 4) If there is no continuity, repair the wiring.
  - a) Re-connect connector D890 to the Fueling Shutoff Valve.
  - b) Re-connect connector D4578J to the Wing Refuel Panel.
  - c) Do the Repair Confirmation at the end of the task.
- Re-connect connector D4578J to the Wing Refuel Panel.
- 6) Set the switch for the Tank 1 Fueling Shutoff Valve to the OPEN position.
- 7) Do a check for 28V DC from pins 3 and 2 (ground) of the connector D890.
- 8) Set the switch for the Tank 1 Fueling Shutoff Valve to the CLOSED position.
- 9) If there is 28V DC between pins 3 and 2 of D890, then do these steps:
  - Replace the Fueling Shutoff Valve, V44. These are the tasks:
     Fueling Shutoff Valve Removal, AMM TASK 28-21-51-000-801,
     Fueling Shutoff Valve Installation, AMM TASK 28-21-51-400-801.
  - b) Do the Repair Confirmation at the end of this task.
- 10) If there is not 28V DC between pins 3 and 2 of D890, then continue.
  - a) Reconnect connector D890 to the Fueling Shutoff Valve.
- (b) For Tank 2, do these steps:
  - 1) Disconnect the electrical connector D894 from the Fueling Shutoff Valve.
  - 2) Disconnect electrical connector D4578J from the Wing Refuel Panel.
  - 3) Do a continuity check as follows:

	Wing Refuel
Refuel Valve	Panel
D894	D4578J
pin 3	pin 9

- 4) If there is no continuity, repair the wiring.
  - a) Re-connect connector D894 to the Fueling Shutoff Valve.

AKS ALL



- b) Re-connect connector D4578J to the Wing Refuel Panel.
- c) Do the Repair Confirmation at the end of the task.
- 5) Re-connect connector D4578J to the Wing Refuel Panel.
- 6) Set the switch for the Tank 2 Fueling Shutoff Valve to the OPEN position.
- 7) Do a check for 28V DC from pins 3 and 2 (ground) of the connector D894.
- 8) Set the switch for the Tank 2 Fueling Shutoff Valve to the CLOSED position.
- 9) If there is 28V DC between pins 3 and 2 of D894, then do these steps:
  - a) Replace the Fueling Shutoff Valve, V45. These are the tasks:
     Fueling Shutoff Valve Removal, AMM TASK 28-21-51-000-801,
     Fueling Shutoff Valve Installation, AMM TASK 28-21-51-400-801.
  - b) Do the Repair Confirmation at the end of this task.
- 10) If there is not 28V DC between pins 3 and 2 of D894, then continue.
  - a) Reconnect connector D894 to the Fueling Shutoff Valve.
- (c) For the Center Tank, do these steps:
  - 1) Disconnect the electrical connector D892 from the Fueling Shutoff Valve.
  - 2) Disconnect electrical connector D4578J from the Wing Refuel Panel.
  - 3) Do a continuity check as follows:

	Wing Refuel
Refuel Valve	Panel
D892	D4578J
pin 3	pin 18

- 4) If there is no continuity, repair the wiring.
  - a) Re-connect connector D892 to the Fueling Shutoff Valve.
  - b) Re-connect connector D4578J to the Wing Refuel Panel.
  - c) Do the Repair Confirmation at the end of the task.
- 5) Re-connect connector D4578J to the Wing Refuel Panel.
- 6) Set the switch for the Center Fueling Shutoff Valve to the OPEN position.
- 7) Do a check for 28V DC from pins 3 and 2 (ground) of the connector D892.
- 8) Set the switch for the Center Fueling Shutoff Valve to the CLOSED position.
- 9) If there is 28 V DC between pins 3 and 2 of D892, then do these steps:
  - a) Replace the Fueling Shutoff Valve, V46. These are the tasks: Fueling Shutoff Valve Removal, AMM TASK 28-21-51-000-801, Fueling Shutoff Valve Installation, AMM TASK 28-21-51-400-801.
  - b) Do the Repair Confirmation at the end of this task.
- 10) If there is not 28V DC between pins 3 and 2 of D892, then continue.
  - a) Reconnect connector D892 to the Fueling Shutoff Valve.
- (4) Do this check of the Refuel Float Switch and the related wiring (WDM 28-44-11):
  - (a) For Tank 1, do these steps:
    - 1) Disconnect connector D4578J on the Wing Refuel Panel, P15.

AKS ALL



2) Do a check for an open circuit between these pins:

D4578	3J	D4578J
pin 1		pin 8

- 3) If there is an open circuit (the Refuel Float Switch is open and in the FULL position) and Tank 1 is not full, then do these steps:
  - a) Do a check for continuity between these pins (WDM 28-44-11):

D4578	3J	D39905
pin 1		pin 20
pin 8		pin 21

- b) If there is no continuity between these pins, then repair the wiring.
  - <1> Do the Repair Confirmation at the end of this task.
- Remove the Refuel Float Switch, S574. This is the task: Float Switch Removal, AMM TASK 28-21-71-020-801
- d) Do a continuity check of wire 2001B-20 from the location where you cut the wire to remove the float switch to pin 21 on connector D39907.
- e) Do a continuity check of wire 2001R-20 from the location where you cut the wire to remove the float switch to pin 20 on connector D39907.
- f) If there is not continuity from the cut wires to connector D39907, then repair the wiring.
  - <1> Install the Refuel Float Switch again. This task: Float Switch Installation, AMM TASK 28-21-71-400-802
  - <2> Do the Repair Confirmation at the end of this task.
- g) If there is continuity from the cut wires to connector D39907, then install a new Refuel Float Switch, S574. This is the task: Float Switch Installation, AMM TASK 28-21-71-400-802
  - <1> Do the Repair Confirmation at the end of this task.
- 4) If there is continuity between pins 1 and 8, then continue.
  - a) Re-connect connector D4578J.
- (b) For Tank 2, do these steps:
  - 1) Disconnect connector D4578J on the Wing Refuel Panel, P15.
  - 2) Do a check for an open circuit between these pins:

D4578	J										D4578J
pin 7											pin 9

- 3) If there is an open circuit (the Refuel Float Switch is open and in the FULL position) and the Tank 2 is not full, then do these steps:
  - a) Remove the Refuel Float Switch, S578. This is the task: Float Switch Removal, AMM TASK 28-21-71-020-801
  - b) Do a continuity check of wire 1024-20 from the location where you cut the wire to remove the float switch to pin 9 on connector D4578J.

AKS ALL



- Do a continuity check of wire 1018-20 from the location where you cut the wire to remove the float switch to pin 7 on connector D4578J.
- d) If there is no continuity from the cut wires to connector D4578J, then repair the wiring. Install the float switch again.
  - <1> If there is no continuity, repair the wiring.
  - <2> Install the Fuel Quantity Indicator again. This is the task: Float Switch Installation, AMM TASK 28-21-71-400-802
  - <3> Do the Repair Confirmation at the end of this task.
- e) If there is continuity from the cut wires to connector D39907, then install a new Refuel Float Switch, S574. This is the task: Float Switch Installation, AMM TASK 28-21-71-400-802
  - <1> Do the Repair Confirmation at the end of this task.
- 4) If there is continuity between pins 7 and 9, then continue.
  - a) Re-connect connector D4578J.
- (c) For the Center Tank, do these steps:
  - 1) Disconnect connector D4578J on the Wing Refuel Panel, P15.
  - 2) Do a check for an open circuit between these pins:

D4578J	D4578J
pin 14	 pin 18

- 3) If there is an open circuit (the Refuel Float Switch is open and in the FULL position) and the Center Tank is not full, then do these steps:
  - a) Remove the Refuel Float Switch, S576. This is the task: Float Switch Removal, AMM TASK 28-21-71-020-801,
  - Do a continuity check of wire 1019-20 from the location where you cut the wire to remove the float switch to pin 14 on connector D4578J.
  - c) Do a continuity check of wire 1026-20 from the location where you cut the wire to remove the float switch to pin 18 on connector D4578J.
  - d) If there is no continuity from the cut wires to connector D4578J, then repair the wiring.
    - <1> Install the Refuel Float Switch again. This is the task: Float Switch Installation, AMM TASK 28-21-71-400-802
    - <2> Do the Repair Confirmation at the end of this task.
  - e) If there is continuity from the cut wires to connector D39907, then install a new Refuel Float Switch, S576. This is the task: Float Switch Installation, AMM TASK 28-21-71-400-802
    - <1> Do the Repair Confirmation at the end of this task.
- 4) Re-connect connector D4578J.

#### G. Repair Confirmation

- Do this check of the VALVE POSITION LIGHT for the Fueling Shutoff Valve.
  - (a) Set the applicable switch for the Fueling Shutoff Valve to OPEN.
  - (b) Make sure the applicable VALVE POSITION LIGHT comes ON.
    - 1) If the VALVE POSITION LIGHT comes ON, then you corrected the problem.

AKS ALL



- a) Set the applicable switch back to the CLOSED position.
- b) Make sure that the VALVE POSITION LIGHT goes OFF again.
- c) Close this access panel:

Number Name/Location
621GB Refuel Access Panel - Slat Station 143.27

2) If the VALVE POSITION LIGHT does not come ON, then continue the Fault Isolation Procedure at the applicable subsequent step.

----- END OF TASK -----

# 808. Fuel Does Not Flow Into The Fuel Tank With Fueling Shutoff Valve Switch in the OPEN Position and Refueling Manifold Pressurized

## A. Description

(1) Fuel pressure from a pressurized fuel source is applied to the fueling receptacle and the fueling shutoff valve switch is set to the OPEN position (AMM TASK 12-11-00-650-802), but fuel does not flow into the applicable fuel tank. That is, you do not see the fuel quantity in the applicable tank increase on the indicator or the flowmeter on the fuel source shows no fuel flow.

## B. Possible Causes

- (1) Fueling shutoff valve, V44 (tank No. 1), V45 (tank No. 2), or V46 (center tank)
- (2) Switch for the fueling shutoff valve, S157 (tank No. 1), S158 (tank No. 2), or S159 (center tank)
- (3) Fueling float switch, S574 (tank No. 1), S576 (center tank), or S578 (tank No. 2)
- (4) Fueling receptacle (if fuel does not flow into all three fuel tanks)

## C. Circuit Breakers

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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	3	C00032	FUEL FUELING CONT
Α	4	C01441	FUEL FUELING IND
Α	5	C00398	FUEL QTY 2
Α	6	C00397	FUEL QTY 1

#### D. Related Data

- (1) (SSM 28-44-11)
- (2) (WDM 28-44-11)

#### E. Initial Evaluation

(1) Open this access panel:

<u>Number</u>	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

- (2) Do a check make sure the fuel tank with the problem is not full.
- (3) Make sure the shutoff valves are clean. If necessary do the following task:
  - Fueling Shutoff Valve Maintenance Practices, AMM TASK 28-21-51-100-801

AKS ALL

28-21 TASKS 807-808



- (4) Do a check to see if the VALVE POSITION LIGHT for the fueling shutoff valve comes on when the fueling shutoff valve switch is set to the OPEN position.
  - (a) If the VALVE POSITION LIGHT does not come on when the fueling shutoff valve switch is set to the OPEN position, then, do this task: Fueling Shutoff Valve Position Indicator Light Does not Come ON when the Valve Switch is set to OPEN - Fault Isolation, 28-21 TASK 807
- (5) Do these steps to prepare for pressure fueling if you did not do them before:
  - (a) Do this task: Precautions and Limits for the Refuel Operation, AMM TASK 12-11-00-650-801.

**WARNING:** MAKE SURE THERE IS ELECTRICAL CONTINUITY BETWEEN THE FUEL SOURCE AND THE AIRPLANE. A FIRE OR AN EXPLOSION CAN OCCUR.

(b) Attach the bonding cable on the nozzle of the fuel hose to the ground jack on the wing.

NOTE: The bonding cable is not necessary if there is electrical continuity between the nozzle and the receptacle.

- (c) Attach the nozzle on the fuel hose to the fueling receptacle.
  - 1) Open the valve in the nozzle on the fuel hose.
  - 2) Make sure the nozzle and the fueling receptacle have a good seal.

WARNING: MAKE SURE THE FUEL SOURCE DOES NOT HAVE MORE THAN A MAXIMUM PRESSURE OF 55 PSI (379 KPA). INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (6) Do these steps to do a check for a fueling shutoff valve that does not open during the refuel operation:
  - (a) Make sure all of the fueling shutoff valve switches are set to the CLOSED position and the VALVE POSITION lights are off.
  - (b) Start the pump on the fuel truck or the fuel source.
  - (c) Monitor the fuel source to make sure the pressure is not more than 55 psi (379 kPa).
  - (d) The flowmeter on the fuel truck or the fuel source must show no fuel flow.
  - (e) Set the fueling shutoff valve switch for the tank(s) that has the problem to OPEN.
  - (f) If the flowmeter on the fuel source shows fuel flow and the fuel tank quantity increases at the usual rate, then there was an intermittent fault.
  - (g) If there is no fuel flow on the flowmeter or if the fuel flow is much slower than usual, then do these steps:
    - 1) Stop the fuel pump on the truck.
    - 2) Do the Fault Isolation Procedure below.

#### F. Fault Isolation Procedure

(1) If only one tank will not accept fuel when the fueling shutoff valve switch is in the OPEN position, then replace the applicable fueling shutoff valve, V44 (tank No. 1), V45 (tank No. 2), or V46 (center tank).

These are the tasks:

Fueling Shutoff Valve Removal, AMM TASK 28-21-51-000-801,

Fueling Shutoff Valve Installation, AMM TASK 28-21-51-400-801.

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

AKS ALL



(2) If all three tanks will not accept fuel when the fueling shutoff valve switch is in the OPEN position, then replace the fueling receptacle.

These are the tasks:

Fueling Receptacle Removal, AMM TASK 28-21-11-000-801,

Fueling Receptacle Installation, AMM TASK 28-21-11-400-801.

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

## G. Repair Confirmation

- (1) Do these steps to prepare for pressure fueling if you did not do them before:
  - (a) Do this task: Precautions and Limits for the Refuel Operation, AMM TASK 12-11-00-650-801.

**WARNING:** MAKE SURE THERE IS ELECTRICAL CONTINUITY BETWEEN THE FUEL SOURCE AND THE AIRPLANE. A FIRE OR AN EXPLOSION CAN OCCUR.

- (b) Attach the bonding cable on the nozzle of the fuel hose to the ground jack on the wing.
  - <u>NOTE</u>: The bonding cable is not necessary if there is electrical continuity between the nozzle and the receptacle.
- (c) Attach the nozzle on the fuel hose to the fueling receptacle.
  - 1) Open the valve in the nozzle on the fuel hose.
  - 2) Make sure the nozzle and the fueling receptacle have a good seal.

WARNING: MAKE SURE THE FUEL SOURCE DOES NOT HAVE MORE THAN A MAXIMUM PRESSURE OF 55 PSI (379 KPA). INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (2) Do these steps to do a check for a fueling shutoff valve that does not open during the refuel operation:
  - (a) Make sure all of the fueling shutoff valve switches are set to the CLOSED position and the VALVE POSITION lights are off.
  - (b) Start the pump on the fuel truck or the fuel source.
  - (c) Monitor the fuel source to make sure the pressure is not more than 55 psi.
  - (d) The flowmeter on the fuel truck or the fuel source must show no fuel flow.
  - (e) Set the fueling shutoff valve switch for the tank(s) that has the problem to OPEN.
  - (f) If the flowmeter on the fuel source shows fuel flow and the fuel tank quantity increases at the usual rate, then you corrected the fault.
- (3) If solution is unsatisfactory, then continue the Fault Isolation Procedure at the subsequent step.

END	OF TA	CIZ	
		13N —	

# 809. Fuel Flow Into The Fuel Tank Does Not Stop With Fueling Shutoff Valve Switch in the CLOSED Position

## A. Description

(1) You did the pressure fueling operation (AMM TASK 12-11-00-650-802), but fuel continued to flow into one [or more] of the tanks when the applicable fueling shutoff valve switch is set to the CLOSED position. That is, the fuel quantity in the applicable tank continues to increase on the indicator or the flowmeter on the fuel source continues to show fuel flow.

AKS ALL

28-21 TASKS 808-809



#### B. Possible Causes

- (1) Fueling shutoff valve, V44 (tank No. 1), V45 (tank No. 2), or V46 (center tank)
- (2) Switch for the fueling shutoff valve, S157 (tank No. 1), S158 (tank No. 2), or S159 (center tank)
- (3) Fueling float switch, S574 (tank No. 1), S576 (center tank), or S578 (tank No. 2)

#### C. Circuit Breakers

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

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

Row	<u>Col</u>	<u>Number</u>	Name
Α	3	C00032	<b>FUEL FUELING CONT</b>
Α	4	C01441	FUEL FUELING IND
Α	5	C00398	FUEL QTY 2
Α	6	C00397	FUEL QTY 1

#### D. Related Data

- (1) (SSM 28-44-11)
- (2) (WDM 28-44-11)

#### E. Initial Evaluation

(1) Open this access panel:

<u>Number</u>	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

- (2) Make sure the shutoff valves are clean. If necessary do the following task:
  - Fueling Shutoff Valve Maintenance Practices, AMM TASK 28-21-51-100-801
- (3) Do a check to see if the VALVE POSITION LIGHT for the fueling shutoff valve goes off when the fueling shutoff valve switch is set to the CLOSED position.
  - (a) If the VALVE POSITION LIGHT does not go off when the fueling shutoff valve switch is set to the closed position, then, do this task: Fueling Shutoff Valve Position Indicator Light Does not Come ON when the Valve Switch is set to OPEN - Fault Isolation, 28-21 TASK 807.
- (4) Do these steps to prepare for pressure fueling if you did not do them before:
  - (a) Do this task: Precautions and Limits for the Refuel Operation, AMM TASK 12-11-00-650-801.

WARNING: MAKE SURE THERE IS ELECTRICAL CONTINUITY BETWEEN THE FUEL SOURCE AND THE AIRPLANE. A FIRE OR AN EXPLOSION CAN OCCUR.

- (b) Attach the bonding cable on the nozzle of the fuel hose to the ground jack on the wing.
  - NOTE: The bonding cable is not necessary if there is electrical continuity between the nozzle and the receptacle.
- (c) Attach the nozzle on the fuel hose to the fueling receptacle.
  - 1) Open the valve in the nozzle on the fuel hose.
  - 2) Make sure the nozzle and the fueling receptacle have a good seal.

AKS ALL 28-21 TASK 809



WARNING: MAKE SURE THE FUEL SOURCE DOES NOT HAVE MORE THAN A MAXIMUM PRESSURE OF 55 PSI (379 KPA). INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (5) Do these steps to do a check for an open fueling shutoff valve of the pressure fueling system during the refuel operation:
  - (a) Make sure all of the fueling shutoff valve switches are set to the CLOSED position and the VALVE POSITION lights are off.
  - (b) Start the pump on the fuel truck or the fuel source.
  - (c) Monitor the fuel source to make sure the pressure is not more than 55 psi (379 kPa).
  - (d) The flowmeter on the fuel truck or the fuel source must show no fuel flow.
  - (e) If there is no fuel flow on the flowmeter, then there was an intermittent fault.
  - (f) If there is some fuel flow shown on the flowmeter, then do these steps:
    - Monitor the fuel quantity in each tank until you see an increase in the fuel quantity in one of the tanks.
    - Stop the fuel pump on the truck.
    - 3) Do the Fault Isolation Procedure below.

#### F. Fault Isolation Procedure

(1) Replace the applicable fueling shutoff valve, V44 (tank No. 1), V45 (tank No. 2), or V46 (center tank).

These are the tasks:

Fueling Shutoff Valve Removal, AMM TASK 28-21-51-000-801,

Fueling Shutoff Valve Installation, AMM TASK 28-21-51-400-801.

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

#### G. Repair Confirmation

- (1) Make sure the VALVE POSITION LIGHT for the fueling shutoff valve goes off when the fueling shutoff valve switch is set to the CLOSED position.
- (2) Do these steps to prepare for pressure fueling if you did not do them before:
  - (a) Do this task: Precautions and Limits for the Refuel Operation, AMM TASK 12-11-00-650-801.

WARNING: MAKE SURE THERE IS ELECTRICAL CONTINUITY BETWEEN THE FUEL SOURCE AND THE AIRPLANE. A FIRE OR AN EXPLOSION CAN OCCUR.

(b) Attach the bonding cable on the nozzle of the fuel hose to the ground jack on the wing.

NOTE: The bonding cable is not necessary if there is electrical continuity between the nozzle and the receptacle.

- (c) Attach the nozzle on the fuel hose to the fueling receptacle.
  - 1) Open the valve in the nozzle on the fuel hose.
  - 2) Make sure the nozzle and the fueling receptacle have a good seal.

WARNING: MAKE SURE THE FUEL SOURCE DOES NOT HAVE MORE THAN A MAXIMUM PRESSURE OF 55 PSI (379 KPA). INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(3) Do these steps to do a check for an open fueling shutoff valve of the pressure fueling system during the refuel operation:

AKS ALL



- (a) Make sure all of the fueling shutoff valve switches are set to the CLOSED position and the VALVE POSITION lights are off.
- (b) Start the pump on the fuel truck or the fuel source.
- (c) Monitor the fuel source to make sure the pressure is not more than 55 psi (379 kPa).
- (d) The flowmeter on the fuel truck or the fuel source must show no fuel flow.
- (e) If there is no fuel flow on the flowmeter, then you corrected the fault.

----- END OF TASK -----

## 810. Fueling Station Flood Light Does Not Come On - Fault Isolation

## A. Description

(1) There are two flood lights at the refueling station. One flood light lights the fueling receptacle. The other flood light lights the P15 refueling panel. If power is supplied to the fueling station, these two flood lights should come one when the Refuel Acces Panel - Slat Station 143.27, 621GB is opened.

#### B. Possible Causes

- (1) Flood lights, L279 or L280
- (2) Refueling Power Control Relay, R11
- (3) Fueling Power Control Switch, S156
- (4) Wiring from the R11 relay to the flood lights, L279 and L280

## C. Circuit Breakers

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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	3	C00032	<b>FUEL FUELING CONT</b>
Α	4	C01441	FUEL FUELING IND
Α	5	C00398	FUEL QTY 2
Α	6	C00397	FUEL QTY 1

## D. Related Data

- (1) (SSM 28-44-11)
- (2) (WDM 28-44-11)

#### E. Initial Evaluation

(1) Open this access panel:

<u>Number</u>	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

- (a) If one floodlight for the refueling panel is not on, then do the Fault Isolation Procedure One Floodlight Not On below.
- (b) If both floodlights for the refueling panel are not on, then do the Fault Isolation Procedure Both Floodlights Not On below.
- (c) If both floodlights are on, then there was an intermittent fault.

AKS ALL

28-21 TASKS 809-810



## F. Fault Isolation Procedure - One Floodlight Not On

- (1) Replace the applicable floodlight L279 or L280.
  - (a) If the two floodlights come on when the following access panel is opened, then you corrected the fault:

Number Name/Location

621GB Refuel Access Panel - Slat Station 143.27

1) Close this access panel:

Number Name/Location

621GB Refuel Access Panel - Slat Station 143.27

## G. Fault Isolation Procedure - Both Floodlights Not On

- (1) Do this test to find out if there is 28 VDC power to the floodlights:
  - (a) Set the switch for the fueling shutoff valve for the No. 2 tank to OPEN.
  - (b) If the VALVE POSITION LIGHT for the No. 2 tank comes on, then do these steps:
    - 1) Replace the two floodlights, L279 and L280.
    - 2) If the two floodlights come on when the following access panel is opened, then you corrected the fault:

Number Name/Location

621GB Refuel Access Panel - Slat Station 143.27

- (c) If the VALVE POSITION LIGHT does not come on, then continue.
  - 1) Set the switch for the fueling shutoff valve for the No. 2 tank back to CLOSED.
- (2) Do this test of the fueling power control switch:
  - (a) Set the FUELING INDICATION TEST SWITCH to FUEL DOOR SWITCH BYPASS.
  - (b) If the two floodlights, L279 and L280, come on, then do these steps:
    - Make sure the magnet for the fueling power control switch, S156 is correctly installed on the actuator bracket.
    - 2) If the magnet is not installed correctly, then do these steps:
      - a) Remove and re-install the magnet.

These are the tasks:

Remove the Fueling Power Control Switch Sensor Magnet, AMM TASK 28-21-81-000-801.

Install the Fueling Power Control Switch Sensor Magnet, AMM TASK 28-21-81-400-801.

b) If the two floodlights come on when the following access panel is opened, then you corrected the fault:

Number Name/Location

621GB Refuel Access Panel - Slat Station 143.27

c) Close this access panel:

Number Name/Location

621GB Refuel Access Panel - Slat Station 143.27

AKS ALL



3) Make sure there is the correct gap between the magnet face and the switch sensor when you move the following access panel from the closed to the open position:

Number Name/Location

621GB Refuel Access Panel - Slat Station 143.27

- a) To do a check of the gap, do this task: Remove the Actuator Switch for the Fueling Power Control Switch, AMM TASK 28-21-81-350-801
- 4) If the gap between the magnet face and the switch sensor is not correct, then do these steps:
  - Adjust the gap to make it correct. To adjust it, do this task: Remove the Actuator Switch for the Fueling Power Control Switch, AMM TASK 28-21-81-350-801.
  - b) If the two floodlights come on when the following access panel is opened, then you corrected the fault:

NumberName/Location621GBRefuel Access Panel - Slat Station 143.27

c) Close this access panel:

Number Name/Location
621GB Refuel Access Panel - Slat Station 143.27

- (c) If the two floodlights do not come on, then continue.
- (3) Replace the refueling power control relay, R11.

NOTE: The R11 relay is on the P6 panel.

(a) If the two floodlights come on when the following access panel is opened, then you corrected the fault:

Number Name/Location

621GB Refuel Access Panel - Slat Station 143.27

1) Close this access panel:

Number Name/Location

621GB Refuel Access Panel - Slat Station 143.27

- (b) If the two floodlights do not come on, then continue.
- (4) Do this check of the wiring:

**AKS ALL** 

- (a) Remove the refueling power control relay, R11.
- (b) Disconnect connector D4578J at the refuel panel, P15.
- (c) Do a check for an open circuit between these pins of connector D944 on the P6 panel and connector D4578J at the refuel panel:

D944	D4578J
pin A2	 pin 12

- (d) If there is an open circuit, then do these steps:
  - 1) Repair the wiring.
  - Re-install the refueling power control relay, R11.



- 3) Re-connect connector D4578J at the refuel panel.
- If the two floodlights are on when the refuel access door is open, then you corrected the fault.

Close this access panel:

Number Name/Location

621GB Refuel Access Panel - Slat Station 143.27

----- END OF TASK -----

## 812. Unwanted Fuel Transfer into the Center Tank - Source Unknown - Fault Isolation

## A. Description

- (1) Fuel moved from the No. 1 or the No. 2 tank to the center tank without a commanded fuel transfer
- (2) Unwanted particles (debris) in the fuel tank is a common cause of unwanted fuel transfer. Even small particles can cause a valve not to seal correctly. This can cause a large quantity of fuel to transfer. Note that debris in the fuel tank can cause leakage in more than one valve at a time.
- (3) Problems with the fuel scavenge system are only applicable to unwanted transfer from the No. 1 tank to the center tank.
- (4) (SDS SUBJECT 28-21-00)

#### B. Possible Causes

- (1) Unwanted particles (debris) in the fuel tank
- (2) Leakage in the fuel scavenge system (cause of transfer from No. 1 tank only)
- (3) Leakage in one of the boost pumps
- (4) Leakage in the engine fuel-feed manifold
- (5) Leakage in the fueling manifold
- (6) Leakage in the tank wall (Rib No. 5)

## C. Initial Evaluation

- (1) Transfer all of the fuel from the center tank and No. 2 tank into the No. 1 tank. To do this, do this task: Tank to Tank Fuel Transfer, AMM TASK 28-26-00-650-802
- (2) Fill the No. 1 tank to its full capacity.
- (3) Drain the center tank down to the level of the sumps. To do this, do this task: Drain the Fuel from the Sumps after Defueling, AMM TASK 12-11-00-650-804.

NOTE: It is helpful if the airplane is as close as possible to the nominal attitude, roll = 0 degrees, pitch = -1.14 degrees, as specified in (AMM TASK 12-11-00-650-804).

- (a) Wait for the fuel to stop draining from the sump completely.
- (b) Leave the center tank sump drain open (as a diagnostic tool).
- (4) Make sure the crossfeed valve is closed.
- (5) Monitor the center tank sump drain for 5 minutes with no boost pumps operating.
  - (a) Note the drip rate (if any) from the center tank sump drain with all boost pumps off.
    - 1) If a large fuel quantity (more than a U.S. gallon) drains out of the center tank sump drain, do these steps:
      - a) Close the center tank sump drain and monitor the center tank fuel quantity.

AKS ALL 28-21 TAS

28-21 TASKS 810-812



- b) Do this task: Unwanted Fuel Transfer from the No. 1 Tank to the Center Tank -Fault Isolation, 28-21 TASK 803.
- (b) Set the L FWD boost pump switch and the L AFT boost pump switch, on the P5 overhead panel, to the ON position.
- (6) Monitor the center tank sump drain for 5 minutes with the two boost pumps operating.
  - (a) Note the drip rate (if any) from the center tank sump drain with the two boost pumps operating.
    - 1) If a large fuel quantity (more than one U.S. gallon) drains out of the center tank sump drain, then do these steps:
      - a) Close the center tank sump drain and monitor the center tank fuel quantity.
      - b) Do this task: Unwanted Fuel Transfer from the No. 1 Tank to the Center Tank Fault Isolation, 28-21 TASK 803.
  - (b) Set the L FWD boost pump switch and the L AFT boost pump switch, on the P5 overhead panel, to the OFF position.
- (7) Transfer all of the fuel from the No. 1 tank into the No. 2 tank. To do this, do this task: Tank to Tank Fuel Transfer, AMM TASK 28-26-00-650-802
  - (a) Make sure the No. 2 tank is filled to its full capacity.
  - (b) Make sure the center tank is still empty.
  - (c) Make sure the center tank sump drain is still open.
- (8) Monitor the center tank sump drain for 5 minutes with no boost pumps operating.
  - (a) Note the drip rate (if any) from the center tank sump drain with all boost pumps off.
    - 1) If a large fuel quantity (more than a U.S. gallon) drains out of the center tank sump drain, then do these steps:
      - a) Close the center tank sump drain and monitor the center tank fuel quantity.
      - b) Do this task: Unwanted Fuel Transfer from the No. 2 Tank to the Center Tank Fault Isolation, 28-21 TASK 813.
  - (b) Set the R FWD boost pump switch and the R AFT boost pump switch, on the P5 overhead panel, to the ON position.
- (9) Monitor the center tank sump drain for 5 minutes with the two boost pumps operating.
  - (a) Note the drip rate (if any) from the center tank sump drain with the two boost pumps operating.
    - 1) If a large fuel quantity (more than one U.S. gallon) drains out of the center tank sump drain, do these steps:
      - a) Close the center tank sump drain and monitor the center tank fuel quantity.
      - b) Do this task: Unwanted Fuel Transfer from the No. 2 Tank to the Center Tank Fault Isolation, 28-21 TASK 813.
  - (b) Set the R FWD boost pump switch and the R AFT boost pump switch, on the P5 overhead panel, to the OFF position.
- (10) If the drip rate from center tank sump drain was more when the No. 1 tank was full than when the No. 2 tank was full, then, do this task: Unwanted Fuel Transfer from the No. 1 Tank to the Center Tank Fault Isolation, 28-21 TASK 803
- (11) If the drip rate from the center tank sump drain was more when the No. 2 tank was full than when the No. 1 tank was full, then, do this task: Unwanted Fuel Transfer from the No. 2 Tank to the Center Tank Fault Isolation, 28-21 TASK 813

AKS ALL



(12) If the drip rate from the center tank sump drain was the same when the No. 1 tank was full as when the No. 2 tank was full under all conditions, then there was an intermittent fault.

——— END OF TASK ———

#### 813. Unwanted Fuel Transfer from the No. 2 Tank to the Center Tank - Fault Isolation

## A. Description

- (1) Fuel moved from the No. 2 tank to the center tank without a commanded fuel transfer.
- (2) Unwanted particles (debris) in the fuel tank is a common cause of unwanted fuel transfer. Even small particles can cause a valve not to seal correctly. This can cause a large quantity of fuel to transfer. Note that the debris in the fuel tank can cause leakage in more than one valve at a time.
- (3) Problems with the fuel scavenge system are not applicable to unwanted transfer from the No. 2 tank to the center tank.
- (4) (SDS SUBJECT 28-21-00)

#### B. Possible Causes

- (1) Unwanted particles (debris) in the fuel tank
- (2) Leakage in one of the boost pumps
- (3) Leakage in the engine fuel-feed manifold
- (4) Leakage in the fueling manifold
- (5) Leakage in the tank wall (Rib No. 5)

## C. Initial Evaluation

- (1) Transfer all of the fuel from the center tank and the No. 1 tank into the No. 2 tank. To do this, do this task: Tank to Tank Fuel Transfer. AMM TASK 28-26-00-650-802
- (2) Drain the center tank down to the level of the sumps. To do this, do this task: Drain the Fuel from the Sumps after Defueling, AMM TASK 12-11-00-650-804.

NOTE: It is helpful if the airplane is as close as possible to the nominal attitude, roll = 0 degrees, pitch = -1.14 degrees, as specified in (AMM TASK 12-11-00-650-804).

- (a) Wait for the fuel to stop draining from the sump completely.
- (b) Leave the center tank sump drain open (as a diagnostic tool).
- (3) Fill the No. 2 tank to its full capacity.
- (4) Make sure the crossfeed valve is closed.
- (5) Monitor the center tank sump drain for 5 minutes with no boost pumps operating.
  - (a) Note the drip rate (if any) from the center tank sump drain with all boost pumps off.
    - 1) If a large fuel quantity drains out of the center tank sump drain, close the center tank sump drain and monitor the center tank fuel quantity.
- (6) If fuel does not drip from the center tank sump drain under any conditions, then there was an intermittent fault.
- (7) If fuel drips from the center tank sump drain, then do the Fault Isolation Procedure below.

#### D. Fault Isolation Procedure

NOTE: You must do the steps in the Initial Evaluation before you do these steps.

- (1) Do these steps to look for leakage in the output tubing for the R AFT boost pump:
  - (a) Set the RAFT PUMP switch, on the P5 Overhead Panel, to the ON position.

AKS ALL

28-21 TASKS 812-813



- (b) Let the pump operate for 15 minutes.
- (c) Monitor the center tank sump drain (still open) for drops of fuel.
  - 1) If a large fuel quantity drains out of the center tank sump drain, close the center tank sump drain and monitor the center tank fuel quantity.
- (d) Monitor the No. 2 tank fuel quantity to see if it decreases.
- (e) Set the R AFT PUMP switch, on the P5 Overhead Panel, to the OFF position.
- (f) If fuel started to drip from the center tank sump drain or if the drip rate increased while the R AFT PUMP was on, then do these steps:

WARNING: OBEY THE PRECAUTIONS FOR PURGING AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

- 1) Prepare to go into the center fuel tank. To do this, do this task: Purging and Fuel Tank Entry, AMM TASK 28-11-00-910-802.
- 2) Pressurize the engine fuel-feed manifold to 4 psig. To do this, do this task: Engine Fuel Feed Manifold Leak Test, AMM TASK 28-22-15-710-801.

NOTE: Do the steps in (AMM TASK 28-22-15-710-801) but only pressurize to 4 psig.

- 3) Do a check for leakage at the engine fuel feed tubing and couplings downstream of the R FWD boost pump.
- 4) If you find problems, repair the problems that you find.
  - a) Do the Repair Confirmation at the end of this task.
- (g) If fuel did not start to drip from the center tank sump drain and if the drip rate did not increase while the R FWD pump was on, then continue.
- (2) Do these steps to look for leakage in the output tubing of the R FWD boost pump:
  - (a) Set the R FWD PUMP switch, on the P5 Overhead Panel, to the ON position.
  - (b) Let the pump operate for 15 minutes.
  - (c) Monitor the center tank sump drain (still open) for drops of fuel.
    - If a large fuel quantity drains out of the center tank sump drain, close the center tank sump drain and monitor the center tank fuel quantity.
  - (d) Monitor the No. 2 tank fuel quantity to see if it decreases.
  - (e) Set the R FWD PUMP switch, on the P5 Overhead Panel, to the OFF position.
  - (f) If fuel started to drip from the center tank sump drain or if the drip rate increased while the R FWD PUMP was on, then do these steps:

WARNING: OBEY THE PRECAUTIONS FOR PURGING AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

- 1) Prepare to go into the center fuel tank. To do this, do this task: Purging and Fuel Tank Entry, AMM TASK 28-11-00-910-802.
- 2) Pressurize the engine fuel-feed manifold to 4 psig. To do this, do this task: Engine Fuel Feed Manifold Leak Test, AMM TASK 28-22-15-710-801.

NOTE: Do the steps in (AMM TASK 28-22-15-710-801) but only pressurize to 4 psig.

AKS ALL



- 3) Do a check for leakage in the engine fuel feed tubing and couplings downstream of the R AFT boost pump.
- 4) If you find problems, repair the problems that you find.
  - a) Do the Repair Confirmation at the end of this task.
- (g) If fuel did not start to drip from the center tank sump drain and if the drip rate did not increase while the R AFT PUMP was on, then continue.
- (3) Do these steps to examine the boost pumps for indications of leakage:

WARNING: OBEY THE PRECAUTIONS FOR PURGING AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (a) Prepare to go into the center fuel tank. To do this, do this task: Purging and Fuel Tank Entry, AMM TASK 28-11-00-910-802.
- (b) Examine the boost pump discharge check valves for the center tank. To do this, do this task: Discharge Check Valve Removal, AMM TASK 28-22-71-000-801.
- (c) If there are indications of leakage, then repair the problems that you find.
  - 1) Do the Repair Confirmation at the end of this task.
    - a) If the Repair Confirmation is not OK, then continue.
- (d) If there are no indications of leakage, then continue.
- (4) Do these steps to look for indications of leakage in the fueling manifold and the fuel-feed manifold:

WARNING: OBEY THE PRECAUTIONS FOR PURGING AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (a) Do this task: Purging and Fuel Tank Entry, AMM TASK 28-11-00-910-802.
- (b) Pressurize the engine fuel-feed manifold and the fueling manifold to 4 psig. To do this, do this task: Engine Fuel Feed Manifold Leak Test, AMM TASK 28-22-15-710-801.

NOTE: Do the steps in (AMM TASK 28-22-15-710-801) but open the defuel valve and only pressurize to 4 psig.

- (c) Do an inspection of the full length of the fueling manifold and the couplings of the fuel-feed manifold for indications of leakage.
  - 1) Listen for air leakage or use soap solution if it is necessary.
- (d) If you find leakage, repair the problem that you find. To do it, do this task: Fuel Line, Fitting and Coupling Removal, AMM TASK 28-22-15-000-801.
  - Do the Repair Confirmation at the end of this task.
    - a) If the Repair Confirmation is not OK, then continue.
- (e) If you do not find leakage, then continue.
- (5) Examine the fuel tank sealant on Rib No. 5 (the tank wall between the center tank and the No. 2 tank) for indication of leakage.
  - (a) If you find indications of leakage, repair the bad sealant. To do it, do this task: Repair of Sealant Leaks in the Fuel Tank Structure, AMM TASK 28-11-00-300-803.
  - (b) Do the Repair Confirmation at the end of this task.

28-21 TASK 813

AKS ALL

EFFECTIVITY '



## E. Repair Confirmation (Recommended)

- (1) Close the fuel tanks that you opened to do the leak detection. To do it, do this task: Purging and Fuel Tank Entry, AMM TASK 28-11-00-910-802.
- (2) Close the center tank sump drain valve if it is open.
- (3) Do these steps to make sure there is no unwanted fuel transfer:
  - (a) Transfer all of the fuel out of the center tank. To do it, do this task: Tank to Tank Fuel Transfer, AMM TASK 28-26-00-650-802.
  - (b) Fill the No. 1 and the No. 2 tank with fuel. To do it, do this task: Pressure Refuel Procedure, AMM TASK 12-11-00-650-802.
  - (c) Let the airplane stand for four hours.
    - Monitor the center tank fuel quantity for indications of fuel transfer to the center tank.
    - 2) If there is no fuel in the center tank after the four hours, then you corrected the fault.

## F. Repair Confirmation (alternative)

- (1) Close the fuel tanks that you opened to do the leak detection. To do it, do this task: Purging and Fuel Tank Entry, AMM TASK 28-11-00-910-802.
- (2) Close the center tank sump drain valve if it is open.
- (3) If there is no indication of unwanted fuel transfer on subsequent flights, then you corrected the fault.



## 814. Unwanted Fuel Transfer from the Center Tank to the No. 1 Tank - Fault Isolation

#### A. Description

- (1) Fuel moved from the Center Tank to the No. 1 Tank without a commanded fuel transfer.
- (2) Usually, fuel transfer into the No. 1 Tank is observed during flight, while the boost pumps operate. Fuel transfer from the Center Tank to the No. 1 tank is usually caused by failure of the Fuel Scavenge Float Valve to close completely, or by leakage in the Left Boost Pump Bypass Valve when it is pressurized by the Center Tank Boost Pump (Override Pump). Unwanted particles (debris) can cause the Boost Pump Bypass Valve to leak fuel into No. 1 Tank. Even small particles can cause a valve not to seal correctly. This can cause a large quantity of fuel to transfer. Unwanted fuel transfer can also be caused by leakage in the Boost Pump Discharge Check Valves, other parts of the Engine Fuel-Feed Manifold, the Fueling Manifold or the tank wall.
- (3) The Fuel Scavenge System has a minimum transfer rate of 220 pounds/hour (100 kilograms/hour). Usually, fuel scavenge transfer rates are between approximately 220 pounds/hour (100 kilograms/hour) and 450 pounds/hour (200 kilograms/hour).

## B. Possible Causes

- (1) Fuel Scavenge Float Operated Shutoff Valve
- (2) Leakage in the Boost Pump Bypass Valve
- (3) Leakage in the Boost Pump Discharge Check Valves for one of the No. 1 Tank Boost Pumps
- (4) Leakage in the Engine Fuel-Feed Manifold
- (5) Leakage in the Fueling Manifold
- (6) Leakage in the Boost Pump Discharge Check Valve for the APU DC Fuel Boost Pump.
- (7) Leakage in the tank wall (Rib No. 5)

28-21 TASKS 813-814

EFFECTIVITY '



#### C. Related Data

- (1) SDS SUBJECT 28-21-00
- (2) SDS SUBJECT 28-22-00

#### D. Initial Evaluation

- Make sure the No. 1 Tank contains more than 6500 pounds (3000 kilograms) of fuel.
  - NOTE: This will make sure that the Fuel Scavenge Float Operated Shutoff Valve is closed if it is operating correctly.
- (2) Make sure the Center Tank contains more than 1000 pounds (460 kilograms) of fuel.
  - NOTE: This will make sure there is sufficient fuel in the Center Tank to transfer into the No. 1 Tank for troubleshooting.
- (3) Make sure the Crossfeed Valve is closed.
- (4) Do these steps to do a check for leakage through the Float Operated Shutoff Valve:
  - NOTE: When it is operating normally, the Fuel Scavenge System has a minimum transfer rate of 220 pounds/hour (100 kilograms/hour). Usually, fuel scavenge transfer rates are between approximately 220 pounds/hour (100 kilograms/hour) and 450 pounds/hour (200 kilograms/hour).
  - (a) Set the FUEL PUMP TANK 1 FWD switch, on the P5 Overhead Panel, to ON.
  - (b) Let the FWD pump for the No. 1 Tank operate for thirty minutes.
  - (c) Monitor the fuel quantity in the No. 1 Tank to see if it increases.
  - (d) Monitor the fuel quantity in the Center Tank to see if it decreases.
  - (e) Set the FUEL PUMP TANK 1 FWD Switch, on the P5 Overhead Panel, to the OFF position.
  - (f) If the fuel quantity in the No. 1 Tank increases or if the fuel quantity in the Center Tank decreases, then do the Fault Isolation Procedure - Fuel Transfer through Fuel Scavenge System below.
  - (g) If the fuel quantity in the No. 1 Tank does not increase and the fuel quantity in the Center Tank does not decrease, then continue.
- (5) Do these steps to do a check for leakage through the Fuel Boost Pump Bypass Valve or the Engine Fuel-Feed System:
  - (a) Set the FUEL PUMP CENTER TANK LEFT switch, on the P5 Overhead Panel, to ON.
  - (b) Let the Left Center Boost Pump (Override Pump) operate for thirty minutes.
  - (c) Monitor the fuel quantity in the No. 1 Tank to see if it increases.
  - (d) Monitor the fuel quantity in the Center Tank to see if it decreases.
  - (e) Set the FUEL PUMP CENTER TANK LEFT Switch, on the P5 Overhead Panel, to OFF.
  - (f) If the fuel quantity in the No. 1 Tank increases or if the fuel quantity in the Center Tank decreases, then do the Fault Isolation Procedure - Fuel Transfer Through Engine Fuel-Feed System below.
  - (g) If the fuel quantity in the No. 1 Tank does not increase and the fuel quantity in the Center Tank does not decrease, then continue.
- (6) If there is no indication of unwanted fuel transfer on subsequent flights, then there was an intermittent problem.

## E. Fault Isolation Procedure - Fuel Transfer through Fuel Scavenge System

NOTE: You must do the steps in the Initial Evaluation before you do these steps.

AKS ALL



(1) Do these steps to look for leakage in the Fuel Scavenge System:

WARNING: OBEY THE FUEL TANK ENTRY PRECAUTIONS. FAILURE TO OBEY THE FUEL TANK ENTRY PRECAUTIONS CAN CAUSE INJURY OR DAMAGE.

- (a) Prepare to go into the No. 1 Tank. To do it, do this task: Purging and Fuel Tank Entry, AMM TASK 28-11-00-910-802.
- (b) Examine the Float-Operated Shutoff Valve to see if it operates correctly.
  - NOTE: Do a careful check for particles that keep the valve open.
- (c) If there are problems with the Float-Operated Shutoff Valve, then replace it. These are the tasks:
  - Fuel Scavenge Float-Operated Shutoff Valve Removal, AMM TASK 28-22-16-000-801
  - Fuel Scavenge Float-Operated Shutoff Valve Installation, AMM TASK 28-22-16-400-801
  - 1) Do the Repair Confirmation procedure at the end of this task.
- (d) If there are no problems with the Float-Operated Shutoff Valve, then do these steps:
  - Do a check for leakage at the couplings of the fuel scavenge tubing in the No. 1 Tank.
    - a) If it is necessary, replace the applicable couplings in the Fuel Scavenge System. These are the tasks:
      - Fuel Line, Fitting and Coupling Removal, AMM TASK 28-22-15-000-801
      - Fuel Line, Fitting and Coupling Installation, AMM TASK 28-22-15-400-801
  - Do a check for leakage in the tubing of the Fuel Scavenge System in the No. 1 Tank.
    - a) If you find problems, repair the problems that you find. Do the Repair Confirmation at the end of this task.
- F. Fault Isolation Procedure Fuel Transfer Through Leakage in the Engine Fuel Feed System NOTE: You must do the steps in the Initial Evaluation before you do these steps.

WARNING: BE PREPARED TO PUT THE BOOST PUMP IMPELLER IMMEDIATELY BACK INTO ITS POSITION TO STOP FUEL FLOW. IF THERE IS A FUEL LEAK AT THE DISCHARGE CHECK VALVE, FUEL CAN CONTINUOUSLY FLOW FROM THE PUMP.

- (1) Do these steps to look for a leak in the AFT Boost Pump Discharge Check Valve for the No. 1 Tank:
  - (a) Loosen the mounting screws for the Aft Boost Pump Impeller. To do it, do this task: Motor Impeller Removal, AMM TASK 28-22-41-000-801.
  - (b) Carefully pull the impeller unit away from the boost pump housing to see if there is any fuel leakage from the Discharge Check Valve.
  - (c) If there is indication of fuel leakage, immediately install the impeller unit that you removed.
  - (d) If there is no indication of fuel leakage, set the FUEL PUMP CENTER TANK LEFT switch, on the P5 Overhead Panel, to ON.
    - NOTE: This applies the pressure of the Left Center Tank Boost Pump to the AFT Boost Pump Discharge Check Valve.
  - (e) If there is indication of leakage, immediately turn off the FUEL PUMP CENTER TANK LEFT switch and install the impeller unit that you removed. Do these steps:

AKS ALL 28



- Replace the Aft Boost Pump Discharge Check Valve for the No. 1 Tank. These are the tasks:
  - Discharge Check Valve Removal, AMM TASK 28-22-71-000-801
  - Discharge Check Valve Installation, AMM TASK 28-22-71-400-801
- 2) Do the Repair Confirmation procedure at the end of this task.
- (f) If there is no indication of leakage from the Aft Boost Pump Discharge Check Valve, then continue. Re-install the Boost Pump that you removed and tighten the mounting screws. To do it, do this task: Motor Impeller Installation, AMM TASK 28-22-41-400-801

WARNING: BE PREPARED TO PUT THE BOOST PUMP IMPELLER IMMEDIATELY BACK INTO ITS POSITION TO STOP FUEL FLOW. IF THERE IS A FUEL LEAK AT THE DISCHARGE CHECK VALVE. FUEL CAN CONTINUOUSLY FLOW FROM THE PUMP.

- (2) Do these steps to look for a leak in the FWD Boost Pump Discharge Check Valve for the No. 1 Tank:
  - (a) Loosen the mounting screws for the Fwd Boost Pump Impeller. To do it, do this task: Motor Impeller Removal, AMM TASK 28-22-41-000-801.
  - (b) Carefully pull the impeller unit away from the boost pump housing to see if there is any fuel leakage from the Discharge Check Valve.
  - (c) If there is indication of fuel leakage, immediately replace the impeller unit.
  - (d) If there is no indication of fuel leakage, set the FUEL PUMP CENTER TANK LEFT switch, on the P5 Overhead Panel, to ON.
    - NOTE: This applies the pressure of the Left Center Tank Boost Pump to the FWD Boost Pump Discharge Check Valve.
  - (e) If there is indication of leakage, immediately turn off the FUEL PUMP CENTER TANK -LEFT switch and install the impeller unit that you removed. Do these steps:
    - Replace the Fwd Boost Pump Discharge Check Valve for the No. 1 Tank. These are the tasks:
      - Discharge Check Valve Removal, AMM TASK 28-22-71-000-801
      - Discharge Check Valve Installation, AMM TASK 28-22-71-400-801
    - 2) Do the Repair Confirmation procedure at the end of this task.
  - (f) If there is no indication of leakage, then continue. Re-install the Boost Pump that you removed and tighten the mounting screws. To do it, do this task: Motor Impeller Installation, AMM TASK 28-22-41-400-801
- (3) Do these steps to look for indications of leakage in the Fueling Manifold and the Fuel-Feed Manifold:

<u>WARNING</u>: OBEY THE FUEL TANK ENTRY PRECAUTIONS. FAILURE TO OBEY THE FUEL TANK ENTRY PRECAUTIONS CAN CAUSE INJURY OR DAMAGE.

- (a) Do this task: Purging and Fuel Tank Entry, AMM TASK 28-11-00-910-802.
- (b) Pressurize the Engine Fuel-Feed Manifold and the Fueling Manifold to 40 psig. To do this, do this task: Engine Fuel Feed Manifold Leak Test, AMM TASK 28-22-15-710-801.
- (c) Do an inspection of the Fuel Boost Pump Bypass Valve to see if there is leakage.
  - 1) If there is leakage in the Fuel Boost Pump Bypass Valve, replace the Fuel Boost Pump Bypass Valve. These are the tasks:
    - Fuel Boost Pump Bypass Valve Removal, AMM TASK 28-22-61-000-801

AKS ALL 28-21 TASK 814



- Fuel Boost Pump Bypass Valve Installation, AMM TASK 28-22-61-400-801
- a) Do the Repair Confirmation at the end of this task.
- 2) If there is no leakage in the Fuel Boost Pump Bypass Valve, then continue.
- (d) Do an inspection of the full length of the fueling manifold and the couplings of the Fuel-Feed Manifold in the No. 1 Tank for indications of leakage.
  - 1) Listen for air leakage or use soap solution if it is necessary.
- (e) If you find leakage, repair the problem that you find. To do it, do this task: Fuel Line, Fitting and Coupling Removal, AMM TASK 28-22-15-000-801.
  - 1) Do the Repair Confirmation at the end of this task.
    - a) If the Repair Confirmation is not OK, then continue.
- (f) If you do not find leakage, then continue.
- (4) Do these steps to look for a leak in the APU DC Fuel Boost Pump Discharge Check Valve:
  - (a) Remove the APU DC Fuel Boost Pump Housing (APU DC Fuel Pump (Housing) Removal, AMM TASK 28-25-01-000-802).
  - (b) Do an inspection of the Discharge Check Valve Retaining Ring on the Boost Pump Housing to see if it is installed correctly.
    - 1) If the Retaining Ring is not installed correctly, then re-install the Retaining Ring so that it aligns with the guide slots.
      - a) Re-install the APU DC Fuel Boost Pump that you removed (APU DC Fuel Pump (Housing) Installation, AMM TASK 28-25-01-400-802).
      - b) Do the Repair Confirmation procedure at the end of this task.
    - 2) If the retaining ring is installed correctly, then continue. Re-install the APU DC Fuel Boost Pump that you removed (APU DC Fuel Pump (Housing) Installation, AMM TASK 28-25-01-400-802).
- (5) Do a check for signs of leakage between the Center Tank and the No. 1 Tank.
  - (a) Transfer all of the fuel out of the Center Tank. This is the task: Tank to Tank Fuel Transfer, AMM TASK 28-26-00-650-802.
  - (b) Fill the No. 1 Tank with fuel. This is the task: Pressure Refuel Procedure, AMM TASK 12-11-00-650-802
  - (c) Let the airplane stand for four hours.
    - Monitor the Center Tank fuel quantity for indications of fuel transfer to the Center Tank.
      - a) If no fuel is found in the Center Tank, then there was an intermittent problem.
      - b) If fuel is found in the Center Tank, then continue.
- 6) Examine the fuel tank sealant on Rib No. 5 (the tank wall between the Center Tank and the No. 1 Tank) for indication of leakage.
  - (a) If you find indications of leakage, repair the bad sealant. To do it, do this task: Repair of Sealant Leaks in the Fuel Tank Structure, AMM TASK 28-11-00-300-803.
  - (b) Do the Repair Confirmation at the end of this task.

28-21 TASK 814

EFFECTIVITY '



## G. Repair Confirmation (Recommended)

- (1) Close the fuel tanks that you opened to do the leak detection or repairs. To do it, do this task: Purging and Fuel Tank Entry, AMM TASK 28-11-00-910-802.
- (2) Make sure the No. 1 Tank contains more than 6500 pounds (3000 kilograms) of fuel.
  - NOTE: This will make sure that the Fuel Scavenge Float Operated Shutoff Valve is closed if it is operating correctly.
- (3) Make sure the Center Tank contains more than 1000 pounds (460 kilograms) of fuel.
  - NOTE: This will make sure there is sufficient fuel in the Center Tank to transfer into the No. 1 Tank for troubleshooting.
- (4) Make sure the Crossfeed Valve is closed.
- (5) Do these steps to make sure there is no leakage through the Float Operated Shutoff Valve:
  - (a) Set the FUEL PUMP TANK 1 FWD Switch, on the P5 Overhead Panel, to ON.
  - (b) Let the FWD pump for the No. 1 Tank operate for thirty minutes.
  - (c) Monitor the fuel quantity in the No. 1 Tank to see if it increases.
  - (d) Monitor the fuel quantity in the Center Tank to see if it decreases.
  - (e) Set the FUEL PUMP TANK 1 FWD Switch, on the P5 Overhead Panel, to the OFF position.
  - (f) Make sure the fuel quantity in the No. 1 Tank does not increase and the fuel quantity in the Center Tank does not decrease.
- (6) Do these steps to make sure there is no leakage through the Fuel Boost Pump Bypass Valve or the Engine Fuel-Feed System:
  - (a) Set the FUEL PUMP CENTER TANK LEFT Switch, on the P5 Overhead Panel, to ON.
  - (b) Let the Left Center Boost Pump (Override Pump) operate for thirty minutes.
  - (c) Monitor the fuel quantity in the No. 1 Tank to see if it increases.
  - (d) Monitor the fuel quantity in the Center Tank to see if it decreases.
  - (e) Set the FUEL PUMP CENTER TANK LEFT Switch, on the P5 Overhead Panel, to OFF.
  - (f) If the fuel quantity in the No. 1 Tank does not increase and the fuel quantity in the Center Tank does not decrease, then you corrected the problem.

#### H. Repair Confirmation (alternative)

AKS ALL

- (1) Close the fuel tanks that you opened to do the leak detection or repairs. To do it, do this task: Purging and Fuel Tank Entry, AMM TASK 28-11-00-910-802.
- (2) If there is no indication of unwanted fuel transfer on subsequent flights, then you corrected the problem.

<b>END</b>	$\triangle E = E$	VCK	

EFFECTIVITY 28-21 TASK 814



## 815. Unwanted Fuel Transfer from the Center Tank to the No. 2 Tank - Fault Isolation

## A. Description

- (1) Fuel moved from the Center Tank to the No. 2 Tank without a commanded fuel transfer.
- (2) Usually, fuel transfer into the No. 2 Tank is observed during flight, while the Boost Pumps operate. Fuel transfer from the Center Tank to the No. 2 Tank is usually caused by leakage in the Right Boost Pump Bypass Valve when it is pressurized by the Center Tank Boost Pump (Override Pump). Unwanted particles (debris) can cause the Boost Pump Bypass Valve to leak fuel into No. 2 Tank. Even small particles can cause a valve not to seal correctly. This can cause a large quantity of fuel to transfer. Unwanted fuel transfer can also be caused by leakage in the Boost Pump Discharge Check Valves, other parts of the Engine Fuel-Feed Manifold, the Fueling Manifold or the tank wall.

#### B. Possible Causes

- (1) Leakage in the Boost Pump Bypass Valve
- (2) Leakage in the Boost Pump Discharge Check Valves for one of the No. 2 Tank Boost Pumps
- (3) Leakage in the Engine Fuel-Feed Manifold
- (4) Leakage in the Fueling Manifold
- (5) Leakage in the tank wall (Rib No. 5)

#### C. Related Data

- (1) SDS SUBJECT 28-21-00
- (2) SDS SUBJECT 28-22-00

#### D. Initial Evaluation

- (1) Make sure the No. 2 Tank contains more than 100 pounds (50 kilograms) of fuel.
  - NOTE: This will make sure that an increase in No. 2 Tank fuel quantity can be measured by the FQIS.
- (2) Make sure the Center Tank contains more than 1000 pounds (460 kilograms) of fuel.
  - NOTE: This will make sure there is sufficient fuel in the Center Tank to transfer into the No. 2 Tank for troubleshooting.
- (3) Make sure the Crossfeed Valve is closed.
- (4) Do these steps to do a check for leakage through the Fuel Boost Pump Bypass Valve or the Engine Fuel-Feed System:
  - (a) Set the FUEL PUMP CENTER TANK RIGHT Switch, on the P5 Overhead Panel, to ON.
  - (b) Let the Right Center Boost Pump (Override Pump) operate for thirty minutes.
  - (c) Monitor the fuel quantity in the No. 2 Tank to see if it increases.
  - (d) Monitor the fuel quantity in the Center Tank to see if it decreases.
  - (e) Set the FUEL PUMP CENTER TANK RIGHT Switch, on the P5 Overhead Panel, to OFF.
  - (f) If the fuel quantity in the No. 2 Tank increases or if the fuel quantity in the Center Tank decreases, then do the Fault Isolation Procedure below.
  - (g) If the fuel quantity in the No. 2 Tank does not increase and the fuel quantity in the Center Tank does not decrease, then continue.
- (5) If there is no indication of unwanted fuel transfer on subsequent flights, then there was an intermittent problem.

AKS ALL



#### E. Fault Isolation Procedure

WARNING: BE PREPARED TO PUT THE BOOST PUMP IMPELLER IMMEDIATELY BACK INTO ITS POSITION TO STOP FUEL FLOW. IF THERE IS A FUEL LEAK AT THE DISCHARGE CHECK VALVE, FUEL CAN CONTINUOUSLY FLOW FROM THE PUMP.

- (1) Do these steps to look for a leak in the AFT Boost Pump Discharge Check Valve for the No. 2 Tank:
  - (a) Loosen the mounting screws for the Aft Boost Pump Impeller. This is the task: Motor Impeller Removal, AMM TASK 28-22-41-000-801.
  - (b) Carefully pull the impeller unit away from the Boost Pump Housing to see if there is any fuel leakage from the Discharge Check Valve.
  - (c) If there is indication of fuel leakage, immediately install the impeller unit that you removed.
  - (d) If there is no indication of fuel leakage, set the FUEL PUMP CENTER TANK RIGHT Switch, on the P5 Overhead Panel, to ON.
    - NOTE: This applies the pressure of the Right Center Tank Boost Pump to the AFT Boost Pump Discharge Check Valve.
  - (e) If there is indication of leakage, immediately turn off the FUEL PUMP CENTER TANK -RIGHT switch and install the impeller unit that you removed. Do these steps:
    - Replace the Aft Boost Pump Discharge Check Valve for the No. 2 Tank. These are the tasks:
      - Discharge Check Valve Removal, AMM TASK 28-22-71-000-801
      - Discharge Check Valve Installation, AMM TASK 28-22-71-400-801
    - 2) Do the Repair Confirmation procedure at the end of this task.
  - (f) If there is no indication of leakage from the Aft Boost Pump Discharge Check Valve, then continue. Re-install the Boost Pump that you removed and tighten the mounting screws. This is the task: Motor Impeller Installation, AMM TASK 28-22-41-400-801

WARNING: BE PREPARED TO PUT THE BOOST PUMP IMPELLER IMMEDIATELY BACK INTO ITS POSITION TO STOP FUEL FLOW. IF THERE IS A FUEL LEAK AT THE DISCHARGE CHECK VALVE, FUEL CAN CONTINUOUSLY FLOW FROM THE PUMP.

- (2) Do these steps to look for a leak in the FWD Boost Pump Discharge Check Valve for the No. 2 Tank:
  - (a) Loosen the mounting screws for the Fwd Boost Pump Impeller. This is the task: Motor Impeller Removal, AMM TASK 28-22-41-000-801.
  - (b) Carefully pull the impeller unit away from the Boost Pump Housing to see if there is any fuel leakage from the Discharge Check Valve.
  - (c) If there is indication of fuel leakage, immediately replace the impeller unit.
  - (d) If there is no indication of fuel leakage, set the FUEL PUMP CENTER TANK RIGHT Switch, on the P5 Overhead Panel, to ON.
    - NOTE: This applies the pressure of the Right Center Tank Boost Pump to the FWD Boost Pump Discharge Check Valve.
  - (e) If there is indication of leakage, immediately turn off the FUEL PUMP CENTER TANK RIGHT Switch and install the impeller unit that you removed. Do these steps:
    - Replace the Fwd Boost Pump Discharge Check Valve for the No. 2 Tank. These are the tasks:

AKS ALL 28-21 TASK 815



- Discharge Check Valve Removal, AMM TASK 28-22-71-000-801
- Discharge Check Valve Installation, AMM TASK 28-22-71-400-801
- 2) Do the Repair Confirmation procedure at the end of this task.
- (f) If there is no indication of leakage, then continue. Re-install the Boost Pump that you removed and tighten the mounting screws. This is the task: Motor Impeller Installation, AMM TASK 28-22-41-400-801
- (3) Do these steps to look for indications of leakage in the Fueling Manifold and the Fuel-Feed Manifold:

WARNING: OBEY THE FUEL TANK ENTRY PRECAUTIONS. FAILURE TO OBEY THE FUEL TANK ENTRY PRECAUTIONS CAN CAUSE INJURY OR DAMAGE.

- (a) Do this task: Purging and Fuel Tank Entry, AMM TASK 28-11-00-910-802.
- (b) Pressurize the Engine Fuel-Feed Manifold and the Fueling Manifold to 40 psig. This is the task: Engine Fuel Feed Manifold Leak Test, AMM TASK 28-22-15-710-801.
- (c) Do an inspection of the Fuel Boost Pump Bypass Valve to see if there is leakage.
  - 1) If there is leakage in the Fuel Boost Pump Bypass Valve, replace the Fuel Boost Pump Bypass Valve. These are the tasks:
    - Fuel Boost Pump Bypass Valve Removal, AMM TASK 28-22-61-000-801
    - Fuel Boost Pump Bypass Valve Installation, AMM TASK 28-22-61-400-801
    - a) Do the Repair Confirmation at the end of this task.
  - 2) If there is no leakage in the Fuel Boost Pump Bypass Valve, then continue.
- (d) Do an inspection of the full length of the fueling manifold and the couplings of the Fuel-Feed Manifold in the No. 2 Tank for indications of leakage.
  - 1) Listen for air leakage or use soap solution if it is necessary.
- (e) If you find leakage, repair the problem that you find. This is the task: Fuel Line, Fitting and Coupling Removal, AMM TASK 28-22-15-000-801.
  - 1) Do the Repair Confirmation at the end of this task.
    - a) If the Repair Confirmation is not OK, then continue.
- (f) If you do not find leakage, then continue.
- (4) Do a check for signs of leakage between the Center Tank and the No. 2 Tank.
  - (a) Transfer all of the fuel out of the Center Tank. This is the task: Tank to Tank Fuel Transfer, AMM TASK 28-26-00-650-802.
  - (b) Fill the No. 2 Tank with fuel. This is the task: Pressure Refuel Procedure, AMM TASK 12-11-00-650-802.
  - (c) Let the airplane stand for four hours.
    - Monitor the Center Tank fuel quantity for indications of fuel transfer to the Center Tank.
      - a) If no fuel is found in the Center Tank, then there was an intermittent problem.
      - b) If fuel is found in the Center Tank, then continue.
- (5) Examine the fuel tank sealant on Rib No. 5 (the tank wall between the Center Tank and the No. 2 Tank) for indication of leakage.
  - (a) If you find indications of leakage, repair the bad sealant. This is the task: Repair of Sealant Leaks in the Fuel Tank Structure, AMM TASK 28-11-00-300-803.

AKS ALL



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

## F. Repair Confirmation (Recommended)

- (1) Close the fuel tanks that you opened to do the leak detection or repairs. This is the task: Purging and Fuel Tank Entry, AMM TASK 28-11-00-910-802.
- (2) Make sure the No. 2 Tank contains more than 100 pounds (50 kilograms) of fuel.
  - NOTE: This will make sure that an increase in No. 2 Tank fuel quantity can be measured by the FQIS.
- (3) Make sure the Center Tank contains more than 1000 pounds (460 kilograms) of fuel.
  - NOTE: This will make sure there is sufficient fuel in the Center Tank to transfer into the No. 2 tank for troubleshooting.
- (4) Make sure the Crossfeed Valve is closed.
- (5) Do these steps to make sure there is no leakage through the Fuel Boost Pump Bypass Valve or the Engine Fuel-Feed System:
  - (a) Set the FUEL PUMP CENTER TANK RIGHT Switch, on the P5 Overhead Panel, to ON.
  - (b) Let the Right Center Boost Pump (Override Pump) operate for thirty minutes.
  - (c) Monitor the fuel quantity in the No. 2 Tank to see if it increases.
  - (d) Monitor the fuel quantity in the Center Tank to see if it decreases.
  - (e) Set the FUEL PUMP CENTER TANK RIGHT Switch, on the P5 Overhead Panel, to OFF.
  - (f) If the fuel quantity in the No. 2 Tank does not increase and the fuel quantity in the Center Tank does not decrease, then you corrected the problem.

## G. Repair Confirmation (alternative)

- (1) Close the fuel tanks that you opened to do the leak detection or repairs. This is the task: Purging and Fuel Tank Entry, AMM TASK 28-11-00-910-802.
- (2) If there is no indication of unwanted fuel transfer on subsequent flights, then you corrected the problem.



## 816. Refuel Quantity Indicator Flashes - Fault Isolation

#### A. Description

- (1) One of the refuel quantity indicators flashes at an interval of approximately one second and shows the fuel quantity in the applicable tank.
- (2) The flashing shows that the fuel quantity (as calculated by the fuel quantity processor) is more than the expected full tank shutoff quantity (total tank volume minus 2 percent expansion volume). The fueling float switch is designed to close the applicable fueling shutoff valve during pressure fueling when the applicable tank has an expansion volume of 2 percent. The fuel quantity processor causes the applicable refuel quantity indicator to flash when it calculates a fuel quantity of more than the full tank shutoff quantity. The design tolerance of the Fuel Quantity Indicating System (FQIS) is +/- 2 percent. Thus, because of variations in fuel density and in the rate of closure of the fueling shutoff valve, it is possible for a tank to contain more (or in a few cases less) than the expected full tank shutoff quantity and cause the fuel quantity display on the refuel panel to flash.

EFFECTIVITY 28-21 TASKS 815-816



- (3) AIRPLANES WITH FUEL QUANTITY PROCESSOR S345A001-010; This condition can occur because it is possible for processor S345A001-010 to read a fuel quantity that is more than the overfill quantity when the actual fuel quantity is less than the overfill quantity. If it is possible, replace processor S345A001-010 with S345A001-011 (for standard 737-600, -700, and -800) or S345A001-015 (for 737-700 Increased Gross Weight or the Boeing Business Jet) before you do more troubleshooting (AMM TASK 28-41-81-000-801).
- (4) (SDS SUBJECT 28-21-00)
- (5) (SDS SUBJECT 28-41-00)

#### B. Possible Causes

- (1) Airplane is not level
- (2) Fueling float switch, S574 (No. 1 tank), S576 (center tank), or S578 (No. 2 tank)
- (3) Fueling shutoff valve, V44 (No. 1 tank), V45 (No. 2 tank), or V46 (center tank)
- (4) Fuel quantity processor unit (FQPU), M1827
- (5) Wiring

#### C. Circuit Breakers

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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	3	C00032	FUEL FUELING CONT
Α	4	C01441	FUEL FUELING IND
Α	5	C00398	FUEL QTY 2
Α	6	C00397	FUEL QTY 1

## D. Related Data

- (1) (SSM 28-44-11)
- (2) (WDM 28-44-11)

## E. Initial Evaluation

(1) Make sure the airplane has a ground attitude of 1.14 degrees nose-down pitch and 0.0 degree roll.

<u>NOTE</u>: This attitude permits you to put the maximum quantity of fuel in the tanks.

- (2) Make sure the shutoff valves are clean. If necessary do the following task:
  - Fueling Shutoff Valve Maintenance Practices, AMM TASK 28-21-51-100-801
- (3) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - (a) If the FQIS BITE test shows a maintenance message, then do the Fault Isolation procedure below.
- (4) Do the pressure refueling procedure for the applicable tank. To do it, do this task: Pressure Refuel Procedure, AMM TASK 12-11-00-650-802.
  - (a) Make sure the other two fueling shutoff valves are closed.
  - (b) Monitor the fuel quantity in the applicable tank.
  - (c) Make sure automatic shutoff occurs (the VALVE POSITION LIGHT goes off and all fuel flow stops) before the fuel quantity increases to its full capacity (approximately 30,000 pounds (13,600 kilograms) for the center tank, 9000 pounds (4090 kilograms) for the No. 1 or No. 2 tank).

AKS ALL



- 1) If automatic shutoff does not occur, then, do this task: Fuel Spill at Surge Tank or Fuel Tank Auto-Shutoff Inoperative Fault Isolation, 28-21 TASK 801.
- 2) If the automatic shutoff occurs, then continue.
- (5) Look at the P15 refueling panel with the following access panel fully open and power on.

# Number Name/Location

621GB Refuel Access Panel - Slat Station 143.27

- (a) If the refuel quantity indicator for the applicable tank flashes, then do the Fault Isolation Procedure below.
- (b) If the refuel quantity indicator does not flash and shows the correct fuel quantity, then there was an intermittent fault.

#### F. Fault Isolation Procedure

NOTE: You must do the steps in the Initial Evaluation before you do these steps.

- (1) Do these steps to look for a problem with the FQIS:
  - (a) If the FQIS BITE test showed a maintenance message in the Initial Evaluation, then do the corrective action for that message to correct the fault.
    - 1) Look at the refuel indicators to see if they show the fuel quantity correctly.
    - 2) If the refuel indicators show the fuel quantity correctly, then you corrected the fault.
      - a) If it is necessary, do this task: Pressure Refuel Procedure, AMM TASK 12-11-00-650-802
      - b) Close this access panel:

## Number Name/Location

621GB Refuel Access Panel - Slat Station 143.27

- 3) If the refuel indicators flash or do not show the fuel quantity correctly, then continue.
- (b) If the FQIS BITE test did not show a maintenance message, then continue.
- (2) If the VALVE POSITION LIGHT for the fueling shutoff valve did not go off, then do these steps:
  - (a) Replace the fueling float switch for the applicable tank, S574 (No. 1 tank), S576 (center tank), or S578 (No. 2 tank).

These are the tasks:

Float Switch Removal, AMM TASK 28-21-71-020-801,

Float Switch Installation, AMM TASK 28-21-71-400-802.

- (b) Examine the mounting bracket for the fueling float switch to see if it is bent or at the incorrect level.
  - 1) Repair the mounting bracket if it is necessary.
- (c) Do the Repair Confirmation at the end of this task.
- (3) If the applicable VALVE POSITION LIGHT went off, then do these steps:
  - (a) Replace the fueling shutoff valve.

These are the tasks:

Fueling Shutoff Valve Removal, AMM TASK 28-21-51-000-801,

Fueling Shutoff Valve Installation, AMM TASK 28-21-51-400-801.

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

28-21 TASK 816

Page 250 Jun 15/2016



## G. Repair Confirmation

- (1) Obey all precautions for pressure refueling (AMM TASK 12-11-00-650-801).
- (2) Do the pressure refueling procedure for the applicable tank. To do it, do this task: Pressure Refuel Procedure, AMM TASK 12-11-00-650-802.
  - (a) Make sure the other two fueling shutoff valves are closed.
  - (b) Monitor the fuel quantity in the applicable tank.
  - (c) Make sure automatic shutoff occurs (the VALVE POSITION LIGHT goes off and all fuel flow stops) before the fuel quantity increases to its full capacity (approximately 30,000 pounds (13,600 kilograms) for the center tank, 9000 pounds (4090 kilograms for the No. 1 or No. 2 tank).
    - 1) If the automatic shutoff occurs, then you corrected the fault.
    - 2) Look at the refuel indicators to see if they show the fuel quantity correctly.
    - 3) If the refuel indicators show the fuel quantity correctly (without flashing), then you corrected the fault.
      - a) If it is necessary, do this task: Pressure Refuel Procedure, AMM TASK 12-11-00-650-802
      - b) Close this access panel:

Number Name/Location
621GB Refuel Access Panel - Slat Station 143.27

- 4) If solution is unsatisfactory, then continue the Fault Isolation Procedure at the subsequent step.
- (3) Remove electrical power if it is not necessary for other tasks (AMM TASK 24-22-00-860-812).



## 817. Lower Refuel Quantity Indicator Display Shows the Message

#### A. Description

- (1) The upper display of one or more of the refuel quantity indicators is blank. The related lower display shows the message "ARINC".
- (2) (SDS SUBJECT 28-41-00)

#### B. Possible Causes

- (1) The wiring from the Fuel Quantity Processor Unit (FQPU), M1827 to the Refueling Panel, P15
- (2) Fuel Quantity Processor Unit (FQPU), M1827
- (3) Refuel Quantity Indicator, N193, N194, or N195

#### C. Circuit Breakers

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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	3	C00032	FUEL FUELING CONT
Α	4	C01441	FUEL FUELING IND
Α	5	C00398	FUEL QTY 2
Α	6	C00397	FUEL QTY 1

EFFECTIVITY '

28-21 TASKS 816-817

Page 251 Jun 15/2016



#### D. Related Data

- (1) (SSM 28-41-11)
- (2) (SSM 28-44-11)
- (3) (WDM 28-41-11)
- (4) (WDM 28-44-11)

#### E. Initial Evaluation

(1) Open this access panel:

Number Name/Location
621GB Refuel Access Panel - Slat Station 143.27

- (2) If the upper display of one or more of the indicators is blank and the lower display shows the message "ARINC", then do the Fault Isolation Procedure below.
- (3) If the upper display of each of the indicators shows the correct fuel quantity, then do these steps:
  - (a) Set the FUELING INDICATION TEST SWITCH on the P15 Fueling Control Panel to the TEST GAGES position.
  - (b) On each of the refuel quantity indicators do a check to see if all segments on the display come on for approximately two seconds and then go off for two seconds alternately until the FUELING INDICATION TEST SWITCH is released.

NOTE: If the SWITCH is held for more than twenty (20) seconds, the test stops automatically and the indicators go back to indicating mode.

- (c) If the upper display of one or more of the indicators is blank and the lower display shows the message "ARINC", then do the Fault Isolation Procedure below.
- (d) If all segments on each display come on for approximately two seconds and then go off for approximately two seconds, then there was an intermittent fault.

#### F. Fault Isolation Procedure

- (1) For a problem shown on the No. 1 tank refuel quantity indicator, do this check of the wiring:
  - (a) Remove the No. 1 tank refuel indicator, N193. To remove it, do this task: Refuel Quantity Indicator Removal, AMM TASK 28-41-61-000-801.
  - (b) Do a check for an open circuit from pin 17 on connector D11318 for the No. 1 tank refuel indicator to pin 24 on connector D11306.
  - (c) Do a check for an open circuit from pin 18 on connector D11318 for the No. 1 tank refuel indicator to pin 25 on connector D11306.
  - (d) If you find a problem with the wiring, repair the problem.
    - 1) Re-install the fueling indicator for the No. 1 tank again. To do this, do this task: Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801
    - 2) Do the Repair Confirmation procedure below.
  - (e) If you do not find a problem with the wiring, then replace the fuel quantity processor.

These are the tasks:

Fuel Quantity Processor Unit Removal, AMM TASK 28-41-81-000-801.

Fuel Quantity Processor Unit Installation, AMM TASK 28-41-81-400-801.

1) Do the Repair Confirmation procedure below.

28-21 TASK 817

AKS ALL

EFFECTIVITY



(f) If the problem continues, then replace the No. 1 tank refuel quantity indicator, N193.

These are the tasks:

Refuel Quantity Indicator Removal, AMM TASK 28-41-61-000-801

Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801

- 1) Do the Repair Confirmation procedure below.
- (2) For a problem shown on the No. 2 tank refuel quantity indicator, do this check of the wiring:
  - (a) Remove the No. 2 tank refuel indicator, N194. To remove it, do this task: Refuel Quantity Indicator Removal, AMM TASK 28-41-61-000-801.
  - (b) Do a check for an open circuit from pin 17 on connector D11320 for the No. 2 tank refuel indicator to pin 24 on connector D11306.
  - (c) Do a check for an open circuit from pin 18 on connector D11320 for the No. 2 tank refuel indicator to pin 25 on connector D11306.
  - (d) If you find a problem with the wiring, repair the problem.
    - 1) Re-install the No. 2 tank fueling indicator. To do this, do this task: Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801
    - 2) Do the Repair Confirmation procedure below.
  - (e) If you do not find a problem with the wiring, then replace the fuel quantity processor.

These are the tasks:

Fuel Quantity Processor Unit Removal, AMM TASK 28-41-81-000-801,

Fuel Quantity Processor Unit Installation, AMM TASK 28-41-81-400-801.

- 1) Do the Repair Confirmation procedure below.
- (f) If the problem continues, then replace the No. 2 tank refuel quantity indicator, N194.

These are the tasks:

Refuel Quantity Indicator Removal, AMM TASK 28-41-61-000-801

Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801

- 1) Do the Repair Confirmation procedure below.
- (3) For a problem shown on the center tank refuel quantity indicator, do this check of the wiring:
  - (a) Remove the center tank refuel indicator, N195. To remove it, do this task: Refuel Quantity Indicator Removal, AMM TASK 28-41-61-000-801.
  - (b) Do a check for an open circuit from pin 17 on connector D11322 for the center tank refuel indicator to pin 24 on connector D11306.
  - (c) Do a check for an open circuit from pin 18 on connector D11322 for the center tank refuel indicator to pin 25 on connector D11306.
  - (d) If you find a problem with the wiring, repair the problem.
    - Re-install the center tank fueling indicator. To do this, do this task: Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801
    - Do the Repair Confirmation procedure below.
  - (e) If you do not find a problem with the wiring, then replace the fuel quantity processor.

These are the tasks:

Fuel Quantity Processor Unit Removal, AMM TASK 28-41-81-000-801,

Fuel Quantity Processor Unit Installation, AMM TASK 28-41-81-400-801.

AKS ALL



- 1) Do the Repair Confirmation procedure below.
- (f) If the problem continues, then replace the center tank refuel quantity indicator, N195.

These are the tasks:

Refuel Quantity Indicator Removal, AMM TASK 28-41-61-000-801 Refuel Quantity Indicator Installation, AMM TASK 28-41-61-400-801

1) Do the Repair Confirmation procedure below.

## G. Repair Confirmation

- (1) If the upper display of each of the indicators shows the correct fuel quantity, then do these steps:
  - (a) Set the FUELING INDICATION TEST SWITCH on the P15 Fueling Control Panel to the TEST GAGES position.
  - (b) On each of the refuel quantity indicators do a check to see if all segments on the display come on for approximately two seconds and then go off for two seconds alternately until the FUELING INDICATION TEST SWITCH is released.

<u>NOTE</u>: If the SWITCH is held for more than twenty (20) seconds, the test stops automatically and the indicators go back to indicating mode.

(c) If all segments on each display come on for approximately two seconds and then go off for approximately two seconds, then you corrected the fault.

----- END OF TASK -----

28-21 TASK 817

EFFECTIVITY



## 801. Center Tank Left Fuel Pump LOW PRESSURE light is on - Fault Isolation

## A. Description

- (1) The LOW PRESSURE light for the left center tank boost pump (override pump) is on. This means that the left center tank boost pump is not pressurizing the fuel feed manifold.
  - (a) If either one or both LOW PRESSURE lights for the center tank stay on for at least 10 seconds, then the FUEL light on the pilots master caution panel will come on.
- (2) This fault is expected to occur during flight when the center tank becomes empty. The auto shutoff system will turn off the center boost pumps after a 15 second time delay if the switches for the center boost pumps are in the ON position. The pilot usually turns off the center tank boost pumps at this time. The low pressure lights for the center tank boost pumps should go off when the switches for the center tank boost pumps are in the OFF position.
- (3) This fault is expected to occur during flight when the center tank becomes empty. The pilot usually turns off the center tank boost pumps at this time. If the center tank boost pump continues to operate when it has been commanded off, a series connected pump relay, R962, will provide the means of inhibiting the fuel pump through redundancy in turning off the pump.
- (4) This fault can also occur because the center boost pump has lost its prime. If the center tank is filled to 14,000 lb (6350 kg), as described in the initial evaluation, the boost pump will become primed. You can also use one of the alternative boost pump priming procedures given in (AMM TASK 28-22-41-420-801).
- (5) (SDS SUBJECT 28-22-00)

#### B. Possible Causes

- (1) Low pressure switch for the left center tank boost pump, S154
- (2) Center tank left boost pump relay, R54
- (3) Left center tank boost pump (override pump), M234
- (4) Left auto shutoff time delay (TD) relay, R934
- (5) Center tank left secondary relay, R962
- (6) Wiring

## C. Circuit Breakers

(1) This is the primary circuit breaker related to the fault:

**Power Distribution Panel Number 1, P91** 

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

#### D. Related Data

EFFECTIVITY

- (1) (SSM 28-23-11)
- (2) (SSM 28-43-11)
- (3) (WDM 28-23-11)
- (4) (WDM 28-43-11)

28-22 TASK 801

**AKS ALL** 



#### E. Initial Evaluation

WARNING: DO NOT OPERATE A FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. THIS CONDITION CAN CAUSE THE IGNITION OF THE FUEL FUMES IN THE FUEL TANK. A FIRE OR AN EXPLOSION CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (1) Obey these precautions at all times during this task:
  - (a) To operate any of the fuel pumps, you must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.
  - (b) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.
- WARNING: DO NOT CLOSE A GFI RELAY FOR A FUEL PUMP THAT OPENED (TRIPPED) UNTIL YOU CORRECT THE PROBLEM. THIS CONDITION CAN CAUSE A FIRE OR EXPLOSION.
- WARNING: DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.
- (2) Do a visual inspection of the left boost pump GFI relay, R54:

NOTE: The GFI relay, R54, is on the P91 panel in the Electronic Equipment Compartment. You will need to open the panel to get access to the GFI relay.

## 28-AWL-18: CDCCL

- (a) If the RESET button is out, and you can see the white band, then do the Fault Isolation Procedure Left Boost Pump GFI Relay Open below.
  - NOTE: CDCCL Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).
  - NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.
  - NOTE: The RESET button, found at the top edge of the GFI relay, moves out to show a narrow white band when the GFI circuit turns off the relay due to a ground fault, or when you push the TEST button found on the top surface of the relay.
- (b) If the RESET button on the left boost pump GFI relay, R54, is not out and you cannot see the white band, then continue.
- (3) Do a check of this circuit breaker:
  - (a) This is the circuit breaker:

## **Power Distribution Panel Number 1, P91**

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

- (4) If the FUEL BOOST PUMP CENTER TANK LEFT (91D6) circuit breaker is open, then, do this task: Center Tank, Left Boost Pump Circuit Breaker Open Fault Isolation, 28-22 TASK 817.
- (5) If the FUEL BOOST PUMP CENTER TANK LEFT (91D6) circuit breaker is closed, then continue.

AKS ALL



- (6) Make sure the center tank has a minimum of 14,000 lb (6350 kg) of fuel.
  - NOTE: This step makes sure that the boost pump is correctly primed.
- (7) If it is not possible to add 14,000 lb (6350 kg) to the center tank, then, do this task: Fuel Boost Pump and Override Pump Priming, AMM TASK 28-22-41-420-801.
- (8) Make sure that these circuit breakers are closed:

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

Row	<u>Col</u>	Number	<u>Name</u>
С	3	C01637	BOOST PMP CTR TNK LAUTO SHUT OFF-DC
D	7	C01659	AT S-O/UCPO BST PMP CTR TNK L AC

- (9) On the P5 forward overhead panel, set the L CTR FUEL PUMP switch to ON.
  - (a) If the LOW PRESSURE light for the left center boost pump comes on and then goes off (after a maximum of 90 seconds), then there was an intermittent fault.
    - NOTE: Refer to the Description section for a possible cause of the intermittent fault.
  - (b) If the LOW PRESSURE light for the left center boost pump comes on and stays on (for a minimum of 90 seconds), then do these steps:
    - 1) With the L CTR FUEL PUMP switch ON, listen to the left center tank boost pump and touch it to make sure it operates.
    - 2) If the left center boost pump operates, then do the Fault Isolation Procedure Boost Pump Operates below.
    - If the left center boost pump does not operate, then do the Fault Isolation Procedure
       Boost Pump Does Not Operate below.

## F. Fault Isolation Procedure - Left Boost Pump GFI Relay Open

WARNING: DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

#### 28-AWL-18: CDCCL

- (1) Before you reset the GFI, you must isolate the fault that opened (tripped) the GFI and correct it.
  - NOTE: CDCCL Refer to the task: Airworthiness Limitation Precautions, AMM

    TASK 28-00-00-910-801, for important information on Critical Design Configuration

    Control Limitations (CDCCLs).
  - NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.
  - NOTE: The GFI relay, R54, is on the P91 panel in the Electronic Equipment Compartment. You will need to open the panel to get access to the GFI relay.
- WARNING: DO NOT OPERATE A FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. THIS CONDITION CAN CAUSE THE IGNITION OF THE FUEL FUMES IN THE FUEL TANK. A FIRE OR AN EXPLOSION CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.
- (2) Obey these precautions at all times during this task:

AKS ALL 28-22 TASK 801



- (a) To operate any of the fuel pumps, you must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.
- (b) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.
- (3) Make sure that you do the Initial Evaluation before you start the Fault Isolation Procedure.
- (4) Make sure the center tank has a minimum of 14,000 lb (6350 kg) of fuel.

NOTE: This step makes sure that the boost pump is correctly primed.

WARNING: OBEY THE PROCEDURE FOR THE INSTALLATION OF THE DOWNLOCK PINS. IF YOU MOVE THE CONTROL LEVER FOR THE LANDING GEAR TO THE UP POSITION, THE LANDING GEAR CAN RETRACT. THIS CAN CAUSE INJURIES TO PERSONNEL. AND DAMAGE TO EQUIPMENT.

- (5) If the downlock pins are not installed, do this task: AMM TASK 32-00-01-480-801.
- (6) Get access to the left fuel boost pump for the center tank (AMM TASK 28-22-41-000-801).
- (7) Examine the fuel boost pump and the area around it for fuel leakage.
  - (a) If there are signs of fuel leakage, find the source of the fuel leakage and repair it.
- (8) Do these steps to do a check of the electrical connector and the boost pump:
  - (a) Disconnect the electrical connector, D802, from the fuel boost pump (WDM 28-23-11).
  - (b) Examine the airplane and pump sides of the electrical connector, D802, for damage.
    - 1) Repair all damage that you find.
  - (c) Make sure that the electrical connector, D802, is disconnected.
  - (d) Make sure the RESET button on the left boost pump GFI relay, R54, is pushed in.
  - (e) On the P5 Overhead Panel, set the L CTR FUEL PUMP switch to ON.
  - (f) After five minutes, set the L CTR FUEL PUMP switch on the P5 Overhead Panel, to OFF.
  - (g) If the RESET button on the left boost pump GFI relay, R54, is not out and you cannot see the white band, then do one of these steps:

NOTE: The circuit on the airplane side of the electrical connector is good.

- 1) For the left center boost pump, M234, do this task: Fuel Boost Pump Insulation Resistance Test, AMM TASK 28-22-00-760-802.
  - a) If the insulation resistance test is not OK, then replace the left center boost pump, M234.

These are the tasks:

Motor Impeller Removal, AMM TASK 28-22-41-000-801.

Motor Impeller Installation, AMM TASK 28-22-41-400-801.

- b) Do the Repair Confirmation at the end of this task.
- 2) Replace the left center boost pump, M234.

These are the tasks:

**AKS ALL** 

Motor Impeller Removal, AMM TASK 28-22-41-000-801.

Motor Impeller Installation, AMM TASK 28-22-41-400-801.

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

EFFECTIVITY 28-22 TASK 801



(h) If the RESET button on the GFI relay is out, and you can see the white band, then continue.

NOTE: The circuit on the airplane side of the electrical connector is bad.

(i) Make sure to reconnect the connector, D802.

## G. Fault Isolation Procedure - Boost Pump Does Not Operate

- Make sure that you do the Initial Evaluation before you start the Fault Isolation Procedure.
  - (a) This procedure isolates the fault to one of these possible causes:
    - 1) Left boost pump relay for the center tank, R54
    - 2) Left boost pump switch for the center tank, S8
    - 3) Left auto shutoff time delay (TD) relay, R934
    - 4) Center tank left secondary relay, R962
    - 5) Wiring

WARNING: DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

- (2) Do these checks of the left boost pump relay for the center tank, R54, the switch for the left center tank boost pump, S8, and the left auto shutoff TD relay, R934 (SSM 28-23-11):
  - (a) Make sure the L CTR FUEL PUMP switch is ON.
  - (b) Do a voltage check for 115V AC from pin X1 to pin X2 of the left boost pump relay, R54.

NOTE: The left boost pump relay for the center tank, R54 is on the P91 panel in the electronic equipment compartment.

- (c) If there is not 115V AC from pin X1 to pin X2, then do these steps:
  - 1) Open these circuit breakers and install safety tags:

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
С	3	C01637	BOOST PMP CTR TNK LAUTO SHUT OFF-DC
D	7	C01659	AT S-O/UCPO BST PMP CTR TNK L AC

- 2) Disconnect the connector, D626, from the P5-2 overhead panel in the flight compartment.
- Do a voltage check for 115V AC at pin 35 of connector, D626.
  - a) If there is 115V AC at pin 35, replace the left boost pump switch for the center tank, S8.

NOTE: The left boost pump switch for the center tank, S8, is on the P5 forward overhead panel in the flight compartment.

- b) If there is not 115V AC at pin 35, replace the left auto shutoff TD relay, R934, in the J20 junction box.
- 4) Connect the connector, D626, to the P5-2 overhead panel.

AKS ALL 28-22 TASK 801



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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
С	3	C01637	BOOST PMP CTR TNK LAUTO SHUT OFF-DC
D	7	C01659	AT S-O/UCPO BST PMP CTR TNK LAC

- 6) Do the Repair Confirmation at the end of this task.
- 7) If the Repair Confirmation is not OK, then do these steps:
  - a) If there was 115V AC at pin 35 of connector, D626, from the P5-2 overhead panel in the flight compartment, do a check of the pin and wiring from pin 34 of connector, D626, to ground.
  - b) If there was not 115V AC at pin 35 of connector, D626, do a check for an open circuit from pin 35, connector, D626, on the P5-2 panel to pin X2 of relay, R54.
  - c) Repair the wiring.
  - d) Do the Repair Confirmation at the end of this task.
- (d) If there is 115V AC from pin X1 to pin X2 at connector, D12286, of the relay, R54, then do these steps:
  - 1) Replace the relay, R54.
  - 2) Do the Repair Confirmation at the end of this task.
  - 3) If the Repair Confirmation is not OK, then continue.
- (3) Do these steps for the center tank left secondary relay:
  - (a) Replace the center tank left secondary relay, R962.
  - (b) Do this task: Center Tank Fuel Boost Pump Power Failed On Functional Test, AMM TASK 28-22-00-720-806.
  - (c) Do the Repair Confirmation at the end of this task.
  - (d) If the Repair Confirmation is not OK, then continue.
- (4) Do this check of the wiring:
  - (a) Make sure the L CTR FUEL PUMP switch is OFF.
  - (b) Disconnect the connector, D802, from the left boost pump for the center tank.
  - (c) Do a check for an open circuit between these pins on D802 and these pins on R962:

D802	R962
pin 1	 pin A1
pin 2	 pin B1
pin 3	 pin C1

(d) Do a check for an open circuit between these pins on R962 and these pins on D12286 for the boost pump center left relay, R54:

R962	D12286
pin A2	 pin A1
pin B2	 pin B1
pin C2	 pin C1

(e) If you find a fault with the wiring, then do these steps:

AKS ALL



- 1) Repair the wiring.
- 2) Re-connect connector, D802.
- 3) Do the Repair Confirmation at the end of this task.

## H. Fault Isolation Procedure - Boost Pump Operates

- (1) Make sure that you do the Initial Evaluation before you start the Fault Isolation Procedure.
  - (a) This procedure isolates the fault to one of these possible causes:
    - 1) Low Pressure Switch, S154
    - 2) P5-2 Module
    - 3) Wiring
- (2) Do this check of the low pressure switch, S154:

NOTE: The low pressure switch, S154, is on the rear spar of the wing center section in the left main landing gear wheel well.

- (a) Make sure the L CTR FUEL PUMP switch is ON.
- (b) Disconnect the connector, D876, from the low pressure switch.
- (c) If the LOW PRESSURE light for the center boost pump goes off, then do these steps:
  - 1) Replace the low pressure switch, S154.

These are the tasks:

Fuel Boost Pump Pressure Switch Removal, AMM TASK 28-42-11-000-801.

Fuel Boost Pump Pressure Switch Installation, AMM TASK 28-42-11-420-801.

- 2) Do the Repair Confirmation at the end of this task.
- 3) If the Repair Confirmation is not OK, then continue.
- (3) Do these steps to do a check of the wiring from the low pressure switch to the low pressure light (WDM 28-43-11):
  - (a) Make sure the L CTR FUEL PUMP switch is ON.
  - (b) Do a check for a short circuit from pin 3, connector, D876, to pin 2 (ground), connector D876.
  - (c) If there is a short circuit from pin 3 to pin 2 (ground), then do these steps:
    - Repair the short circuit.
    - 2) Re-connect connector, D876.
    - 3) Do the Repair Confirmation at the end of this task.
    - 4) If the Repair Confirmation is not OK, then continue.
  - (d) If there is not a short circuit from pin 3 to pin 2 (ground), then continue. Re-connect connector, D876.
- (4) Replace the P5-2 module on the P5 forward overhead panel.
  - (a) Do the Repair Confirmation at the end of this task.

## I. Repair Confirmation

- (1) Make sure that the RESET button on the left boost pump GFI relay, R54, is not out and you cannot see the white band.
- (2) Set the L CTR FUEL PUMP switch to ON.

28-22 TASK 801

AKS ALL

EFFECTIVITY '

Page 207 Jun 15/2016



- (a) If the low pressure indication light for the left center boost pump comes on and then goes off, then you corrected the fault.
- (b) Set the L CTR FUEL PUMP switch to OFF.

----- END OF TASK -----

## 802. Center Tank Right Fuel Pump LOW PRESSURE light is on - Fault Isolation

## A. Description

- (1) The LOW PRESSURE light for the right center tank boost pump (override pump) is on. This means that the right center tank boost pump is not pressurizing the fuel feed manifold.
  - (a) If either one or both LOW PRESSURE lights for the center tank come on for at least 10 seconds, then the FUEL light on the pilots master caution panel will come on.
- (2) This fault condition is expected to occur during flight when the center tank becomes empty. The auto shutoff system will turn off the center boost pumps after a 15 second time delay if the switches for the center boost pumps are in the ON position. The pilot usually turns off the center tank boost pumps at this time. The low pressure lights for the center tank boost pumps should go off when the switches for the center tank boost pumps are in the OFF position.
- (3) This fault condition is expected to occur during flight when the center tank becomes empty. The pilot usually turns off the center tank boost pumps at this time. If the center tank boost pump continues to operate when it has been commanded off, a series connected pump relay, R963, will provide the means of inhibiting the fuel pump through redundancy in turning off the pump.
- (4) This fault condition can also occur because the center boost pump has lost its prime. If the center tank is filled to 14,000 lb (6350 kg), as described in the initial evaluation, the boost pump will become primed. You can also use one of the alternative boost pump priming procedures given in (AMM TASK 28-22-41-420-801).
- (5) (SDS SUBJECT 28-22-00)

## B. Possible Causes

- (1) Low pressure switch for the right center tank boost pump, S155
- (2) Center tank right boost pump relay, R55
- (3) Right center tank boost pump (override pump), M235
- (4) Right auto shutoff time delay (TD) relay, R935
- (5) Center tank right secondary relay, R963
- (6) Wiring

#### C. Circuit Breakers

(1) This is the primary circuit breaker related to the fault:

## Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

## D. Related Data

- (1) (SSM 28-23-11)
- (2) (SSM 28-43-11)
- (3) (WDM 28-23-11)
- (4) (WDM 28-43-11)

28-22 TASKS 801-802

EFFECTIVITY • AKS ALL



#### E. Initial Evaluation

WARNING: DO NOT OPERATE A FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. THIS CONDITION CAN CAUSE THE IGNITION OF THE FUEL FUMES IN THE FUEL TANK. A FIRE OR AN EXPLOSION CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (1) Obey these precautions at all times during this task:
  - (a) To operate any of the fuel pumps, you must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.
  - (b) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.

WARNING: DO NOT CLOSE A GFI RELAY FOR A FUEL PUMP THAT OPENED (TRIPPED) UNTIL YOU CORRECT THE PROBLEM. THIS CONDITION CAN CAUSE A FIRE OR EXPLOSION.

WARNING: DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(2) Do a visual inspection of the right boost pump GFI relay, R55:

NOTE: The GFI relay, R55, is on the P92 panel in the Electronic Equipment Compartment. You will need to open the panel to get access to the GFI relay.

## 28-AWL-18: CDCCL

(a) If the RESET button is out, and you can see the white band, then do the Fault Isolation Procedure - Right Boost Pump GFI Relay Open below.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

NOTE: The RESET button, found at the top edge of the GFI relay, moves out to show a narrow white band when the GFI circuit turns off the relay due to a ground fault, or when you push the TEST button found on the top surface of the relay.

- (b) If the RESET button on the right boost pump GFI relay, R55, is not out and you cannot see the white band, then continue.
- (3) Do a check of this circuit breaker:

Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

- (4) If the FUEL BOOST PUMP CENTER TANK RIGHT (92D6) circuit breaker is open, then, do this task: Center Tank, Right Boost Pump Circuit Breaker Open Fault Isolation, 28-22 TASK 818.
- (5) If the FUEL BOOST PUMP CENTER TANK RIGHT (92D6) circuit breaker is closed, then continue.

28-22 TASK 802

**AKS ALL** 

EFFECTIVITY '



- (6) Make sure the center tank has a minimum of 14,000 lb (6350 kg) of fuel.
  - NOTE: This step makes sure that the boost pump is correctly primed.
- (7) If it is not possible to add 14,000 lb (6350 kg) to the center tank, then, do this task: Fuel Boost Pump and Override Pump Priming, AMM TASK 28-22-41-420-801.
- (8) Make sure that these circuit breakers are closed:

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
С	7	C01638	BOOST PMP CTR TNK R AUTO SHUT OFF-DC
E	7	C01658	FUEL AT S-O/UCPO BST PMP CTR TNK R AC

- (9) On the P5 forward overhead panel, set the R CTR FUEL PUMP switch to ON.
  - (a) If the LOW PRESSURE light for the right center boost pump comes on and then goes off (after a maximum of 90 seconds), then there was an intermittent fault.
    - NOTE: Refer to the Description section for a possible cause of the intermittent fault.
  - (b) If the LOW PRESSURE light for the right center boost pump comes on and stays on (for a minimum of 90 seconds), then do these steps:
    - 1) With the R CTR FUEL PUMP switch at ON, listen to the right center tank boost pump and touch it to make sure it operates.
    - 2) If the right center boost pump operates, then do the Fault Isolation Procedure Boost Pump Operates below.
    - 3) If the right center boost pump does not operate, then do the Fault Isolation Procedure Boost Pump Does Not Operate below.

#### F. Fault Isolation Procedure - Right Boost Pump GFI Relay Open

WARNING: DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

#### 28-AWL-18: CDCCL

- (1) Before you reset the GFI, you must isolate the fault that opened (tripped) the GFI and correct it.
  - NOTE: CDCCL Refer to the task: Airworthiness Limitation Precautions, AMM
    TASK 28-00-00-910-801, for important information on Critical Design Configuration
    Control Limitations (CDCCLs).
  - NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.
  - NOTE: The GFI relay, R55, is on the P92 panel in the Electronic Equipment Compartment. You will need to open the panel to get access to the GFI relay.
- WARNING: DO NOT OPERATE A FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. THIS CONDITION CAN CAUSE THE IGNITION OF THE FUEL FUMES IN THE FUEL TANK. A FIRE OR AN EXPLOSION CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.
- (2) Obey these precautions at all times during this task:

AKS ALL 28-22 TASK 802



- (a) To operate any of the fuel pumps, you must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.
- (b) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.
- (3) Make sure that you do the Initial Evaluation before you start the Fault Isolation Procedure.
- (4) Make sure the center tank has a minimum of 14,000 lb (6350 kg) of fuel.

NOTE: This step makes sure that the boost pump is correctly primed.

WARNING: OBEY THE PROCEDURE FOR THE INSTALLATION OF THE DOWNLOCK PINS. IF YOU MOVE THE CONTROL LEVER FOR THE LANDING GEAR TO THE UP POSITION, THE LANDING GEAR CAN RETRACT. THIS CAN CAUSE INJURIES TO PERSONNEL. AND DAMAGE TO EQUIPMENT.

- (5) If the downlock pins are not installed, do this task: AMM TASK 32-00-01-480-801.
- (6) Get access to the right fuel boost pump for the center tank (AMM TASK 28-22-41-000-801).
- (7) Examine the fuel boost pump and the area around it for fuel leakage.
  - (a) If there are signs of fuel leakage, find the source of the fuel leakage and repair it.
- (8) Do these steps to do a check of the electrical connector and the boost pump:
  - (a) Disconnect the electrical connector, D804, from the fuel boost pump (WDM 28-23-11).
  - (b) Examine the airplane and pump sides of the electrical connector, D804, for damage.
    - 1) Repair all damage that you find.
  - (c) Make sure that the electrical connector, D804, is disconnected.
  - (d) Make sure the RESET button on the right boost pump GFI relay, R55, is pushed in.
  - (e) On the P5 Overhead Panel, set the R CTR FUEL PUMP switch to ON.
  - (f) After five minutes, set the R CTR FUEL PUMP switch on the P5 Overhead Panel, to OFF.
  - (g) If the RESET button on the right boost pump GFI relay, R55, is not out and you cannot see the white band, then do one of these steps:

NOTE: The circuit on the airplane side of the electrical connector is good.

- For the right center boost pump, M235, do this task: Fuel Boost Pump Insulation Resistance Test, AMM TASK 28-22-00-760-802.
  - a) If the insulation resistance test is not OK, then replace the right center boost pump, M235.

These are the tasks:

Motor Impeller Removal, AMM TASK 28-22-41-000-801.

Motor Impeller Installation, AMM TASK 28-22-41-400-801.

- b) Do the Repair Confirmation at the end of this task.
- 2) Replace the right center boost pump, M235.

These are the tasks:

Motor Impeller Removal, AMM TASK 28-22-41-000-801.

Motor Impeller Installation, AMM TASK 28-22-41-400-801.

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

AKS ALL 28-22 TASK 802

Page 211 Jun 15/2016



(h) If the RESET button on the GFI relay is out, and you can see the white band, then continue.

NOTE: The circuit on the airplane side of the electrical connector is bad.

(i) Make sure to reconnect the connector, D804.

# G. Fault Isolation Procedure - Boost Pump Does Not Operate

- Make sure that you do the Initial Evaluation before you start the Fault Isolation Procedure.
  - (a) This procedure isolates the fault to one of these possible causes:
    - 1) Right boost pump relay for the center tank, R55
    - 2) Right boost pump switch for the center tank, S9
    - 3) Right auto shutoff time delay (TD) relay, R935
    - 4) Center tank right secondary relay, R963
    - 5) Wiring

WARNING: DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

- (2) Do these checks of the right boost pump relay for the center tank, R55, the switch for the right center tank boost pump, S9, and the right auto shutoff TD relay, R935 (SSM 28-23-11):
  - (a) Make sure the R CTR FUEL PUMP switch is ON.
  - (b) Do a voltage check for 115 VAC from pin X1 to pin X2 of the right boost pump relay, R55.
    - NOTE: The right boost pump relay for the center tank, R55, is on the P92 panel in the electronic equipment compartment.
  - (c) If there is not 115 VAC from pin X1 to pin X2, then do these steps:
    - 1) Open these circuit breakers and install safety tags:

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
С	7	C01638	BOOST PMP CTR TNK R AUTO SHUT OFF-DC
Е	7	C01658	FUEL AT S-O/UCPO BST PMP CTR TNK R AC

- 2) Disconnect the connector, D628, from the P5-2 overhead panel in the flight compartment.
- 3) Do a voltage check for 115 VAC at pin 35 of connector, D628.
  - a) If there is 115 VAC at pin 35, replace the right boost pump switch for the center tank, S9.
    - NOTE: The right boost pump switch for the center tank, S9, is on the P5 forward overhead panel in the flight compartment.
  - b) If there is not 115 VAC at pin 35, replace the right auto shutoff TD relay, R935, in the J4 junction box.
- 4) Connect the connector, D628, to the P5-2 overhead panel.

AKS ALL 28-22 TASK 802



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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
С	7	C01638	BOOST PMP CTR TNK R AUTO SHUT OFF-DC
Ε	7	C01658	FUEL AT S-O/UCPO BST PMP CTR TNK R AC

- 6) Do the Repair Confirmation at the end of this task.
- 7) If the Repair Confirmation is not OK, then do these steps:
  - a) If there was 115 VAC at pin 35 of connector, D628, from the P5-2 overhead panel in the flight compartment, do a check of the pin and wiring from pin 34 of connector, D628, to ground.
  - b) If there was not 115 VAC at pin 35 of connector, D628, do a check for an open circuit from pin 35, connector, D628, on the P5-2 panel to pin X2 of relay, R55.
  - c) Repair the wiring.
  - d) Do the Repair Confirmation at the end of this task.
- (d) If there is 115 VAC from pin X1 to pin X2 at connector, D12288, of the relay, R55, then do these steps:
  - 1) Replace the relay, R55.
  - 2) Do the Repair Confirmation at the end of this task.
  - 3) If the Repair Confirmation is not OK, then continue.
- (3) Do these steps for the center tank right secondary relay:
  - (a) Replace the center tank right secondary relay, R963.
  - (b) Do this task: Center Tank Fuel Boost Pump Power Failed On Functional Test, AMM TASK 28-22-00-720-806.
  - (c) Do the Repair Confirmation at the end of this task.
  - (d) If the Repair Confirmation is not OK, then continue.
- (4) Do this check of the wiring:
  - (a) Make sure the R CTR FUEL PUMP switch is OFF.
  - (b) Disconnect the connector, D804, from the right boost pump for the center tank.
  - (c) Do a check for an open circuit between these pins on D804 and these pins on R963:

D804	R963
pin 1	 pin A1
pin 2	 pin B1
pin 3	 pin C1

(d) Do a check for an open circuit between these pins on R963 and D12288 for the boost pump center right relay, R55:

R963	D12288
pin A2	 pin A1
pin B2	 pin B1
pin C2	 pin C1

(e) If you find a problem with the wiring, then do these steps:

AKS ALL



- 1) Repair the wiring.
- 2) Reconnect connector, D804.
- 3) Do the Repair Confirmation procedure at the end of this task.

## H. Fault Isolation Procedure - Boost Pump Operates

- Make sure that you do the Initial Evaluation before you start the Fault Isolation Procedure.
  - (a) This procedure isolates the fault to one of these possible causes:
    - 1) Low Pressure Switch, S155
    - 2) P5-2 Module
    - 3) Wiring
- (2) Do this check of the low pressure switch, S155:

NOTE: The low pressure switch, S155, is on the rear spar of the wing center section in the right main landing gear wheel well.

- (a) Make sure the R CTR FUEL PUMP switch is ON.
- (b) Disconnect the connector, D878, from the low pressure switch.
- (c) If the LOW PRESSURE light for the right center boost pump goes off, then do these steps:
  - 1) Replace the low pressure switch, S155.

These are the tasks:

Fuel Boost Pump Pressure Switch Removal, AMM TASK 28-42-11-000-801.

Fuel Boost Pump Pressure Switch Installation, AMM TASK 28-42-11-420-801.

- 2) Do the Repair Confirmation at the end of this task.
- 3) If the Repair Confirmation is not OK, then continue.
- (3) Do these steps to do a check of the wiring from the low pressure switch to the low pressure light (WDM 28-43-11):
  - (a) Make sure the R CTR FUEL PUMP switch is ON.
  - (b) Do a check for a short circuit from pin 3, connector, D878, to pin 2 (ground), connector, D878.
  - (c) If there is a short circuit from pin 3 to pin 2 (ground), then do these steps:
    - Repair the short circuit.
    - 2) Re-connect connector, D878.
    - 3) Do the Repair Confirmation at the end of this task.
    - 4) If the Repair Confirmation is not OK, then continue.
  - (d) If there is not a short circuit from pin 3 to pin 2 (ground), then continue. Reconnect connector. D878.
- (4) Replace the P5-2 module on the P5 forward overhead panel.
  - (a) Do the Repair Confirmation at the end of this task.

# I. Repair Confirmation

- (1) Make sure that the RESET button on the right boost pump GFI relay, R55, is not out and you cannot see the white band.
- (2) On the P5-2 panel, set the R CTR FUEL PUMP switch to ON.

AKS ALL 28-22 TASK 802



- (a) If the low pressure indication light for the right center boost pump comes on and then goes off, then you corrected the fault.
- (b) Set the R CTR FUEL PUMP switch to OFF.

----- END OF TASK -----

## 803. No. 1 Tank AFT pump LOW PRESSURE light is on - Fault Isolation

## A. Description

- (1) On the P5 panel, the No. 1 tank AFT LOW PRESSURE light is on. This means that the No. 1 tank aft boost pump is not pressurizing the fuel feed manifold. When the two low pressure lights for the No. 1 tank come on, the FUEL light on the master caution panel also comes on.
- (2) This LOW PRESSURE light is expected to be on when the AFT boost pump for the No. 1 tank is off.
- (3) This fault condition can also occur because the No. 1 tank aft boost pump has lost its prime. If the No. 1 tank is filled to 500 lb (227 kg), as described in the initial evaluation, the boost pump will become primed. You can also use one of the alternative boost pump priming procedures given in (AMM TASK 28-22-41-420-801).
- (4) (SDS SUBJECT 28-22-00)

#### B. Possible Causes

- (1) Low pressure switch for the tank No. 1 aft boost pump, S150
- (2) Tank No. 1 Aft boost pump relay, R18
- (3) Tank No. 1 aft boost pump, M46
- (4) Wiring
- (5) The wiring or logic in the P5-2 module

## C. Circuit Breakers

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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Е	11	C00313	INDICATOR MASTER DIM SECT 1
F	12	C00318	INDICATOR MASTER DIM SECT 6

#### Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT

#### D. Related Data

- (1) (SSM 28-23-11)
- (2) (SSM 28-43-11)
- (3) (WDM 28-23-11)
- (4) (WDM 28-43-11)

28-22 TASKS 802-803

EFFECTIVITY

AKS ALL



#### E. Initial Evaluation

WARNING: DO NOT OPERATE A FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. THIS CONDITION CAN CAUSE THE IGNITION OF THE FUEL FUMES IN THE FUEL TANK. A FIRE OR AN EXPLOSION CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (1) Obey these precautions at all times during this task:
  - (a) To operate any of the fuel pumps, you must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.
  - (b) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.
- WARNING: DO NOT CLOSE A GFI RELAY FOR A FUEL PUMP THAT OPENED (TRIPPED) UNTIL YOU CORRECT THE PROBLEM. THIS CONDITION CAN CAUSE A FIRE OR EXPLOSION.
- WARNING: DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.
- (2) Do a visual inspection of the BOOST PUMP TANK 1 AFT GFI relay, R18:

NOTE: The GFI relay, R18, is on the P92 panel in the Electronic Equipment Compartment. You will need to open the panel to get access to the GFI relay.

## 28-AWL-18: CDCCL

- (a) If the RESET button is out, and you can see the white band, then do the Fault Isolation Procedure - BOOST PUMP TANK 1 AFT GFI Relay Open below.
  - NOTE: CDCCL Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).
  - NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.
  - NOTE: The RESET button, found at the top edge of the GFI relay, moves out to show a narrow white band when the GFI circuit turns off the relay due to a ground fault, or when you push the TEST button found on the top surface of the relay.
- (b) If the RESET button on the BOOST PUMP TANK 1 AFT GFI relay , R18, is not out and you cannot see the white band, then continue.
- (3) Do a check of this circuit breaker:

## Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT

- (4) If the FUEL BOOST PUMP TANK 1 AFT (92D2) circuit breaker is open, then, do this task: No. 1 Tank, Aft Boost Pump Circuit Breaker Open Fault Isolation, 28-22 TASK 814.
- (5) If the FUEL BOOST PUMP TANK 1 AFT (92D2) circuit breaker is closed, then continue.
- (6) Make sure the No. 1 tank has a minimum of 500 lb (227 kg) of fuel.

NOTE: This step makes sure that the boost pump is primed correctly.

AKS ALL



- (7) If it is not possible to add 500 lb (227 kg) to the No. 1 tank, then, do this task: Fuel Boost Pump and Override Pump Priming, AMM TASK 28-22-41-420-801.
- (8) On the P5 forward overhead panel, set the AFT 1 FUEL PUMP switch to ON.
  - (a) If the LOW PRESSURE light for the aft boost pump for the No. 1 tank goes off (after a maximum of 90 seconds), then there was an intermittent fault.
  - (b) If the LOW PRESSURE light for the aft boost pump for the No. 1 tank stays on (for a minimum of 90 seconds), then do these steps:
    - 1) With the AFT 1 FUEL PUMP switch at ON, listen to the aft boost pump for the No. 1 tank and touch it to make sure it operates.
    - If the boost pump operates, then do the Fault Isolation Procedure Boost Pump Operates below.
    - 3) If the boost pump does not operate, then do the Fault Isolation Procedure Boost Pump Does Not Operate below.

## F. Fault Isolation Procedure - BOOST PUMP TANK 1 AFT GFI Relay Open

WARNING: DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

#### 28-AWL-18: CDCCL

- (1) Before you reset the GFI, you must isolate the fault that opened (tripped) the GFI and correct it.
  - NOTE: CDCCL Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).
  - NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.
  - NOTE: The GFI relay, R18, is on the P92 panel in the Electronic Equipment Compartment. You will need to open the panel to get access to the GFI relay.

WARNING: DO NOT OPERATE A FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. THIS CONDITION CAN CAUSE THE IGNITION OF THE FUEL FUMES IN THE FUEL TANK. A FIRE OR AN EXPLOSION CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (2) Obey these precautions at all times during this task:
  - (a) To operate any of the fuel pumps, you must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.
  - (b) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.
- (3) Make sure that you do the Initial Evaluation before you start the Fault Isolation Procedure.
- (4) Make sure there is minimum of 500 lb (227 kg) of fuel in the No. 1 tank.
  - NOTE: This step makes sure that the boost pump is correctly primed.
- (5) Get access to the aft boost pump for the No. 1 tank (AMM TASK 28-22-41-000-801).
- (6) Examine the fuel boost pump and the area around it for fuel leakage.
  - (a) If there are signs of fuel leakage, find the source of the fuel leakage and repair it.

AKS ALL



- (7) Do these steps to do a check of the electrical connector and the boost pump:
  - (a) Disconnect the electrical connector, D70, from the fuel boost pump (WDM 28-23-11).
  - (b) Examine the airplane and pump sides of the electrical connector, D70, for damage.
    - 1) Repair all damage that you find.
  - (c) Make sure that the electrical connector, D70, is disconnected.
  - (d) Make sure the RESET button on the BOOST PUMP TANK 1 AFT GFI relay, R18, is pushed in.
  - (e) On the P5 Overhead Panel, set the AFT 1 FUEL PUMP switch to ON.
  - (f) After five minutes, set the AFT 1 FUEL PUMP switch on the P5 Overhead Panel, to OFF.
  - (g) If the RESET button on the BOOST PUMP TANK 1 AFT GFI relay, R18, is not out and you cannot see the white band, then do one of these steps:

NOTE: The circuit on the airplane side of the electrical connector is good.

- 1) For the No. 1 aft boost pump, M46, do this task: Fuel Boost Pump Insulation Resistance Test, AMM TASK 28-22-00-760-802.
  - a) If the insulation resistance test is not OK, then replace the aft boost pump, M46, for the No. 1 tank.

These are the tasks:

Motor Impeller Removal, AMM TASK 28-22-41-000-801.

Motor Impeller Installation, AMM TASK 28-22-41-400-801.

- b) Do the Repair Confirmation at the end of this task.
- 2) Replace the aft boost pump, M46, for the No. 1 tank.

These are the tasks:

Motor Impeller Removal, AMM TASK 28-22-41-000-801.

Motor Impeller Installation, AMM TASK 28-22-41-400-801.

- a) Do the Repair Confirmation at the end of this task.
- (h) If the RESET button on the GFI relay is out, and you can see the white band, then continue.

NOTE: The circuit on the airplane side of the electrical connector is bad.

(i) Make sure to reconnect the connector, D70.

## G. Fault Isolation Procedure - Boost Pump Does Not Operate

- (1) Make sure that you do the Initial Evaluation before you start the Fault Isolation Procedure.
  - (a) This procedure isolates the fault to one of these possible causes:
    - 1) AFT Boost Pump Relay for the No. 1 Tank, R18
    - 2) AFT Boost Pump Switch for the No. 1 Tank, S4
    - 3) Wiring

28-22 TASK 803

**EFFECTIVITY** 



WARNING: DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

- (2) Do these checks of the aft boost pump relay for the No. 1 tank, R18, and the switch for the No. 1 tank aft boost pump, S4 (SSM 28-23-11):
  - (a) Make sure the AFT 1 FUEL PUMP switch is set to ON.
  - (b) Do a voltage check for 115V AC from pin X1 to pin X2 of the aft boost pump relay for the No. 1 tank, R18.

NOTE: The aft boost pump relay for the No. 1 tank, R18, is on the P92 panel in the Electronic Equipment compartment.

- (c) If there is not 115V AC from pin X1 to pin X2, then do these steps:
  - 1) Replace the aft boost pump switch for the No. 1 tank, S4.

NOTE: The aft boost pump switch for the No. 1 tank, S4, is on the P5 forward overhead panel in the flight compartment.

- 2) Do the Repair Confirmation at the end of this task.
- 3) If the Repair Confirmation is not OK, then do these steps:
  - a) Do a check for an open circuit from pin 37, connector, D628, on the P5-2 panel to pin X2 of relay, R18.
  - b) Do a check of the wiring for a ground or loose pin at pin 36, connector D628 on the P5-2 panel.
  - c) Repair the wiring.
  - d) Do the Repair Confirmation at the end of this task.
- (d) If there is 115V AC from pin X1 to pin X2 at connector, D12278, of the relay, R18, then do these steps:
  - 1) Replace the relay, R18.
  - 2) Do the Repair Confirmation procedure at the end of this task.
  - 3) If the Repair Confirmation procedure is not OK, then continue.
- (3) Do this check of the wiring:
  - (a) Make sure the AFT 1 FUEL PUMP switch is OFF.
  - (b) Disconnect the connector, D70, from the aft boost pump for the No. 1 tank.
  - (c) Do a check for an open circuit between these pins on D70 and these pins on D12278 for the boost pump tank 1 relay, R18:

D70	D12278
pin 1	 pin A1
pin 2	 pin B1
pin 3	 pin C1

- (d) If you find a problem with the wiring, then do these steps:
  - Repair the wiring.
  - 2) Reconnect connector, D70.

AKS ALL



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

## H. Fault Isolation Procedure - Boost Pump Operates

- (1) Make sure that you do the Initial Evaluation before you start the Fault Isolation Procedure.
  - (a) This procedure isolates the fault to one of these possible causes:
    - 1) Low Pressure Switch, S150
    - 2) P5-2 Module
    - 3) Wiring
- (2) Do this check of the low pressure switch, S150:

NOTE: The low pressure switch, S150, is on the rear spar in the left main landing gear wheel well.

- (a) Make sure the AFT 1 FUEL PUMP switch is ON.
- (b) Disconnect the connector, D868, from the low pressure switch.
- (c) If the LOW PRESSURE light for the No. 1 tank aft boost pump goes off, then do these steps:
  - 1) Replace the low pressure switch, S150.

These are the tasks:

Fuel Boost Pump Pressure Switch Removal, AMM TASK 28-42-11-000-801.

Fuel Boost Pump Pressure Switch Installation, AMM TASK 28-42-11-420-801.

- 2) Do the Repair Confirmation at the end of this task.
- 3) If the Repair Confirmation is not OK, then continue.
- (3) Do these steps to do a check of the wiring from the low pressure switch to the low pressure light (WDM 28-43-11):
  - (a) Make sure the AFT 1 FUEL PUMP switch is ON.
  - (b) Do a check for a short circuit from pin 3, connector, D868, to pin 2 (ground), connector, D868.
  - (c) If there is a short circuit from pin 3 to pin 2 (ground), then do these steps:
    - 1) Repair the short circuit.
    - 2) Re-connect connector, D868.
    - 3) Do the Repair Confirmation at the end of this task.
    - 4) If the Repair Confirmation is not OK, then continue.
  - (d) If there is not a short circuit from pin 3 to pin 2 (ground), then continue. Reconnect connector, D868.
- (4) Replace the P5-2 module on the P5 forward overhead panel.
  - (a) Do the Repair Confirmation at the end of this task.

#### I. Repair Confirmation

- (1) Make sure that the RESET button on the BOOST PUMP TANK 1 AFT GFI relay, R18, is not out and you cannot see the white band.
- (2) On the P5-2 panel, set the AFT 1 FUEL PUMP switch to ON.
  - (a) If the LOW PRESSURE light for the aft boost pump for the No. 1 tank goes off (after a maximum of 90 seconds), then you corrected the fault.

AKS ALL 28-22 TASK 803



(b) Set the AFT 1 FUEL PUMP switch to OFF.

# 804. No. 1 Tank FWD pump LOW PRESSURE light is on - Fault Isolation

## A. Description

- (1) On the P5 panel, the No. 1 tank FWD LOW PRESSURE light is on. This means that the No. 1 tank forward boost pump is not pressurizing the fuel feed manifold. When the two low pressure lights for the No. 1 tank come on, the FUEL light on the master caution panel also comes on.
- (2) This LOW PRESSURE light is expected to be on when the FWD boost pump for the No. 1 tank is off.
- (3) This fault condition can also occur because the No. 1 forward boost pump has lost its prime. If the No. 1 tank is filled to 500 lb (227 kg), as described in the initial evaluation, the boost pump will become primed. You can also use one of the alternative boost pump priming procedures given in (AMM TASK 28-22-41-420-801).
- (4) (SDS SUBJECT 28-22-00)

#### B. Possible Causes

- (1) Low pressure switch for the tank No. 1 forward boost pump, S151
- (2) Tank No. 1 forward boost pump relay, R19
- (3) Tank No. 1 forward boost pump, M47
- (4) Wiring
- (5) The wiring or logic in the P5-2 module

#### C. Circuit Breakers

(1) This is the primary circuit breaker related to the fault:

#### Power Distribution Panel Number 1, P91

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD

## D. Related Data

- (1) (SSM 28-23-11)
- (2) (SSM 28-43-11)
- (3) (WDM 28-23-11)
- (4) (WDM 28-43-11)

#### E. Initial Evaluation

WARNING: DO NOT OPERATE A FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. THIS CONDITION CAN CAUSE THE IGNITION OF THE FUEL FUMES IN THE FUEL TANK. A FIRE OR AN EXPLOSION CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (1) Obey these precautions at all times during this task:
  - (a) To operate any of the fuel pumps, you must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.
  - (b) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.

AKS ALL 28-22 TA

28-22 TASKS 803-804



WARNING: DO NOT CLOSE A GFI RELAY FOR A FUEL PUMP THAT OPENED (TRIPPED) UNTIL

YOU CORRECT THE PROBLEM. THIS CONDITION CAN CAUSE A FIRE OR

EXPLOSION.

WARNING: DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL

WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR

CAUSE INJURIES.

(2) Do a visual inspection of the BOOST PUMP TANK 1 FWD GFI relay, R19:

NOTE: The GFI relay, R19, is on the P91 panel in the Electronic Equipment Compartment. You will need to open the panel to get access to the GFI relay.

28-AWL-18: CDCCL

(a) If the RESET button is out, and you can see the white band, then do the Fault Isolation Procedure - BOOST PUMP TANK 1 FWD GFI Relay Open below.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

NOTE: The RESET button, found at the top edge of the GFI relay, moves out to show a narrow white band when the GFI circuit turns off the relay due to a ground fault, or when you push the TEST button found on the top surface of the relay.

- (b) If the RESET button on the BOOST PUMP TANK 1 FWD GFI relay, R19, is not out and you cannot see the white band, then continue.
- (3) Do a check of this circuit breaker:
  - (a) This is the circuit breaker:

# **Power Distribution Panel Number 1, P91**

Row	<u>Col</u>	<u>Number</u>	Name
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD

- (4) If the FUEL BOOST PUMP TANK 1 FWD (91D2) circuit breaker is open, then, do this task: No. 1 Tank, Forward Boost Pump Circuit Breaker Open Fault Isolation, 28-22 TASK 813.
- (5) If the FUEL BOOST PUMP TANK 1 FWD (91D2) circuit breaker is closed, then continue.
- (6) Make sure the No. 1 tank has a minimum of 500 lb (227 kg) of fuel.
  - NOTE: This step makes sure that the boost pump is primed correctly.
- (7) If it is not possible to add 500 lb (227 kg) to the No. 1 tank, then, do this task: Fuel Boost Pump and Override Pump Priming, AMM TASK 28-22-41-420-801.
- (8) On the P5 forward overhead panel, set the FWD 1 FUEL PUMP switch to ON.
  - (a) If the LOW PRESSURE light for the forward boost pump for the No. 1 tank goes off (after a maximum of 90 seconds), then there was an intermittent fault.
  - (b) If the LOW PRESSURE light for the forward boost pump for the No. 1 tank stays on (for a minimum of 90 seconds), then do these steps:
    - 1) With the FWD 1 FUEL PUMP switch ON, listen to the forward boost pump for the No. 1 tank and touch it to make sure it operates.

AKS ALL



- If the boost pump operates, then do the Fault Isolation Procedure Boost Pump Operates below.
- 3) If the boost pump does not operate, then do the Fault Isolation Procedure Boost Pump Does Not Operate below.

## F. Fault Isolation Procedure - BOOST PUMP TANK 1 FWD GFI Relay Open

WARNING: DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

## 28-AWL-18: CDCCL

(1) Before you reset the GFI, you must isolate the fault that opened (tripped) the GFI and correct it.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM
TASK 28-00-00-910-801, for important information on Critical Design Configuration
Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

NOTE: The GFI relay, R19, is on the P91 panel in the Electronic Equipment Compartment. You will need to open the panel to get access to the GFI relay.

WARNING: DO NOT OPERATE A FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. THIS CONDITION CAN CAUSE THE IGNITION OF THE FUEL FUMES IN THE FUEL TANK. A FIRE OR AN EXPLOSION CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (2) Obey these precautions at all times during this task:
  - (a) To operate any of the fuel pumps, you must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.
  - (b) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.
- (3) Make sure that you do the Initial Evaluation before you start the Fault Isolation Procedure.
- (4) Make sure there is minimum of 500 lb (227 kg) of fuel in the No. 1 tank.
  NOTE: This step makes sure that the boost pump is correctly primed.
- (5) Get access to the fwd boost pump for the No. 1 tank (AMM TASK 28-22-41-000-801).
- (6) Examine the fuel boost pump and the area around it for fuel leakage.
  - (a) If there are signs of fuel leakage, find the source of the fuel leakage and repair it.
- (7) Do these steps to do a check of the electrical connector and the boost pump:
  - (a) Disconnect the electrical connector, D72, from the fuel boost pump (WDM 28-23-11).
  - (b) Examine the airplane and pump sides of the electrical connector, D72, for damage.
    - 1) Repair all damage that you find.
  - (c) Make sure that the electrical connector, D72, is disconnected.
  - (d) Make sure the RESET button on the BOOST PUMP TANK 1 FWD GFI relay, R19, is pushed in.
  - (e) On the P5 Overhead Panel, set the FWD 1 FUEL PUMP switch to ON.

AKS ALL 28-22 TASK 804



- (f) After five minutes, set the FWD 1 FUEL PUMP switch on the P5 Overhead Panel, to OFF.
- (g) If the RESET button on the BOOST PUMP TANK 1 FWD GFI relay, R19, is not out and you cannot see the white band, then do one of these steps:

NOTE: The circuit on the airplane side of the electrical connector is good.

- 1) For the No. 1 fwd boost pump, M47, do this task: Fuel Boost Pump Insulation Resistance Test. AMM TASK 28-22-00-760-802.
  - If the insulation resistance test is not OK, then replace the fwd boost pump, M47, for the No. 1 tank.

These are the tasks:

Motor Impeller Removal, AMM TASK 28-22-41-000-801.

Motor Impeller Installation, AMM TASK 28-22-41-400-801.

- b) Do the Repair Confirmation at the end of this task.
- 2) Replace the fwd boost pump, M47, for the No. 1 tank.

These are the tasks:

Motor Impeller Removal, AMM TASK 28-22-41-000-801.

Motor Impeller Installation, AMM TASK 28-22-41-400-801.

- a) Do the Repair Confirmation at the end of this task.
- (h) If the RESET button on the GFI relay is out, and you can see the white band, then continue.

NOTE: The circuit on the airplane side of the electrical connector is bad.

(i) Make sure to reconnect the connector, D72.

#### G. Fault Isolation Procedure - Boost Pump Does Not Operate

- (1) Make sure that you do the Initial Evaluation before you start the Fault Isolation Procedure.
  - (a) This procedure isolates the fault to one of these possible causes:
    - 1) FWD Boost Pump Relay for the No. 1 Tank, R19
    - 2) FWD Boost Pump Switch for the No. 1 Tank, S5
    - 3) Wiring

# WARNING: DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

- (2) Do these checks of the forward boost pump relay for the No. 1 tank, R19, and the switch for the No. 1 tank forward boost pump, S5 (SSM 28-23-11):
  - (a) Make sure the FWD 1 FUEL PUMP switch is ON.
  - (b) Do a voltage check for 115V AC from pin X1 to pin X2 of the forward boost pump relay for the No. 1 tank, R19.

NOTE: The forward boost pump relay for the No. 1 tank, R19, is on the P91 panel in the Electronic Equipment Compartment.

(c) If there is not 115V AC from pin X1 to pin X2, then do these steps:

AKS ALL



- 1) Replace the forward boost pump switch for the No. 1 tank, S5.
  - NOTE: The forward boost pump switch for the No. 1 tank, S5, is on the P5 forward overhead panel in the flight compartment.
- Do the Repair Confirmation procedure at the end of this task.
- 3) If the Repair Confirmation procedure is not OK, then do these steps:
  - a) Do a check for an open circuit from pin 37, connector, D626, on the P5-2 panel to pin X2 of relay, R19.
  - b) Do a check of the wiring for a ground or loose pin at pin 36, connector, D626, on the P5-2 panel.
  - c) Repair the wiring.
  - d) Do the Repair Confirmation procedure at the end of this task.
- (d) If there is 115V AC from pin X1 to pin X2 at connector, D12280, of the relay, R19, then do these steps:
  - 1) Replace the relay, R19.
  - 2) Do the Repair Confirmation at the end of this task.
  - 3) If the Repair Confirmation procedure is not OK, then continue.
- (3) Do this check of the wiring:
  - (a) Make sure the FWD 1 FUEL PUMP switch is OFF.
  - (b) Disconnect the connector, D72, from the forward boost pump for the No. 1 tank.
  - (c) Do a check for an open circuit between these pins on D72 and these pins on D12280 for the No. 1 forward boost pump relay, R19:

D72	D12280
pin 1	 pin A1
pin 2	 pin B1
pin 3	 pin C1

- (d) If you find a problem with the wiring, then do these steps:
  - 1) Repair the wiring.
  - 2) Reconnect connector, D72.
  - 3) Do the Repair Confirmation procedure at the end of this task.

#### H. Fault Isolation Procedure - Boost Pump Operates

- (1) Make sure that you do the Initial Evaluation before you start the Fault Isolation Procedure
  - (a) This procedure isolates the fault to one of these possible causes:
    - 1) Low Pressure Switch, S151
    - 2) P5-2 Module
    - 3) Wiring
- (2) Do this check of the low pressure switch, S151:

NOTE: The low pressure switch, S151, is on the front spar behind the Krueger flaps on the left wing.

- (a) Make sure the FWD 1 FUEL PUMP switch is ON.
- (b) Disconnect the connector, D870, from the low pressure switch.

AKS ALL



- (c) If the LOW PRESSURE light for the No. 1 tank forward boost pump goes off, then do these steps:
  - 1) Replace the low pressure switch, S151.

These are the tasks:

Fuel Boost Pump Pressure Switch Removal, AMM TASK 28-42-11-000-801.

Fuel Boost Pump Pressure Switch Installation, AMM TASK 28-42-11-420-801.

- 2) Do the Repair Confirmation at the end of this task.
- 3) If the Repair Confirmation is not OK, then continue. Re-connect connector, D870.
- (3) Do these steps to do a check of the wiring from the low pressure switch to the low pressure light (WDM 28-43-11):
  - (a) Make sure the FWD 1 FUEL PUMP switch is ON.
  - (b) Disconnect connector, D870, from the low pressure switch, S151.
  - (c) Do a check for a short circuit from pin 3, connector, D870, to pin 2 (ground), connector, D870.
  - (d) If there is a short circuit from pin 3 to pin 2 (ground), then do these steps:
    - 1) Repair the short circuit.
    - 2) Re-connect connector, D870.
    - 3) Do the Repair Confirmation at the end of this task.
    - 4) If the Repair Confirmation is not OK, then continue.
    - If there is not a short circuit from pin 3 to pin 2 (ground), then continue.
- (4) Replace the P5-2 module on the P5 forward overhead panel.
  - (a) Do the Repair Confirmation at the end of this task.

#### I. Repair Confirmation

- (1) Make sure that the RESET button on the BOOST PUMP TANK 1 FWD GFI relay, R19, is not out and you cannot see the white band.
- (2) On the P5-2 panel, set the FWD 1 FUEL PUMP switch to ON.
  - (a) If the LOW PRESSURE light for the forward boost pump for the No. 1 tank goes off (after a maximum of 90 seconds), then you corrected the fault.
  - (b) Set the FWD 1 FUEL PUMP switch to OFF.

## ——— END OF TASK ———

## 805. No. 2 Tank AFT pump LOW PRESSURE light is on - Fault Isolation

#### A. Description

- (1) On the P5 panel, the No. 2 tank AFT LOW PRESSURE light is on. This means that the No. 2 tank aft boost pump is not pressurizing the fuel feed manifold. When the two low pressure lights for the No. 2 tank come on, the FUEL light on the master caution panel also comes on.
- (2) This LOW PRESSURE light is expected to be on when the AFT boost pump for the No. 2 tank is off.
- (3) This fault condition can also occur because the No. 2 aft boost pump has lost its prime. If the No. 2 tank is filled to 500 lb (227 kg), as described in the initial evaluation, the boost pump will become primed. You can also use one of the alternative boost pump priming procedures given in (AMM TASK 28-22-41-420-801).

EFFECTIVITY —
AKS ALL

28-22 TASKS 804-805



(4) (SDS SUBJECT 28-22-00)

#### B. Possible Causes

- (1) Low pressure switch for the tank No. 2 aft boost pump, S152
- (2) Tank No. 2 aft boost pump relay, R20
- (3) Tank No. 2 aft boost pump, M48
- (4) Wiring
- (5) The wiring or logic in the P5-2 module

#### C. Circuit Breakers

(1) This is the primary circuit breaker related to the fault:

**Power Distribution Panel Number 1, P91** 

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT

#### D. Related Data

- (1) (SSM 28-23-11)
- (2) (SSM 28-43-11)
- (3) (WDM 28-23-11)
- (4) (WDM 28-43-11)

#### E. Initial Evaluation

WARNING: DO NOT OPERATE A FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. THIS CONDITION CAN CAUSE THE IGNITION OF THE FUEL FUMES IN THE FUEL TANK. A FIRE OR AN EXPLOSION CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (1) To operate any of the fuel pumps, you must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.
  - (a) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.

WARNING: DO NOT CLOSE A GFI RELAY FOR A FUEL PUMP THAT OPENED (TRIPPED) UNTIL YOU CORRECT THE PROBLEM. THIS CONDITION CAN CAUSE A FIRE OR EXPLOSION.

WARNING: DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

#### 28-AWL-18: CDCCL

(2) Do a visual inspection of the BOOST PUMP TANK 2 AFT GFI relay, R20:

NOTE: The GFI relay, R20, is on the P91 panel in the Electronic Equipment Compartment. You will need to open the panel to get access to the GFI relay.

AKS ALL



(a) If the RESET button is out, and you can see the white band, then do the Fault Isolation Procedure - BOOST PUMP TANK 2 AFT GFI Relay Open below.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

NOTE: The RESET button, found at the top edge of the GFI relay, moves out to show a narrow white band when the GFI circuit turns off the relay due to a ground fault, or when you push the TEST button found on the top surface of the relay.

- (b) If the RESET button on the BOOST PUMP TANK 2 AFT GFI relay, R20, is not out and you cannot see the white band, then continue.
- (3) Do a check of this circuit breaker:

**Power Distribution Panel Number 1, P91** 

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT

- (4) If the FUEL BOOST PUMP TANK 2 AFT (91D4) circuit breaker is open, then, do this task: No. 2 Tank, Aft Boost Pump Circuit Breaker Open Fault Isolation, 28-22 TASK 816.
- (5) If the FUEL BOOST PUMP TANK 2 AFT (91D4) circuit breaker is closed, then continue.
- (6) Make sure the No. 2 tank has a minimum of 500 lb (227 kg) of fuel.
  - NOTE: This step makes sure that the boost pump is primed correctly.
- (7) If it is not possible to add 500 lb (227 kg) to the No. 2 tank, then, do this task: Fuel Boost Pump and Override Pump Priming, AMM TASK 28-22-41-420-801
- (8) On the P5 forward overhead panel, set the AFT 2 FUEL PUMP switch to ON.
  - (a) If the LOW PRESSURE light for the aft boost pump for the No. 2 tank goes off (after a maximum of 90 seconds), then there was an intermittent fault.
  - (b) If the LOW PRESSURE light for the aft boost pump for the No. 2 tank stays on (for a minimum of 90 seconds), then do these steps:
    - 1) With the AFT 2 FUEL PUMP switch ON, listen to the aft boost pump for the No. 2 tank and touch it to make sure it operates.
    - 2) If the boost pump operates, then do the Fault Isolation Procedure Boost Pump Operates below.
    - 3) If the boost pump does not operate, then do the Fault Isolation Procedure Boost Pump Does Not Operate below.

28-22 TASK 805

EFFECTIVITY AKS ALL



## F. Fault Isolation Procedure - BOOST PUMP TANK 2 AFT GFI Relay Open

WARNING: DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

#### 28-AWL-18: CDCCL

(1) Before you reset the GFI, you must isolate the fault that opened (tripped) the GFI and correct it.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

NOTE: The GFI relay, R20, is on the P91 panel in the Electronic Equipment Compartment. You will need to open the panel to get access to the GFI relay.

WARNING: DO NOT OPERATE A FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. THIS CONDITION CAN CAUSE THE IGNITION OF THE FUEL FUMES IN THE FUEL TANK. A FIRE OR AN EXPLOSION CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (2) Obey these precautions at all times during this task:
  - (a) To operate any of the fuel pumps, you must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.
  - (b) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.
- (3) Make sure that you do the Initial Evaluation before you start the Fault Isolation Procedure.
- (4) Make sure there is minimum of 500 lb (227 kg) of fuel in the No. 2 tank.
  - NOTE: This step makes sure that the boost pump is correctly primed.
- (5) Get access to the aft boost pump for the No. 2 tank (AMM TASK 28-22-41-000-801).
- (6) Examine the fuel boost pump and the area around it for fuel leakage.
  - (a) If there are signs of fuel leakage, find the source of the fuel leakage and repair it.
- (7) Do these steps to do a check of the electrical connector and the boost pump:
  - (a) Disconnect the electrical connector, D74, from the fuel boost pump (WDM 28-23-11).
  - (b) Examine the airplane and pump sides of the electrical connector, D74, for damage.
    - 1) Repair all damage that you find.
  - (c) Make sure that the electrical connector, D74, is disconnected.
  - (d) Make sure the RESET button on the BOOST PUMP TANK 2 AFT GFI relay, R20, is pushed in.
  - (e) On the P5 Overhead Panel, set the AFT 2 FUEL PUMP switch to ON.
  - (f) After five minutes, set the AFT 2 FUEL PUMP switch on the P5 Overhead Panel, to OFF.
  - (g) If the RESET button on the BOOST PUMP TANK 2 AFT GFI relay, R20, is not out and you cannot see the white band, then do one of these steps:

<u>NOTE</u>: The circuit on the airplane side of the electrical connector is good.

AKS ALL



- For the No. 2 aft boost pump, M48, do this task: Fuel Boost Pump Insulation Resistance Test, AMM TASK 28-22-00-760-802.
  - If the insulation resistance test is not OK, then replace the aft boost pump, M48, for the No. 2 tank.

These are the tasks:

Motor Impeller Removal, AMM TASK 28-22-41-000-801.

Motor Impeller Installation, AMM TASK 28-22-41-400-801.

- b) Do the Repair Confirmation at the end of this task.
- 2) Replace the aft boost pump, M48, for the No. 2 tank.

These are the tasks:

Motor Impeller Removal, AMM TASK 28-22-41-000-801.

Motor Impeller Installation, AMM TASK 28-22-41-400-801.

- a) Do the Repair Confirmation at the end of this task.
- (h) If the RESET button on the GFI relay is out, and you can see the white band, then continue.

NOTE: The circuit on the airplane side of the electrical connector is bad.

(i) Make sure to reconnect the connector, D74.

## G. Fault Isolation Procedure - Boost Pump Does Not Operate

- (1) Make sure that you do the Initial Evaluation before you start the Fault Isolation Procedure.
  - (a) This procedure isolates the fault to one of these possible causes:
    - 1) AFT Boost Pump Relay for the No. 2 Tank, R20
    - 2) AFT Boost Pump Switch for the No. 2 Tank, S7
    - 3) Wiring

WARNING: DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

- (2) Do these checks of the aft boost pump relay for the No. 2 tank, R20, and the switch for the No. 2 tank aft boost pump, S7 (SSM 28-23-11):
  - (a) Do a voltage check for 115V AC from pin X1 to pin X2 of the aft boost pump relay, R20, for the No. 2 tank.

NOTE: The aft boost pump relay for the No. 2 tank, R20, is on the P91 panel in the Electronic Equipment Compartment.

- (b) If there is not 115 V AC from pin X1 to pin X2, then do these steps:
  - 1) Replace the aft boost pump switch for the No. 2 tank, S7.

NOTE: The aft boost pump switch for the No. 2 tank, S7, is on the P5 forward overhead panel in the flight compartment.

- 2) Do the Repair Confirmation at the end of this task.
- 3) If the Repair Confirmation procedure is not OK, then do these steps:

AKS ALL



- a) Do a check for an open circuit from pin 39, connector, D626, on the P5-2 panel to pin X2 of relay, R20.
- b) Do a check of the wiring for a ground or loose pin at pin 38, connector, D626, on the P5-2 panel.
- c) Repair the wiring.
- d) Do the Repair Confirmation procedure at the end of this task.
- (c) If there is 115V AC from pin X1 to pin X2 at connector, D12282, of the relay, R20, then do these steps:
  - 1) Replace the relay, R20.
  - Do the Repair Confirmation at the end of this task.
  - 3) If the Repair Confirmation is not OK, then continue.
- (3) Do this check of the wiring:
  - (a) Make sure the AFT 2 FUEL PUMP switch is OFF.
  - (b) Disconnect the connector, D74, from the aft boost pump for the No. 2 tank.
  - (c) Do a check for an open circuit between these pins on D74 and these pins on D12282 for the boost pump tank 2 aft relay, R20:

D76	D12282
pin 1	 pin A1
pin 2	 pin B1
pin 3	 pin C1

- (d) If you find a problem with the wiring, then do these steps:
  - 1) Repair the wiring.
  - Reconnect connector, D74.
  - 3) Do the Repair Confirmation procedure at the end of this task.

## H. Fault Isolation Procedure - Boost Pump Operates

- Make sure that you do the Initial Evaluation before you start the Fault Isolation Procedure.
  - (a) This procedure isolates the fault to one of these possible causes:
    - 1) Low Pressure Switch, S152
    - 2) P5-2 Module
    - 3) Wiring
- (2) Do this check of the low pressure switch, S152:

NOTE: The low pressure switch, S152, is on the rear spar in the right main landing gear wheel well

- (a) Make sure the AFT 2 FUEL PUMP switch is ON.
- (b) Disconnect the connector, D872, from the low pressure switch.
- (c) If the LOW PRESSURE light for the No. 2 tank aft boost pump goes off, then do these steps:
  - 1) Replace the low pressure switch, S152.

These are the tasks:

Fuel Boost Pump Pressure Switch Removal, AMM TASK 28-42-11-000-801.

AKS ALL



Fuel Boost Pump Pressure Switch Installation, AMM TASK 28-42-11-420-801.

- Do the Repair Confirmation at the end of this task.
- 3) If the Repair Confirmation is not OK, then continue.
- (3) Do these steps to do a check of the wiring from the low pressure switch to the low pressure light (WDM 28-43-11):
  - (a) Make sure the AFT 2 FUEL PUMP switch is ON.
  - (b) Do a check for a short circuit from pin 3, connector, D872, to pin 2 (ground), connector, D872.
  - (c) If there is a short circuit from pin 3 to pin 2 (ground), then do these steps:
    - 1) Repair the short circuit.
    - 2) Re-connect connector, D872.
    - 3) Do the Repair Confirmation at the end of this task.
    - 4) If the Repair Confirmation is not OK, then continue.
  - (d) If there is not a short circuit from pin 3 to pin 2 (ground), then continue.
- (4) Replace the P5-2 module on the P5 forward overhead panel.
  - (a) Do the Repair Confirmation at the end of this task.

## I. Repair Confirmation

- (1) Make sure that the RESET button on the BOOST PUMP TANK 2 AFT GFI relay, R20, is not out and you cannot see the white band.
- (2) On the P5-2 panel, set the AFT 2 FUEL PUMP switch to ON.
  - (a) If the LOW PRESSURE light for the aft boost pump for the No. 2 tank goes off (after a maximum of 90 seconds), then you corrected the fault.
  - (b) Set the AFT 2 FUEL PUMP switch to OFF.

#### ----- END OF TASK -----

#### 806. No. 2 Tank FWD pump LOW PRESSURE light is on - Fault Isolation

## A. Description

- (1) On the P5 panel, the No. 2 tank FWD LOW PRESSURE light is on. This means that the No. 2 tank forward boost pump is not pressurizing the fuel feed manifold. When the two low pressure lights for the No. 2 tank come on, the FUEL light on the master caution panel also comes on.
- (2) This LOW PRESSURE light is expected to be on when the FWD boost pump for the No. 2 tank is off.
- (3) This fault condition can also occur because the No. 2 forward boost pump has lost its prime. If the No. 2 tank is filled to 500 lb (227 kg), as described in the initial evaluation, the boost pump will become primed. You can also use one of the alternative boost pump priming procedures given in (AMM TASK 28-22-41-420-801).
- (4) (SDS SUBJECT 28-22-00)

#### B. Possible Causes

- (1) Low pressure switch for the tank No. 2 forward boost pump, S153
- (2) Tank No. 2 forward boost pump relay, R21
- (3) Tank No. 2 forward boost pump, M49
- (4) Wiring

AKS ALL 28-22 TASKS 805-806



(5) The wiring or logic in the P5-2 module

#### C. Circuit Breakers

(1) This is the primary circuit breaker related to the fault:

#### Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD

#### D. Related Data

- (1) (SSM 28-23-11)
- (2) (SSM 28-43-11)
- (3) (WDM 28-23-11)
- (4) (WDM 28-43-11)

#### E. Initial Evaluation

WARNING: DO NOT OPERATE A FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. THIS CONDITION CAN CAUSE THE IGNITION OF THE FUEL FUMES IN THE FUEL TANK. A FIRE OR AN EXPLOSION CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (1) Obey these precautions at all times during this task:
  - (a) To operate any of the fuel pumps, you must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.
  - (b) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.

WARNING: DO NOT CLOSE A GFI RELAY FOR A FUEL PUMP THAT OPENED (TRIPPED) UNTIL YOU CORRECT THE PROBLEM. THIS CONDITION CAN CAUSE A FIRE OR EXPLOSION.

WARNING: DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(2) Do a visual inspection of the BOOST PUMP TANK 2 FWD GFI relay, R21:

NOTE: The GFI relay, R21, is on the P92 panel in the Electronic Equipment Compartment. You will need to open the panel to get access to the GFI relay.

28-22 TASK 806

**AKS ALL** 

EFFECTIVITY '



## **28-AWL-18: CDCCL**

(a) If the RESET button is out, and you can see the white band, then do the Fault Isolation Procedure - BOOST PUMP TANK 2 FWD GFI Relay Open below.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

NOTE: The RESET button, found at the top edge of the GFI relay, moves out to show a narrow white band when the GFI circuit turns off the relay due to a ground fault, or when you push the TEST button found on the top surface of the relay.

- (b) If the RESET button on the BOOST PUMP TANK 2 FWD GFI relay, R21, is not out and you cannot see the white band, then continue.
- (3) Do a check of this circuit breaker:
  - (a) This is the circuit breaker:

## Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD

- (4) If the FUEL BOOST PUMP TANK 2 FWD (92D4) circuit breaker is open, then, do this task: No. 2 Tank, Forward Boost Pump Circuit Breaker Open Fault Isolation, 28-22 TASK 815.
- (5) If the FUEL BOOST PUMP TANK 2 FWD (92D4) circuit breaker is closed, then continue.
- (6) Make sure the No. 2 tank has a minimum of 500 lb (227 kg) of fuel.
  - NOTE: This step makes sure that the boost pump is primed correctly.
- (7) If it is not possible to add 500 lb (227 kg) to the No. 2 tank, then, do this task: Fuel Boost Pump and Override Pump Priming, AMM TASK 28-22-41-420-801
- (8) On the P5 forward overhead panel, set the FWD 2 FUEL PUMP switch to ON.
  - (a) If the LOW PRESSURE light for the forward boost pump for the No. 2 tank goes off (after a maximum of 90 seconds), then there was an intermittent fault.
  - (b) If the LOW PRESSURE light for the forward boost pump for the No. 2 tank stays on (for a minimum of 90 seconds), then do these steps:
    - 1) With the FWD 2 FUEL PUMP switch ON, listen to the forward boost pump for the No. 2 tank and touch it to make sure it operates.
    - 2) If the boost pump operates, then do the Fault Isolation Procedure Boost Pump Operates below.
    - 3) If the boost pump does not operate, then do the Fault Isolation Procedure Boost Pump Does Not Operate below.



## F. Fault Isolation Procedure - BOOST PUMP TANK 2 FWD GFI Relay Open

WARNING: DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

#### 28-AWL-18: CDCCL

(1) Before you reset the GFI, you must isolate the fault that opened (tripped) the GFI and correct it.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

NOTE: The GFI relay, R21, is on the P92 panel in the Electronic Equipment Compartment. You will need to open the panel to get access to the GFI relay.

WARNING: DO NOT OPERATE A FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. THIS CONDITION CAN CAUSE THE IGNITION OF THE FUEL FUMES IN THE FUEL TANK. A FIRE OR AN EXPLOSION CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (2) Obey these precautions at all times during this task:
  - (a) To operate any of the fuel pumps, you must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.
  - (b) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.
- (3) Make sure that you do the Initial Evaluation before you start the Fault Isolation Procedure.
- (4) Make sure there is minimum of 500 lb (227 kg) of fuel in the No. 2 tank.
  - NOTE: This step makes sure that the boost pump is correctly primed.
- (5) Get access to the fwd boost pump for the No. 2 tank (AMM TASK 28-22-41-000-801).
- (6) Examine the fuel boost pump and the area around it for fuel leakage.
  - (a) If there are signs of fuel leakage, find the source of the fuel leakage and repair it.
- (7) Do these steps to do a check of the electrical connector and the boost pump:
  - (a) Disconnect the electrical connector, D76, from the fuel boost pump (WDM 28-23-11).
  - (b) Examine the airplane and pump sides of the electrical connector, D76, for damage.
    - 1) Repair all damage that you find.
  - (c) Make sure that the electrical connector, D76, is disconnected.
  - (d) Make sure the RESET button on the BOOST PUMP TANK 2 FWD GFI relay, R21, is pushed in.
  - (e) On the P5 Overhead Panel, set the FWD 2 FUEL PUMP switch to ON.
  - (f) After five minutes, set the FWD 2 FUEL PUMP switch on the P5 Overhead Panel, to OFF.
  - (g) If the RESET button on the BOOST PUMP TANK 2 FWD GFI relay, R21, is not out and you cannot see the white band, then do one of these steps:

NOTE: The circuit on the airplane side of the electrical connector is good.

AKS ALL



- For the No. 2 fwd boost pump, M49, do this task: Fuel Boost Pump Insulation Resistance Test, AMM TASK 28-22-00-760-802.
  - If the insulation resistance test is not OK, then replace the fwd boost pump, M49, for the No. 2 tank.

These are the tasks:

Motor Impeller Removal, AMM TASK 28-22-41-000-801.

Motor Impeller Installation, AMM TASK 28-22-41-400-801.

- b) Do the Repair Confirmation at the end of this task.
- 2) Replace the fwd boost pump, M49, for the No. 2 tank.

These are the tasks:

Motor Impeller Removal, AMM TASK 28-22-41-000-801.

Motor Impeller Installation, AMM TASK 28-22-41-400-801.

- a) Do the Repair Confirmation at the end of this task.
- (h) If the RESET button on the GFI relay is out, and you can see the white band, then continue.

NOTE: The circuit on the airplane side of the electrical connector is bad.

(i) Make sure to reconnect the connector, D76.

## G. Fault Isolation Procedure - Boost Pump Does Not Operate

- (1) Make sure that you do the Initial Evaluation before you start the Fault Isolation Procedure.
  - (a) This procedure isolates the fault to one of these possible causes:
    - 1) FWD Boost Pump Relay for the No. 2 Tank, R21
    - 2) FWD Boost Pump Switch for the No. 2 Tank, S6
    - 3) Wiring

WARNING: DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

- (2) Do these checks of the forward boost pump relay for the No. 2 tank, R21 and the switch for the No. 2 tank forward boost pump, S6 (SSM 28-23-11):
  - (a) Make sure the FWD 2 FUEL PUMP switch is ON.
  - (b) Do a voltage check for 115V AC from pin X1 to pin X2 of the forward boost pump relay, R21, for the No. 2 tank.

NOTE: The forward boost pump relay for the No. 2 tank, R21, is on the P92 panel in the Electronic Equipment Compartment.

- (c) If there is not 115V AC from pin X1 to pin X2, then do these steps:
  - 1) Replace the forward boost pump switch for the No. 2 tank, S6.

<u>NOTE</u>: The forward boost pump switch for the No. 2 tank, S6, is on the P5 forward overhead panel in the flight compartment.

- 2) Do the Repair Confirmation at the end of this task.
- 3) If the Repair Confirmation procedure is not OK, then do these steps:

AKS ALL



- a) Do a check for an open circuit from pin 39, connector, D628, on the P5-2 panel to pin X2 of relay, R21.
- b) Do a check of the wiring for a ground or loose pin at pin 38, connector, D628, on the P5-2 panel.
- c) Repair the wiring.
- d) Do the Repair Confirmation at the end of this task.
- (d) If there is 115V AC from pin X1 to pin X2 at connector, D12284, of the relay, R21, then do these steps:
  - 1) Replace the relay, R21.
  - 2) Do the Repair Confirmation procedure at the end of this task.
  - 3) If the Repair Confirmation procedure is not OK, then continue.
- (3) Do this check of the wiring:
  - (a) Make sure the FWD 2 FUEL PUMP switch is OFF.
  - (b) Disconnect the connector, D76, from the forward boost pump for the No. 2 tank.
  - (c) Do a check for an open circuit between these pins on D76 and these pins on D12284 for the No. 2 forward boost pump relay, R21:

D76	D12284
pin 1	 pin A1
pin 2	 pin B1
pin 3	 pin C1

- (d) If you find a problem with the wiring, then do these steps:
  - 1) Repair the wiring.
  - Reconnect connector, D76.
  - 3) Do the Repair Confirmation procedure at the end of this task.

## H. Fault Isolation Procedure - Boost Pump Operates

- 1) Make sure that you do the Initial Evaluation before you start the Fault Isolation Procedure.
  - (a) This procedure isolates the fault to one of these possible causes:
    - 1) Low Pressure Switch, S153
    - 2) P5-2 Module
    - 3) Wiring
- (2) Do this check of the low pressure switch, S153:

NOTE: The low pressure switch, S153, is on the front spar behind the Krueger flaps on the right wing.

- (a) Make sure the FWD 2 FUEL PUMP switch is ON.
- (b) Disconnect the connector, D874, from the low pressure switch.
- (c) If the LOW PRESSURE light for the No. 2 tank forward boost pump goes off, then do these steps:
  - 1) Replace the low pressure switch, S153.

These are the tasks:

Fuel Boost Pump Pressure Switch Removal, AMM TASK 28-42-11-000-801.

AKS ALL



Fuel Boost Pump Pressure Switch Installation, AMM TASK 28-42-11-420-801.

- Do the Repair Confirmation at the end of this task.
- 3) If the Repair Confirmation is not OK, then continue. Re-connect connector, D874.
- (3) Do these steps to do a check of the wiring from the low pressure switch to the low pressure light (WDM 28-43-11):
  - (a) Make sure the FWD 2 FUEL PUMP switch is ON.
  - (b) Disconnect connector, D874, from the low pressure switch, S153.
  - (c) Do a check for a short circuit from pin 3, connector, D874, to pin 2 (ground), connector, D874.
  - (d) If there is a short circuit from pin 3 to pin 2 (ground), then do these steps:
    - 1) Repair the short circuit.
    - 2) Re-connect connector, D874.
    - 3) Do the Repair Confirmation at the end of this task.
    - 4) If the Repair Confirmation is not OK, then continue.
  - (e) If there is not a short circuit from pin 3 to pin 2 (ground), then continue.
- (4) Replace the P5-2 module on the P5 forward overhead panel.
  - (a) Do the Repair Confirmation at the end of this task.

## I. Repair Confirmation

- (1) Make sure that the RESET button on the BOOST PUMP TANK 2 FWD GFI relay, R21, is not out and you cannot see the white band.
- (2) On the P5-2 panel, set the FWD 2 FUEL PUMP switch to ON.
  - (a) If the LOW PRESSURE light for the forward boost pump for the No. 2 tank goes off (after a maximum of 90 seconds), then you corrected the fault.
  - (b) Set the FWD 2 FUEL PUMP switch to OFF.



## 807. VALVE OPEN Light for the Crossfeed Valve Stays on Bright - Fault Isolation

## A. Description

- (1) The VALVE OPEN light for the crossfeed valve stays on bright when you turn the CROSSFEED switch to the valve-open or the valve-closed position. When the valve operates correctly, the VALVE OPEN light comes on bright while the crossfeed valve changes position. The light stays on dim when the valve is open. The light is off when the valve is closed.
- (2) The switches in the actuator send data about the valve position to the P5-2 module. The valve position is shown on the actuator by the position of the manual override lever.
- (3) (SDS SUBJECT 28-22-00)

#### B. Possible Causes

• EFFECTIVITY

- (1) Crossfeed valve actuator, V39
- (2) Crossfeed valve body
- (3) Crossfeed valve switch, S3
- (4) Wiring from the P5-2 module to the crossfeed valve actuator
- (5) Crossfeed valve indication (VALVE OPEN) light, L3

28-22 TASKS 806-807

**AKS ALL** 



(6) The wiring or logic in the P5-2 module

## C. Circuit Breakers

(1) This is the primary circuit breaker related to the fault:

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
В	7	C00361	FUEL CROSS FEED VALVE

#### D. Related Data

- (1) (SSM 28-22-11)
- (2) (WDM 28-22-11)

#### E. Initial Evaluation

- (1) Turn the CROSSFEED switch on the P5 panel to the valve-open position.
  - (a) Do a check to see if the VALVE OPEN light comes on bright while the valve changes position and then stays on dim when the valve is fully open.
  - (b) If the VALVE OPEN light stays on bright and does not become dim, then do the Fault Isolation Procedure below.
  - (c) If the VALVE OPEN light comes on bright and then stays on dim, then continue.
- (2) Turn the CROSSFEED switch on the P5 panel to the valve-closed position.
  - (a) Do a check to see if the VALVE OPEN light comes on bright while the valve changes position and then goes off when the valve is fully closed.
  - (b) If the VALVE OPEN light stays on bright and does not go off, then do the Fault Isolation Procedure below.
  - (c) If the VALVE OPEN light comes on bright and then goes off, then there was an intermittent fault.

#### F. Fault Isolation Procedure

- (1) Do this check of the crossfeed valve actuator, V39 and the crossfeed valve body while the valve opens:
  - (a) Do a check to see if the manual override handle on the crossfeed valve actuator changes from the closed to the open position when you turn the CROSSFEED switch in the flight compartment to the valve-open position.
  - (b) If the manual override handle stays in the closed position, then do these steps:
    - 1) Open this circuit breaker and install safety tag:

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

Row	<u>Col</u>	Number	<u>Name</u>
В	7	C00361	FUEL CROSS FEED VALVE

- 2) Disconnect the electrical connector, D792, from the actuator.
- 3) Remove the safety tag and close this circuit breaker:

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

Row	<u>Col</u>	Number	<u>Name</u>
R	7	C00361	FUEL CROSS FEED VALVE

4) With the CROSSFEED switch in the valve-open position:

AKS ALL



- Do a check for 27 +/- 9 VDC between pin 2 and pin 4 (ground) of connector, D792.
- b) If there is not 27 +/- 9 VDC between pins 2 and 4 with the switch in the valve-open position, then inspect the wiring and the fuel crossfeed valve switch, S3.
- c) If there is 27 +/- 9 VDC between pins 2 and 4, then continue.
- d) Do a check for 0 +/- 5 VDC between pin 5 and pin 4 (ground) of connector, D792.
- e) If there is not 0 +/- 5 VDC between pins 5 and 4 with the switch in the valve-open position, then inspect the wiring and the fuel crossfeed valve switch, S3.
- f) If there is 0 +/- 5 VDC between pins 5 and 4, then do these steps:
  - <1> Replace the crossfeed valve actuator, V39.

These are the tasks:

Actuator of the Engine Fuel Crossfeed Valve Removal, AMM TASK 28-22-21-000-804

Actuator of the Engine Fuel Crossfeed Valve Installation, AMM TASK 28-22-21-400-804

- g) Do the Repair Confirmation at the end of this task.
- (c) If the VALVE OPEN light comes on bright and does not dim, and the manual override handle moves to the open position, then do these steps:
  - 1) Open this circuit breaker and install safety tag:

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
В	7	C00361	FUEL CROSS FEED VALVE

- 2) Disconnect the electrical connector, D792, from the actuator.
- 3) Remove the safety tag and close this circuit breaker:

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
В	7	C00361	FUEL CROSS FEED VALVE

- 4) With the CROSSFEED switch in the valve-open position:
  - a) Do a check for 27 +/- 9 VDC between pin 2 and pin 4 (ground) of connector, D792.
  - b) If there is not 27 +/- 9 VDC between pins 2 and 4 with the switch in the valve-open position, then inspect the wiring for an open circuit.
  - c) If there is 27 +/- 9 VDC between pins 2 and 4, then continue.
  - d) Install a jumper between pin 2 and pin 3 of connector, D792.
  - e) Make sure the VALVE OPEN light goes dim.
  - f) If the VALVE OPEN light stays on and bright and does not become dim, then inspect the wiring for an open circuit.
  - g) Remove the jumper between pin 2 and pin 3 of connector, D792.
  - h) Make sure the VALVE OPEN light comes on bright.

28-22 TASK 807

Page 240 Jun 15/2016



- i) If the VALVE OPEN light does not come on bright, then do these steps:
  - <1> Replace the crossfeed valve actuator, V39.

These are the tasks:

Actuator of the Engine Fuel Crossfeed Valve Removal, AMM TASK 28-22-21-000-804

Actuator of the Engine Fuel Crossfeed Valve Installation, AMM TASK 28-22-21-400-804

- i) Do the Repair Confirmation at the end of this task.
- k) If the VALVE OPEN light comes on bright, then continue.
- (d) If the manual override handle moved completely to the open position when you set the CROSSFEED switch in the flight compartment to the valve-open position and the VALVE OPEN light came on bright in transit and then became dim, then continue.
- (2) Do this check of the crossfeed valve actuator, V39 and the valve body while the valve closes.
  - (a) Do a check to see if the manual override handle on the crossfeed valve actuator changes from the open to the closed position when you set the CROSSFEED switch in the flight compartment to the valve-close position.
  - (b) Carefully try to move the manual override handle to the closed position with your hand to make sure it is fully closed.
  - (c) If the manual override handle did not move completely to the closed position when you set the CROSSFEED switch to the valve-closed postion, then do these steps:
    - Remove the actuator from the valve body. To remove the actuator, do this task: Actuator of the Engine Fuel Crossfeed Valve Removal, AMM TASK 28-22-21-000-804.
      - a) Do not disconnect connector D792 from the actuator.
    - 2) With the actuator disconnected from the mounting plate, set the CROSSFEED switch to the valve-open position and then to the valve-closed position.
    - 3) If the manual override handle moves completely to the closed position, then do these steps:
      - a) Replace the valve body.

These are the tasks:

Engine Fuel Crossfeed Valve Body Removal, AMM TASK 28-22-21-000-803, Install the Engine Fuel Crossfeed Valve Body, AMM TASK 28-22-21-400-803.

- b) Do the Repair Confirmation at the end of this task.
- 4) If the manual override handle does not move completely to the closed position, then do these steps:
  - a) Replace the valve actuator.

These are the tasks:

Actuator of the Engine Fuel Crossfeed Valve Removal, AMM TASK 28-22-21-000-804,

Actuator of the Engine Fuel Crossfeed Valve Installation, AMM TASK 28-22-21-400-804.

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

AKS ALL



## G. Repair Confirmation

- (1) Turn the CROSSFEED switch on the P5 panel to the valve-open position.
  - (a) Make sure the VALVE OPEN light comes on bright while the valve changes position and then stays on dim when the valve is fully open.
- (2) Turn the CROSSFEED switch on the P5 panel to the valve-closed position.
  - (a) Make sure the VALVE OPEN light comes on bright while the valve changes position and then goes off when the valve is fully closed.
- (3) If VALVE OPEN light had these conditions, then you corrected the fault:
  - (a) The VALVE OPEN light came on bright while the valve went from closed to open.
  - (b) The VALVE OPEN light stayed on dim while the valve was open.
  - (c) The VALVE OPEN light came on bright while the valve went from open to closed.
  - (d) The VALVE OPEN light went off again when the valve was closed.



# 808. <u>VALVE OPEN Light for the Crossfeed Valve Does Not Come On During Valve Transit - Fault Isolation</u>

## A. Description

- (1) You set the CROSSFEED switch on the P5 panel to the OPEN position and the VALVE OPEN light does not come on to show that the valve is changing its position. Or you set the CROSSFEED switch to on the P5 panel to the CLOSED position and the VALVE OPEN light does not come on to show that the valve is changing its position. When the valve operates correctly, the VALVE OPEN light comes on bright while the crossfeed valve changes position. The light stays on dim when the valve is open. The light is off when the valve is closed.
- (2) (SDS SUBJECT 28-22-00)

#### B. Possible Causes

- (1) Crossfeed valve switch, S3
- Crossfeed valve indication light, L3
- (3) Crossfeed valve actuator, V39
- (4) The wiring or logic in the P5-2 panel

#### C. Circuit Breakers

(1) This is the primary circuit breaker related to the fault:

F/O Electrical System Panel, P6-3

Row Col Number Name

B 7 C00361 FUEL CROSS FEED VALVE

#### D. Related Data

**AKS ALL** 

- (1) (SSM 28-22-11)
- (2) (WDM 28-22-11)

## E. Initial Evaluation

- (1) Push and hold the VALVE OPEN light for the crossfeed valve on the P5-2 module to make sure the VALVE OPEN light operates correctly.
  - (a) Make sure the VALVE OPEN light comes on bright.

28-22 TASKS 807-808



- (b) If the VALVE OPEN light does not come on bright, then replace the VALVE OPEN light.
- (2) Turn the CROSSFEED switch on the P5 panel to the valve-open position.
  - (a) Do a check to see if the VALVE OPEN light comes on bright while the valve changes position and then stays on dim when the valve is fully open.
  - (b) If the VALVE OPEN light does not come on, then do the Fault Isolation Procedure below.
  - (c) If the VALVE OPEN light comes on bright and then stays on dim, then continue.
  - (d) If the VALVE OPEN light comes on dim while the valve is in transit and stays dim when the valve is open, then continue.
- (3) Turn the CROSSFEED switch on the P5 panel to the valve-closed position.
  - (a) Do a check to see if the VALVE OPEN light comes on bright while the valve changes position and then goes off when the valve is fully closed.
  - (b) If the VALVE OPEN light does not come on in transit, but remains dim, then do these steps:
    - 1) Replace the valve actuator.

These are the tasks:

Actuator of the Engine Fuel Crossfeed Valve Removal, AMM TASK 28-22-21-000-804

Actuator of the Engine Fuel Crossfeed Valve Installation, AMM TASK 28-22-21-400-804

- 2) Do the Repair Confirmation at the end of this task.
- (c) If the VALVE OPEN light does not come on, then do the Fault Isolation Procedure below.
- (d) If the VALVE OPEN light comes on bright and then goes off, then there was an intermittent fault.

## F. Fault Isolation Procedure

- (1) Turn the CROSSFEED switch on the P5 panel to the valve-open position.
  - (a) Do a check to see if the manual override handle on the crossfeed valve actuator moves to the open position.
    - If the manual override handle moves to the open position, then replace the P5-2 module.
    - 2) If the manual override handle does not move to the open position, then replace the CROSSFEED switch, S3 on the P5-2 module.
    - 3) Do the Repair Confirmation at the end of this task.

#### G. Repair Confirmation

- (1) Set the CROSSFEED switch on the P5 panel to the valve-open position.
  - (a) The VALVE OPEN light must come on bright while the valve changes position and then stay on dim when the valve is fully open.
- (2) Turn the CROSSFEED switch on the P5 panel to the valve-closed position.
  - (a) The VALVE OPEN light must come on bright while the valve changes position and then go off when the valve is fully closed.
- (3) If VALVE OPEN light showed these conditions, then you corrected the fault:
  - (a) The VALVE OPEN light came on bright while the valve went from closed to open.
  - (b) The VALVE OPEN light stayed on dim while the valve was open.

28-22 TASK 808

AKS ALL

EFFECTIVITY '

Page 243

Jun 15/2016



- (c) The VALVE OPEN light came on bright while the valve went from open to closed.
- (d) The VALVE OPEN light went off again when the valve was closed.



## 809. Engine No. 1 SPAR VALVE CLOSED Light Stays on Bright - Fault Isolation

## A. Description

- (1) You set the engine start lever 1 to IDLE or RUN or CUTOFF or you pull the engine No. 1 fire handle and the engine No. 1 SPAR VALVE CLOSED light stays on bright. When the valve operates correctly, the SPAR VALVE CLOSED light comes on bright while the spar valve changes position. The light stays on dim when the valve is closed. The light is off when the valve is open.
- (2) The switches in the actuator send data about the valve position to the P5-2 module. The valve position is shown on the actuator by the position of the manual override lever.
- (3) (SDS SUBJECT 28-22-00)

#### B. Possible Causes

- (1) Engine No. 1 spar valve actuator, V37
- (2) Engine No. 1 spar valve body

#### AKS 001-017, 019

(3) Engine No. 1 start switch module, M1824

#### AKS 018, 020-999

(4) Engine start lever 1, S1221

#### **AKS ALL**

- (5) Engine No. 1 fire switch, S8
- (6) Engine No. 1 SPAR VALVE OPEN indication light
- (7) The wiring or logic in the P5-2 module
- (8) The wiring from the actuator to the fire switch, the start switch, and the P5-2 module.

## C. Circuit Breakers

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

# F/O Electrical System Panel, P6-3

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
В	3	C00360	FUEL SPAR VALVE ENG 2
В	4	C00359	FUEL SPAR VALVE ENG 1
В	5	C00540	FUEL SPAR VALVE IND
С	4	C01471	FUEL SHUTOFF VALVES PWR PACK
С	6	C01472	FUEL SHUTOFF VALVES BUS

## D. Related Data

- (1) (SSM 28-21-11)
- (2) (SSM 28-21-21)
- (3) (WDM 28-21-11)
- (4) (WDM 28-21-21)

28-22 TASKS 808-809

EFFECTIVITY AKS ALL



#### E. Initial Evaluation

- (1) Do this check of the SPAR VALVE CLOSED indication:
  - (a) Set the engine start lever 1 on the control stand to IDLE or RUN.
  - (b) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then goes off when the valve is fully open.
    - If the SPAR VALVE CLOSED light stays on bright and does not go off, then do the Fault Isolation Procedure below.
    - 2) If the SPAR VALVE CLOSED light comes on bright and then goes off, then continue.

**CAUTION:** DO NOT TURN THE FIRE HANDLE. YOU WILL CAUSE THE FIRE BOTTLES TO RELEASE THEIR CONTENTS IF YOU TURN THE HANDLE.

- (c) On the P8 panel, pull the No. 1 engine fire switch to the FIRE position.
- (d) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then becomes dim when the valve is fully closed.
  - 1) If the SPAR VALVE CLOSED light stays on bright and does not become dim, then do the Fault Isolation Procedure below.
  - 2) If the SPAR VALVE CLOSED light comes on bright and then goes dim, then continue.

**CAUTION:** DO NOT TURN THE FIRE HANDLE. YOU WILL CAUSE THE FIRE BOTTLES TO RELEASE THEIR CONTENTS IF YOU TURN THE HANDLE.

- (e) On the P8 panel, set the No. 1 engine fire switch back to the NORMAL position.
- (f) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then goes off when the valve is fully open.
  - 1) If the SPAR VALVE CLOSED light stays on bright and does not go off, then do the Fault Isolation Procedure below.
  - 2) If the SPAR VALVE CLOSED light comes on bright and then goes off, then continue.
- (g) Set the engine start lever 1 on the control stand to the CUTOFF position.
- (h) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then stays on dim when the valve is fully closed.
  - If the SPAR VALVE CLOSED light stays on bright and does not become dim, then
    do the Fault Isolation Procedure below.
  - 2) If the SPAR VALVE CLOSED light comes on bright and then stays on dim, then there was an intermittent fault.

## F. Fault Isolation Procedure

- (1) Do this check of the spar valve actuator operation:
  - (a) Open this access panel:

Number Name/Location
521BB Engine Fuel Valve Shu

521BB Engine Fuel Valve Shutoff Access Panel - Slat Station 36.02

on the front spar.

(b) Set the engine start lever 1 in the flight compartment to IDLE or RUN.

AKS ALL



- (c) Make sure the manual override handle on the spar valve actuator changes from the closed to the open position.
- (d) If the manual override handle stays in the closed position, then do these steps:
  - 1) Open this circuit breaker and install safety tag:

# F/O Electrical System Panel, P6-3

ı

Row	<u>Col</u>	Number	<u>Name</u>
В	4	C00359	FUEL SPAR VALVE ENG 1

- 2) Disconnect the electrical connector, D788, from the actuator.
- 3) Remove the safety tag and close this circuit breaker:

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
В	4	C00359	FUEL SPAR VALVE ENG 1

- 4) With the engine start lever 1 in the IDLE or RUN position:
  - a) Do a check for 27 +/– 9 VDC between pin 2 and pin 4 (ground) of connector, D788.
  - b) If there is not 27 +/- 9 VDC between pins 2 and 4, then inspect the wiring.
  - c) If there is 27 +/- 9 VDC between pins 2 and 4, then continue.
  - d) Do a check for 0 +/- 5 VDC between pin 5 and pin 4 (ground) of connector, D788.
  - e) If there is not 0 +/- 5 VDC between pins 5 and 4, then inspect the wiring.
  - f) If there is 0 +/- 5 VDC between pins 5 and 4, then do these steps:
    - <1> Replace the spar valve actuator, V37.

These are the tasks:

Actuator of the Spar Valve Removal, AMM TASK 28-22-11-000-804 Actuator of the Spar Valve Installation, AMM TASK 28-22-11-400-804

- g) Do the Repair Confirmation at the end of this task.
- (e) If the SPAR VALVE CLOSED light stays bright, and the manual override handle moves to the open position, then do these steps:
  - 1) Open this circuit breaker and install safety tag:

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
В	4	C00359	FUEL SPAR VALVE ENG 1

- 2) Disconnect the electrical connector, D788, from the actuator.
- 3) Remove the safety tag and close this circuit breaker:

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
В	4	C00359	FUEL SPAR VALVE FNG 1

4) With the engine start lever 1 in the IDLE or RUN position:

AKS ALL



- a) Do a check for 27 +/- 9 VDC between pin 2 and pin 4 (ground) of connector, D788.
- b) If there is not 27 +/- 9 VDC between pins 2 and 4, then inspect the wiring for an open circuit.
- c) If there is 27 +/- 9 VDC between pins 2 and 4, then continue.
- d) Install a jumper between pin 2 and pin 3 of connector, D788.
- e) Make sure the SPAR VALVE CLOSED light is off.
- f) If the SPAR VALVE CLOSED light stays on, then inspect the wiring for an open circuit.
- g) Remove the jumper between pin 2 and pin 3 of connector, D788.
- h) Make sure the SPAR VALVE CLOSED light comes on bright.
- i) If the SPAR VALVE CLOSED light does not come on bright, then do these steps:
  - <1> Replace the spar valve actuator, V37.

These are the tasks:

Actuator of the Spar Valve Removal, AMM TASK 28-22-11-000-804 Actuator of the Spar Valve Installation, AMM TASK 28-22-11-400-804

- j) Do the Repair Confirmation at the end of this task.
- k) If the SPAR VALVE CLOSED light comes on bright, then continue.
- (2) Do this check of the spar valve actuator operation:
  - (a) Set the engine start lever 1 in the flight compartment to CUTOFF.
  - (b) Make sure the manual override handle on the spar valve actuator changes from the open to the closed position.
  - (c) Carefully try to move the override handle to the closed position with your hand to make sure it is fully closed.
  - (d) If the override handle did not move completely to the closed position when you set the engine start lever 1 to the CUTOFF position, then do these steps:
    - 1) Remove the actuator from the valve body. To remove it, (AMM TASK 28-22-11-000-803)

NOTE: Do not disconnect D788 from the actuator.

- 2) With the actuator disconnected from the mounting plate, then do these steps:
  - a) Set the engine start lever 1 to IDLE or RUN.
  - b) Wait for the manual override handle on the spar valve actuator to move to the open position.
  - Set the engine start lever 1 to CUTOFF.
  - If the override handle moves completely to the closed position, then replace the valve body.

These are the tasks:

Valve Body of the Spar Valve Removal, AMM TASK 28-22-11-000-803, Valve Body of the Spar Valve Installation, AMM TASK 28-22-11-400-803.

e) If the override handle does not move completely to the closed position, then replace the valve actuator.

AKS ALL



These are the tasks:

Actuator of the Spar Valve Removal, AMM TASK 28-22-11-000-804, Actuator of the Spar Valve Installation. AMM TASK 28-22-11-400-804.

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

## G. Repair Confirmation

- 1) Do this check of the SPAR VALVE CLOSED indication:
  - (a) Make sure the engine start lever 1 is in the CUTOFF position.
  - (b) Set the engine start lever 1 on the control stand to IDLE or RUN.
  - (c) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then goes off when the valve is fully open.

**CAUTION:** DO NOT TURN THE FIRE HANDLE TO THE RIGHT OR LEFT. THE FIRE BOTTLES WILL DISCHARGE.

- (d) On the P8 panel, pull the No. 1 engine fire switch to the FIRE position.
- (e) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then becomes dim when the valve is fully closed.

**CAUTION:** DO NOT TURN THE FIRE HANDLE TO THE RIGHT OR LEFT. THE FIRE BOTTLES WILL DISCHARGE.

- (f) On the P8 panel, set the No. 1 engine fire switch back to the NORMAL position.
- (g) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then goes off when the valve is fully open.
- (h) Set the engine start lever 1 on the control stand to the CUTOFF position.
- (i) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then stays on dim when the valve is fully closed.
- (j) If the engine No. 1 SPAR VALVE CLOSED light showed these conditions while the valve was operated by the engine start lever 1 and by the engine No. 1 fire switch, then you corrected the fault:
  - 1) The SPAR VALVE CLOSED light came on bright while the valve went from open to closed.
  - 2) The SPAR VALVE CLOSED light stayed on dim while the valve was closed.
  - 3) The SPAR VALVE CLOSED light came on bright while the valve went from closed to open.
  - 4) The SPAR VALVE CLOSED light went off again when the valve was opened.
- (k) Close this access panel:

<u>Number</u>	Name/Location
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 36.02
	END OF TASK

AKS ALL



## 810. Engine No. 2 SPAR VALVE CLOSED Light Stays on Bright - Fault Isolation

## A. Description

- (1) You set the engine start lever 2 to IDLE or RUN or CUTOFF or you pull the engine No. 2 fire handle and the engine No. 2 SPAR VALVE CLOSED light stays on bright. When the valve operates correctly, the SPAR VALVE CLOSED light comes on bright while the spar valve changes position. The light stays on dim when the valve is closed. The light is off when the valve is open.
- (2) The switches in the actuator send data about the valve position to the P5-2 module. The valve position is shown on the actuator by the position of the manual override lever.
- (3) (SDS SUBJECT 28-22-00)

## B. Possible Causes

- (1) Engine No. 2 spar valve actuator, V38
- (2) Engine No. 2 spar valve body

#### AKS 001-017, 019

(3) Engine No. 2 start switch, M1825

## AKS 018, 020-999

(4) Engine start lever 2, S1222

#### **AKS ALL**

- (5) Engine No. 2 SPAR VALVE CLOSED indication light
- (6) The wiring or logic in the P5-2 module
- (7) The wiring from the actuator to the fire switch, the start switch, and the P5-2 module.

#### C. Circuit Breakers

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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
В	3	C00360	FUEL SPAR VALVE ENG 2
В	4	C00359	FUEL SPAR VALVE ENG 1
В	5	C00540	FUEL SPAR VALVE IND
С	4	C01471	FUEL SHUTOFF VALVES PWR PACK
С	6	C01472	FUEL SHUTOFF VALVES BUS

## D. Related Data

- (1) (SSM 28-21-11)
- (2) (SSM 28-21-21)
- (3) (WDM 28-21-11)
- (4) (WDM 28-21-21)

#### E. Initial Evaluation

- (1) Do this check of the SPAR VALVE CLOSED indication:
  - (a) Set the engine start lever 2 on the control stand to IDLE or RUN.
  - (b) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then goes off when the valve is fully open.

AKS ALL



- 1) If the SPAR VALVE CLOSED light stays on bright and does not go off, then do the Fault Isolation procedure below.
- If the SPAR VALVE CLOSED light comes on bright and then goes off, then continue.

**CAUTION:** DO NOT TURN THE FIRE HANDLE. YOU WILL CAUSE THE FIRE BOTTLES TO RELEASE THEIR CONTENTS IF YOU TURN THE HANDLE.

- (c) On the P8 panel, pull the No. 2 engine fire switch to the FIRE position.
- (d) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then becomes dim when the valve is fully closed.
  - If the SPAR VALVE CLOSED light stays on bright and does not become dim, then
    do the Fault Isolation Procedure below.
  - 2) If the SPAR VALVE CLOSED light comes on bright and then goes dim, then continue.

**CAUTION:** DO NOT TURN THE FIRE HANDLE. YOU WILL CAUSE THE FIRE BOTTLES TO RELEASE THEIR CONTENTS IF YOU TURN THE HANDLE.

- (e) On the P8 panel, set the No. 2 engine fire switch back to the NORMAL position.
- (f) Do a check to see if the SPAR VALVE CLOSED light comes on bright while the valve changes position and then goes off when the valve is fully open.
  - 1) If the SPAR VALVE CLOSED light stays on bright and does not go off, then do the Fault Isolation Procedure below.
  - If the SPAR VALVE CLOSED light comes on bright and then goes off, then continue.
- (g) Set the engine start lever 2 on the Control Stand to the CUTOFF position.
- (h) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then stays on dim when the valve is fully closed.
  - 1) If the SPAR VALVE CLOSED light stays on bright and does not become dim, then do the Fault Isolation Procedure below.
  - If the SPAR VALVE CLOSED light comes on bright and then stays on dim, then there was an intermittent fault.

## F. Fault Isolation Procedure

- (1) Do this check of the spar valve actuator operation:
  - (a) Open this access panel:

<u>Number</u>	Name/Location
621BB	Engine Fuel Spar Valve Access Panel - Slat Station 36.02

- on the front spar.
- (b) Set the engine start lever 2 in the flight compartment to IDLE or RUN.
- (c) Make sure the manual override handle on the spar valve actuator changes from the closed to the open position.
- (d) If the manual override handle stays in the closed position, then do these steps:

AKS ALL



1) Open this circuit breaker and install safety tag:

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
В	3	C00360	FUEL SPAR VALVE ENG 2

- 2) Disconnect the electrical connector, D790, from the actuator.
- 3) Remove the safety tag and close this circuit breaker:

# F/O Electrical System Panel, P6-3

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
В	3	C00360	FUEL SPAR VALVE ENG 2

- 4) With the engine start lever 2 in the IDLE or RUN position:
  - a) Do a check for 27 +/– 9 VDC between pin 2 and pin 4 (ground) of connector, D790.
  - b) If there is not 27 +/- 9 VDC between pins 2 and 4, then inspect the wiring.
  - c) If there is 27 +/- 9 VDC between pins 2 and 4, then continue.
  - d) Do a check for 0 +/- 5 VDC between pin 5 and pin 4 (ground) of connector, D790.
  - e) If there is not 0 +/- 5 VDC between pins 5 and 4, then inspect the wiring.
  - f) If there is 0 +/- 5 VDC between pins 5 and 4, then do these steps:
    - <1> Replace the spar valve actuator, V38.

These are the tasks:

Actuator of the Spar Valve Removal, AMM TASK 28-22-11-000-804 Actuator of the Spar Valve Installation, AMM TASK 28-22-11-400-804

- g) Do the Repair Confirmation at the end of this task.
- (e) If the SPAR VALVE CLOSED light stays bright, and the manual override handle moves to the open position, then do these steps:
  - 1) Open this circuit breaker and install safety tag:

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

Row	<u>Col</u>	Number	<u>Name</u>
В	3	C00360	FUEL SPAR VALVE ENG 2

- 2) Disconnect the electrical connector, D790, from the actuator.
- 3) Remove the safety tag and close this circuit breaker:

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

Row	<u>Col</u>	Number	<u>Name</u>
В	3	C00360	FUEL SPAR VALVE ENG 2

- 4) With the engine start lever 2 in the IDLE or RUN position:
  - a) Do a check for 27 +/- 9 VDC between pin 2 and pin 4 (ground) of connector, D790.
  - b) If there is not 27 +/- 9 VDC between pins 2 and 4, then inspect the wiring for an open circuit.

AKS ALL



- c) If there is 27 +/- 9 VDC between pins 2 and 4, then continue.
- d) Install a jumper between pin 2 and pin 3 of connector, D790.
- e) Make sure the SPAR VALVE CLOSED light is off.
- f) If the SPAR VALVE CLOSED light stays on, then inspect the wiring for an open circuit.
- g) Remove the jumper between pin 2 and pin 3 of connector, D790.
- h) Make sure the SPAR VALVE CLOSED light comes on bright.
- i) If the SPAR VALVE CLOSED light does not come on bright, then do these steps:
  - <1> Replace the spar valve actuator, V38.

These are the tasks:

Actuator of the Spar Valve Removal, AMM TASK 28-22-11-000-804 Actuator of the Spar Valve Installation, AMM TASK 28-22-11-400-804

- j) Do the Repair Confirmation at the end of this task.
- k) If the SPAR VALVE CLOSED light comes on bright, then continue.
- (2) Do this check of the spar valve actuator operation:
  - (a) Set the engine start lever 2 in the flight compartment to CUTOFF.
  - (b) Make sure the manual override handle on the spar valve actuator changes from the open to the closed position.
  - (c) Carefully try to move the override handle to the closed position with your hand to make sure it is fully closed.
  - (d) If the override handle did not move completely to the closed position when you set the engine start lever 2 to the CUTOFF position, then do these steps:
    - 1) Remove the actuator from the valve body. To remove it, (AMM TASK 28-22-11-000-803)

NOTE: Do not disconnect D790 from the actuator.

- 2) With the actuator disconnected from the mounting plate, do these steps:
  - a) Set the engine start lever 2 to IDLE or RUN.
  - b) Wait for the manual override handle on the spar valve actuator to move to the open position.
  - c) Set the engine start lever 2 to CUTOFF.
  - d) If the override handle moves completely to the closed position, then replace the valve body.

These are the tasks:

Valve Body of the Spar Valve Removal, AMM TASK 28-22-11-000-803, Valve Body of the Spar Valve Installation, AMM TASK 28-22-11-400-803.

e) If the override handle does not move completely to the closed position, then replace the valve actuator.

These are the tasks:

Actuator of the Spar Valve Removal, AMM TASK 28-22-11-000-804, Actuator of the Spar Valve Installation, AMM TASK 28-22-11-400-804.

AKS ALL



- f) Do the Repair Confirmation at the end of this task.
- (e) If the override handle moved completely to the closed position when you set the engine start lever 2 in the flight compartment to CUTOFF, then continue.
- (3) Do these checks of the switches in the spar valve actuator (WDM 28-21-11):
  - (a) Make sure the engine start lever 2 on the control stand is at CUTOFF.
  - (b) Disconnect the connector D790 from the actuator.
    - Do a continuity check between these pins on the receptacle of the actuator for connector D790:

D790	D790
pin 3	 pin 5
pin 3	 pin 6

- 2) If there is not continuity between the pairs of pins above, then do these steps:
  - a) Replace the spar valve actuator.

These are the tasks:

Actuator of the Spar Valve Removal, AMM TASK 28-22-11-000-804, Actuator of the Spar Valve Installation, AMM TASK 28-22-11-400-804.

- b) Do the Repair Confirmation at the end of this task.
- 3) If there is continuity between the pairs of pins above, then continue.
- (c) Re-connect connector D790.
- (d) Move the engine start lever 2 to IDLE or RUN.
- (e) Disconnect connector D790 from the actuator.
- (f) Do a continuity check between these pins on the receptacle of the actuator for connector D790:

D790	D790
pin 2	 pin 3

- 1) If there is not continuity between the pair of pins above, then do these steps:
  - a) Replace the spar valve actuator.

These are the tasks:

Actuator of the Spar Valve Removal, AMM TASK 28-22-11-000-804, Actuator of the Spar Valve Installation, AMM TASK 28-22-11-400-804.

- b) Do the Repair Confirmation at the end of this task.
- (4) Do this wiring check:
  - (a) Make sure the engine start lever 2 is in CUTOFF position.
  - (b) Disconnect connector D628 from the P5-2 module (WDM 28-22-11).
  - (c) With the positive voltage probe on pin 30 and the ground probe on pin 23, do a continuity check from pin 23 to pin 30 of connector D628.

NOTE: Do this check with the positive voltage probe on pin 30 and the ground probe on pin 23. Diode R693 will block current in the opposite direction, thus there will appear to be no continuity.

AKS ALL



- (d) If there is not continuity from pin 23 to pin 30 of connector D628, then repair the wiring from connector D628, pin 23 to D790, pin 30 or from connector D628, pin 23 to D790, pin 5 and pin 6.
  - 1) Re-connect connector D628.
  - 2) Do the Repair Confirmation at the end of this task.
- (e) If there is continuity from pin 23 to pin 30 of connector D628, then continue. Re-connect connector D628.
- (5) Do this wiring check (WDM 28-21-11):
  - (a) Set the engine start lever 2 to the IDLE or RUN position.
  - (b) Disconnect connector D628 from the P5-2 module.
  - (c) With the positive voltage probe on pin 29 and the ground probe on pin 23, do a continuity check from pin 23 to pin 29 of connector D628.

NOTE: Do this check with the positive voltage probe on pin 29 and the ground probe on pin 23. Diode R693 will block current in the opposite direction, thus there will appear to be no continuity.

- (d) If there is not continuity from pin 23 to pin 29 of connector D628, then do these steps:
  - 1) Repair the wiring from connector D628, pin 23 to D790, pin 3 or from connector D628, pin 29 to D790, pin 2.
  - 2) Re-connect connector D628.
  - 3) Do the Repair Confirmation at the end of this task.
- (e) If there is continuity from pin 23 to pin 29 of connector D628, then do these steps:
  - 1) Replace the P5-2 module of the P5 panel.
  - 2) Do the Repair Confirmation at the end of this task.

## G. Repair Confirmation

ı

- (1) Do this check of the SPAR VALVE CLOSED indication:
  - (a) Set the engine start lever 2 on the control stand to IDLE or RUN.
  - (b) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then goes off when the valve is fully open.

**CAUTION:** DO NOT TURN THE FIRE HANDLE TO THE RIGHT OR LEFT. THE FIRE BOTTLES WILL DISCHARGE.

- (c) On the P8 panel, pull the No. 2 engine fire switch to the FIRE position.
- (d) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then becomes dim when the valve is fully closed.

**CAUTION:** DO NOT TURN THE FIRE HANDLE TO THE RIGHT OR LEFT. THE FIRE BOTTLES WILL DISCHARGE.

- (e) On the P8 panel, set the No. 2 engine fire switch back to the NORMAL position.
- (f) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then goes off when the valve is fully open.
- (g) Set the engine start lever 2 on the control stand to the CUTOFF position.
- (h) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then stays on dim when the valve is fully closed.

AKS ALL



- (i) If the engine No. 2 SPAR VALVE CLOSED light showed these conditions while the valve was operated by the engine start lever 2 and by the engine No. 2 fire switch, then you corrected the fault:
  - 1) The SPAR VALVE CLOSED light came on bright while the valve went from open to closed.
  - 2) The SPAR VALVE CLOSED light stayed on dim while the valve was closed.
  - 3) The SPAR VALVE CLOSED light came on bright while the valve went from closed to open.
  - 4) The SPAR VALVE CLOSED light went off again when the valve was opened.
- (j) Close this access panel:

<u>Number</u>	Name/Location
621BB	Engine Fuel Spar Valve Access Panel - Slat Station 36.02

## ------ END OF TASK ------

# 811. Engine No. 1 SPAR VALVE CLOSED Light Does Not Come On Bright During Valve Transit or Dim When the Valve is Closed - Fault Isolation

## A. Description

- (1) You set the engine start lever 1 to IDLE or RUN or CUTOFF or you pull the engine No. 1 fire handle and the engine No. 1 SPAR VALVE CLOSED light does not come on to show that the valve is changing its position. When the valve operates correctly, the SPAR VALVE CLOSED light comes on bright while the spar valve changes position. The light stays on dim when the valve is closed. The light is off when the valve is open.
- (2) (SDS SUBJECT 28-22-00)

## B. Possible Causes

(1) Engine No. 1 Spar Valve Actuator, V37

## AKS 001-017, 019

(2) Engine No. 1 start switch module, M1824

#### AKS 018, 020-999

(3) Engine start lever 1, S1221

#### **AKS ALL**

- (4) Engine No. 1 fire switch, S8 on the P8-1 fire protection panel
- (5) The wiring or logic in the P5-2 module
- (6) The wiring from the engine No. 1 start switch module or the engine No. 1 fire switch to the P5-2 module.

#### C. Circuit Breakers

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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
В	4	C00359	FUEL SPAR VALVE ENG 1
В	5	C00540	FUEL SPAR VALVE IND
С	4	C01471	FUEL SHUTOFF VALVES PWR PACK
С	6	C01472	FUEL SHUTOFF VALVES BUS

EFFECTIVITY '

28-22 TASKS 810-811



#### D. Related Data

- (1) (SSM 28-21-11)
- (2) (WDM 28-21-11)

#### E. Initial Evaluation

- (1) Do this check of the SPAR VALVE CLOSED indication:
  - (a) Push and hold the SPAR VALVE CLOSED light for the engine No. 1 spar valve on the P5-2 module.
  - (b) Make sure the SPAR VALVE CLOSED light comes on bright.
    - If the SPAR VALVE CLOSED light does not come on bright, then replace the SPAR VALVE CLOSED light.
  - (c) Set the engine start lever 1 on the control stand to IDLE or RUN.
  - (d) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then goes off when the valve is fully open.
    - If the SPAR VALVE CLOSED light does not come on, then do the Fault Isolation Procedure below.
    - 2) If the SPAR VALVE CLOSED light comes on bright and then goes off, then continue.

<u>CAUTION</u>: DO NOT TURN THE FIRE HANDLE. YOU WILL CAUSE THE FIRE BOTTLES TO RELEASE THEIR CONTENTS IF YOU TURN THE HANDLE.

- (e) On the P8 panel, pull the No. 1 engine fire switch to the FIRE position.
- (f) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then becomes dim when the valve is fully closed.
  - If the SPAR VALVE CLOSED light does not come on, then do the Fault Isolation Procedure below.
  - 2) If the SPAR VALVE CLOSED light comes on bright and then goes dim, then continue.

**CAUTION:** DO NOT TURN THE FIRE HANDLE. YOU WILL CAUSE THE FIRE BOTTLES TO RELEASE THEIR CONTENTS IF YOU TURN THE HANDLE.

- (g) On the P8 panel, set the No. 1 engine fire switch back to the NORMAL position.
- (h) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then goes off when the valve is fully open.
  - If the SPAR VALVE CLOSED light does not come on, then do the Fault Isolation Procedure below.
  - 2) If the SPAR VALVE CLOSED light comes on bright and then goes off, then continue.
- (i) Set the engine start lever 1 on the control stand to the CUTOFF position.
- (j) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then stays on dim when the valve is fully closed.
  - 1) If the SPAR VALVE CLOSED light does not come on, then do the Fault Isolation Procedure below.
  - 2) If the SPAR VALVE CLOSED light comes on bright and then stays on dim, then there was an intermittent fault.

AKS ALL 28-22 TASK 811



#### F. Fault Isolation Procedure

- (1) Do this check of the engine start lever 1:
  - (a) Set the engine start lever 1 on the control stand to the IDLE or RUN position.
  - (b) Make sure the No. 1 engine SPAR VALVE CLOSED light comes on bright and then goes off.
    - 1) If the No. 1 engine SPAR VALVE CLOSED light does not come on bright during transit and then go off, then do these steps:
      - a) Set the engine start lever 1 on the control stand to the CUTOFF position.
      - b) If the No. 1 engine SPAR VALVE CLOSED light comes on dim, while the valve is in transit and stays on dim, then replace the spar valve actuator, V37.

These are the tasks:

Actuator of the Spar Valve Removal, AMM TASK 28-22-11-000-804 Actuator of the Spar Valve Installation, AMM TASK 28-22-11-400-804

- c) Set the engine start lever 1 on the control stand to the IDLE or RUN position.
- d) Do the Repair Confirmation at the end of this task.
- If the No. 1 engine SPAR VALVE CLOSED light comes on bright and then goes off, then continue.
- (2) Do this check of the engine No. 1 fire switch:

<u>CAUTION</u>: DO NOT TURN THE FIRE HANDLE. YOU WILL CAUSE THE FIRE BOTTLES TO RELEASE THEIR CONTENTS IF YOU TURN THE HANDLE.

- (a) With the engine start lever 1 in the IDLE or RUN position, pull the engine No. 1 fire switch on the P8-1 panel to the FIRE position.
- (b) Make sure the No. 1 engine SPAR VALVE CLOSED light comes on bright and then goes dim.
  - 1) If the No. 1 engine SPAR VALVE CLOSED light does not come on bright and then go dim, then do these steps:
    - a) Replace the engine No. 1 fire switch, S8, on the P8-1 panel.
    - b) Do the Repair Confirmation at the end of this task.
  - 2) If the No. 1 engine SPAR VALVE CLOSED light comes on bright and then becomes dim, then continue. Move the engine No. 1 fire switch back to the NORMAL position.
- (3) Do these checks of the wiring and the P5-2 module:
  - (a) Set the engine start lever 1 to the CUTOFF position.
  - (b) On the front spar, make sure the manual override handle on the engine No. 1 spar valve moves to the closed position.

NOTE: Open the Engine Fuel Valve Shutoff Access Panel - Slat Station 36.02, 521BB to get access to the engine No. 1 spar valve on the front spar.

- If the manual override handle moves to the closed position, then replace the P5-2 module.
  - a) Replace the P5-2 module.
  - b) Do the Repair Confirmation at the end of this task.
- 2) If the manual override handle does not move to the closed position, then continue.

AKS ALL



(c) Do a continuity check of the wiring from these pins on connector D11288 on the engine No. 1 start switch module to connector D788 on the engine No. 1 spar valve actuator:

D788	D11288
pin 2	 pin 8
pin 5	 pin 7

- 1) If there is no continuity between these pins, then do these steps:
  - a) Repair the wiring.
  - b) Re-connect connectors D788 and D11288.
  - c) Do the Repair Confirmation at the end of this task.
- 2) If there is continuity between these pins, then continue.
- (d) Set the engine start lever 1 to the IDLE or RUN position.
- (e) Set the engine No. 1 fire switch back to the FIRE position.
- (f) On the front spar, make sure the manual override handle on the engine No. 1 spar valve moves to the closed position.
  - 1) If the manual override handle moves to the closed position, then do these steps:
    - a) Replace the P5-2 module.
    - b) Do the Repair Confirmation at the end of this task.
  - 2) If the manual override handle does not move to the closed position, then continue.
- (g) Do a continuity check of the wiring from these pins on connector D576 on the engine No. 1 fire switch module to connector D788 on the engine No. 1 spar valve actuator:

D788	D576
pin 6	 pin 21
pin 2	 pin 23

- 1) Repair the wiring.
- 2) Re-connect connectors D788 and D576.
- 3) Do the Repair Confirmation at the end of this task.

## G. Repair Confirmation

- (1) Do this check of the SPAR VALVE CLOSED indication:
  - (a) Set the engine start lever 1 on the control stand to IDLE or RUN.
  - (b) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then goes off when the valve is fully open.

**CAUTION:** DO NOT TURN THE FIRE HANDLE TO THE RIGHT OR LEFT. THE FIRE BOTTLES WILL DISCHARGE.

- (c) On the P8 panel, pull the No. 1 engine fire switch to the FIRE position.
- (d) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then becomes dim when the valve is fully closed.

**CAUTION:** DO NOT TURN THE FIRE HANDLE TO THE RIGHT OR LEFT. THE FIRE BOTTLES WILL DISCHARGE.

(e) On the P8 panel, set the No. 1 engine fire switch back to the NORMAL position.

AKS ALL



- (f) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then goes off when the valve is fully open.
- (g) Set the engine start lever 1 on the control stand to the CUTOFF position.
- (h) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then stays on dim when the valve is fully closed.
- (i) If the engine No. 1 SPAR VALVE CLOSED light showed these conditions while the valve was operated by the engine start lever 1 and by the engine No. 1 fire switch, then you corrected the fault:
  - 1) The SPAR VALVE CLOSED light came on bright while the valve went from open to closed.
  - 2) The SPAR VALVE CLOSED light stayed on dim while the valve was closed.
  - 3) The SPAR VALVE CLOSED light came on bright while the valve went from closed to open.
  - 4) The SPAR VALVE CLOSED light went off again when the valve was opened.
- (j) Close this access panel:

Number521BBEngine Fuel Valve Shutoff Access Panel - Slat Station 36.02

----- END OF TASK -----

# 812. Engine No. 2 SPAR VALVE CLOSED Light Does Not Come On Bright During Valve Transit or Dim When the Valve is Closed - Fault Isolation

## A. Description

- (1) You set the engine start lever 2 to IDLE or RUN or CUTOFF or you pull the engine No. 2 fire handle and the engine No. 2 SPAR VALVE CLOSED light does not come on to show that the valve is changing its position. When the valve operates correctly, the SPAR VALVE CLOSED light comes on bright while the spar valve changes position. The light stays on dim when the valve is closed. The light is off when the valve is open.
- (2) (SDS SUBJECT 28-22-00)

#### B. Possible Causes

(1) Engine No. 2 spar valve actuator, V38

## AKS 001-017, 019

(2) Engine No. 2 start switch module, M1825

#### AKS 018, 020-999

(3) Engine start lever, S1222

#### **AKS ALL**

EFFECTIVITY '

**AKS ALL** 

- (4) Engine No. 2 fire switch, S9 on the P8-1 fire protection panel
- (5) The wiring or logic in the P5-2 module
- (6) The wiring from the engine No. 2 start switch module or the engine No. 2 fire switch to the P5-2 module.

28-22 TASKS 811-812

Page 259 Jun 15/2016



#### C. Circuit Breakers

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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
В	3	C00360	FUEL SPAR VALVE ENG 2
В	5	C00540	FUEL SPAR VALVE IND
С	4	C01471	FUEL SHUTOFF VALVES PWR PACK
С	6	C01472	FUEL SHUTOFF VALVES BUS

#### D. Related Data

- (1) (SSM 28-21-11)
- (2) (WDM 28-21-11)

#### E. Initial Evaluation

- (1) Do this check of the SPAR VALVE CLOSED indication:
  - (a) Push and hold the SPAR VALVE CLOSED light for the engine No. 2 spar valve on the P5-2 module.
  - (b) Make sure the SPAR VALVE CLOSED light comes on bright.
    - If the SPAR VALVE CLOSED light does not come on bright, then replace the SPAR VALVE CLOSED light.
  - (c) Set the engine start lever 2 on the control stand to IDLE or RUN.
  - (d) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then goes off when the valve is fully open.
    - 1) If the SPAR VALVE CLOSED light does not come on, then do the Fault Isolation Procedure below.
    - If the SPAR VALVE CLOSED light comes on bright and then goes off, then continue.

**CAUTION:** DO NOT TURN THE FIRE HANDLE. YOU WILL CAUSE THE FIRE BOTTLES TO RELEASE THEIR CONTENTS IF YOU TURN THE HANDLE.

- (e) On the P8 panel, pull the No. 2 engine fire switch to the FIRE position.
- (f) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then becomes dim when the valve is fully closed.
  - 1) If the SPAR VALVE CLOSED light does not come on, then do the Fault Isolation Procedure below.
  - 2) If the SPAR VALVE CLOSED light comes on bright and then goes dim, then continue.

**CAUTION:** DO NOT TURN THE FIRE HANDLE. YOU WILL CAUSE THE FIRE BOTTLES TO RELEASE THEIR CONTENTS IF YOU TURN THE HANDLE.

- (g) On the P8 panel, set the No. 2 engine fire switch back to the NORMAL position.
- (h) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then goes off when the valve is fully open.
  - If the SPAR VALVE CLOSED light does not come on, then do the Fault Isolation Procedure below.

28-22 TASK 812

Page 260 Jun 15/2016

EFFECTIVITY



- If the SPAR VALVE CLOSED light comes on bright and then goes off, then continue.
- (i) Set the engine start lever 2 on the control stand to the CUTOFF position.
- (j) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then stays on dim when the valve is fully closed.
  - If the SPAR VALVE CLOSED light does not come on, then do the Fault Isolation Procedure below.
  - If the SPAR VALVE CLOSED light comes on bright and then stays on dim, then there was an intermittent fault.

## F. Fault Isolation Procedure

- (1) Do this check of the engine start lever 2:
  - (a) Set the engine start lever 2 on the control stand to the IDLE or RUN position.
  - (b) Make sure the No. 2 engine SPAR VALVE CLOSED light comes on bright and then goes off.
    - 1) If the No. 2 engine SPAR VALVE CLOSED light does not come on bright during transit and then go off, then do these steps:
      - a) Set the engine start lever 2 on the control stand to the CUTOFF position.
      - b) If the No. 2 engine SPAR VALVE CLOSED light comes on dim, while the valve is in transit and stays on dim, then replace the spar valve actuator, V38.

These are the tasks:

Actuator of the Spar Valve Removal, AMM TASK 28-22-11-000-804 Actuator of the Spar Valve Installation, AMM TASK 28-22-11-400-804

- c) Set the engine start lever 2 on the control stand to the IDLE or RUN position.
- d) Do the Repair Confirmation at the end of this task.
- 2) If the No. 2 engine SPAR VALVE CLOSED light comes on bright and then goes off, then continue.
- (2) Do this check of the engine No. 2 fire switch:

**CAUTION:** DO NOT TURN THE FIRE HANDLE. YOU WILL CAUSE THE FIRE BOTTLES TO RELEASE THEIR CONTENTS IF YOU TURN THE HANDLE.

- (a) With the engine start lever 2 in the IDLE or RUN position, pull the engine No. 2 fire switch on the P8-1 panel to the FIRE position.
- (b) Make sure the No. 2 engine SPAR VALVE CLOSED light comes on bright and then goes dim.
  - 1) If the No. 2 engine SPAR VALVE CLOSED light does not come on bright and then go dim, then do these steps:
    - a) Replace the engine No. 2 fire switch, S9, on the P8-1 panel.
    - b) Do the Repair Confirmation at the end of this task.
  - 2) If the No. 2 engine SPAR VALVE CLOSED light comes on bright and then becomes dim, then continue. Move the engine No. 2 fire switch back to the NORMAL position.
- (3) Do these checks of the wiring and the P5-2 module:
  - (a) Set the engine start lever 2 to the CUTOFF position.

AKS ALL



(b) On the front spar, make sure the manual override handle on the engine No. 2 spar valve moves to the closed position.

NOTE: Open the Engine Fuel Valve Shutoff Access Panel - Slat Station 36.02, 621BB to get access to the engine No. 2 spar valve on the front spar.

- 1) If the manual override handle moves to the closed position, then do these steps:
  - a) Replace the P5-2 module.
  - b) Do the Repair Confirmation at the end of this task.
- 2) If the manual override handle does not move to the closed position, then continue.
- (c) Do a continuity check of the wiring from these pins on connector D11292 on the engine No. 2 start switch module to connector D790 on the engine No. 2 spar valve actuator:

D790	D11292
pin 2	 pin 8
pin 5	 pin 7

- 1) If there is no continuity between these pins, then do these steps:
  - a) Repair the wiring.
  - b) Re-connect connectors D790 and D11292.
  - c) Do the Repair Confirmation at the end of this task.
- 2) If there is continuity between these pins, then continue.
- (d) Set the engine start lever 2 to the IDLE or RUN position.
- (e) Set the engine No. 2 fire switch back to the FIRE position.
- (f) On the front spar, make sure the manual override handle on the engine No. 2 spar valve moves to the closed position.
  - 1) If the manual override handle moves to the closed position, then do these steps:
    - a) Replace the P5-2 module.
    - b) Do the Repair Confirmation at the end of this task.
  - 2) If the manual override handle does not move to the closed position, then continue.
- (g) Do a continuity check of the wiring from these pins on connector D578 on the engine No. 2 fire switch module to connector D790 on the engine No. 2 spar valve actuator:

D790	D578
pin 6	 pin 21
pin 2	 pin 23

- 1) Repair the wiring.
- 2) Re-connect connectors D790 and D578.
- 3) Do the Repair Confirmation at the end of this task.

## G. Repair Confirmation

- (1) Do this check of the SPAR VALVE CLOSED indication:
  - (a) Set the engine start lever 2 on the control stand to IDLE or RUN.
  - (b) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then goes off when the valve is fully open.

AKS ALL



**CAUTION:** DO NOT TURN THE FIRE HANDLE TO THE RIGHT OR LEFT. THE FIRE BOTTLES WILL DISCHARGE.

- (c) On the P8 panel, pull the No. 2 engine fire switch to the FIRE position.
- (d) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then becomes dim when the valve is fully closed.

**CAUTION:** DO NOT TURN THE FIRE HANDLE TO THE RIGHT OR LEFT. THE FIRE BOTTLES WILL DISCHARGE.

- (e) On the P8 panel, set the No. 2 engine fire switch back to the NORMAL position.
- (f) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then goes off when the valve is fully open.
- (g) Set the engine start lever 2 on the control stand to the CUTOFF position.
- (h) Make sure the SPAR VALVE CLOSED light comes on bright while the valve changes position and then stays on dim when the valve is fully closed.
- (i) If the engine No. 2 SPAR VALVE CLOSED light showed these conditions while the valve was operated by the engine start lever 2 and by the engine No. 2 fire switch, then you corrected the fault:
  - 1) The SPAR VALVE CLOSED light came on bright while the valve went from open to closed.
  - 2) The SPAR VALVE CLOSED light stayed on dim while the valve was closed.
  - 3) The SPAR VALVE CLOSED light came on bright while the valve went from closed to open.
  - 4) The SPAR VALVE CLOSED light went off again when the valve was opened.
- (i) Close this access panel:

Number Name/Location

621BB Engine Fuel Spar Valve Access Panel - Slat Station 36.02

#### ------ END OF TASK ------

## 813. No. 1 Tank, Forward Boost Pump Circuit Breaker Open - Fault Isolation

## A. Description

#### 28-AWL-18: CDCCL

(1) The circuit breaker, FUEL BOOST PUMP TANK 1 FWD, is found to be open during flight or on the ground. Do not reset this circuit breaker before you do the Initial Evaluation below. This problem can be caused by a short circuit in the wiring for the boost pump, a damaged boost pump, or a damaged circuit breaker or relay.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM

TASK 28-00-00-910-801, for important information on Critical Design Configuration
Control Limitations (CDCCLs).

<u>NOTE</u>: This is applicable to Airworthiness Limitation 28-AWL-18.

#### B. Possible Causes

- (1) 115V AC Wiring
- (2) No. 1 tank forward boost pump relay, R19
- (3) No. 1 tank forward boost pump, M47

AKS ALL

28-22 TASKS 812-813

Page 263 Jun 15/2016



(4) Circuit breaker, C00827, FUEL BOOST PUMP TANK 1 FWD

## C. Circuit Breakers

(1) This is the primary circuit breaker related to the fault:

Power Distribution Panel Number 1, P91

 Row
 Col
 Number
 Name

 D
 1
 C00827
 FUEL BOOST PUMP TANK 1 FWD

## D. Related Data

- (1) (SDS SUBJECT 28-22-00)
- (2) (SSM 28-23-11)
- (3) (WDM 28-23-11)

## E. Initial Evaluation

NOTE: If you make a decision to dispatch the airplane with an open circuit breaker, do the steps in the MEL to deactivate the forward boost pump for the No. 1 tank. Operate the airplane per MEL procedures.

WARNING: DO NOT CLOSE A GFI RELAY FOR A FUEL PUMP THAT OPENED (TRIPPED) UNTIL YOU CORRECT THE PROBLEM. THIS CONDITION CAN CAUSE A FIRE OR EXPLOSION.

WARNING: DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(1) Do a visual inspection of the BOOST PUMP TANK 1 FWD GFI relay, R19:

NOTE: The GFI relay, R19, is on the P91 panel in the Electronic Equipment Compartment. You will need to open the panel to get access to the GFI relay.

## 28-AWL-18: CDCCL

(a) If the RESET button is out, and you can see the white band, then do the "Fault Isolation Procedure - BOOST PUMP TANK 1 FWD GFI Relay Open" in 28-22 TASK 804.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

NOTE: The RESET button, found at the top edge of the GFI relay, moves out to show a narrow white band when the GFI circuit turns off the relay due to a ground fault, or when you push the TEST button found on the top surface of the relay.

- (b) If the RESET button on the BOOST PUMP TANK 1 FWD GFI relay, R19, is not out and vou cannot see the white band, then continue.
- 2) Do a check of this circuit breaker:

Power Distribution Panel Number 1, P91

RowColNumberNameD1C00827FUEL BOOST PUMP TANK 1 FWD

AKS ALL

28-22 TASK 813

Page 264 Jun 15/2016



(3) If the circuit breaker is closed, do this task: No. 1 Tank FWD pump LOW PRESSURE light is on - Fault Isolation, 28-22 TASK 804.

WARNING: DO NOT CLOSE A CIRCUIT BREAKER FOR A FUEL PUMP THAT OPENED (TRIPPED) UNTIL YOU CORRECT THE PROBLEM. THIS CONDITION CAN CAUSE A FIRE OR EXPLOSION.

## 28-AWL-18: CDCCL

(4) If the circuit breaker is open, do these steps:

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

## 28-AWL-18: CDCCL

(a) Install an approved for flight, open position circuit breaker lock, STD-1062, and safety tag on the circuit breaker.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

## 28-AWL-18: CDCCL

(b) Do the fault isolation steps in this procedure.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

#### F. Fault Isolation Procedure

WARNING: DO NOT OPERATE A FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. THIS CONDITION CAN CAUSE THE IGNITION OF THE FUEL FUMES IN THE FUEL TANK. A FIRE OR AN EXPLOSION CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (1) Obey these precautions at all times during this task:
  - (a) To operate any of the fuel pumps, one person must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.
  - (b) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.
- (2) Make sure there is minimum of 20,000 lb (9072 kg) of fuel in the center tank and 1000 lb (454 kg) of fuel in the No. 1 tank.

NOTE: This will cover the boost pump and boost pump inlet with fuel.

WARNING: MAKE SURE THAT PERSONNEL AND EQUIPMENT STAY AWAY FROM THE LEADING EDGE FLAPS AND SLATS, TRAILING EDGE FLAPS, AND DRIVE MECHANISMS. THE FLAPS, SLATS, AND DRIVE MECHANISMS MOVE QUICKLY. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(3) Do this task: Leading Edge Flaps and Slats Extension, AMM TASK 27-81-00-860-803.

AKS ALL



- (4) Get access to the forward fuel boost pump for the No. 1 tank (AMM TASK 28-22-41-000-801).
- (5) Examine the fuel boost pump and the area around it for fuel leakage.
  - (a) If there are signs of fuel leakage, find the source of the fuel leakage and repair it
- (6) Do these steps to do a check of the 115V AC wiring, the circuit breaker, the relay, and the boost pump:
  - (a) Disconnect the electrical connector, D72, from the fuel boost pump (WDM 28-23-11).
  - (b) Examine the airplane and pump sides of the electrical connector, D72, for damage.
    - 1) Repair all damage that you find.
  - (c) Make sure that the electrical connector, D72, is disconnected.
  - (d) Remove the circuit breaker lock and safety tag, and close this circuit breaker:

## **Power Distribution Panel Number 1, P91**

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD

- (e) On the P5 Overhead Panel, set the switch FUEL PUMP TANK 1 FWD to ON.
- (f) After five minutes, set the switch FUEL PUMP TANK 1 FWD, on the P5 Overhead Panel, to OFF.
- (g) If the circuit breaker stays closed, do the subsequent steps:
  - 1) Do a check for 3-phase 115V AC power between pins 1, 2, and 3 of electrical connector, D72 (WDM 28-23-11).
  - 2) If there is 3-phase 115V AC power between pins 1, 2, and 3 of electrical connector, D72, do one of these steps:
    - For the No. 1 forward boost pump, M47, do this task: Fuel Boost Pump -Insulation Resistance Test, AMM TASK 28-22-00-760-802.
      - If the insulation resistance test is not OK, replace the forward boost pump, M47, for the No. 1 tank.

These are the tasks:

Motor Impeller Removal, AMM TASK 28-22-41-000-801,

Motor Impeller Installation, AMM TASK 28-22-41-400-801.

- <2> Do the Repair Confirmation at the end of this task.
- b) Replace the forward boost pump, M47, for the No. 1 tank.

These are the tasks:

Motor Impeller Removal, AMM TASK 28-22-41-000-801,

Motor Impeller Installation, AMM TASK 28-22-41-400-801.

- <1> Do the Repair Confirmation at the end of the task.
- 3) If there is not 3-phase 115V AC power between pins 1, 2, and 3 of electrical connector, D72, do these steps:
  - a) Replace the BOOST PUMP TANK 1 FWD relay, R19 (WDM 28-23-11).
    - <1> Do the Repair Confirmation at the end of this task.
- (h) If the circuit breaker opened, then continue.
- (7) Do these steps to do a check of the BOOST PUMP TANK 1 FWD relay, R19:
  - (a) Replace the BOOST PUMP TANK 1 FWD relay, R19 (WDM 28-23-11).

EFFECTIVITY 28-22 TASK 813



- (b) Make sure that the electrical connector, D72, is disconnected.
- (c) Close this circuit breaker:

**Power Distribution Panel Number 1, P91** 

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD

- (d) On the P5 Overhead Panel, set the switch FUEL PUMP TANK 1 FWD to ON.
- (e) After five minutes, set the switch FUEL PUMP TANK 1 FWD, on the P5 Overhead Panel, to OFF.
- (f) If this circuit breaker stays closed, then do the Repair Confirmation at the end of this task.

## **Power Distribution Panel Number 1, P91**

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD

(g) If this circuit breaker opened, then continue.

## Power Distribution Panel Number 1, P91

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD

- (8) Do these steps to do a check of the circuit breaker:
  - (a) Replace this circuit breaker:

#### **Power Distribution Panel Number 1, P91**

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD

- (b) Make sure that the electrical connector, D72, is disconnected.
- (c) Close this circuit breaker:

## **Power Distribution Panel Number 1, P91**

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD

- (d) On the P5 Overhead Panel, set the switch FUEL PUMP TANK 1 FWD to ON.
- (e) After five minutes, set the switch FUEL PUMP TANK 1 FWD, on the P5 Overhead Panel, to OFF.
- (f) If this circuit breaker stays closed, then do the Repair Confirmation at the end of this task.

## **Power Distribution Panel Number 1, P91**

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD

(g) If this circuit breaker opened, then continue.

## **Power Distribution Panel Number 1, P91**

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD

(9) Do these steps to do a check of the 115V AC wiring for the boost pump:

AKS ALL



(a) Do a wiring check between these pins of connector, D72, at the Tank No. 1 forward boost pump, M47, and the circuit breaker, FUEL BOOST PUMP TANK 1 FWD (SSM 28-23-11):

D72	C00827
pin 1	 pin A2
pin 2	 pin B2
pin 3	 pin C2

- (b) Find the problem and repair the wiring.
- (c) Make sure that the electrical connector, D72, is disconnected.
- (d) Close this circuit breaker:

## Power Distribution Panel Number 1, P91

Row	<u>Col</u>	<u>Number</u>	Name
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD

- (e) Do not re-connect the electrical connector, D72, to the boost pump.
- (f) On the P5 Overhead Panel, set the switch FUEL PUMP TANK 1 FWD to ON.
- (g) After five minutes, set the switch FUEL PUMP TANK 1 FWD, on the P5 Overhead Panel, to OFF.
- (h) Make sure this circuit breaker stays closed:

## **Power Distribution Panel Number 1, P91**

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD

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

## G. Repair Confirmation

- (1) Connect the electrical connector, D72, to the Tank No. 1 forward boost pump (WDM 28-23-11).
- (2) On the P5 Overhead Panel, set the switch FUEL PUMP TANK 1 FWD to ON.
- (3) On the P5 Overhead Panel, make sure that the amber PRESS light FUEL PUMP TANK 1 FWD goes off.

- END OF TASK —

- (4) After five minutes, set the switch FUEL PUMP TANK 1 FWD, on the P5 Overhead Panel, to OFF.
- (5) If this circuit breaker stays closed, then you corrected the fault.

## **Power Distribution Panel Number 1, P91**

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD

28-22 TASK 813

AKS ALL

EFFECTIVITY



## 814. No. 1 Tank, Aft Boost Pump Circuit Breaker Open - Fault Isolation

## A. Description

## 28-AWL-18: CDCCL

(1) The circuit breaker, FUEL BOOST PUMP TANK 1 AFT, is found to be open during flight or on the ground. Do not reset this circuit breaker before you do the Initial Evaluation below. This problem can be caused by a short circuit in the wiring for the boost pump, a damaged boost pump, or a damaged circuit breaker or relay.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

## B. Possible Causes

- (1) 115V AC Wiring
- (2) No. 1 tank aft boost pump relay, R18
- (3) No. 1 tank aft boost pump, M46
- (4) Circuit breaker, C00826, FUEL BOOST PUMP TANK 1 AFT

#### C. Circuit Breakers

(1) This is the primary circuit breaker related to the fault:

Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT

#### D. Related Data

- (1) (SDS SUBJECT 28-22-00)
- (2) (SSM 28-23-11)
- (3) (WDM 28-23-11)

## E. Initial Evaluation

NOTE: If you make a decision to dispatch the airplane with an open circuit breaker, do the steps in the MEL to deactivate the aft boost pump for the No. 1 tank. Operate the airplane per MEL procedures.

WARNING: DO NOT CLOSE A GFI RELAY FOR A FUEL PUMP THAT OPENED (TRIPPED) UNTIL YOU CORRECT THE PROBLEM. THIS CONDITION CAN CAUSE A FIRE OR

EXPLOSION.

WARNING: DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF

THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR

CAUSE INJURIES.

(1) Do a visual inspection of the BOOST PUMP TANK 1 AFT GFI relay, R18:

NOTE: The GFI relay, R18, is on the P92 panel in the Electronic Equipment Compartment. You will need to open the panel to get access to the GFI relay.

AKS ALL



## **28-AWL-18: CDCCL**

(a) If the RESET button is out, and you can see the white band, then do the "Fault Isolation Procedure - BOOST PUMP TANK 1 AFT GFI Relay Open" in 28-22 TASK 803.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

NOTE: The RESET button, found at the top edge of the GFI relay, moves out to show a narrow white band when the GFI circuit turns off the relay due to a ground fault, or when you push the TEST button found on the top surface of the relay.

- (b) If the RESET button on the BOOST PUMP TANK 1 AFT GFI relay, R18, is not out and you cannot see the white band, then continue.
- (2) Do a check of this circuit breaker:
  - (a) This is the circuit breaker:

## Power Distribution Panel Number 2, P92

		Number	Name
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT

(3) If the circuit breaker is closed, do this task: No. 1 Tank AFT pump LOW PRESSURE light is on - Fault Isolation, 28-22 TASK 803.

WARNING: DO NOT CLOSE A CIRCUIT BREAKER FOR A FUEL PUMP THAT OPENED (TRIPPED) UNTIL YOU CORRECT THE PROBLEM. THIS CONDITION CAN CAUSE A FIRE OR EXPLOSION.

## 28-AWL-18: CDCCL

(4) If the circuit breaker is open, do these steps:

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

#### 28-AWL-18: CDCCL

(a) Install an approved for flight, open position circuit breaker lock, STD-1062, and safety tag on the circuit breaker.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

## 28-AWL-18: CDCCL

(b) Do the fault isolation steps in this procedure.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

AKS ALL



#### F. Fault Isolation Procedure

WARNING: DO NOT OPERATE A FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. THIS CONDITION CAN CAUSE THE IGNITION OF THE FUEL FUMES IN THE FUEL TANK. A FIRE OR AN EXPLOSION CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (1) Obey these precautions at all times during this task:
  - (a) To operate any of the fuel pumps, one person must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.
  - (b) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.
- (2) Make sure there is minimum of 20,000 lb (9072 kg) of fuel in the center tank and 1000 lb (454 kg)) of fuel in the No. 1 tank.

NOTE: This will cover the boost pump and boost pump inlet with fuel.

- (3) Get access to the aft fuel boost pump for the No. 1 tank (AMM TASK 28-22-41-000-801).
- (4) Examine the fuel boost pump and the area around it for fuel leakage.
  - (a) If there are signs of fuel leakage, find the source of the fuel leakage and repair it.
- (5) Do these steps to do a check of the 115V AC wiring, the circuit breaker, the relay, and the fuel boost pump:
  - (a) Disconnect the electrical connector, D70, from the fuel boost pump (WDM 28-23-11).
  - (b) Examine the airplane and pump sides of the electrical connector, D70, for damage.
    - 1) Repair all damage that you find.
  - (c) Make sure that the electrical connector, D70, is disconnected.
  - (d) Remove the circuit breaker lock and safety tag, and close this circuit breaker:

## Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT

- (e) On the P5 Overhead Panel, set the switch FUEL PUMP TANK 1 AFT to ON.
- (f) After five minutes, set the switch FUEL PUMP TANK 1 AFT, on the P5 Overhead Panel, to OFF.
- (g) If the circuit breaker stays closed, then do the subsequent steps:
  - 1) Do a check for 3-phase 115V AC power between pins 1, 2, and 3 of electrical connector, D70 (WDM 28-23-11).
  - 2) If there is 3-phase 115V AC power between pins 1, 2, and 3 of electrical connector, D70, do one of these steps:
    - For the No.1 aft boost pump, M46, do this task: Fuel Boost Pump Insulation Resistance Test, AMM TASK 28-22-00-760-802.
      - <1> If the insulation resistance check is not OK, then replace the aft boost pump, M46, for the No. 1 tank.

These are the tasks:

Motor Impeller Removal, AMM TASK 28-22-41-000-801,

Motor Impeller Installation, AMM TASK 28-22-41-400-801.

AKS ALL



- <2> Do the Repair Confirmation at the end of this task.
- b) Replace the aft boost pump, M46, for the No. 1 tank.

These are the tasks:

Motor Impeller Removal, AMM TASK 28-22-41-000-801,

Motor Impeller Installation, AMM TASK 28-22-41-400-801.

- <1> Do the Repair Confirmation at the end of this task.
- 3) If there is not 3-phase 115V AC power between pins 1, 2, and 3 of electrical connector, D70, do these steps:
  - a) Replace the BOOST PUMP TANK 1 AFT relay, R18 (WDM 28-23-11).
    - <1> Do the Repair Confirmation at the end of this task.
- (h) If the circuit breaker opened, then continue.
- (6) Do these steps to do a check of the BOOST PUMP TANK 1 AFT relay, R18:
  - (a) Replace the BOOST PUMP TANK 1 AFT relay, R18 (WDM 28-23-11).
  - (b) Make sure that the electrical connector, D70, is disconnected.
  - (c) Close this circuit breaker:

## Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT

- (d) On the P5 Overhead Panel, set the switch FUEL PUMP TANK 1 AFT to ON.
- (e) After five minutes, set the switch FUEL PUMP TANK 1 AFT, on the P5 Overhead Panel, to OFF.
- (f) If this circuit breaker stays closed, then do the Repair Confirmation at the end of this task.

#### Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT

(g) If this circuit breaker opened, then continue.

## Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT

- (7) Do these steps to do a check of the circuit breaker:
  - (a) Replace this circuit breaker:

## Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT

(b) Make sure that the electrical connector, D70, is disconnected.

28-22 TASK 814

**AKS ALL** 

EFFECTIVITY



(c) Close this circuit breaker:

Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT

- (d) On the P5 Overhead Panel, set the switch FUEL PUMP TANK 1 AFT to ON.
- (e) After five minutes, set the switch FUEL PUMP TANK 1 AFT, on the P5 Overhead Panel, to OFF.
- (f) If this circuit breaker stays closed, then do the Repair Confirmation at the end of this task.

## Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT

(g) If this circuit breaker opened, then continue.

## Power Distribution Panel Number 2, P92

- 01101 Blott Battott 1 allot 1 tallibot 2, 1 02				
Row	<u>Col</u>	<u>Number</u>	<u>Name</u>	
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT	

- (8) Do these steps to do a check of the 115V AC wiring for the boost pump:
  - (a) Do a wiring check between these pins of connector, D70, at the Tank No. 1 aft boost pump M46, and the circuit breaker, FUEL BOOST PUMP TANK 1 AFT (SSM 28-23-11):

D70	C00826
pin 1	 pin A2
pin 2	 pin B2
pin 3	 pin C2

- (b) Find the problem and repair the wiring.
- (c) Make sure that the electrical connector, D70, is disconnected.
- (d) Close this circuit breaker:

## Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT

- (e) Do not re-connect electrical connector, D70, to the boost pump.
- (f) On the P5 Overhead Panel, set the switch FUEL PUMP TANK 1 AFT to ON.
- (g) After five minutes, set the switch FUEL PUMP TANK 1 AFT, on the P5 Overhead Panel, to OFF.
- (h) Make sure this circuit breaker stays closed:

## Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT

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

28-22 TASK 814

Page 273 Jun 15/2016

D633A103-AKS



## G. Repair Confirmation

- (1) Connect the electrical connector, D70, to the Tank No. 1 aft boost pump (WDM 28-23-11).
- (2) On the P5 Overhead Panel, set the switch FUEL PUMP TANK 1 AFT to ON.
- (3) On the P5 Overhead Panel, make sure that the amber PRESS light FUEL PUMP TANK 1 AFT goes off.
- (4) After five minutes, set the switch FUEL PUMP TANK 1 AFT, on the P5 Overhead Panel, to OFF.
- (5) If this circuit breaker stays closed, then you corrected the fault.

Power Distribution Panel Number 2, P92

Row	Col	<u>Number</u>	<u>Name</u>
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT

——— END OF TASK ———

## 815. No. 2 Tank, Forward Boost Pump Circuit Breaker Open - Fault Isolation

## A. Description

## 28-AWL-18: CDCCL

(1) The circuit breaker, FUEL BOOST PUMP TANK 2 FWD is found to be open during flight or on the ground. Do not reset this circuit breaker before you do the Initial Evaluation below. This problem can be caused by a short circuit in the wiring for the boost pump, a damaged boost pump, or a damaged circuit breaker or relay.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

## B. Possible Causes

- (1) 115V AC Wiring
- (2) No. 2 tank forward boost pump relay, R21
- (3) No. 2 tank forward boost pump, M49
- (4) Circuit breaker, C00829, FUEL BOOST PUMP TANK 2 FWD

## C. Circuit Breakers

(1) This is the primary circuit breaker related to the fault:

Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD

#### D. Related Data

- (1) (SDS SUBJECT 28-22-00)
- (2) (SSM 28-23-11)
- (3) (WDM 28-23-11)

28-22 TASKS 814-815

EFFECTIVITY AKS ALL

Page 274 Jun 15/2016



#### E. Initial Evaluation

NOTE: If you make a decision to dispatch the airplane with an open circuit breaker, do the steps in the MEL to deactivate the forward boost pump for the No. 2 tank. Operate the airplane per MEL procedures.

WARNING: DO NOT CLOSE A GFI RELAY FOR A FUEL PUMP THAT OPENED (TRIPPED) UNTIL YOU CORRECT THE PROBLEM. THIS CONDITION CAN CAUSE A FIRE OR EXPLOSION.

WARNING: DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(1) Do a visual inspection of the BOOST PUMP TANK 2 FWD GFI relay, R21:

NOTE: The GFI relay, R21, is on the P92 panel in the Electronic Equipment Compartment. You will need to open the panel to get access to the GFI relay.

## 28-AWL-18: CDCCL

(a) If the RESET button is out, and you can see the white band, then do the "Fault Isolation Procedure - BOOST PUMP TANK 2 FWD GFI Relay Open" in 28-22 TASK 806.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

NOTE: The RESET button, found at the top edge of the GFI relay, moves out to show a narrow white band when the GFI circuit turns off the relay due to a ground fault, or when you push the TEST button found on the top surface of the relay.

- (b) If the RESET button on the BOOST PUMP TANK 2 FWD GFI relay, R21, is not out and you cannot see the white band, then continue.
- (2) Do a check of this circuit breaker:

#### Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD

(3) If the circuit breaker is closed, do this task: No. 2 Tank FWD pump LOW PRESSURE light is on - Fault Isolation, 28-22 TASK 806.

WARNING: DO NOT CLOSE A CIRCUIT BREAKER FOR A FUEL PUMP THAT OPENED (TRIPPED) UNTIL YOU CORRECT THE PROBLEM. THIS CONDITION CAN CAUSE A FIRE OR EXPLOSION.

#### 28-AWL-18: CDCCL

(4) If the circuit breaker opened, do these steps:

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

AKS ALL



## **28-AWL-18: CDCCL**

(a) Install an approved for flight, open position circuit breaker lock, STD-1062, and safety tag on the circuit breaker.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

## 28-AWL-18: CDCCL

(b) Do the troubleshooting steps in this procedure.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

## F. Fault Isolation Procedure

WARNING: DO NOT OPERATE A FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. THIS CONDITION CAN CAUSE THE IGNITION OF THE FUEL FUMES IN THE FUEL TANK. A FIRE OR AN EXPLOSION CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (1) Obey these precautions at all times during this task:
  - (a) To operate any of the fuel pumps, on person must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.
  - (b) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.
- (2) Make sure there is minimum of 20,000 lb (9072 kg) of fuel in the center tank and 1000 lb (454 kg)) of fuel in the No. 2 tank.

NOTE: This will cover the boost pump and boost pump inlet with fuel.

WARNING: MAKE SURE THAT PERSONNEL AND EQUIPMENT STAY AWAY FROM THE LEADING EDGE FLAPS AND SLATS, TRAILING EDGE FLAPS, AND DRIVE MECHANISMS. THE FLAPS, SLATS, AND DRIVE MECHANISMS MOVE QUICKLY. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (3) Do this task: Leading Edge Flaps and Slats Extension, AMM TASK 27-81-00-860-803.
- (4) Get access to the forward fuel boost pump for the No. 2 tank (AMM TASK 28-22-41-000-801).
- (5) Examine the fuel boost pump and the area around it for fuel leakage.
  - (a) If there are signs of fuel leakage, find the source of the fuel leakage and repair it.
- (6) Do these steps to do a check of the 115V AC wiring, the circuit breaker, the relay, and the fuel boost pump:
  - (a) Disconnect the electrical connector, D76, from the fuel boost pump (WDM 28-23-11).
  - (b) Examine the airplane and pump sides of the electrical connector, D76, for damage.
    - 1) Repair all damage that you find.
  - (c) Make sure that the electrical connector, D76, is disconnected.

28-22 TASK 815

**AKS ALL** 

EFFECTIVITY '



(d) Remove the circuit breaker lock and safety tag, and close this circuit breaker:

Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD

- (e) On the P5 Overhead Panel, set the switch FUEL PUMP TANK 2 FWD to ON.
- (f) After five minutes, set the switch FUEL PUMP TANK 2 FWD, on the P5 Overhead Panel, to OFF.
- (g) If the circuit breaker stays closed, then do the subsequent steps:
  - 1) Do a check for 3-phase 115V AC power between pins 1, 2, and 3 of electrical connector, D76 (WDM 28-23-11).
  - 2) If there is 3-phase 115V AC power between pins 1, 2, and 3 of electrical connector, D76, do one of these steps:
    - a) For the No. 2 forward boost pump, M49, do this task: Fuel Boost Pump Insulation Resistance Test, AMM TASK 28-22-00-760-802.
      - <1> If the insulation resistance test is not OK, replace the forward boost pump, M49, for the No. 2 tank.

These are the tasks:

Motor Impeller Removal, AMM TASK 28-22-41-000-801, Motor Impeller Installation, AMM TASK 28-22-41-400-801.

- Do the Repair Confirmation at the end of this task.
- b) Replace the forward boost pump, M49, for the No. 2 tank.

These are the tasks:

Motor Impeller Removal, AMM TASK 28-22-41-000-801,

Motor Impeller Installation, AMM TASK 28-22-41-400-801.

- <1> Do the Repair Confirmation at the end of the task.
- 3) If there is not 3-phase 115V AC power between pins 1, 2, and 3 of electrical connector, D76, do these steps:
  - a) Replace the BOOST PUMP TANK 2 FWD relay, R21 (WDM 28-23-11).
    - <1> Do the Repair Confirmation at the end of this task.
- (h) If the circuit breaker opened, then continue.
- (7) Do these steps to do a check of the BOOST PUMP TANK 2 FWD relay, R21:
  - (a) Replace the BOOST PUMP TANK 2 FWD relay, R21 (SSM 28-23-11).
  - (b) Make sure that the electrical connector, D76, is disconnected.
  - (c) Close this circuit breaker:

**Power Distribution Panel Number 2, P92** 

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD

- (d) On the P5 Overhead Panel, set the switch FUEL PUMP TANK 2 FWD to ON.
- (e) After five minutes, set the switch FUEL PUMP TANK 2 FWD, on the P5 Overhead Panel, to OFF.

AKS ALL



(f) If this circuit breaker stays closed, then do the Repair Confirmation at the end of this task.

## Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD

(g) If this circuit breaker opened, then continue.

## Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD

- (8) Do these steps to do a check of the circuit breaker:
  - (a) Replace this circuit breaker:

## Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD

- (b) Make sure that the electrical connector, D76, is disconnected.
- (c) Close this circuit breaker:

## Power Distribution Panel Number 2, P92

Row	Col	<u>Number</u>	<u>Name</u>
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD

- (d) On the P5 Overhead Panel, set the switch FUEL PUMP TANK 2 FWD to ON.
- (e) After five minutes, set the switch FUEL PUMP TANK 2 FWD, on the P5 Overhead Panel, to OFF.
- (f) If this circuit breaker stays closed, then do the Repair Confirmation at the end of this task.

## Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD

(g) If this circuit breaker opened, then continue.

# Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD

- (9) Do these steps to do a check of the 115V AC wiring for the boost pump:
  - (a) Do a wiring check between these pins of connector, D76, at the Tank No. 2 aft boost pump, M49, and the circuit breaker, FUEL BOOST PUMP TANK 2 FWD (SSM 28-23-11):

D76	C00829
pin 1	 pin A2
pin 2	 pin B2
pin 3	 pin C2

- (b) Find the problem and repair the wiring.
- (c) Make sure that the electrical connector, D76, is disconnected.

EFFECTIVITY
AKS ALL



(d) Close this circuit breaker:

Power Distribution Panel Number 2, P92

Row	Col	<u>Number</u>	<u>Name</u>
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD

- (e) Do not re-connect electrical connector, D76, to the boost pump.
- (f) On the P5 Overhead Panel, set the switch FUEL PUMP TANK 2 FWD to ON.
- (g) After five minutes, set the switch FUEL PUMP TANK 2 FWD, on the P5 Overhead Panel, to OFF.
- (h) Make sure this circuit breaker stays closed:

Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD

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

## G. Repair Confirmation

- (1) Connect the electrical connector, D76, to the Tank No. 2 forward boost pump (WDM 28-23-11).
- (2) On the P5 Overhead Panel, set the switch FUEL PUMP TANK 2 FWD to ON.
- (3) On the P5 Overhead Panel, make sure that the amber PRESS light FUEL PUMP TANK 2 FWD goes off.
- (4) After five minutes, set the switch FUEL PUMP TANK 2 FWD, on the P5 Overhead Panel, to OFF.
- (5) If this circuit breaker stays closed, then you corrected the fault.

Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD

----- END OF TASK -----

## 816. No. 2 Tank, Aft Boost Pump Circuit Breaker Open - Fault Isolation

## A. Description

## 28-AWL-18: CDCCL

(1) The circuit breaker, FUEL BOOST PUMP TANK 2 AFT, is found to be open during flight or on the ground. Do not reset this circuit breaker before you do the Initial Evaluation below. This problem can be caused by a short circuit in the wiring for the boost pump, a damaged boost pump, or a damaged circuit breaker or relay.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM
TASK 28-00-00-910-801, for important information on Critical Design Configuration
Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

## B. Possible Causes

- (1) 115V AC Wiring
- (2) No. 2 tank aft boost pump relay, R20
- (3) No. 2 tank aft boost pump, M48

AKS ALL 28-22 TASKS 815-816

Page 279 Jun 15/2016



(4) Circuit breaker, C00828, FUEL BOOST PUMP TANK 2 AFT

## C. Circuit Breakers

(1) This is the primary circuit breaker related to the fault:

Power Distribution Panel Number 1, P91

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT

## D. Related Data

- (1) (SDS SUBJECT 28-22-00)
- (2) (SSM 28-23-11)
- (3) (WDM 28-23-11)

## E. Initial Evaluation

NOTE: If you make a decision to dispatch the airplane with an open circuit breaker, do the steps in the MEL to deactivate the aft boost pump for the No. 2 tank. Operate the airplane per MEL procedures.

WARNING: DO NOT CLOSE A GFI RELAY FOR A FUEL PUMP THAT OPENED (TRIPPED) UNTIL YOU CORRECT THE PROBLEM. THIS CONDITION CAN CAUSE A FIRE OR EXPLOSION.

WARNING: DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(1) Do a visual inspection of the BOOST PUMP TANK 2 AFT GFI relay, R20:

NOTE: The GFI relay, R20, is on the P91 panel in the Electronic Equipment Compartment. You will need to open the panel to get access to the GFI relay.

## 28-AWL-18: CDCCL

(a) If the RESET button is out, and you can see the white band, then do the "Fault Isolation Procedure - BOOST PUMP TANK 2 AFT GFI Relay Open" in 28-22 TASK 805.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

NOTE: The RESET button, found at the top edge of the GFI relay, moves out to show a narrow white band when the GFI circuit turns off the relay due to a ground fault, or when you push the TEST button found on the top surface of the relay.

- (b) If the RESET button on the BOOST PUMP TANK 2 AFT GFI relay, R20, is not out and vou cannot see the white band, then continue.
- (2) Do a check of this circuit breaker:

28-22 TASK 816

Page 280 Jun 15/2016



(a) This is the circuit breaker:

Power Distribution Panel Number 1, P91

Row Col Number Name

D 3 C00828 FUEL BOOST PUMP TANK 2 AFT

(3) If the circuit breaker is closed, do this task: No. 2 Tank AFT pump LOW PRESSURE light is on - Fault Isolation. 28-22 TASK 805.

WARNING: DO NOT CLOSE A CIRCUIT BREAKER FOR A FUEL PUMP THAT OPENED (TRIPPED) UNTIL YOU CORRECT THE PROBLEM. THIS CONDITION CAN CAUSE A FIRE OR EXPLOSION.

## **28-AWL-18: CDCCL**

(4) If the circuit breaker is open, then do these steps:

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

<u>NOTE</u>: This is applicable to Airworthiness Limitation 28-AWL-18.

## 28-AWL-18: CDCCL

 Install an approved for flight, open position circuit breaker lock, STD-1062, and safety tag on the circuit breaker.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

## 28-AWL-18: CDCCL

(b) Do the troubleshooting steps in this procedure.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

## F. Fault Isolation Procedure

WARNING: DO NOT OPERATE A FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. THIS CONDITION CAN CAUSE THE IGNITION OF THE FUEL FUMES IN THE FUEL TANK. A FIRE OR AN EXPLOSION CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (1) Obey these precautions at all times during this task:
  - (a) To operate any of the fuel pumps, one person must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.
  - (b) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.
- (2) Make sure there is minimum of 20,000 lb (9072 kg) of fuel in the center tank and 1000 lb (454 kg)) of fuel in the No. 2 tank.

NOTE: This will cover the boost pump and boost pump inlet with fuel.

(3) Get access to the aft fuel boost pump for the No. 2 tank (AMM TASK 28-22-41-000-801).

AKS ALL 28-22 TASK 816



- (4) Examine the fuel boost pump and the area around it for fuel leakage.
  - (a) If there are signs of fuel leakage, find the source of the fuel leakage and repair it.
- (5) Do these steps to do a check of the 115V AC wiring, the circuit breaker, the relay, and the boost pump:
  - (a) Disconnect the electrical connector, D74, from the fuel boost pump (WDM 28-23-11).
  - (b) Examine the airplane and pump sides of the electrical connector, D74, for damage.
    - 1) Repair all damage that you find.
  - (c) Make sure that the electrical connector, D74, is disconnected.
  - (d) Remove the circuit breaker lock and safety tag, and close this circuit breaker:

## **Power Distribution Panel Number 1, P91**

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT

- (e) On the P5 Overhead Panel, set the switch FUEL PUMP TANK 2 AFT to ON.
- (f) After five minutes, set the switch FUEL PUMP TANK 2 AFT, on the P5 Overhead Panel, to OFF.
- (g) If the circuit breaker stays closed, then do the subsequent steps:
  - 1) Do a check for 3-phase 115V AC power between pins 1, 2, and 3 of electrical connector, D74 (WDM 28-23-11).
  - 2) If there is 3-phase 115V AC power between pins 1, 2, and 3 of electrical connector, D74, do one of these steps:
    - a) For the No. 2 aft boost pump, M48, do this task: Fuel Boost Pump Insulation Resistance Test, AMM TASK 28-22-00-760-802.
      - If the insulation resistance test is not OK, replace the aft boost pump, M48, for the No. 2 tank.

These are the tasks:

Motor Impeller Removal, AMM TASK 28-22-41-000-801,

Motor Impeller Installation, AMM TASK 28-22-41-400-801.

- <2> Do the Repair Confirmation at the end of this task.
- b) Replace the aft boost pump, M48, for the No. 2 tank.

These are the tasks:

Motor Impeller Removal, AMM TASK 28-22-41-000-801,

Motor Impeller Installation, AMM TASK 28-22-41-400-801.

- <1> Do the Repair Confirmation at the end of this task.
- 3) If there is not 3-phase 115V AC power between pins 1, 2, and 3 of electrical connector, D74, do these steps:
  - a) Replace the BOOST PUMP TANK 2 AFT relay, R20 (WDM 28-23-11).
    - <1> Do the Repair Confirmation at the end of this task.
- (h) If the circuit breaker opened, then continue.
- (6) Do these steps to do a check of the BOOST PUMP TANK 2 AFT relay, R20:
  - (a) Replace the BOOST PUMP TANK 2 AFT relay, R20 (SSM 28-23-11).
  - (b) Make sure that the electrical connector, D74, is disconnected.

28-22 TASK 816

AKS ALL

Page 282 Jun 15/2016



(c) Close this circuit breaker:

Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT

- (d) On the P5 Overhead Panel, set the switch FUEL PUMP TANK 2 AFT to ON.
- (e) After five minutes, set the switch FUEL PUMP TANK 2 AFT, on the P5 Overhead Panel, to OFF.
- (f) If this circuit breaker stays closed, then do the Repair Confirmation at the end of this task.

## Power Distribution Panel Number 1, P91

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT

(g) If this circuit breaker opened, then continue.

## Power Distribution Panel Number 1, P91

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT

- (7) Do these steps to do a check of the circuit breaker:
  - (a) Replace this circuit breaker:

## **Power Distribution Panel Number 1, P91**

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT
(WDM 2	28-23-1	11).	

- (b) Make sure that the electrical connector, D74, is disconnected.
- (c) Close this circuit breaker:

## **Power Distribution Panel Number 1, P91**

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT

- (d) On the P5 Overhead Panel, set the switch FUEL PUMP TANK 2 AFT to ON.
- (e) After five minutes, set the switch FUEL PUMP TANK 2 AFT, on the P5 Overhead Panel, to OFF.
- (f) If this circuit breaker stays closed, then do the Repair Confirmation at the end of this task.

## **Power Distribution Panel Number 1, P91**

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT

(g) If this circuit breaker opened, then continue.

## **Power Distribution Panel Number 1, P91**

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT

(8) Do these steps to do a check of the 115V AC wiring for the boost pump:

AKS ALL



(a) Do a wiring check between these pins of connector, D74, at the Tank No. 2 aft boost pump, M48, and the circuit breaker, FUEL BOOST PUMP TANK 2 AFT (SSM 28-23-11):

D74	C00828
pin 1	 pin A2
pin 2	 pin B2
pin 3	 pin C2

- (b) Find the problem and repair the wiring.
- (c) Make sure that the electrical connector, D74, is disconnected.
- (d) Close this circuit breaker:

# Power Distribution Panel Number 1, P91

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT

- (e) Do not re-connect electrical connector, D74, to the boost pump.
- (f) On the P5 Overhead Panel, set the switch FUEL PUMP TANK 2 AFT to ON.
- (g) After five minutes, set the switch FUEL PUMP TANK 2 AFT, on the P5 Overhead Panel, to OFF.
- (h) Make sure this circuit breaker stays closed:

## **Power Distribution Panel Number 1, P91**

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT

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

## G. Repair Confirmation

- (1) Connect the electrical connector, D74, to the Tank No. 2 aft boost pump (WDM 28-23-11).
- (2) On the P5 Overhead Panel, set the switch FUEL PUMP TANK 2 AFT to ON.
- (3) On the P5 Overhead Panel, make sure that the amber PRESS light FUEL PUMP TANK 2 AFT goes off.
- (4) After five minutes, set the switch FUEL PUMP TANK 2 AFT, on the P5 Overhead Panel, to OFF.
- (5) If this circuit breaker stays closed, then you corrected the fault.

## **Power Distribution Panel Number 1, P91**

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT

------ END OF TASK ------

28-22 TASK 816

**AKS ALL** 

EFFECTIVITY

Page 284 Jun 15/2016



## 817. Center Tank, Left Boost Pump Circuit Breaker Open - Fault Isolation

## A. Description

# 28-AWL-18: CDCCL

(1) The circuit breaker, BOOST PUMP CTR TANK LEFT, is found to be open during flight or on the ground. Do not reset this circuit breaker before you do the Initial Evaluation below. This problem can be caused by a short circuit in the wiring for the boost pump, a damaged boost pump, or a damaged circuit breaker or relay.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

## B. Possible Causes

- (1) 115V AC Wiring
- (2) Center tank left boost pump relay, R54
- (3) Center tank left boost pump, M234
- (4) Circuit breaker, C00845, BOOST PUMP CENTER TANK LEFT

#### C. Circuit Breakers

(1) This is the primary circuit breaker related to the fault:

**Power Distribution Panel Number 1, P91** 

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

## D. Related Data

- (1) (SDS SUBJECT 28-22-00)
- (2) (SSM 28-23-11)
- (3) (WDM 28-23-11)

## E. Initial Evaluation

NOTE: If you make a decision to dispatch the airplane with an open circuit breaker, do the steps in the MEL to deactivate the left boost pump for the center tank. Operate the airplane per MEL procedures.

WARNING: DO NOT CLOSE A GFI RELAY FOR A FUEL PUMP THAT OPENED (TRIPPED) UNTIL YOU CORRECT THE PROBLEM. THIS CONDITION CAN CAUSE A FIRE OR

EXPLOSION.

WARNING: DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE

THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR

CAUSE INJURIES.

(1) Do a visual inspection of the left boost pump GFI relay, R54:

NOTE: The GFI relay, R54, is on the P91 panel in the Electronic Equipment Compartment. You will need to open the panel to get access to the GFI relay.

AKS ALL



## **28-AWL-18: CDCCL**

(a) If the RESET button is out, and you can see the white band, then do the "Fault Isolation Procedure - Left Boost Pump GFI Relay Open" in 28-22 TASK 801.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

NOTE: The RESET button, found at the top edge of the GFI relay, moves out to show a narrow white band when the GFI circuit turns off the relay due to a ground fault, or when you push the TEST button found on the top surface of the relay.

- (b) If the RESET button on the left boost pump GFI relay, R54, is not out and you cannot see the white band, then continue.
- (2) Do a check of this circuit breaker:
  - (a) This is the circuit breaker:

## **Power Distribution Panel Number 1, P91**

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

(3) If the circuit breaker is closed, do this task: Center Tank Left Fuel Pump LOW PRESSURE light is on - Fault Isolation, 28-22 TASK 801.

WARNING: DO NOT CLOSE A CIRCUIT BREAKER FOR A FUEL PUMP THAT OPENED (TRIPPED) UNTIL YOU CORRECT THE PROBLEM. THIS CONDITION CAN CAUSE A FIRE OR EXPLOSION.

## 28-AWL-18: CDCCL

(4) If the circuit breaker is open, do these steps:

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM
TASK 28-00-00-910-801, for important information on Critical Design Configuration
Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

#### 28-AWL-18: CDCCL

(a) Install an approved for flight, open position circuit breaker lock, STD-1062, and safety tag on the circuit breaker.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

## 28-AWL-18: CDCCL

(b) Do the troubleshooting steps in this procedure.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

AKS ALL



#### F. Fault Isolation Procedure

**AKS ALL** 

WARNING: DO NOT OPERATE A FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. THIS CONDITION CAN CAUSE THE IGNITION OF THE FUEL FUMES IN THE FUEL TANK. A FIRE OR AN EXPLOSION CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (1) Obey these precautions at all times during this task:
  - (a) To operate any of the fuel pumps, one person must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.
  - (b) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.
- (2) Make sure there is minimum of 20,000 lb (9072 kg) of fuel in the center tank.

NOTE: This will cover the boost pump with fuel.

WARNING: OBEY THE PROCEDURE FOR THE INSTALLATION OF THE DOWNLOCK PINS. IF YOU MOVE THE CONTROL LEVER FOR THE LANDING GEAR TO THE UP POSITION, THE LANDING GEAR CAN RETRACT. THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

- (3) If the downlock pins are not installed, do this task: Landing Gear Downlock Pins Installation, AMM TASK 32-00-01-480-801.
- (4) Get access to the left fuel boost pump for the center tank (AMM TASK 28-22-41-000-801).
- (5) Examine the fuel boost pump and the area around it for fuel leakage.
  - (a) If there are signs of fuel leakage, find the source of the fuel leakage and repair it.
- (6) Do these steps to do a check of the 115V AC wiring, the circuit breaker, the relay, and the boost pump:
  - (a) Disconnect the electrical connector, D802, from the fuel boost pump (WDM 28-23-11).
  - (b) Examine the airplane and pump sides of the electrical connector, D802, for damage.
    - 1) Repair all damage that you find.
  - (c) Make sure that the electrical connector, D802, is disconnected.
  - (d) Remove the circuit breaker lock and safety tag, and close this circuit breaker:

# Power Distribution Panel Number 1, P91

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>	
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT	

- (e) On the P5 Overhead Panel, set the switch CTR FUEL PUMPS L to ON.
- (f) After five minutes, set the switch CTR FUEL PUMPS L, on the P5 Overhead Panel, to OFF.
- (g) If the circuit breaker stays closed, do the subsequent steps:
  - 1) Do a check for 3-phase 115V AC power between pins 1, 2, and 3 of electrical connector, D802 (WDM 28-23-11).
  - 2) If there is 3-phase 115V AC power between pins 1, 2, and 3 of electrical connector, D802, do one of these steps:
    - For the left center boost pump, M234, do this task: Fuel Boost Pump -Insulation Resistance Test, AMM TASK 28-22-00-760-802.



<1> If the insulation resistance test is not OK, replace the left center boost pump, M234.

These are the tasks:

Motor Impeller Removal, AMM TASK 28-22-41-000-801, Motor Impeller Installation, AMM TASK 28-22-41-400-801.

- <2> Do the Repair Confirmation at the end of this task.
- b) Replace the left center boost pump, M234.

These are the tasks:

Motor Impeller Removal, AMM TASK 28-22-41-000-801,

Motor Impeller Installation, AMM TASK 28-22-41-400-801.

- <1> Do the Repair Confirmation at the end of this task.
- 3) If there is not 3-phase 115V AC power between pins 1, 2, and 3 of electrical connector, D802, do these steps:
  - a) Replace the BOOST PUMP CTR TANK LEFT relay, R54 (WDM 28-23-11).
    - <1> Do the Repair Confirmation at the end of this task.
- (h) If the circuit breaker opened, then continue.
- (7) Do these steps to do a check of the BOOST PUMP CENTER TANK LEFT relay, R54:
  - (a) Replace the BOOST PUMP CENTER TANK LEFT relay, R54 (SSM 28-23-11).
  - (b) Make sure that the electrical connector, D802, is disconnected.
  - (c) Close this circuit breaker:

## Power Distribution Panel Number 1, P91

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

- (d) On the P5 Overhead Panel, set the switch CTR FUEL PUMPS L to ON.
- (e) After five minutes, set the switch CTR FUEL PUMPS L, on the P5 Overhead Panel, to OFF.
- (f) If this circuit breaker stays closed, then do the Repair Confirmation at the end of this task.

## **Power Distribution Panel Number 1, P91**

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

(g) If this circuit breaker opened, then continue.

## **Power Distribution Panel Number 1, P91**

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

- (8) Do these steps to do a check of the circuit breaker:
  - (a) Replace this circuit breaker:

#### Power Distribution Panel Number 1, P91

Row	Col	<u>Number</u>	<u>Name</u>
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

EFFECTIVITY • AKS ALL

28-22 TASK 817

Page 288 Jun 15/2016



- (b) Make sure that the electrical connector, D802, is disconnected.
- (c) Close this circuit breaker:

# **Power Distribution Panel Number 1, P91**

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

- (d) On the P5 Overhead Panel, set the switch CTR FUEL PUMPS L to ON.
- (e) After five minutes, set the switch CTR FUEL PUMPS L, on the P5 Overhead Panel, to OFF.
- (f) If this circuit breaker stays closed, then do the Repair Confirmation at the end of this task.

## **Power Distribution Panel Number 1, P91**

Row	<u>Col</u>	<u>Number</u>	Name
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

(g) If this circuit breaker opened, then continue.

## **Power Distribution Panel Number 1, P91**

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

- (9) Do these steps to do a check of the 115V AC wiring for the boost pump:
  - (a) Do a wiring check between these pins of connector, D802, at the center tank left boost pump, M234, and the circuit breaker, BOOST PUMP CTR TANK LEFT (SSM 28-23-11):

D802	C00845
pin 1	 pin A2
pin 2	 pin B2
pin 3	 pin C2

- (b) Find the problem and repair the wiring.
- (c) Make sure that the electrical connector, D802, is disconnected.
- (d) Close this circuit breaker:

## **Power Distribution Panel Number 1, P91**

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

- (e) Do not re-connect electrical connector, D802, to the boost pump.
- (f) On the P5 Overhead Panel, set the switch CTR FUEL PUMPS L to ON.
- (g) After five minutes, set the switch CTR FUEL PUMPS L, on the P5 Overhead Panel, to OFF.
- (h) Make sure this circuit breaker stays closed:

#### **Power Distribution Panel Number 1. P91**

Row	<u>Col</u>	<u>Number</u>	Name
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

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

EFFECTIVITY 28-22 TASK 817



## G. Repair Confirmation

- (1) Connect the electrical connector, D802, to the left center tank boost pump (WDM 28-23-11).
- (2) On the P5 Overhead Panel, set the switch CTR FUEL PUMPS L to ON.
  - (a) You must be in the flight compartment and continuously monitor for the amber PRESS light CTR FUEL PUMPS L.
- (3) On the P5 Overhead Panel, make sure that the amber PRESS light CTR FUEL PUMPS L goes off.
  - (a) If the amber PRESS light CTR FUEL PUMPS L stays on, immediately set the switch CTR FUEL PUMPS L, on the P5 Overhead Panel, to OFF.
- (4) After five minutes, set the switch CTR FUEL PUMPS L, on the P5 Overhead Panel, to OFF.
- (5) If this circuit breaker stays closed, then you corrected the fault.

## **Power Distribution Panel Number 1. P91**

Row	Col	<u>Number</u>	<u>Name</u>
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

——— END OF TASK ———

## 818. Center Tank, Right Boost Pump Circuit Breaker Open - Fault Isolation

#### A. Description

# 28-AWL-18: CDCCL

(1) The circuit breaker, BOOST PUMP CTR TANK RIGHT, is found to be open during flight or on the ground. Do not reset this circuit breaker before you do the Initial Evaluation below. This problem can be caused by a short circuit in the wiring for the boost pump, a damaged boost pump, or a damaged circuit breaker or relay.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

## B. Possible Causes

- (1) 115V AC Wiring
- (2) Center tank right boost pump relay, R55
- (3) Center tank right boost pump, M235
- (4) Circuit breaker, C00846, BOOST PUMP CENTER TANK RIGHT

## C. Circuit Breakers

(1) This is the primary circuit breaker related to the fault:

# Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

#### D. Related Data

- (1) (SDS SUBJECT 28-22-00)
- (2) (SSM 28-23-11)
- (3) (WDM 28-23-11)

28-22 TASKS 817-818

EFFECTIVITY • AKS ALL



#### E. Initial Evaluation

NOTE: If you make a decision to dispatch the airplane with an open circuit breaker, do the steps in the MEL to deactivate the right boost pump for the center tank. Operate the airplane per MEL procedures.

<u>WARNING</u>: DO NOT CLOSE A GFI RELAY FOR A FUEL PUMP THAT OPENED (TRIPPED) UNTIL YOU CORRECT THE PROBLEM. THIS CONDITION CAN CAUSE A FIRE OR EXPLOSION.

WARNING: DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(1) Do a visual inspection of the right boost pump GFI relay, R55:

NOTE: The GFI relay, R55, is on the P92 panel in the Electronic Equipment Compartment. You will need to open the panel to get access to the GFI relay.

## 28-AWL-18: CDCCL

(a) If the RESET button is out, and you can see the white band, then do the "Fault Isolation Procedure - Right Boost Pump GFI Relay Open" in 28-22 TASK 802.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

NOTE: The RESET button, found at the top edge of the GFI relay, moves out to show a narrow white band when the GFI circuit turns off the relay due to a ground fault, or when you push the TEST button found on the top surface of the relay.

- (b) If the RESET button on the right boost pump GFI relay, R55, is not out and you cannot see the white band, then continue.
- (2) Do a check of this circuit breaker:

## Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	Name
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

(3) If the circuit breaker is closed, do this task: Center Tank Right Fuel Pump LOW PRESSURE light is on - Fault Isolation, 28-22 TASK 802.

WARNING: DO NOT CLOSE A CIRCUIT BREAKER FOR A FUEL PUMP THAT OPENED (TRIPPED) UNTIL YOU CORRECT THE PROBLEM. THIS CONDITION CAN CAUSE A FIRE OR EXPLOSION.

#### 28-AWL-18: CDCCL

(4) If the circuit breaker is open, do these steps:

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

AKS ALL



## → 28-AWL-18: CDCCL

(a) Install an approved for flight, open position circuit breaker lock, STD-1062, and safety tag on the circuit breaker.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

## 28-AWL-18: CDCCL

(b) Do the troubleshooting steps in this procedure.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

## F. Fault Isolation Procedure

WARNING: DO NOT OPERATE A FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. THIS CONDITION CAN CAUSE THE IGNITION OF THE FUEL FUMES IN THE FUEL TANK. A FIRE OR AN EXPLOSION CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (1) Obey these precautions at all times during this task:
  - (a) To operate any of the fuel pumps, one person must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.
  - (b) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.
- (2) Make sure there is minimum of 20,000 lb (9072 kg) of fuel in the center tank.

NOTE: This will cover the boost pump with fuel.

WARNING: OBEY THE PROCEDURE FOR THE INSTALLATION OF THE DOWNLOCK PINS. IF YOU MOVE THE CONTROL LEVER FOR THE LANDING GEAR TO THE UP POSITION, THE LANDING GEAR CAN RETRACT. THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

- (3) If the downlock pins are not installed, do this task: Landing Gear Downlock Pins Installation, AMM TASK 32-00-01-480-801.
- (4) Get access to the right fuel boost pump for the center tank (AMM TASK 28-22-41-000-801).
- (5) Examine the fuel boost pump and the area around it for fuel leakage.
  - (a) If there are signs of fuel leakage, find the source of the fuel leakage and repair it.
- (6) Do these steps to do a check of the 115V AC wiring, the circuit breaker, the relay, and the boost pump:
  - (a) Disconnect the electrical connector, D804, from the fuel boost pump (WDM 28-23-11).
  - (b) Examine the airplane and pump sides of the electrical connector, D804, for damage.
    - 1) Repair all damage that you find.
  - (c) Make sure that the electrical connector, D804, is disconnected.

28-22 TASK 818

EFFECTIVITY '

**AKS ALL** 

D633A103-AKS



(d) Remove the circuit breaker lock and safety tag, and close this circuit breaker:

Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

- (e) On the P5 Overhead Panel, set the switch CTR FUEL PUMPS R to ON.
- (f) After five minutes, set the switch CTR FUEL PUMPS R, on the P5 Overhead Panel, to OFF.
- (g) If the circuit breaker stays closed, do the subsequent steps:
  - Do a check for 3-phase 115V AC power between pins 1, 2, and 3 of electrical connector, D804 (WDM 28-23-11).
  - 2) If there is 3-phase 115 V AC power between pins 1, 2, and 3 of electrical connector, D804, do one of these steps:
    - a) For the right center boost pump, M235, do this task: Fuel Boost Pump Insulation Resistance Test, AMM TASK 28-22-00-760-802.
      - <1> If the insulation resistance test is not OK, replace the right center boost pump, M235.

These are the tasks:

Motor Impeller Removal, AMM TASK 28-22-41-000-801,

Motor Impeller Installation, AMM TASK 28-22-41-400-801.

- <2> Do the Repair Confirmation at the end of this task.
- b) Replace the right center boost pump, M235.

These are the tasks:

Motor Impeller Removal, AMM TASK 28-22-41-000-801,

Motor Impeller Installation, AMM TASK 28-22-41-400-801.

- <1> Do the Repair Confirmation at the end of this task.
- 3) If there is not 3-phase 115V AC power between pins 1, 2, and 3 of electrical connector, D804, do these steps:
  - a) Replace the BOOST PUMP CTR TANK RIGHT relay, R55 (WDM 28-23-11).
    - <1> Do the Repair Confirmation at the end of this task.
- (h) If the circuit breaker opened, then continue.
- (7) Do these steps to do a check of the BOOST PUMP CENTER TANK RIGHT relay, R55:
  - (a) Replace the BOOST PUMP CENTER TANK RIGHT relay, R55 (SSM 28-23-11).
  - (b) Make sure that the electrical connector, D804, is disconnected.
  - (c) Close this circuit breaker:

#### Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

- (d) On the P5 Overhead Panel, set the switch CTR FUEL PUMPS R to ON.
- (e) After five minutes, set the switch CTR FUEL PUMPS R, on the P5 Overhead Panel, to OFF.

AKS ALL



(f) If this circuit breaker stays closed, then do the Repair Confirmation at the end of this task.

Power Distribution Panel Number 2, P92

Row Col Number Name

D 5 C00846 FUEL BOOST PUMP CTR TANK RIGHT

(g) If this circuit breaker opened, then continue.

## Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

- (8) Do these steps to do a check of the circuit breaker:
  - (a) Replace this circuit breaker:

## Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

- (b) Make sure that the electrical connector, D804, is disconnected.
- (c) Close this circuit breaker:

## **Power Distribution Panel Number 2, P92**

Row	Col	<u>Number</u>	<u>Name</u>
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

- (d) On the P5 Overhead Panel, set the switch CTR FUEL PUMPS R to ON.
- (e) After five minutes, set the switch CTR FUEL PUMPS R, on the P5 Overhead Panel, to OFF.
- (f) If this circuit breaker stays closed, then do the Repair Confirmation at the end of this task.

# Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

(g) If this circuit breaker opened, then continue.

# Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

- (9) Do these steps to do a check of the 115V AC wiring for the boost pump:
  - (a) Do a wiring check between these pins of connector, D804, at the center tank right boost pump, M235, and the circuit breaker, BOOST PUMP CTR TANK RIGHT (SSM 28-23-11):

D804	C00846
pin 1	 pin A2
pin 2	 pin B2
pin 3	 pin C2

- (b) Find the problem and repair the wiring.
- (c) Make sure that the electrical connector, D804, is disconnected.

EFFECTIVITY
AKS ALL



(d) Close this circuit breaker:

Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

- (e) Do not re-connect electrical connector, D804, to the boost pump.
- (f) On the P5 Overhead Panel, set the switch CTR FUEL PUMPS R to ON.
- (g) After five minutes, set the switch CTR FUEL PUMPS R, on the P5 Overhead Panel, to OFF.
- (h) Make sure this circuit breaker stays closed:

Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

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

## G. Repair Confirmation

- (1) Connect the electrical connector, D804, to the right center tank boost pump (WDM 28-23-11).
- (2) On the P5 Overhead Panel, set the switch CTR FUEL PUMPS R to ON.
  - (a) You must be in the flight compartment and continuously monitor for the amber PRESS light CTR FUEL PUMPS R.
- (3) On the P5 Overhead Panel, make sure that the amber PRESS light CTR FUEL PUMPS R goes off.
  - (a) If the amber PRESS light CTR FUEL PUMPS R stays on, immediately set the switch CTR FUEL PUMPS R, on the P5 Overhead Panel, to OFF.
- (4) After five minutes, set the switch CTR FUEL PUMPS R, on the P5 Overhead Panel, to OFF.
- (5) If this circuit breaker stays closed, you corrected the fault.

Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

----- END OF TASK -----

## 819. Engine Fuel Suction Feed Operational Test Failed - Fault Isolation

## A. Description

(1) If engine No. 1 or 2 fails the suction feed operational test, this procedure can help to isolate the problem.

NOTE: The procedure refers to the engine that failed the suction feed test as the applicable engine.

- (2) This procedure opens circuit breakers to keep the high pressure shutoff valve (HPSOV) on the engine in the closed position. It then opens the engine fuel spar shutoff valve. The aft fuel boost pump from the opposite tank is then used to pressurize the fuel feed line. If a tank fuel level increases, this confirms a leak in the fuel feed tubing in that tank.
- (3) It also does a visual check for leaks in the fuel line from the front spar to the engine-driven fuel pump.

28-22 TASKS 818-819



#### B. Possible Causes

- (1) Leak in the fuel feed line
- (2) Main tank fuel boost pump bypass valve
- (3) Center tank discharge check valve
- (4) Engine-driven fuel pump

#### C. Circuit Breakers

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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	1	C00458	<b>ENGINE 1 IGNITION RIGHT</b>
Α	3	C00153	<b>ENGINE 1 IGNITION LEFT</b>

# F/O Electrical System Panel, P6-2

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	4	C00459	<b>ENGINE 2 IGNITION RIGHT</b>
D	6	C00151	<b>ENGINE 2 IGNITION LEFT</b>

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
E	3	C01321	ENGINE FUEL ENGINE 2 HPSOV CONT
Ε	5	C01320	ENGINE FUEL ENGINE 1 HPSOV CONT

#### D. Fault Isolation Procedure

- (1) Do this check of the fuel feed manifold and the engine fuel supply line:
  - (a) Prepare the fuel tanks:
    - 1) Make sure that there is a minimum of 1,870 lbs (850 kgs) of fuel in the main tank opposite the applicable engine (AMM TASK 12-11-00-650-802).
    - Make sure that there is 30 lbs (20 kgs) or less of fuel in the center tank (AMM TASK 28-26-00-650-801, AMM TASK 28-26-00-650-802).
    - 3) If this access panel is open, make sure that the DEFUELING VALVE HANDLE is set to CLOSED:

<u>Number</u>	Name/Location
621EB	Defuel Access Panel - Slat Station 95.15

Close this access panel:

<u>Number</u>	Name/Location
621EB	Defuel Access Panel - Slat Station 95.15

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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	1	C00458	<b>ENGINE 1 IGNITION RIGHT</b>
Α	3	C00153	<b>ENGINE 1 IGNITION LEFT</b>

EFFECTIVITY AKS ALL

28-22 TASK 819

Page 296 Jun 15/2016



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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	4	C00459	<b>ENGINE 2 IGNITION RIGHT</b>
D	6	C00151	ENGINE 2 IGNITION LEFT

- (c) Do these tasks to get access to the fuel feed line from the front spar to the engine-driven fuel pump on the engine:
  - 1) Forward Fairing Removal, AMM TASK 54-52-01-010-801
  - 2) Wing Junction Fairing Removal, AMM TASK 54-52-03-010-801
- (d) Put the fuel valves in the necessary positions:
  - 1) Make sure that the engine start levers are in the CUTOFF position.
  - Make sure that the ENGINE START switches, on the P5 Overhead Panel, are in the OFF position.
  - 3) Open these circuit breakers and install safety tags:

# F/O Electrical System Panel, P6-3

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Ε	3	C01321	ENGINE FUEL ENGINE 2 HPSOV CONT
Ε	5	C01320	ENGINE FUEL ENGINE 1 HPSOV CONT

NOTE: This step makes sure that the two engine high pressure shutoff valves will not open.

- 4) For the applicable engine:
  - a) Move the engine start lever to the IDLE or RUN position.
    - NOTE: This opens the spar shutoff valve without opening the engine HPSOV.
  - b) Make sure that the corresponding SPAR VALVE CLOSED light, on the P5 Overhead Panel, is OFF.
- 5) Set the CROSSFEED switch, on the P5 Overhead Panel, to the open position.
- 6) Make sure that the VALVE OPEN light, on the P5 Overhead Panel, is on dim to show that the crossfeed valve is open.
- (e) Record the quantity of fuel in the No. 1, Center, and No. 2 fuel tanks.

WARNING: DO NOT OPERATE A FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. THIS CONDITION CAN CAUSE THE IGNITION OF THE FUEL FUMES IN THE FUEL TANK. A FIRE OR AN EXPLOSION CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (f) Operate the aft fuel pump of the main tank opposite the applicable engine.
  - 1) For the right engine, set the FUEL PUMPS 1 AFT switch, on the P5 Overhead Panel, to the ON position.
  - 2) For the left engine, set the FUEL PUMPS 2 AFT switch, on the P5 Overhead Panel, to the ON position.
- (g) Do a check for leaks in the fuel feed line:

NOTE: The time necessary for the test can change with the size and number of possible leaks.

1) Monitor the center tank fuel level.

AKS ALL



- a) If it increases, there is a leak in the fuel feed manifold in the center tank. The leak is between the crossfeed valve and the main tank of the applicable engine.
- 2) Monitor the fuel level of the main tank of the applicable engine.
  - a) If the main tank fuel level increases, there is a leak in the fuel feed manifold in the main tank.
- 3) Visually examine the fuel feed line from the front spar to the engine-driven fuel pump on the engine, for fuel leaks.
- (h) Turn off the fuel pump by setting the applicable switch, on the P5 Overhead Panel, to the OFF position.
- (i) Put the fuel valves in the necessary positions:
  - 1) For the applicable engine, move the engine start lever to the CUTOFF position.
    - a) Make sure that the corresponding SPAR VALVE CLOSED light is on dim.
    - b) Make sure that the corresponding ENG VALVE CLOSED light is on dim.
  - 2) Set the CROSSFEED switch, on the P5 Overhead Panel, to the closed position.
- (j) If you found leaks, make the necessary repairs:
  - 1) If you found leaks in the fuel feed line between the front spar and the engine-driven fuel pump, do these tasks where necessary:
    - a) Fuel Supply Hose Removal, AMM TASK 73-11-10-000-801-F00
       Fuel Supply Hose Installation, AMM TASK 73-11-10-400-801-F00
    - Fuel Line, Fitting and Coupling Removal, AMM TASK 28-22-15-000-801
       Fuel Line, Fitting and Coupling Installation, AMM TASK 28-22-15-400-801
  - 2) If you found leaks in the fuel feed manifold in the center tank or main tank, make the necessary repairs:
    - To find the locations of leaks in these tanks, do this task or a different applicable task: Engine Fuel Feed Manifold - Leak Test, AMM TASK 28-22-15-710-801.
      - NOTE: It is not necessary to do a check for leaks in the fuel feed manifold in the main tank opposite the applicable engine.
    - b) To remove the necessary parts of the fuel feed manifold, do this task: Fuel Line, Fitting and Coupling Removal, AMM TASK 28-22-15-000-801.
    - c) To install replacement components for parts of the fuel feed manifold that you removed, do this task: Fuel Line, Fitting and Coupling Installation, AMM TASK 28-22-15-400-801.
  - 3) Return the airplane to its usual condition:
    - a) Do these tasks:
      - <1> Forward Fairing Installation, AMM TASK 54-52-01-410-801
      - <2> Wing Junction Fairing Installation, AMM TASK 54-52-03-410-801
    - b) Remove the safety tags and close these circuit breakers:

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

RowColNumberNameA1C00458ENGINE 1 IGNITION RIGHT

AKS ALL



(Continued)

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

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	3	C00153	<b>ENGINE 1 IGNITION LEFT</b>

# F/O Electrical System Panel, P6-2

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	4	C00459	<b>ENGINE 2 IGNITION RIGHT</b>
D	6	C00151	<b>ENGINE 2 IGNITION LEFT</b>

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Ε	3	C01321	ENGINE FUEL ENGINE 2 HPSOV CONT
E	5	C01320	ENGINE FUEL ENGINE 1 HPSOV CONT

- 4) Do the Repair Confirmation at the end of this task.
  - a) If the Repair Confirmation is OK, then you corrected the fault.
  - b) If the Repair Confirmation is not OK, then continue.
- (k) If you did not find leaks, then continue.

- 1) If you did not do it before this step, return the airplane to its usual condition:
  - a) Do these tasks:
    - <1> Forward Fairing Installation, AMM TASK 54-52-01-410-801
    - <2> Wing Junction Fairing Installation, AMM TASK 54-52-03-410-801
  - b) Remove the safety tags and close these circuit breakers:

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	1	C00458	<b>ENGINE 1 IGNITION RIGHT</b>
Α	3	C00153	ENGINE 1 IGNITION LEFT

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	4	C00459	<b>ENGINE 2 IGNITION RIGHT</b>
D	6	C00151	<b>ENGINE 2 IGNITION LEFT</b>

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Е	3	C01321	ENGINE FUEL ENGINE 2 HPSOV CONT
E	5	C01320	ENGINE FUEL ENGINE 1 HPSOV CONT

- (2) Do these steps to replace the applicable main tank fuel boost pump bypass valve:
  - (a) Do these tasks:
    - 1) Fuel Boost Pump Bypass Valve Removal, AMM TASK 28-22-61-000-801
    - 2) Fuel Boost Pump Bypass Valve Installation, AMM TASK 28-22-61-400-801
  - (b) Do the Repair Confirmation at the end of this task.
  - (c) If the Repair Confirmation is not OK, then continue.

AKS ALL



- (3) Do these steps to replace the discharge check valve on the applicable center tank fuel boost pump:
  - (a) Determine which discharge check valve to replace:
    - 1) If engine 1 failed the suction feed test, replace the discharge check valve on the center tank left boost pump.
    - 2) If engine 2 failed the suction feed test, replace the discharge check valve on the center tank right boost pump.
  - (b) Do these tasks:
    - 1) Discharge Check Valve Removal, AMM TASK 28-22-71-000-801
    - 2) Discharge Check Valve Installation, AMM TASK 28-22-71-400-801
  - (c) Do the Repair Confirmation at the end of this task.
  - (d) If the Repair Confirmation is not OK, then continue.
- (4) Do a check of the engine-driven fuel pump on the applicable engine:
  - (a) Do this task: The Visual Inspection of the Impeller Rotation, AMM TASK 73-11-01-200-801-F00.
  - (b) Do the Repair Confirmation at the end of this task.

## E. Repair Confirmation

- (1) Do this task: Engine Fuel Suction Feed Operational Test, AMM TASK 28-22-00-710-802.
  - (a) If the test passes, then you corrected the fault.
  - (b) If solution is unsatisfactory, then continue the Fault Isolation at the subsequent step.



# 820. Center Tank Empty, LOW PRESSURE Light is not ON with L CTR FUEL PUMP Switch ON - Fault Isolation

## A. Description

- (1) The LOW PRESSURE Light for the L CTR FUEL PUMP is not ON when the Center Tank is empty and the L CTR FUEL PUMP Switch is ON.
- (2) The LOW PRESSURE Light for the L CTR FUEL PUMP should come ON when the pump fuel pressure is below the minimum permitted pressure.

#### B. Possible Causes

- (1) Left Center Tank Low Pressure Light, L14
- (2) Left Center Tank Boost Pump Pressure Switch, S154
- (3) Wiring
- (4) Left Auto Shutoff Test Switch, S1
- (5) Left Auto Shutoff Time Delay Relay, R934
- (6) Left Auto Shutoff Relay, R936
- (7) Left Center Tank Boost Pump Switch, S8

28-22 TASKS 819-820



#### C. Circuit Breakers

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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
С	3	C01637	BOOST PMP CTR TNK LAUTO SHUT OFF-DC
D	7	C01659	AT S-O/UCPO BST PMP CTR TNK L AC

#### **Power Distribution Panel Number 1, P91**

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

#### D. Related Data

- (1) SSM 28-23-11
- (2) SSM 28-43-11
- (3) WDM 28-23-11
- (4) WDM 28-43-11

#### E. Initial Evaluation

WARNING: DO NOT OPERATE A FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. THIS CONDITION CAN CAUSE THE IGNITION OF THE FUEL FUMES IN THE FUEL TANK. A FIRE OR AN EXPLOSION CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (1) Obey these precautions at all times during this task:
  - (a) To operate any of the fuel pumps, you must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.
  - (b) Immediately put the applicable Fuel Pump Switch to OFF if the LOW PRESSURE Light comes ON and stays ON.
- (2) Make sure that the Center Tank has a minimum of 14000 lb (6400 kg) of fuel.

NOTE: This step makes sure that the Boost Pump is correctly primed.

- (a) If necessary, refuel the fuel tanks. This is the task: Pressure Refuel Procedure, AMM TASK 12-11-00-650-802.
- (b) If it is not possible to add 14000 lb (6400 kg) to the Center Tank, then do this task: Fuel Boost Pump and Override Pump Priming, AMM TASK 28-22-41-420-801.

## F. Fault Isolation Procedure

**AKS ALL** 

- Do this task: Master Dim and Test Operational Test, AMM TASK 33-18-00-710-802.
  - (a) Make sure that the Left Center Tank Low Pressure Light operates correctly.
    - If the Left Center Tank Low Pressure Light does not come ON, then replace the Left Center Tank Low Pressure Light, L14.
      - a) Do the Repair Confirmation at the end of this task.
    - 2) If the Left Center Tank Low Pressure Light comes ON, then continue.
- (2) On the P5 Overhead Panel, put the L CTR FUEL PUMP Switch to ON. Listen to the Left Center Tank Boost Pump and touch it to make sure it operates.
  - (a) If the Left Center Tank Boost Pump operates, then do these steps:

28-22 TASK 820

Page 298.3 Jun 15/2016



- Replace the Left Center Tank Boost Pump Pressure Switch, S154. These are the tasks:
  - Fuel Boost Pump Pressure Switch Removal, AMM TASK 28-42-11-000-801
  - Fuel Boost Pump Pressure Switch Installation, AMM TASK 28-42-11-420-801
  - a) Do the Repair Confirmation at the end of this task.
- Do this check of the wiring (WDM 28-43-11):
  - Make sure that the L CTR FUEL PUMP Switch is OFF.
  - Disconnect the connector, D876, from the Left Center Tank Boost Pump Low Pressure Switch, S154.
  - Disconnect the connector, D626, from the Left Center Tank Boost Pump Switch, S8, on the P5 Overhead Panel.
  - Do a wiring check between this pin of connector, D876, and this pin of connector, D626.

<b>D876</b> pin 3	 <b>D626</b> pin 26	
<b>D876</b> pin 2	 GD320-DC	

- If you find a problem with the wiring, then do these steps:
  - Repair the wiring.
  - Re-connect the connectors, D876 and D626. <2>
  - Do the Repair Confirmation at the end of this task.
- If you do not find a problem with the wiring, then continue.
- 3) Re-connect the connectors, D876 and D626.
- Put the L CTR FUEL PUMP Switch to ON.
- Disconnect the connector, D13790, from the Left Auto Shutoff Test Switch, S1, on the P61 panel (WDM 28-23-11).
- Do a check for 28V DC at pin 15 of connector, D13790.
  - If you find 28V DC at pin 15, then replace the Left Auto Shutoff Test Switch, S1.
    - <1> Do the Repair Confirmation at the end of this task.
    - Do a wiring check between pin 1 of the Left Auto Shutoff Test Switch, S1, and ground, GD642-DC.
      - Repair the wiring.
      - Do the Repair Confirmation at the end of this task.
  - b) If you do not find 28V DC at pin 15, then do a check for 28V DC at pin X1 of the Left Auto Shutoff TD Relay, R934.
    - If you find 28V DC at pin X1, then replace the Left Auto Shutoff TD Relay, R934.
    - If you do not find 28V DC at pin X1, then replace the Left Auto Shutoff <2> 115V AC Relay, R936.

EFFECTIVITY AKS ALL



- <3> Do the Repair Confirmation at the end of this task.
- 7) Do this check of the wiring (WDM 28-23-11):
  - a) If you found 28V DC at pin X1 of the Left Auto Shutoff TD Relay, then do a wiring check between the Left Auto Shutoff TD Relay and the Left Auto Shutoff Test Switch, S1, as follows:

D13794	D13790
pin X2	 pin 15

D13790

pin 1 ..... GD642-DC

- <1> Repair the wiring.
- <2> Do the Repair Confirmation at the end of this task.
- b) If you did not find 28V DC at pin X1 of the Left Auto Shutoff TD Relay, then do these steps:
  - <1> Open these circuit breakers and install safety tags:

# F/O Electrical System Panel, P6-3

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
С	3	C01637	BOOST PMP CTR TNK LAUTO SHUT OFF-DC
D	7	C01659	AT S-O/UCPO BST PMP CTR TNK L AC

On a wiring check between the Left Auto Shutoff TD Relay, R934, and this circuit breaker.

#### D13794

<3> Do a wiring check between the Left Center Tank Boost Pump Switch, S8, and this circuit breaker.

#### D626

<4> Remove the safety tags and close these circuit breakers:

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
С	3	C01637	BOOST PMP CTR TNK LAUTO SHUT OFF-DC
D	7	C01659	AT S-O/UCPO BST PMP CTR TNK L AC

- <5> Repair the wiring.
- <6> Do the Repair Confirmation at the end of this task.
- (b) If the Left Center Tank Boost Pump does not operate, then do these steps:
  - 1) Replace the Left Center Tank Boost Pump Switch, S8, on the P5 Overhead Panel.
    - a) Do the Repair Confirmation at the end of this task.

28-22 TASK 820

EFFECTIVITY '



## G. Repair Confirmation

- (1) Do the Left Center Boost Pump section of this task: Center Tank Boost Pump Auto Shutoff Functional Test, AMM TASK 28-22-00-720-805.
  - (a) If the Left Center Tank Low Pressure Light comes ON in the specified time of 15±2 seconds, then you corrected the problem.
  - (b) If the Left Center Tank Low Pressure Light does not come ON or comes ON, but not in the specified time of 15±2 seconds, then continue the Fault Isolation Procedure at the subsequent step.



# 821. Center Tank Empty, LOW PRESSURE Light is not ON with R CTR FUEL PUMP Switch ON - Fault Isolation

## A. Description

- (1) The LOW PRESSURE Light for the R CTR FUEL PUMP is not ON when the Center Tank is empty and the R CTR FUEL PUMP Switch is ON.
- (2) The LOW PRESSURE Light for the R CTR FUEL PUMP is should come ON when the pump fuel pressure is below the minimum permitted pressure.

#### B. Possible Causes

- (1) Right Center Tank Low Pressure Light, L15
- (2) Right Center Tank Boost Pump Pressure Switch, S155
- (3) Wiring
- (4) Right Auto Shutoff Test Switch, S2
- (5) Right Auto Shutoff Time Delay Relay, R935
- (6) Right Auto Shutoff Relay, R937
- (7) Right Center Tank Boost Pump Switch, S9

#### C. Circuit Breakers

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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
С	7	C01638	BOOST PMP CTR TNK R AUTO SHUT OFF-DC
Ε	7	C01658	FUEL AT S-O/UCPO BST PMP CTR TNK R AC

## Power Distribution Panel Number 2, P92

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

## D. Related Data

- (1) SSM 28-23-11
- (2) SSM 28-43-11
- (3) WDM 28-23-11
- (4) WDM 28-43-11

28-22 TASKS 820-821

EFFECTIVITY AKS ALL



#### E. Initial Evaluation

WARNING: DO NOT OPERATE A FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. THIS CONDITION CAN CAUSE THE IGNITION OF THE FUEL FUMES IN THE FUEL TANK. A FIRE OR AN EXPLOSION CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (1) Obey these precautions at all times during this task:
  - (a) To operate any of the fuel pumps, you must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.
  - (b) Immediately put the applicable Fuel Pump Switch to OFF if the LOW PRESSURE Light comes ON and stays ON.
- (2) Make sure that the Center Tank has a minimum of 14000 lb (6400 kg) of fuel.

NOTE: This step makes sure that the Boost Pump is correctly primed.

- (a) If necessary, refuel the fuel tanks. This is the task: Pressure Refuel Procedure, AMM TASK 12-11-00-650-802.
- (b) If it is not possible to add 14000 lb (6400 kg) to the Center Tank, then do this task: Fuel Boost Pump and Override Pump Priming, AMM TASK 28-22-41-420-801.

#### F. Fault Isolation Procedure

- (1) Do this task: Master Dim and Test Operational Test, AMM TASK 33-18-00-710-802.
  - (a) Make sure that the Right Center Tank Low Pressure Light operates correctly.
    - 1) If the Right Center Tank Low Pressure Light does not come ON, then replace the Right Center Tank Low Pressure Light, L15.
      - a) Do the Repair Confirmation at the end of this task.
    - 2) If the Right Center Tank Low Pressure Light comes ON, then continue.
- (2) On the P5 Overhead Panel, put the R CTR FUEL PUMP Switch to ON. Listen to the Right Center Tank Boost Pump and touch it to make sure it operates.
  - (a) If the Right Center Tank Boost Pump operates, then do these steps:
    - 1) Replace the Right Center Tank Boost Pump Pressure Switch, S155. These are the
      - Fuel Boost Pump Pressure Switch Removal, AMM TASK 28-42-11-000-801
      - Fuel Boost Pump Pressure Switch Installation, AMM TASK 28-42-11-420-801
      - a) Do the Repair Confirmation at the end of this task.
    - 2) Do this check of the wiring (WDM 28-43-11):
      - a) Make sure that the R CTR FUEL PUMP Switch is OFF.
      - Disconnect the connector, D878, from the Right Center Tank Boost Pump Low Pressure Switch. S155.
      - c) Disconnect the connector, D628, from the Right Center Tank Boost Pump Switch, S9, on the P5 Overhead Panel.
      - d) Do a wiring check between this pin of connector, D878, and this pin of connector, D628.

D878	D628
pin 3	 pin 26

AKS ALL



D878										
pin 2										GD314-DC

- e) If you find a problem with the wiring, then do these steps:
  - <1> Repair the wiring.
  - <2> Re-connect the connectors, D878 and D628.
  - <3> Do the Repair Confirmation at the end of this task.
- f) If you do not find a problem with the wiring, then continue.
- 3) Re-connect the connectors, D878 and D628.
- 4) Put the R CTR FUEL PUMP Switch to ON.
- 5) Disconnect the connector, D13792, from the Right Auto Shutoff Test Switch, S2, on the P61 panel (WDM 28-23-11).
- 6) Do a check for 28V DC at pin 14 of connector, D13792.
  - a) If you find 28V DC at pin 14, then replace the Right Auto Shutoff Test Switch, S2.
    - <1> Do the Repair Confirmation at the end of this task.
    - On a wiring check between pin 1 of the Right Auto Shutoff Test Switch, S2, and ground, GD638-DC.
      - <a> Repair the wiring.
      - <br/> <br/> b> Do the Repair Confirmation at the end of this task.
  - b) If do not find 28V DC at pin 14, then do a check for 28V DC at pin X1 of the Right Auto Shutoff TD Relay, R935.
    - <1> If you find 28V DC at pin X1, then replace the Right Auto Shutoff TD Relay, R935.
    - <2> If you do not find 28V DC at pin X1, then replace the Right Auto Shutoff 115V AC Relay, R937.
    - <3> Do the Repair Confirmation at the end of this task.
- 7) Do this check of the wiring (WDM 28-23-11):
  - a) If you found 28V DC at pin X1 of the Right Auto Shutoff TD Relay, then do a wiring check between the Right Auto Shutoff TD Relay and the Right Auto Shutoff Test Switch, S2, as follows:

<b>D13798</b> pin X2	<b>D13792</b> pin 14
<b>D13792</b> pin 1	GD638-DC

- <1> Repair the wiring.
- <2> Do the Repair Confirmation at the end of this task.
- b) If you did not find 28V DC at pin X1 of the Right Auto Shutoff TD Relay, then do these steps:

28-22 TASK 821

**EFFECTIVITY** 



<1> Open these circuit breakers and install safety tags:

# F/O Electrical System Panel, P6-3

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
С	7	C01638	BOOST PMP CTR TNK R AUTO SHUT OFF-DC
E	7	C01658	FUEL AT S-O/UCPO BST PMP CTR TNK R AC

<2> Do a wiring check between the Right Auto Shutoff TD Relay, R935, and this circuit breaker.

D13798										
pin X1										C1638

<3> Do a wiring check between the Right Center Tank Boost Pump Switch, S9, and this circuit breaker.

D628										
pin 35										C1658

<4> Remove the safety tags and close these circuit breakers:

# F/O Electrical System Panel, P6-3

Row	<u>Col</u>	Number	<u>Name</u>
С	7	C01638	BOOST PMP CTR TNK R AUTO SHUT OFF-DC
Е	7	C01658	FUEL AT S-O/UCPO BST PMP CTR TNK R AC

- <5> Repair the wiring.
- <6> Do the Repair Confirmation at the end of this task.
- (b) If the Right Center Tank Boost Pump does not operate, then do these steps:
  - 1) Replace the Right Center Tank Boost Pump Switch, S8, on the P5 Overhead Panel.
    - a) Do the Repair Confirmation at the end of this task.

## G. Repair Confirmation

- (1) Do the Right Center Boost Pump section of this task: Center Tank Boost Pump Auto Shutoff Functional Test, AMM TASK 28-22-00-720-805.
  - (a) If the Right Center Tank Low Pressure Light comes ON in the specified time of 15±2 seconds, then you corrected the problem.
  - (b) If the Right Center Tank Low Pressure Light does not come ON or comes ON, but not in the specified time of 15±2 seconds, then continue the Fault Isolation Procedure at the subsequent step.

——— END OF TASK ——	
--------------------	--

28-22 TASK 821

**AKS ALL** 

EFFECTIVITY '



#### 801. Fuel Flow to the APU is not Sufficient - Fault Isolation

## A. Description

(1) The APU fuel-feed system does not supply sufficient fuel flow to the APU, as shown by (AMM TASK 49-31-00-700-802) or by other problems with the APU.

#### B. Possible Causes

- (1) Blockage in the APU fuel line
- (2) APU fuel valve does not open sufficiently
- (3) Check valve near the bypass inlet does not open sufficiently
- (4) Check valve is stuck in the open position
- (5) Leakage in the APU fuel line

## C. Circuit Breakers

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

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

Row	<u>Col</u>	Number	Name
В	19	C01344	APU FIRE SW POWER

## F/O Electrical System Panel, P6-4

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	14	C00033	AUX POWER UNIT CONT

#### D. Initial Evaluation

- (1) Make sure the No. 1 tank contains a minimum of 350 pounds (159 kilograms) of fuel.
- (2) Do this task: APU Fuel Supply Flow Check, AMM TASK 49-31-00-700-802.
  - (a) If there is not sufficient fuel flow, then do the Fault Isolation procedure below.
  - (b) If there is sufficient fuel flow, then continue.
- (3) Do this task: APU BITE Procedure, 49-60 TASK 801.
  - (a) If the BITE test shows a fault message, then do the Fault Isolation for the fault message shown.
  - (b) If the BITE test shows no fault messages, then continue.
- (4) Do this test of the APU:
  - (a) Do this task: APU Starting and Operation Activation, AMM TASK 49-11-00-860-801.
  - (b) Operate the APU for a minimum of five minutes.
  - (c) Do this task: APU Usual Shutdown, AMM TASK 49-11-00-860-802.
  - (d) Set the APU master switch to the ON position.
  - (e) Look at the CURRENT STATUS page on the CDU display to see if a maintenance message shows.
  - (f) If a maintenance message shows, then go to the fault isolation task for the message that shows.
  - (g) If the CDU display does not show a maintenance message, then there was an intermittent fault.

AKS ALL

28-25 TASK 801



#### E. Fault Isolation

- (1) Do this check of the APU fuel valve:
  - (a) On the P5 panel, set the APU master switch to ON.
  - (b) On the rear spar in the left main wheel well, make sure the override handle on the APU fuel valve goes to the open position.
  - (c) Carefully try to move the override handle to the open position to make sure it is fully open.
  - (d) If the override handle did not completely move to the open position when you set the APU master switch to ON, then do these steps:
    - 1) Remove the APU shutoff valve actuator, V43, from the mounting plate (AMM TASK 28-25-02-000-801), but do not remove the electrical connector, D920 from the actuator.
    - 2) With the actuator disconnected from the mounting plate, set the APU master switch to OFF, and then back to ON.
    - 3) If the override handle now moves completely to the open position when the APU master switch is set to ON, then replace the valve body.

These are the tasks:

APU Shutoff Valve Body Assembly Removal, AMM TASK 28-25-02-000-802,

APU Shutoff Valve Body Assembly Installation, AMM TASK 28-25-02-400-802.

4) If the override handle does not move completely to the open position when the APU master switch is set to ON, then replace the valve actuator.

These are the tasks:

APU Shutoff Valve Actuator Assembly Removal, AMM TASK 28-25-02-000-801, APU Shutoff Valve Actuator Assembly Installation, AMM TASK 28-25-02-400-801.

- 5) Do the Repair Confirmation at the end of this task.
- (e) If the override handle moved completely to the open position when you set the APU master switch to ON, then continue.
- (2) Do these steps to do a test for leakage in the APU fuel line from the top of the center tank to the APU inlet:
  - (a) Do these steps to open the APU shutoff valve:
    - 1) Make sure that this circuit breaker is closed:

# F/O Electrical System Panel, P6-4 Row Col Number Name A 14 C00033 AUX POWER UNIT CONT

- 2) Set the BATTERY SWITCH to ON.
- 3) Set the APU master switch to ON.
- (b) Set the switch for the forward boost pump for the No. 1 tank to ON.

NOTE: This will pressurize the APU fuel line from the No. 1 tank to the APU.

- (c) On the P5 Panel, make sure the FWD 1 LOW PRESSURE indicator light goes off.
  - If the FWD 1 LOW PRESSURE indicator light does not go off (after 90 seconds), then, do this task: No. 1 Tank FWD pump LOW PRESSURE light is on - Fault Isolation, 28-22 TASK 804.

AKS ALL

28-25 TASK 801



- (d) Monitor the APU drain mast for 10 minutes to look for fuel leakage in the APU fuel line.
- (e) Monitor the flexible APU fuel line in the APU compartment for 10 minutes to look for fuel leakage.
- (f) Set the switch for the forward boost pump for the No. 1 tank to OFF.
- (g) Set the APU master switch to OFF.
- (h) If there was indication of fuel leakage, then do these steps:
  - 1) Replace the section of the APU fuel line that has the leak (AMM TASK 28-25-04-000-802).
  - 2) Do the Repair Confirmation procedure at the end of this task.
- (i) If there is no indication of fuel leakage, then continue.
- (3) Do these steps to do a check for blockage from the forward boost pump to the APU fuel line:
  - (a) Do the APU fuel supply check again with the aft No. 1 boost pump used to pressurize the APU Fuel Line (AMM TASK 49-31-00-700-802).
  - (b) If the APU fuel supply check is satisfactory, then do these steps:
    - 1) For the center tank and the No. 1 tank, do this task: Purging and Fuel Tank Entry, AMM TASK 28-11-00-910-802
    - 2) Look for a blockage problem with the inlet for the forward No. 1 tank boost pump, the discharge check valve for the forward No. 1 tank boost pump or with the fuel-feed line from the discharge check valve to the APU fuel line.
    - 3) Repair the problems that you find.
    - 4) Do the Repair Confirmation procedure at the end of this task.
  - (c) If the APU fuel supply check is not satisfactory, then continue. Do not reconnect the APU fuel line at the APU firewall.
- (4) With the APU fuel line disconnected at the APU firewall, do these steps to do a check for APU fuel line blockage:
  - (a) For the center tank and the No. 1 tank, do this task: Purging and Fuel Tank Entry, AMM TASK 28-11-00-910-802
  - (b) Disconnect the connection between the APU fuel line and the engine fuel-feed manifold.
  - (c) Permit the fuel to drain from the APU fuel line into a 5-gallon (19-liter) fuel resistant container, STD-1054.
  - (d) Apply air pressure to the APU fuel line from the end that you disconnected from the engine fuel-feed manifold.
  - (e) Use the air flow at the open end of the APU fuel line in the APU compartment to look for indications of blockage in the APU fuel line. Note the air flow from the APU fuel line in the APU compartment.
  - (f) Stop the air pressure to the APU fuel line.
  - (g) Disconnect the APU fuel line from the center tank adapter fitting on the top of the center tank (AMM TASK 28-25-04-000-802).
  - (h) Apply air pressure again to the APU fuel line from the end that you disconnected in the center tank.
    - Use the air flow at the open end of the APU fuel line on the top of the tank to look for indications of blockage in the APU fuel line.

AKS ALL 28-25 TASK 801



- 2) If there is significantly more air flow from the center tank adapter fitting than there was from the open connection at the APU firewall, then do these steps:
  - Replace the APU fuel line from the center tank adapter fitting to the APU firewall.

These are the tasks:

APU Fuel Line (Center Wing Section to APU Firewall) Removal, AMM TASK 28-25-04-000-802,

APU Fuel Line (Center Wing Section to APU Firewall) Installation, AMM TASK 28-25-04-400-803.

- b) Do the Repair Confirmation procedure at the end of this task.
- 3) If the air flow from the center tank adapter fitting is approximately the same as the air flow noted at the APU firewall, then do these steps:
  - a) Replace the part of the APU fuel line in the center tank from the connection to the engine fuel-feed manifold to the top of the center tank.

These are the tasks:

APU Fuel Line (No. 1 Tank and Center Tank) Removal, AMM TASK 28-25-04-000-801,

APU Fuel Feed Line (No. 1 Tank and Center Tank) Installation, AMM TASK 28-25-04-400-801.

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

## F. Repair Confirmation

- Do this task: APU Fuel Supply Flow Check, AMM TASK 49-31-00-700-802.
  - (a) Make sure there is sufficient fuel flow.
- (2) Do this task: APU BITE Procedure, 49-60 TASK 801.
  - (a) Make sure the BITE test shows no maintenance messages.
- (3) Do this test of the APU:
  - (a) Do this task: APU Starting and Operation Activation, AMM TASK 49-11-00-860-801.
  - (b) Operate the APU for a minimum of five minutes.
  - (c) Do this task: APU Usual Shutdown, AMM TASK 49-11-00-860-802.
  - (d) Set the APU master switch to the ON position.
  - (e) Make sure the CURRENT STATUS page on the CDU display shows no maintenance messages.
  - (f) If the CDU display does not show a maintenance message, then you corrected the fault.

——— END OF TASK ——	
--------------------	--

# 802. Indication of Fuel Leakage at APU Shroud Drain Mast - Fault Isolation

## A. Initial Evaluation

- (1) Examine the APU shroud drain mast for five minutes.
- (2) If there is no fuel leakage or if the fuel leakage rate is less than one drop per minute, then the APU fuel line is OK.
- (3) If the fuel leakage rate is more than one drop per minute, then continue.
- (4) Do these steps to do a leak check of the APU fuel line while it is pressurized:

AKS ALL

28-25 TASKS 801-802



(a) Make sure that these circuit breakers are closed:

## **Battery Shield, J9**

Row Col Number Name
A 5 C01340 BATTERY BUS

## F/O Electrical System Panel, P6-4

Row Col Number Name

A 14 C00033 AUX POWER UNIT CONT

## Power Distribution Panel Number 2, P92

Row Col Number Name

D 1 C00826 FUEL BOOST PUMP TANK 1 AFT

# Standby Power Control Unit, M01720

Row Col Number Name

B 4 C00169 SW HOT BAT BUS

- (b) Make sure the No. 1 tank has a minimum of 500 pounds (250 kilograms) of fuel (AMM TASK 12-11-00-650-802).
- (c) Set the APU start switch, on the Overhead Panel P5, to the ON position.
- (d) Set the FUEL PUMP TANK 1 AFT switch, on the P5 Overhead Panel, to the ON position.

NOTE: This step pressurizes the APU fuel line.

- (e) With the APU fuel line pressurized, examine the APU shroud drain mast for 30 minutes to do a check for leakage.
- (f) If the fuel leakage rate is less than 60 drops (3 milliliters or 0.1 fluid ounce) in 30 minutes, then do these steps:
  - 1) Set the FUEL PUMP TANK 1 AFT switch, on the P5 Overhead Panel, back to OFF.
  - 2) Set the APU start switch, on the P5 Overhead Panel, back to OFF.
  - 3) Continue with normal operation of the APU in service.
  - 4) Do this pressure check of the APU fuel line every day until you repair the APU fuel line or replace it.
  - 5) When it is possible, do the Fault Isolation procedure below.
- (g) If the fuel leakage rate is more than 60 drops (3 milliliters or 0.1 fluid ounce) in 30 minutes, then deactivate the APU until the fuel line is repaired (AMM TASK 49-11-00-600-802)
  - 1) When it is possible, do the Fault Isolation procedure below.

## B. Fault Isolation

- (1) Make sure the landing gear downlock pins for the nose and main landing gear are installed, do this task: Landing Gear Downlock Pins Installation, AMM TASK 32-00-01-480-801.
- (2) For fuel leakage at the APU shroud drain mast, fuel must be leaking from the APU fuel supply line somewhere between the APU firewall bulkhead fitting and the forward wall of the aft cargo compartment.
- (3) To get access to the APU fuel supply line and connection fittings open the applicable access panels.

EFFECTIVITY

AKS ALL

28-25 TASK 802

Page 205 Oct 15/2014



- (4) Make sure there is more than 800 LB (400 KG) of fuel in the left main fuel tank (AMM TASK 12-11-00-650-802).
- (5) Make sure the APU start switch on the overhead panel P5, is in the off position.
- (6) Attach a DO-NOT-OPERATE tag to the APU start switch.
- (7) Open these circuit breakers and install safety tags:

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
В	19	C01344	APU FIRE SW POWER

## F/O Electrical System Panel, P6-4

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	14	C00033	AUX POWER UNIT CONT

- (8) Move the manual override handle on the APU fuel shutoff valve to the OPEN position.
- (9) Set the FUEL PUMP TANK 1 AFT switch, on the P5 Overhead Panel, to the ON position. NOTE: This step pressurizes the APU fuel supply line.
- (10) Make sure the PRESS light for the left aft boost pump goes off.
- (11) Look for leakage at the supply line and/or connection fittings.
- (12) Do this check at each APU fuel supply line connection until you find the leak.
- (13) When you find the leak, do these steps:
  - (a) Set the FUEL PUMP TANK 1 AFT switch, on the overhead panel P5, to the OFF position.
  - (b) Move the manual override handle on the APU fuel shutoff valve to the CLOSED position.
  - (c) Replace the supply line and/or repair the connection as follows:
    - Replace the APU Fuel line (Wing Center Section to the APU fire wall) if it is necessary.

These are the tasks:

APU Fuel Line (Center Wing Section to APU Firewall) Removal, AMM TASK 28-25-04-000-802,

APU Fuel Line (Center Wing Section to APU Firewall) Installation, AMM TASK 28-25-04-400-803.

- (14) Close all of the access panels.
- (15) Do the Repair Confirmation procedure below.

#### C. Repair Confirmation

- (1) Examine the APU shroud drain mast for five minutes.
  - (a) If there is no fuel leakage or if the fuel leakage rate is less than one drop per minute, then you corrected the fault.

 <b>FND</b>	OF 1	<b>TASK</b>	

28-25 TASK 802

AKS ALL

EFFECTIVITY

Page 206 Oct 15/2014



## 803. APU DC Fuel Pump Circuit Breaker Open - Fault Isolation

## A. Description

(1) The circuit breaker, AUX POWER UNIT FUEL BOOST PUMP, is found to be open during flight or on the ground. Do not reset this circuit breaker before you do the Initial Evaluation below. This problem can be caused by a short circuit in the wiring for the APU DC fuel pump, a damaged APU DC fuel pump, or a damaged circuit breaker or relay.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

## B. Possible Causes

- (1) 28 VDC Wiring
- (2) APU fuel boost pump relay, R155
- (3) APU DC fuel Pump, M668
- (4) Circuit breaker C00633, AUX POWER UNIT FUEL BOOST PUMP

#### C. Circuit Breakers

(1) This is the primary circuit breaker related to the fault:

## F/O Electrical System Panel, P6-4

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	12	C00633	AUX POWER UNIT FUEL BOOST PUMP

#### D. Related Data

AKS ALL

(1) WDM 49-31-31

#### E. Initial Evaluation

(1) Do a check of this circuit breaker:

This is the circuit breaker:

## F/O Electrical System Panel, P6-4

Row	<u>Col</u>	Number	<u>Name</u>
Α	12	C00633	AUX POWER UNIT FUEL BOOST PUMP

WARNING: DO NOT CLOSE A CIRCUIT BREAKER FOR A FUEL PUMP THAT OPENED (TRIPPED) UNTIL YOU CORRECT THE PROBLEM. THIS CONDITION CAN CAUSE A FIRE OR EXPLOSION.

## 28-AWL-18: CDCCL

(2) If the circuit breaker is open, do these steps:

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM

TASK 28-00-00-910-801, for important information on Critical Design Configuration

Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

28-25 TASK 803

Page 207 Oct 15/2015



## 

(a) Install an approved for flight, open position circuit breaker lock, STD-1062, and safety tag on the circuit breaker.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

# 28-AWL-18: CDCCL

(b) Do the fault isolation steps in this procedure.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

<u>NOTE</u>: This is applicable to Airworthiness Limitation 28-AWL-18.

#### F. Fault Isolation Procedure

(1) Make sure there is minimum of 500 lb (227 kg) of fuel in the No. 1 tank.

NOTE: This will prevent the dry operation of the APU DC fuel pump.

- (2) Get access to the APU DC fuel pump (AMM TASK 28-25-01-000-801).
- (3) Examine the APU DC fuel pump and the area around it for fuel leakage.
  - (a) If there are signs of fuel leakage, find the source of the fuel leakage and repair it.
- (4) Do these steps to do a check of the 28 VDC wiring, the circuit breaker, the relay, and the APU DC fuel pump:
  - (a) Disconnect the electrical connector, D1828, from the APU DC fuel pump (WDM 49-31-31).
  - (b) Examine the airplane and pump sides of the electrical connector, D1828, for damage.
    - Repair all damage that you find.
  - (c) Make sure that the electrical connector, D1828, is disconnected.
  - (d) Make sure the boost pump switches are in the OFF position as shown in this table:

SWITCH/CONTROL	POSITION	LOCATION
FUEL PUMP - TANK 1 - AFT	OFF	P5 OVERHEAD PANEL
FUEL PUMP - TANK 1 - FWD	OFF	P5 OVERHEAD PANEL
FUEL PUMP - CTR TANK LEFT	OFF	P5 OVERHEAD PANEL
FUEL PUMP - CTR TANK RIGHT	OFF	P5 OVERHEAD PANEL
FUEL PUMP - TANK 2 - AFT	OFF	P5 OVERHEAD PANEL
FUEL PUMP - TANK 2 - FWD	OFF	P5 OVERHEAD PANEL

(e) Remove the circuit breaker lock and safety tag, and close this circuit breaker:

# F/O Electrical System Panel, P6-4

Row Col Number Name

A 12 C00633 AUX POWER UNIT FUEL BOOST PUMP

(f) Set the APU master switch on the overhead panel, P5, to the ON position.

NOTE: Do not set the APU master switch to the start position. This will start the APU.

AKS ALL

28-25 TASK 803

Page 208 Oct 15/2015



- (g) If the circuit breaker stays closed, then do the subsequent steps:
  - 1) Do a check for 28 VDC power at pin 1 of electrical connector, D1828 (WDM 49-31-31).
  - 2) If there is 28 VDC power at pins 1 of electrical connector, D1828, do one of these steps:
    - a) For the APU DC fuel pump, M668, do this task: APU DC Fuel Pump Insulation ResistanceTest, AMM TASK 28-25-00-760-801.
      - <1> If the insulation resistance check is not OK, then replace the APU DC fuel pump, M668.

These are the tasks:

APU DC Boost Pump Impeller Removal, AMM TASK 28-25-01-000-801, APU DC Boost Pump Impeller Installation, AMM TASK 28-25-01-400-801.

- <2> Do the Repair Confirmation at the end of this task.
- b) Replace the APU DC fuel pump, M668.

These are the tasks:

APU DC Boost Pump Impeller Removal, AMM TASK 28-25-01-000-801,

APU DC Boost Pump Impeller Installation, AMM TASK 28-25-01-400-801.

- <1> Do the Repair Confirmation at the end of this task.
- 3) If there is not 28 VDC power at pin 1 of electrical connector, D1828, do these steps:
  - a) Replace the APU FUEL BOOST PUMP relay, R155 (WDM 49-31-31).
    - <1> Do the Repair Confirmation at the end of this task.
- (h) If the circuit breaker opened, then continue.
- (5) Do these steps to do a check of the APU FUEL BOOST PUMP relay, R155:
  - (a) Replace the APU FUEL BOOST PUMP relay, R155 (WDM 49-31-31).
  - (b) Make sure that the electrical connector, D1828, is disconnected.
  - (c) Close this circuit breaker:

## F/O Electrical System Panel, P6-4

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	12	C00633	AUX POWER UNIT FUEL BOOST PUMP

(d) Set the APU master switch on the overhead panel, P5, to the ON position.

NOTE: Do not set the APU master switch to the start position. This will start the APU.

(e) If this circuit breaker stays closed, then do the Repair Confirmation at the end of this task.

#### F/O Electrical System Panel, P6-4

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	12	C00633	AUX POWER UNIT FUEL BOOST PUMP

(f) If this circuit breaker opened, then continue.

#### F/O Electrical System Panel, P6-4

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	12	C00633	AUX POWER UNIT FUEL BOOST PUMP

EFFECTIVITY • AKS ALL

28-25 TASK 803



- (6) Do these steps to do a check of the circuit breaker:
  - (a) Replace this circuit breaker:

## F/O Electrical System Panel, P6-4

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	12	C00633	AUX POWER UNIT FUEL BOOST PUMP

- (b) Make sure that the electrical connector, D1828, is disconnected.
- (c) Close this circuit breaker:

## F/O Electrical System Panel, P6-4

Row	Col	<u>Number</u>	<u>Name</u>
Α	12	C00633	AUX POWER UNIT FUEL BOOST PUMP

(d) Set the APU master switch on the overhead panel, P5, to the ON position.

NOTE: Do not set the APU master switch to the start position. This will start the APU.

(e) If this circuit breaker stays closed, then do the Repair Confirmation at the end of this task.

# F/O Electrical System Panel, P6-4

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	12	C00633	AUX POWER UNIT FUEL BOOST PUMP

(f) If this circuit breaker opened, then continue.

## F/O Electrical System Panel, P6-4

Row	<u>Col</u>	Number	<u>Name</u>
Α	12	C00633	AUX POWER UNIT FUEL BOOST PUMP

- (7) Do these steps to do a check of the 28 VDC wiring for the APU DC fuel pump:
  - (a) Do a wiring check between pin 1 of connector, D1828, at the APU DC fuel pump, M668, and the circuit breaker, AUX POWER UNIT FUEL BOOST PUMP, C00633 (WDM 49-31-31):
  - (b) Find the problem and repair the wiring.
  - (c) Make sure that the electrical connector, D1828, is disconnected.
  - (d) Close this circuit breaker:

# F/O Electrical System Panel, P6-4

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	12	C00633	AUX POWER UNIT FUEL BOOST PUMP

- (e) Do not re-connect electrical connector, D1828, to the APU DC fuel pump.
- (f) Set the APU master switch on the overhead panel, P5, to the ON position.

NOTE: Do not set the APU master switch to the start position. This will start the APU.

(g) Make sure this circuit breaker stays closed:

## F/O Electrical System Panel, P6-4

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	12	C00633	AUX POWER UNIT FUEL BOOST PUMP

EFFECTIVITY AKS ALL

28-25 TASK 803

Page 210 Jun 15/2016



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

# G. Repair Confirmation

- (1) Connect the electrical connector, D1828, to the APU DC fuel pump (WDM 49-31-31).
- (2) Set the APU master switch on the overhead panel, P5, to the ON position.

  NOTE: Do not set the APU master switch to the start position. This will start the APU.
- (3) If this circuit breaker stays closed, then you corrected the fault.

# F/O Electrical System Panel, P6-4

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	12	C00633	AUX POWER UNIT FUEL BOOST PUMP

(4) Set the APU master switch on the overhead panel, P5, to the OFF position.

NOTE: Do not set the APU master switch to the start position. This will start the APU.



AKS ALL 28-25 TASK 803



#### 801. FQIS BITE Procedure

#### A. General

- (1) You do the FQIS BITE Test from the control display unit (CDU) in the flight compartment. There are two CDUs on the forward electronics panel in the flight compartment.
- (2) The FQIS BITE procedure uses these functions from the FQIS BITE TEST Main Menu:
  - (a) CURRENT STATUS
  - (b) GROUND TEST
- (3) CURRENT STATUS
  - (a) The CURRENT STATUS display shows faults which are currently present in the FQIS system.
- (4) GROUND TEST
  - (a) The GROUND TEST function does a complete system test of the FQIS.

## B. Fuel Quantity BITE Test Procedure

- (1) Do the BITE procedure for the FQIS (Figure 201):
  - (a) If you are not at one of the FQIS BITE TEST displays, then do these steps:
    - 1) Push the INIT REF function key.
    - If the POS INIT display shows, then push the line select key next to the INDEX prompt.
      - NOTE: This makes the INIT/REF INDEX show.
    - 3) Push the line select key next to the MAINT prompt.
  - (b) From the MAINT BITE INDEX, push the line select key next to the FQIS prompt.
  - (c) Do these steps to look for maintenance messages in CURRENT STATUS:
    - 1) Push the line select key next to the CURRENT STATUS prompt.
    - 2) Make a written record of the maintenance message numbers for all of the faults shown on the CURRENT STATUS display.
      - a) If there is more than one page of faults in CURRENT STATUS, then use the NEXT PAGE key and the PREV PAGE key to see all of the maintenance messages.
        - NOTE: The number of pages of faults in CURRENT STATUS are shown in the upper right corner of the display.
          - If a fault shows the message FAULT NO LONGER PRESENT, then the fault was corrected while the CURRENT STATUS display was on.
      - b) Refer to the table at the end of this task to find the fault isolation tasks for the maintenance messages that you find.
    - 3) If NO PRESENT FAULTS shows on the CURRENT STATUS display, then continue. No current faults are found in the system.
    - 4) Push the line select key next to the INDEX prompt.
      - NOTE: This will bring you back to the FQIS BITE TEST main menu.
  - (d) Do these steps to do the FQIS ground test:
    - 1) Push the line select key next to the GROUND TEST prompt.
      - Push the line select key next the YES prompt to verify that you want to do the ground test.

AKS ALL



- When the ground test is complete, the display will show GROUND TEST COMPLETE PASS or FAIL.
- 3) If the display shows GROUND TEST COMPLETE PASS, then there are no faults found in the FQIS.

NOTE: If faults show in CURRENT STATUS, then keep a record of the faults for later fault isolation of intermittent faults. The corrective action given for each fault found in CURRENT FAULTS can also be used to correct intermittent faults that occur frequently.

- 4) If the display shows GROUND TEST COMPLETE FAIL, then push the line select key next to the DISPLAY FAULTS prompt.
- 5) Make a written record of the message numbers for all of the faults shown on the GROUND TEST FAULTS display.
  - a) If there is more than one page of faults in GROUND TEST FAULTS, then use the NEXT PAGE key and the PREV PAGE key to see all of the maintenance messages.

NOTE: The number of pages of faults in GROUND TEST FAULTS are shown in the upper right corner of the display.

6) Refer to the table at the end of this task to find the fault isolation task for the applicable maintenance message.

NOTE: If faults show in CURRENT STATUS that do not show in GROUND TEST FAULTS, then keep a record of the faults for later fault isolation of intermittent faults. The corrective action given for each fault found in CURRENT FAULTS can also be used to correct intermittent faults that occur frequently.

LRU/SYSTEM	MAINTENANCE MESSAGE	GO TO FIM TASK
FQIS	28-41001 NO FMC DATA ON FQIS 6	28-41 TASK 812
FQIS	28-41002 PROCESSOR FAULT	28-41 TASK 809
FQIS	28-41101 1 OR MORE TANK UNIT OPEN	28-41 TASK 818
FQIS	28-41102 TANK UNIT LO-Z OPEN/GND	28-41 TASK 802
FQIS	28-41103 TANK UNIT SHORT/>FULL	28-41 TASK 803
FQIS	28-41104 TANK UNIT LO RESISTANCE	28-41 TASK 804
FQIS	28-41105 HI-Z OP/SHORT TO SHIELD	28-41 TASK 816
FQIS	28-41106 COMPENSATOR LO-Z OP/GND	28-41 TASK 805
FQIS	28-41107 COMPENSATOR SHORTED	28-41 TASK 806
FQIS	28-41108 COMPENSATOR DATA BAD	28-41 TASK 807
FQIS	28-41109 PROCESSOR FAILED	28-41 TASK 808
FQIS	28-41110 PROCESSOR FAULT	28-41 TASK 809
FQIS	28-41111 PROGRAM PINS INVALID	28-41 TASK 811
FQIS	28-41113 PROGRAM PINS INVALID	28-41 TASK 811
FQIS	28-41114 PROCESSOR FAULT	28-41 TASK 809
FQIS	28-41115 ARINC OUTPUT BUS FAILED	28-41 TASK 810

AKS ALL



LRU/SYSTEM	MAINTENANCE MESSAGE	GO TO FIM TASK
FQIS	28-41201 1 OR MORE TANK UNIT OPEN	28-41 TASK 818
FQIS	28-41202 TANK UNIT LO-Z OPEN/GND	28-41 TASK 802
FQIS	28-41203 TANK UNIT SHORT/>FULL	28-41 TASK 803
FQIS	28-41204 TANK UNIT LO RESISTANCE	28-41 TASK 804
FQIS	28-41205 HI-Z OP/SHORT TO SHIELD	28-41 TASK 816
FQIS	28-41206 COMPENSATOR LO-Z OP/GND	28-41 TASK 805
FQIS	28-41207 COMPENSATOR SHORTED	28-41 TASK 806
FQIS	28-41208 COMPENSATOR DATA BAD	28-41 TASK 807
FQIS	28-41209 PROCESSOR FAILED	28-41 TASK 808
FQIS	28-41210 PROCESSOR FAULT	28-41 TASK 809
FQIS	28-41211 PROGRAM PINS INVALID	28-41 TASK 811
FQIS	28-41213 PROGRAM PINS INVALID	28-41 TASK 811
FQIS	28-41214 PROCESSOR FAULT	28-41 TASK 809
FQIS	28-41215 ARINC OUTPUT BUS FAILED	28-41 TASK 810
FQIS	28-41301 1 OR MORE TANK UNIT OPEN	28-41 TASK 818
FQIS	28-41302 TANK UNIT LO-Z OPEN/GND	28-41 TASK 802
FQIS	28-41303 TANK UNIT SHORT/>FULL	28-41 TASK 803
FQIS	28-41304 TANK UNIT LO RESISTANCE	28-41 TASK 804
FQIS	28-41305 HIZ OPEN/SHORT TO SHIELD	28-41 TASK 816
FQIS	28-41306 COMPENSATOR LO-Z OP/GND	28-41 TASK 805
FQIS	28-41307 COMPENSATOR SHORTED	28-41 TASK 806
FQIS	28-41308 COMPENSATOR DATA BAD	28-41 TASK 807
FQIS	28-41309 PROCESSOR FAILED	28-41 TASK 808
FQIS	28-41310 PROCESSOR FAULT	28-41 TASK 809
FQIS	28-41311 PROGRAM PINS INVALID	28-41 TASK 811
FQIS	28-41313 PROGRAM PINS INVALID	28-41 TASK 811
FQIS	28-41314 PROCESSOR FAULT	28-41 TASK 809
FQIS	28-41315 ARINC OUTPUT BUS FAILED	28-41 TASK 810

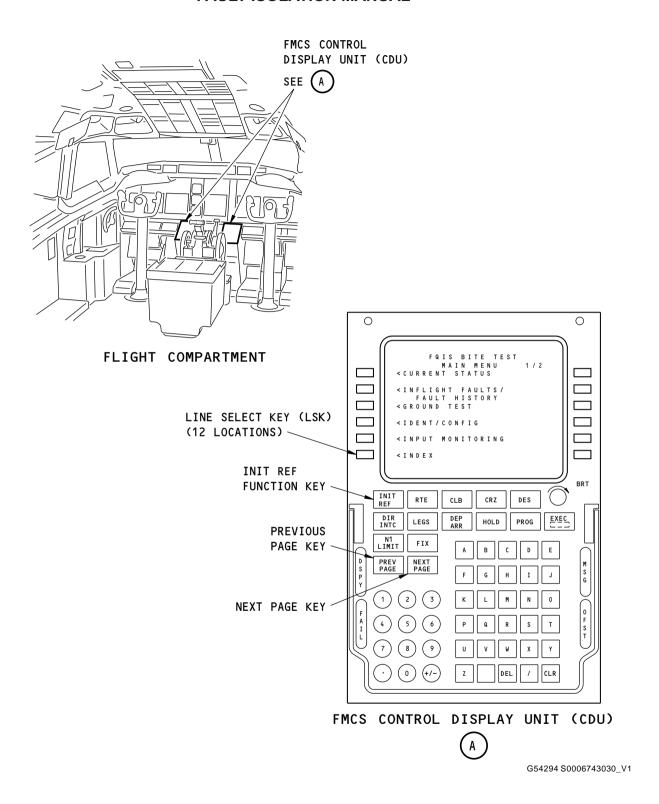
------ END OF TASK ------

EFFECTIVITY -

28-41 TASK 801

Page 203 Oct 15/2013





FQIS BITE Main Menu Figure 201/28-41-00-990-804

EFFECTIVITY

AKS ALL

Page 204

D633A103-AKS

BOEING PROPRIETARY - Copyright © Unpublished Work - See title page for details



## 802. FQIS Fault Message - TANK UNIT LO-Z OPEN/GND - Fault Isolation

## A. Description

- (1) This task is for these maintenance messages:
  - (a) 28-41102 TANK UNIT LO-Z OPEN/GND
    - 1) This fault code shows a problem with the No. 1 tank.
  - (b) 28-41202 TANK UNIT LO-Z OPEN/GND
    - 1) This fault code shows a problem with the No. 2 tank.
  - (c) 28-41302 TANK UNIT LO-Z OPEN/GND
    - 1) This fault code shows a problem with the center tank.
- (2) One or more of the tank unit Lo-Z wires is shorted to ground, or the common tank unit Lo-Z wire is open.
- (3) This message is shown if the measured (total) tank unit capacitance is less than 13 percent of the tank unit empty capacitance.
- (4) This message can also be shown if the compensator Lo-Z wire is shorted to ground through less than 100 ohms (28-41 TASK 805).
- (5) This fault causes the FQIS display and the refuel panel indicator for the tank that has the fault to become blank.

#### B. Possible Causes

- (1) FQIS wire harness
- (2) Out-of-tank wiring (wire bundle) from the wing spar to the FQPU (including the bussing plug)
- (3) FQIS tank unit or compensator

#### C. Circuit Breakers

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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	5	C00398	FUEL QTY 2
Α	6	C00397	FUEL QTY 1

# D. Related Data

- (1) (SSM 28-41-11)
- (2) (WDM 28-41-11)

## E. Initial Evaluation

- (1) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
- (2) If the GROUND TEST shows TANK UNIT LO-Z OPEN/GND for the applicable tank, then do the Fault Isolation Procedure below.
- (3) If the GROUND TEST shows PASS, then there was an intermittent fault.

## F. Fault Isolation

- (1) Disconnect the applicable bussing plug and examine the pins for corrosion or damage. To do this, do this task: Bussing Plug Removal, AMM TASK 28-41-41-000-801.
  - (a) If there is corrosion or damage, then do these steps:
    - 1) Repair the pins if any of the pins have damage.

AKS ALL



- 2) Clean the connector if there is any corrosion (SWPM 20-60-01).
- 3) Re-connect the bussing plug (AMM TASK 28-41-41-400-801).
- 4) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
- 5) If the GROUND TEST shows PASS, then you corrected the fault.
- 6) If the GROUND TEST shows TANK UNIT LO-Z OPEN/GND for the applicable tank, then continue.
- (b) If there is no corrosion or damage, then continue.
- (2) For the applicable tank, do this task: Tank and Compensator Units Test, AMM TASK 28-41-21-710-801.
- (3) If the Tank and Compensator Unit Test does not show problems, then do this test of the out-of-tank wiring (wire bundle) from the bussing plug to the Fuel Quantity Processor Unit (FQPU) in the radar bay:
  - (a) FOR A FAULT IN THE NO. 1 TANK, do these steps:
    - 1) Disconnect connector D11304 on the FQPU, M1827 in the radar bay.
    - Do a continuity check between these pins of connector D11312 on the front spar and connector D11304 on the FQPU, M1827 in the radar bay:

#### AKS 001-013

D11312	D11304
pin 1	. pin 8
pin 2	. pin 22
pin 3	. pin 23

#### AKS 014-999

D1131	D11304	
pin 1		pin 8
pin 2		pin 21
pin 3		pin 17

#### **AKS ALL**

- Make sure connector D11304 is disconnected.
- 4) Make sure the resistance from D11312, pin 1 to structure ground is more than 1 megohm.
- 5) Make sure the resistance from D11312, pin 3 to structure ground is more than 1 megohm.
- 6) Re-connect connectors D11304 and D11312. To re-connect connector D11312, do this task: Bussing Plug Installation, AMM TASK 28-41-41-400-801.
- (b) FOR A FAULT IN THE NO. 2 TANK, do these steps:
  - 1) Disconnect connector D11306 on the FQPU, M1827 in the radar bay.
  - Do a continuity check between these pins of connector D11314 on the front spar and connector D11306 on the FQPU, M1827 in the radar bay:

28-41 TASK 802

EFFECTIVITY



#### AKS 001-013

D11314	D11306
pin 1	pin 8
pin 2	pin 22
pin 3	pin 23

#### AKS 014-999

D1131	D11306	
pin 1		pin 8
pin 2		pin 21
pin 3		pin 17

#### **AKS ALL**

- 3) Make sure connector D11306 is disconnected.
- 4) Make sure the resistance from D11314, pin 1 to structure ground is more than 1 megohm.
- 5) Make sure the resistance from D11314, pin 3 to structure ground is more than 1 megohm.
- 6) Re-connect connectors D11306 and D11314. To re-connect connector D11314, do this task: Bussing Plug Installation, AMM TASK 28-41-41-400-801.
- (c) FOR A FAULT IN THE CENTER TANK, do these steps:
  - 1) Disconnect connector D11308 on the FQPU, M1827 in the radar bay.
  - 2) Do a continuity check between these pins of connector D11316 on the rear spar and connector D11308 on the FQPU, M1827 in the radar bay:

#### AKS 001-013

D11316	D11308
pin 1	pin 8
pin 2	pin 22
pin 3	pin 23

#### AKS 014-999

D11316	D11308
pin 1	pin 8
pin 2	pin 21
pin 3	pin 17

#### **AKS ALL**

- 3) Make sure connector D11308 is disconnected.
- 4) Make sure the resistance from D11316, pin 1 to structure ground is more than 1 megohm.
- 5) Make sure the resistance from D11316, pin 3 to structure ground is more than 1 megohm.

EFFECTIVITY

**AKS ALL** 

28-41 TASK 802

Page 207 Jun 15/2016



- 6) Re-connect connectors D11308 and D11316. To re-connect connector D11316, do this task: Bussing Plug Installation, AMM TASK 28-41-41-400-801.
- (d) If you find a problem with the out-of-tank wire bundle, then repair the wiring (SWPM 20-20-00, SWPM 20-60-06).
  - 1) Make sure the out-of-tank wire bundle is shielded and the shield ground is terminated (SWPM 20-10-15, SWPM 20-20-00).

## 28-AWL-04: CDCCL

(e) Do this task: FQIS - Out Tank Connectors - Electrical Bonding Resistance Check, AMM TASK 05-55-54-200-802, for the applicable side of body FQIS connector D39915 or D39916, or main wheel well FQIS connector D4850P, if it is disconnected or if the coupling ring on the connector is loosened or tightened,.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-04.

#### 28-AWL-04: CDCCL

(f) Do this task: FQIS Wiring And Bonding - Inspection, AMM TASK 05-55-54-200-801, for the applicable wire bundle if the FQIS wire bundle in the unpressurized zone is replaced or the FQIS wire bundle shield is repaired.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-04.

- (g) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - 1) If the GROUND TEST procedure shows PASS, then you corrected the fault.
  - 2) If the GROUND TEST procedure continues to show TANK UNIT LO-Z OPEN/GND, then continue.

WARNING: OBEY THE PRECAUTIONS FOR PURGING AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (4) If a single tank unit or compensator shows problems, then go into the applicable fuel tank (AMM TASK 28-11-00-910-802) and do these steps:
  - (a) Do an inspection of the tank unit and the adjacent wiring for these problems:
    - Make sure no parts of the tank unit or compensator are in electrical contact with the airplane structure.
    - 2) Make sure there are no brackets that are bent or have other problems.
    - 3) Make sure there is no unwanted material in the tank unit or compensator.
    - 4) Make sure there are no loose terminal connections at either the applicable tank unit or the number 2 tank unit.

NOTE: The number 2 tank unit is the top of a daisy chain. If there is a loose connection at the number 2 tank unit, then a fault message can display for other tank units.

 a) If there are loose terminal connections, then tighten the screws to these torque ranges:

AKS ALL



- <1> LO-Z 29 ±6 in-lb (3 ±1 N·m)
- <2> SHIELD 17.5 ±2.5 in-lb (2.0 ±0.3 N·m)
- <3> HI-Z 13.5 ±1.5 in-lb (1.5 ±0.2 N·m)
- 5) Make sure there are not other problems with the wiring near the applicable tank unit or the number 2 tank unit (for example, a wire pinched under a tank unit).
- (b) If there are problems with the tank unit or the adjacent wiring, then repair the problems.
- (c) If the tank unit wiring is repaired or replaced, then make sure the wire slack between the wire and components or structure maintains a clearance of 0.5 in. (12.7 mm).

## → 28-AWL-09: CDCCL

(d) If 0.5 in. (12.7 mm) is not possible, then you must maintain a minimum clearance of 0.125 in. (3.175 mm).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-09.

- (e) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - 1) If the GROUND TEST procedure shows PASS, then you corrected the fault.
  - If the GROUND TEST procedure continues to show TANK UNIT LO-Z OPEN/GND, then replace the tank unit or compensator.

These are the tasks:

Tank Unit or the Compensator Unit Removal, AMM TASK 28-41-21-000-801 Tank Unit or Compensator Unit Installation, AMM TASK 28-41-21-400-801

- 3) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - a) If the GROUND TEST procedure shows PASS, then you corrected the fault.
  - b) If the GROUND TEST procedure continues to show TANK UNIT LO-Z OPEN/GND, then repair or replace the in-tank FQIS wire harness in the applicable tank (AMM TASK 28-41-44-400-801).

WARNING: OBEY THE PRECAUTIONS FOR PURGING AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (5) If two or more tank units show problems, then go into the applicable fuel tank (AMM TASK 28-11-00-910-802) and do these steps:
  - (a) Make sure there are no loose terminal connections at each tank unit within the applicable tank.

NOTE: The number 2 tank unit is the top of a daisy chain. If there is a loose connection at the number 2 tank unit, then a fault message can display for other tank units.

- 1) If there are loose terminal connections, then tighten the screws to these torque ranges:
  - a) LO-Z 29 ±6 in-lb (3 ±1 N·m)
  - b) SHIELD 17.5 ±2.5 in-lb (2.0 ±0.3 N·m)
  - c) HI-Z 13.5 ±1.5 in-lb (1.5 ±0.2 N·m)
- (b) Do this task: FQIS BITE Procedure, 28-41 TASK 801.

AKS ALL



- 1) If the GROUND TEST procedure shows PASS, then you corrected the fault.
- 2) If the GROUND TEST procedure continues to show TANK UNIT LO-Z OPEN/GND, then repair or replace the FQIS wire harness (AMM TASK 28-41-44-400-801).
- (c) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - 1) If the GROUND TEST procedure shows PASS, then you corrected the fault.

——— END OF TASK ———

## 803. FQIS Fault Message - TANK UNIT SHORT/>FULL - Fault Isolation

# A. Description

- (1) This task is for these maintenance messages:
  - (a) 28-41103 TANK UNIT SHORT/FULL
    - 1) This fault code shows a problem with the No. 1 tank.
  - (b) 28-41203 TANK UNIT SHORT/FULL
    - 1) This fault code shows a problem with the No. 2 tank.
  - (c) 28-41303 TANK UNIT SHORT/FULL
    - 1) This fault code shows a problem with the center tank.
- (2) This fault can be caused by one of these three conditions:
  - (a) This fault shows if the measured volume is more than the volume of the tank. For example, this fault shows if the FQIS indicates more than 1400 gal (5300 I) in the No. 1 or the No. 2 tank. The fault also shows if the FQIS indicates more than 4750 gal (17,981 I) in the center tank.
  - (b) This fault shows if there is a resistance in parallel with the tank units that can cause an error of more than 4.5% of full tank in the indicated fuel mass.
  - (c) This fault also shows if an open HI-Z shield causes an FQIS indication that is more than the full tank capacity. Beyond the open point, the shield acts as an antenna for the LO-Z signal. This signal then appears on the HI-Z center conductor. The LO-Z and HI-Z wires are in the same harness so if the open point in the shield is close to the processor (which would allow an antenna of maximum length) it is possible for the added signal to increase the measured fuel quantity by more than 2000 lb (907 kg).
- (3) This fault causes the FQIS display and the refuel panel indicator for the tank that has the fault to become blank.
- (4) When the fault is present, the compensator capacitance can be normal or abnormal. If the fault is caused by contamination in the fuel (water, for example), then the tank unit capacitance will be too large for the quantity of fuel in the tank.
- (5) If the fault is caused by a low resistance in parallel with the tank units, you can measure the resistance from the tank unit LO-Z to the tank unit HI-Z center conductor to confirm the cause of the fault. In the No. 1 or No. 2 tank, the fault is caused by a resistance of less than 65 kilohms. In the center tank, the fault is caused by a resistance of less than 45 kilohms.
- (6) If the fault is caused by an open in the HI-Z shield, do a close inspection of the shield continuity from the processor to the most distant tank unit.
- (7) This fault can also occur if the compensator has a short between 0 and 100 ohms.

#### B. Possible Causes

- (1) FQIS wire harness (including an open HI-Z shield)
- (2) Water contamination in the fuel tank

AKS ALL

28-41 TASKS 802-803



- (3) Microbial growth in the fuel tank
- (4) FQIS tank unit or compensator
- (5) Out-of-tank wiring (wire bundle) from the wing spar to the FQPU (including the bussing plug or an open HI-Z shield)

#### C. Circuit Breakers

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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	5	C00398	FUEL QTY 2
Α	6	C00397	FUEL QTY 1

#### D. Related Data

- (1) (SSM 28-41-11)
- (2) (WDM 28-41-11)

#### E. Initial Evaluation

- (1) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
- (2) If the GROUND TEST shows TANK UNIT SHORT/FULL for the applicable tank, then do the Fault Isolation Procedure below.
- (3) If the GROUND TEST shows PASS, then there was an intermittent fault.

## F. Fault Isolation Procedure

- (1) Do these steps to do a check for water in the fuel:
  - (a) Get a sample of fuel at the sump of the applicable fuel tank (AMM TASK 12-11-00-680-801).
  - (b) Add one or two drops of water-soluble food coloring to the fuel sample.
    - NOTE: If there is water contamination of the fuel sample, the water in the fuel sample will be identified by the food coloring.
  - (c) If there is water contamination of the fuel sample, continue to get samples of fuel until no water is identified by the food coloring (AMM TASK 12-11-00-680-801).
    - 1) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
      - a) If the GROUND TEST shows PASS, then you corrected the fault.
      - b) If the GROUND TEST shows TANK UNIT SHORT/FULL for the applicable tank, then continue.
  - (d) If there is no water contamination of the fuel sample, then continue.
- (2) Do these steps to do a check for microbial growth in the fuel:

WARNING: OBEY THE PRECAUTIONS FOR PURGING AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (a) Go into the No.1 tank (No. 2 tank, center tank) (AMM TASK 28-11-00-910-802).
- (b) Do a check for microbial growth (AMM TASK 28-10-00-200-802).
- (c) Correct any problem that you find (AMM TASK 28-10-00-600-804).
- (d) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
- (e) If the GROUND TEST shows PASS, then you corrected the fault.

AKS ALL



- (f) If the GROUND TEST shows TANK UNIT SHORT/FULL for the applicable tank, then continue.
- (3) If there is no microbial growth in the fuel tank, then continue.
- (4) Disconnect the applicable bussing plug and examine the pins for a bent pin or other damage (AMM TASK 28-41-41-000-801).
  - (a) If there is damage, then do these steps:
    - 1) Repair the pins if any of the pins have damage.
    - 2) Clean the connector if there is any corrosion (SWPM 20-60-01).
    - 3) Re-connect the bussing plug (AMM TASK 28-41-41-400-801).
    - 4) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
    - 5) If the GROUND TEST shows PASS, then you corrected the fault.
    - 6) If the GROUND TEST shows TANK UNIT SHORT/FULL for the applicable tank, then continue.
  - (b) If there is no corrosion or damage, then continue.
- (5) For the applicable tank, do this task: Tank and Compensator Units Test, AMM TASK 28-41-21-710-801.
- (6) If the Tank and Compensator Unit Test does not show problems, then do this test of the out-of-tank wiring (wire bundle) from the bussing plug to the Fuel Quantity Processor Unit (FQPU) in the radar bay:
  - (a) FOR A FAULT IN THE NO. 1 TANK, do these steps:
    - 1) Disconnect connector, D11304, on the FQPU, M1827, in the radar bay.
    - 2) Disconnect connector, D11312, at the front spar if it is not already disconnected.
    - 3) Do a continuity check between these pins of connector, D11312, on the front spar and connector, D11304, on the FQPU, M1827, in the radar bay:

## AKS 001-013

D11312	D11304
pin 1	pin 8
pin 2	pin 22
pin 3	pin 23

## AKS 014-999

D11312	D11304
pin 1	pin 8
pin 2	pin 21
pin 3	pin 17

## AKS ALL

4) Do a continuity check from pin 9 on connector, D11304, to the Hi-Z shield around pin 1 on connector, D11312.

NOTE: This step does a check of the out-of-tank wiring for an open shield condition.

5) Make sure connector, D11304, is disconnected.

AKS ALL



- 6) Make sure the resistance from D11312, pin 2, to D11312, pin 1, is more than 1 megohm.
- 7) Make sure the resistance from D11312, pin 3, to D11312, pin 1, is more than 1 megohm.
- 8) Re-connect connectors D11304 and D11312. To re-connect connector, D11312, do this task: Bussing Plug Installation, AMM TASK 28-41-41-400-801.
- (b) FOR A FAULT IN THE NO. 2 TANK, do these steps:
  - 1) Disconnect connector, D11306, on the FQPU, M1827, in the radar bay.
  - 2) Disconnect connector, D11314, at the front spar if it is not already disconnected.
  - 3) Do a continuity check between these pins of connector, D11314, on the front spar and connector, D11306, on the FQPU, M1827, in the radar bay:

#### AKS 001-013

D1131	4	D11306
pin 1		pin 8
pin 2		pin 22
pin 3		pin 23

#### AKS 014-999

D11314	D11306
pin 1	pin 8
pin 2	pin 21
pin 3	pin 17

## **AKS ALL**

4) Do a continuity check from pin 9 on connector, D11306, to the Hi-Z shield around pin 1 on connector, D11314.

NOTE: This step does a check of the out-of-tank wiring for an open shield condition.

- 5) Make sure connector, D11306, is disconnected.
- 6) Make sure the resistance from D11314, pin 1, to D11314, pin 2, is more than 1 megohm.
- 7) Make sure the resistance from D11314, pin 1, to D11314, pin 3, is more than 1 megohm.
- 8) Re-connect connectors D11306 and D11314. To re-connect connector, D11314, do this task: Bussing Plug Installation, AMM TASK 28-41-41-400-801.
- (c) FOR A FAULT IN THE CENTER TANK, do these steps:
  - 1) Disconnect connector, D11308, on the FQPU, M1827, in the radar bay.
  - 2) Disconnect connector, D11316, at the front spar if it is not already disconnected.
  - 3) Do a continuity check between these pins of connector, D11316, on the rear spar and connector, D11308, on the FQPU, M1827, in the radar bay:



#### AKS 001-013

D11316	D11308
pin 1	pin 8
pin 2	pin 22
pin 3	pin 23

## AKS 014-999

D1131	6	D11308
pin 1		pin 8
pin 2		pin 21
pin 3		pin 17

#### **AKS ALL**

4) Do a continuity check from pin 9 on connector, D11308, to the Hi-Z shield around pin 1 on connector, D11316.

NOTE: This step does a check of the out-of-tank wiring for an open shield condition.

- 5) Make sure connector, D11308, is disconnected.
- 6) Make sure the resistance from D11316, pin 1, to D11316, pin 2, is more than 1 megohm.
- 7) Make sure the resistance from D11316, pin 1, to D11316, pin 3, is more than 1 megohm.
- Re-connect connectors D11308 and D11316. To re-connect connector, D11316, do this task: Bussing Plug Installation, AMM TASK 28-41-41-400-801.
- (d) If you find a problem with the wiring, then repair the problems that you find (SWPM 20-20-00, SWPM 20-60-06).
  - 1) Make sure the out-of-tank wire bundle is shielded and the shield ground is terminated (SWPM 20-10-15, SWPM 20-20-00).

#### 28-AWL-04: CDCCL

(e) Do this task: FQIS - Out Tank Connectors - Electrical Bonding Resistance Check, AMM TASK 05-55-54-200-802, for the applicable side of body FQIS connector D39915 or D39916, or main wheel well FQIS connector D4850P, if it is disconnected or if the coupling ring on the connector is loosened or tightened,.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-04.

## 28-AWL-04: CDCCL

(f) Do this task: FQIS Wiring And Bonding - Inspection, AMM TASK 05-55-54-200-801, for the applicable wire bundle if the FQIS wire bundle in the unpressurized zone is replaced or the FQIS wire bundle shield is repaired.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-04.

EFFECTIVITY

AKS ALL



- (g) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - 1) If the GROUND TEST procedure shows PASS, then you corrected the fault.
  - If the GROUND TEST procedure continues to show TANK UNIT SHORT/>FULL, then continue.

WARNING: OBEY THE PRECAUTIONS FOR PURGING AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (7) If a single tank unit or compensator shows problems, then go into the applicable fuel tank (AMM TASK 28-11-00-910-802) and do these steps:
  - (a) Do an inspection of the tank unit and the adjacent wiring for these problems:
    - 1) Make sure no parts of the tank unit or compensator are in electrical contact with the airplane structure.
    - 2) Make sure there are no brackets that are bent or have other problems.
    - Make sure there is no unwanted material in the tank unit or compensator.
    - 4) Make sure there are no loose terminal connections at either the applicable tank unit or the number 2 tank unit.

NOTE: The number 2 tank unit is the top of a daisy chain. If there is a loose connection at the number 2 tank unit, then a fault message can display for other tank units.

- a) If there are loose terminal connections, then tighten the screws to these torque ranges:
  - <1> LO-Z 29 ±6 in-lb (3 ±1 N·m)
  - <2> SHIELD 17.5 ±2.5 in-lb (2.0 ±0.3 N·m)
  - <3> HI-Z 13.5 ±1.5 in-lb (1.5 ±0.2 N·m)
- 5) Make sure there are not other problems with the wiring near the applicable tank unit or the number 2 tank unit (for example, a wire pinched under a tank unit).
- (b) If there are problems with the tank unit or the adjacent wiring, then repair the problems.
- (c) If the tank unit wiring is repaired or replaced, then make sure the wire slack between the wire and components or structure maintains a clearance of 0.5 in. (12.7 mm).

#### 28-AWL-09: CDCCL

(d) If 0.5 in. (12.7 mm) is not possible, then you must maintain a minimum clearance of 0.125 in. (3.175 mm).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-09.

- (e) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - If the GROUND TEST procedure shows PASS, then you corrected the fault.
  - If the GROUND TEST procedure continues to show TANK UNIT SHORT/FULL, then replace the tank unit or compensator.

These are the tasks:

Tank Unit or the Compensator Unit Removal, AMM TASK 28-41-21-000-801 Tank Unit or Compensator Unit Installation, AMM TASK 28-41-21-400-801

AKS ALL



- Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - a) If the GROUND TEST procedure shows PASS, then you corrected the fault.
  - b) If the GROUND TEST procedure continues to show TANK UNIT SHORT/FULL, then repair or replace the in-tank FQIS wire harness in the applicable tank (AMM TASK 28-41-44-400-801).

WARNING: OBEY THE PRECAUTIONS FOR PURGING AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (8) If two or more tank units show problems, then go into the applicable fuel tank (AMM TASK 28-11-00-910-802) and do these steps:
  - (a) Make sure there are no loose terminal connections at each tank unit within the applicable tank.

NOTE: The number 2 tank unit is the top of a daisy chain. If there is a loose connection at the number 2 tank unit, then a fault message can display for other tank units.

- 1) If there are loose terminal connections, then tighten the screws to these torque ranges:
  - a) LO-Z 29 ±6 in-lb (3 ±1 N·m)
  - b) SHIELD 17.5 ±2.5 in-lb (2.0 ±0.3 N·m)
  - c) HI-Z 13.5 ±1.5 in-lb (1.5 ±0.2 N·m)
- (b) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - 1) If the GROUND TEST procedure shows PASS, then you corrected the fault.
  - 2) If the GROUND TEST procedure continues to show TANK UNIT SHORT/FULL, then repair or replace the FQIS wire harness (AMM TASK 28-41-44-400-801).
- (c) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - 1) If the GROUND TEST procedure shows PASS, then you corrected the fault.



## 804. FQIS Fault Message - TANK UNIT LO RESISTANCE - Fault Isolation

## A. Description

- (1) This task is for these maintenance messages:
  - (a) 28-41104 TANK UNIT LO RESISTANCE
    - 1) This fault code shows a problem with the No. 1 tank.
  - (b) 28-41204 TANK UNIT LO RESISTANCE
    - 1) This fault code shows a problem with the No. 2 tank.
  - (c) 28-41304 TANK UNIT LO RESISTANCE
    - 1) This fault code shows a problem with the center tank.
- (2) This fault message alone does not cause the FQIS display or the refuel panel indicator to become blank. It shows that the measured fuel mass has an error additional to the baseline error which is less than +/- 5 percent of full scale fuel mass.
- (3) This fault message shows if the measured resistance from the tank unit Lo-Z wire to the Hi-Z center conductor is less than approximately 253 kilohm and more than 64.8 kilohm for the No. 1 or No. 2 tank, less than approximately 177 kilohm and more than 45.1 kilohm for the center tank.

AKS ALL

28-41 TASKS 803-804



(4) This fault message is intended to show a condition that can develop into a fault indicated by the message TANK UNIT SHORT/>FULL. This fault message can indicate some contamination in one or more of the tank units or the compensator or a decrease in the resistance from the Lo-Z to the Hi-Z part of the tank unit circuit. This decrease in resistance could be caused by the start of a breakdown in the tank harness insulation or by conductivity across the tank units.

#### B. Possible Causes

- (1) FQIS wire harness
- (2) Water contamination in the fuel tank
- (3) Microbial growth in the fuel tank
- (4) FQIS tank unit or compensator
- (5) Out-of-tank wiring (wire bundle) from the wing spar to the FQPU (including the bussing plug)
- (6) M1827 FQPU Fuel Quantity Processor Unit

#### C. Circuit Breakers

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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	5	C00398	FUEL QTY 2
Α	6	C00397	FUEL QTY 1

#### D. Related Data

**AKS ALL** 

- (1) (SSM 28-41-11)
- (2) (WDM 28-41-11)

#### E. Initial Evaluation

- (1) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
- (2) If the GROUND TEST shows TANK UNIT LO RESISTANCE for the applicable tank, then do the Fault Isolation Procedure below.
- (3) If the GROUND TEST shows PASS, then there was an intermittent fault.

#### F. Fault Isolation Procedure

- (1) Do these steps to do a check for water in the fuel:
  - (a) Get a sample of fuel at the sump of the applicable fuel tank (AMM TASK 12-11-00-680-801).
  - (b) Add one or two drops of water-soluble food coloring to the fuel sample.
    - NOTE: If there is water contamination of the fuel sample, the water in the fuel sample will be identified by the food coloring.
  - (c) If there is water contamination of the fuel sample, continue to get samples of fuel until no water is identified by the food coloring (AMM TASK 12-11-00-680-801).
    - 1) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
      - a) If the GROUND TEST shows PASS, then you corrected the fault.
      - b) If the GROUND TEST shows TANK UNIT LO RESISTANCE for the applicable tank, then continue.
  - (d) If there is no water contamination of the fuel sample, then continue.
- (2) Do these steps to do a check for microbial growth in the fuel:



WARNING: OBEY THE PRECAUTIONS FOR PURGING AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (a) Go into the No.1 tank (No. 2 tank, center tank) (AMM TASK 28-11-00-910-802).
- (b) Do a check for microbial growth (AMM TASK 28-10-00-200-802).
- (c) Correct any problem that you find (AMM TASK 28-10-00-600-804).
- (d) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
- (e) If the GROUND TEST shows PASS, then you corrected the fault.
- (f) If the GROUND TEST shows TANK UNIT LO RESISTANCE for the applicable tank, then continue.
- (3) If there is no microbial growth in the fuel tank, then continue.
- (4) Disconnect the applicable bussing plug and examine the pins for a bent pin or other damage (AMM TASK 28-41-41-000-801).
  - (a) If there is damage, then do these steps:
    - 1) Repair the pins if any of the pins have damage.
    - 2) Clean the connector if there is any corrosion (SWPM 20-60-01).
    - 3) Re-connect the bussing plug (AMM TASK 28-41-41-400-801).
    - 4) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
    - 5) If the GROUND TEST shows PASS, then you corrected the fault.
    - 6) If the GROUND TEST shows TANK UNIT LO RESISTANCE for the applicable tank, then continue.
  - (b) If there is no corrosion or damage, then continue.
- (5) For the applicable tank, do this task: Tank and Compensator Units Test, AMM TASK 28-41-21-710-801.
- (6) If the Tank and Compensator Unit test does not show problems, then do this test of the out-of-tank wiring (wire bundle) from the bussing plug to the Fuel Quantity Processor Unit (FQPU) in the radar bay:
  - (a) FOR A FAULT IN THE NO. 1 TANK, do these steps:
    - 1) Disconnect connector D11304 on the FQPU, M1827 in the radar bay.
    - Do a continuity check between these pins of connector D11312 on the front spar and connector D11304 on the FQPU, M1827 in the radar bay:

#### AKS 001-013

**AKS ALL** 

D11312	D11304
pin 1	pin 8
pin 2	pin 22
pin 3	pin 23

EFFECTIVITY 28-41 TASK 804



#### AKS 014-999

D1131	2	D11304
pin 1		pin 8
pin 2		pin 21
pin 3		pin 17

#### **AKS ALL**

- 3) Make sure connector D11304 is disconnected.
- 4) Make sure the resistance from D11312, pin 2 to D11312, pin 1 is more than 1 megohm.
- 5) Make sure the resistance from D11312, pin 3 to D11312, pin 1 is more than 1 megohm.
- 6) Re-connect connectors D11304 and D11312. To re-connect connector D11312, do this task: Bussing Plug Installation, AMM TASK 28-41-41-400-801.
- (b) FOR A FAULT IN THE NO. 2 TANK, do these steps:
  - 1) Disconnect connector D11306 on the FQPU, M1827 in the radar bay.
  - Do a continuity check between these pins of connector D11314 on the front spar and connector D11306 on the FQPU, M1827 in the radar bay:

#### AKS 001-013

D11314	D11306
pin 1	pin 8
pin 2	pin 22
pin 3	pin 23

#### AKS 014-999

D11314	D11306
pin 1	pin 8
pin 2	pin 21
pin 3	pin 17

### **AKS ALL**

- Make sure connector D11306 is disconnected.
- 4) Make sure the resistance from D11314, pin 1 to D11314, pin 2 is more than 1 megohm.
- 5) Make sure the resistance from D11314, pin 1 to D11314, pin 3 is more than 1 megohm.
- 6) Re-connect connectors D11306 and D11314. To re-connect connector D11314, do this task: Bussing Plug Installation, AMM TASK 28-41-41-400-801.
- (c) FOR A FAULT IN THE CENTER TANK, do these steps:
  - 1) Disconnect connector D11308 on the FQPU, M1827 in the radar bay.
  - 2) Do a continuity check between these pins of connector D11316 on the rear spar and connector D11308 on the FQPU, M1827 in the radar bay:

AKS ALL



#### AKS 001-013

D11316	D11308
pin 1	pin 8
pin 2	pin 22
pin 3	pin 23

#### AKS 014-999

D11316	D11308
pin 1	pin 8
pin 2	pin 21
pin 3	pin 17

#### **AKS ALL**

EFFECTIVITY

AKS ALL

- 3) Make sure connector D11308 is disconnected.
- 4) Make sure the resistance from D11316, pin 2 to D11316, pin 1 is more than 1 megohm.
- 5) Make sure the resistance from D11316, pin 3 to D11316, pin 1 is more than 1 megohm.
- Reconnect connectors D11308 and D11316. To re-connect connector D11316, do this task: Bussing Plug Installation, AMM TASK 28-41-41-400-801.
- (d) If you find a problem with the wiring, then repair the problems that you find (SWPM 20-20-00, SWPM 20-60-06).
  - 1) Make sure the out-of-tank wire bundle is shielded and the shield ground is terminated (SWPM 20-10-15, SWPM 20-20-00).

## 28-AWL-04: CDCCL

(e) Do this task: FQIS - Out Tank Connectors - Electrical Bonding Resistance Check, AMM TASK 05-55-54-200-802, for the applicable side of body FQIS connector D39915 or D39916, or main wheel well FQIS connector D4850P, if it is disconnected or if the coupling ring on the connector is loosened or tightened,.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-04.

#### 28-AWL-04: CDCCL

(f) Do this task: FQIS Wiring And Bonding - Inspection, AMM TASK 05-55-54-200-801, for the applicable wire bundle if the FQIS wire bundle in the unpressurized zone is replaced or the FQIS wire bundle shield is repaired..

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-04.

- (g) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - 1) If the GROUND TEST procedure shows PASS, then you corrected the fault.

28-41 TASK 804

BOEING PROPRIETARY - Copyright © Unpublished Work - See title page for details



 If the GROUND TEST procedure continues to show TANK UNIT LO RESISTANCE, then continue.

WARNING: OBEY THE PRECAUTIONS FOR PURGING AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (7) If a single tank unit or compensator shows problems, then go into the applicable fuel tank (AMM TASK 28-11-00-910-802) and do these steps:
  - (a) Do an inspection of the tank unit and the adjacent wiring for these problems:
    - 1) Make sure no parts of the tank unit or compensator are in electrical contact with the airplane structure.
    - 2) Make sure there are no brackets that are bent or have other problems.
    - 3) Make sure there is no unwanted material in the tank unit or compensator.
    - 4) Make sure there are no loose terminal connections at either the applicable tank unit or the number 2 tank unit.

NOTE: The number 2 tank unit is the top of a daisy chain. If there is a loose connection at the number 2 tank unit, then a fault message can display for other tank units.

- a) If there are loose terminal connections, then tighten the screws to these torque ranges:
  - <1> LO-Z 29 ±6 in-lb (3 ±1 N·m)
  - <2> SHIELD 17.5 ±2.5 in-lb (2.0 ±0.3 N·m)
  - <3> HI-Z 13.5 ±1.5 in-lb (1.5 ±0.2 N·m)
- 5) Make sure there are not other problems with the wiring near the applicable tank unit or the number 2 tank unit (for example, a wire pinched under a tank unit).
- (b) If there are problems with the tank unit or the adjacent wiring, then repair the problems.
- (c) If the tank unit wiring is repaired or replaced, then make sure the wire slack between the wire and components or structure maintains a clearance of 0.5 in. (12.7 mm).

#### 28-AWL-09: CDCCL

(d) If 0.5 in. (12.7 mm) is not possible, then you must maintain a minimum clearance of 0.125 in. (3.175 mm).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-09.

- (e) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - 1) If the GROUND TEST procedure shows PASS, then you corrected the fault.
  - If the GROUND TEST procedure continues to show TANK UNIT LO RESISTANCE, then replace the tank unit or compensator.

These are the tasks:

Tank Unit or the Compensator Unit Removal, AMM TASK 28-41-21-000-801 Tank Unit or Compensator Unit Installation, AMM TASK 28-41-21-400-801

- 3) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - a) If the GROUND TEST procedure shows PASS, then you corrected the fault.

AKS ALL



b) If the GROUND TEST procedure continues to show TANK UNIT LO RESISTANCE, then repair or replace the in-tank FQIS wire harness in the applicable tank (AMM TASK 28-41-44-400-801).

WARNING: OBEY THE PRECAUTIONS FOR PURGING AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (8) If two or more tank units show problems, then go into the applicable fuel tank (AMM TASK 28-11-00-910-802) and do these steps:
  - (a) Make sure there are no loose terminal connections at each tank unit within the applicable tank.

NOTE: The number 2 tank unit is the top of a daisy chain. If there is a loose connection at the number 2 tank unit, then a fault message can display for other tank units.

- 1) If there are loose terminal connections, then tighten the screws to these torque ranges:
  - a) LO-Z 29 ±6 in-lb (3 ±1 N·m)
  - b) SHIELD 17.5 ±2.5 in-lb (2.0 ±0.3 N·m)
  - c) HI-Z 13.5 ±1.5 in-lb (1.5 ±0.2 N·m)
- (b) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - 1) If the GROUND TEST procedure shows PASS, then you corrected the fault.
  - 2) If the GROUND TEST procedure continues to show TANK UNIT LO RESISTANCE, then repair or replace the FQIS wire harness (AMM TASK 28-41-44-400-801).
- (c) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - 1) If the GROUND TEST procedure shows PASS, then you corrected the fault.
- (9) If the problem continues, do these steps:
  - (a) Replace the FQPU. These are the tasks:

Fuel Quantity Processor Unit Removal, AMM TASK 28-41-81-000-801.

Fuel Quantity Processor Unit Installation, AMM TASK 28-41-81-400-801

(b) Do this task: Operational Test - Fuel Quantity Indicating System, AMM TASK 28-41-00-710-801.



#### 805. FQIS Fault Message - COMPENSATOR LO-Z OP/GND - Fault Isolation

## A. Description

- (1) This task is for these maintenance messages:
  - (a) 28-41106 COMPENSATOR LO-Z OP/GND
    - 1) This fault code shows a problem with the No. 1 tank.
  - (b) 28-41206 COMPENSATOR LO-Z OP/GND
    - 1) This fault code shows a problem with the No. 2 tank.
  - (c) 28-41306 COMPENSATOR LO-Z OP/GND
    - 1) This fault code shows a problem with the center tank.
- (2) The compensator Lo-Z wire is open or shorted to ground.

AKS ALL

28-41 TASKS 804-805



- (3) This message is shown if the measured value of [K-1] is less than or equal to -0.85. If this fault condition causes an error in the fuel mass of less than 5 percent, then [K-1] is set to a nominal value of 1.1365.
  - NOTE: K is the "dielectric constant". Air, by definition has a K factor of 1. Fuel, depending on density and source, can have a K factor between approximately 2.0 and 2.2.
- (4) If the fault condition is a short to ground and the magnitude of the short is sufficient to cause an error of 5 percent or more in the fuel mass calculation, the FQIS display and the refuel panel indicator for the tank that has the fault becomes blank.
- (5) If the fault condition is a Lo-Z open wire or the short to ground is not sufficient to cause more than a 5 percent error in mass calculation, the fuel quantity continues to show with [K-1] set to the nominal value of 1.1365.
- (6) This fault can also be shown if the tank unit Lo-Z wire is shorted to ground through less than 100 ohms (28-41 TASK 802).

#### B. Possible Causes

- (1) FQIS wire harness
- Out-of-tank wiring (wire bundle) from the wing spar to the FQPU (including the bussing plug)
- (3) Compensator

## C. Circuit Breakers

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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	5	C00398	FUEL QTY 2
Α	6	C00397	FUEL QTY 1

#### D. Related Data

- (1) (SSM 28-41-11)
- (2) (WDM 28-41-11)

## E. Initial Evaluation

- (1) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
- (2) If the GROUND TEST shows COMPENSATOR LO-Z OP/GND for the applicable tank, then do the Fault Isolation Procedure below.
- (3) If the GROUND TEST shows PASS, then there was an intermittent fault.

#### F. Fault Isolation Procedure

- (1) Disconnect the applicable bussing plug and examine the pins for corrosion or damage (AMM TASK 28-41-41-000-801).
  - (a) If there is corrosion or damage, then do these steps:
    - 1) Repair the pins if any of the pins have damage.
    - 2) Clean the connector if there is any corrosion (SWPM 20-60-01).
    - 3) Re-connect the bussing plug (AMM TASK 28-41-41-400-801).
    - 4) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
    - 5) If the GROUND TEST shows PASS, then you corrected the fault.

AKS ALL 28-41 TASK 805



- If the GROUND TEST shows COMPENSATOR LO-Z OPEN/GND for the applicable tank, then continue.
- (b) If there is no corrosion or damage, then continue.
- (2) For the applicable tank, do this task: Tank and Compensator Units Test, AMM TASK 28-41-21-710-801
- (3) If the Tank and Compensator Unit Test does not show problems, then do this test of the out-of-tank wiring (wire bundle) from the bussing plug to the Fuel Quantity Processor Unit (FQPU) in the radar bay:
  - (a) FOR A FAULT IN THE NO. 1 TANK, do these steps:
    - 1) Disconnect connector D11304 on the FQPU, M1827 in the radar bay.
    - Do a continuity check between these pins of connector D11312 on the front spar and connector D11304 on the FQPU, M1827 in the radar bay:

#### AKS 001-013

D11312	D11304
pin 1	pin 8
pin 2	pin 22
pin 3	pin 23

#### AKS 014-999

D11312	D11304
pin 1	pin 8
pin 2	pin 21
pin 3	pin 17

#### **AKS ALL**

- 3) Make sure connector D11304 is disconnected.
- 4) Make sure the resistance from D11312, pin 1 to the shield on D11312 is more than 1 megohm.
- 5) Re-connect connectors D11304 and D11312. To re-connect connector D11312, do this task: Bussing Plug Installation, AMM TASK 28-41-41-400-801.
- (b) FOR A FAULT IN THE NO. 2 TANK, do these steps:
  - 1) Disconnect connector D11306 on the FQPU, M1827 in the radar bay.
  - Do a continuity check between these pins of connector D11314 on the front spar and connector D11306 on the FQPU, M1827 in the radar bay:

#### AKS 001-013

D11314	D11306
pin 1	 pin 8
pin 2	 pin 22
pin 3	 pin 23

EFFECTIVITY AKS ALL

28-41 TASK 805

Page 224 Jun 15/2016



#### AKS 014-999

D1131	4	D11306
pin 1		pin 8
pin 2		pin 21
pin 3		pin 17

#### **AKS ALL**

- 3) Make sure connector D11306 is disconnected.
- 4) Make sure the resistance from D11314, pin 1 to the shield on D11314 is more than 1 megohm.
- 5) Re-connect connectors D11306 and D11314. To re-connect connector D11314, do this task: Bussing Plug Installation, AMM TASK 28-41-41-400-801.
- (c) FOR A FAULT IN THE CENTER TANK, do these steps:
  - 1) Disconnect connector D11308 on the FQPU, M1827 in the radar bay.
  - 2) Do a continuity check between these pins of connector D11316 on the rear spar and connector D11308 on the FQPU, M1827 in the radar bay:

#### AKS 001-013

D11316	D11308
pin 1	pin 8
pin 2	pin 22
pin 3	pin 23

## AKS 014-999

D11316	D11308
pin 1	pin 8
pin 2	pin 21
pin 3	pin 17

#### **AKS ALL**

- 3) Make sure connector D11308 is disconnected.
- 4) Make sure the resistance from D11316, pin 1 to the shield on D11316 is more than 1 megohm.
- 5) Re-connect connectors D11308 and D11316. To re-connect connector D11316, do this task: Bussing Plug Installation, AMM TASK 28-41-41-400-801.
- (d) If you find a problem with the wiring, then repair the problems that you find (SWPM 20-20-00, SWPM 20-60-06).
  - 1) Make sure the out-of-tank wire bundle is shielded and the shield ground is terminated (SWPM 20-10-15, SWPM 20-20-00).

28-41 TASK 805

**AKS ALL** 

EFFECTIVITY '



## 28-AWL-04: CDCCL

(e) Do this task: FQIS - Out Tank Connectors - Electrical Bonding Resistance Check, AMM TASK 05-55-54-200-802, for the applicable side of body FQIS connector D39915 or D39916, or main wheel well FQIS connector D4850P, if it is disconnected or if the coupling ring on the connector is loosened or tightened,.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-04.

# 28-AWL-04: CDCCL

(f) Do this task: FQIS Wiring And Bonding - Inspection, AMM TASK 05-55-54-200-801, for the applicable wire bundle if the FQIS wire bundle in the unpressurized zone is replaced or the FQIS wire bundle shield is repaired.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-04.

- (g) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - 1) If the GROUND TEST procedure shows PASS, then you corrected the fault.
  - 2) If the GROUND TEST procedure continues to show COMPENSATOR LO-Z OP/GND, then continue.

WARNING: OBEY THE PRECAUTIONS FOR PURGING AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (4) If a single tank unit or compensator shows problems, then go into the applicable fuel tank (AMM TASK 28-11-00-910-802) and do these steps:
  - (a) Do an inspection of the tank unit and the adjacent wiring for these problems:
    - 1) Make sure no parts of the tank unit or compensator are in electrical contact with the airplane structure.
    - 2) Make sure there are no brackets that are bent or have other problems.
    - 3) Make sure there is no unwanted material in the tank unit or compensator.
    - 4) Make sure there are no loose terminal connections at either the applicable tank unit or the number 2 tank unit.

NOTE: The number 2 tank unit is the top of a daisy chain. If there is a loose connection at the number 2 tank unit, then a fault message can display for other tank units.

- a) If there are loose terminal connections, then tighten the screws to these torque ranges:
  - <1> LO-Z 29 ±6 in-lb (3 ±1 N·m)
  - <2> SHIELD 17.5 ±2.5 in-lb (2.0 ±0.3 N·m)
  - <3> HI-Z 13.5 ±1.5 in-lb (1.5 ±0.2 N·m)
- 5) Make sure there are not other problems with the wiring near the applicable tank unit or the number 2 tank unit (for example, a wire pinched under a tank unit).
- (b) If there are problems with the tank unit or the adjacent wiring, then repair the problems.

EFFECTIVITY AKS ALL



- (c) If the tank unit wiring is repaired or replaced, then make sure the wire slack between the wire and components or structure maintains a clearance of 0.5 in. (12.7 mm).
- 28-AWL-09: CDCCL
- (d) If 0.5 in. (12.7 mm) is not possible, then you must maintain a minimum clearance of 0.125 in. (3.175 mm).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-09.

- (e) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - 1) If the GROUND TEST procedure shows PASS, then you corrected the fault.
  - 2) If the GROUND TEST procedure continues to show COMPENSATOR LO-Z OP/GND, then replace the tank unit or compensator.

These are the tasks:

Tank Unit or the Compensator Unit Removal, AMM TASK 28-41-21-000-801 Tank Unit or Compensator Unit Installation, AMM TASK 28-41-21-400-801

- 3) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - a) If the GROUND TEST procedure shows PASS, then you corrected the fault.
  - b) If the GROUND TEST procedure continues to show COMPENSATOR LO-Z OP/GND, then repair or replace the in-tank FQIS wire harness in the applicable tank (AMM TASK 28-41-44-400-801).

WARNING: OBEY THE PRECAUTIONS FOR PURGING AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (5) If two or more tank units show problems, then go into the applicable fuel tank (AMM TASK 28-11-00-910-802) and do these steps:
  - (a) Make sure there are no loose terminal connections at each tank unit within the applicable tank.

NOTE: The number 2 tank unit is the top of a daisy chain. If there is a loose connection at the number 2 tank unit, then a fault message can display for other tank units.

- 1) If there are loose terminal connections, then tighten the screws to these torque ranges:
  - a) LO-Z 29 ±6 in-lb (3 ±1 N·m)
  - b) SHIELD 17.5 ±2.5 in-lb (2.0 ±0.3 N·m)
  - c) HI-Z 13.5  $\pm$ 1.5 in-lb (1.5  $\pm$ 0.2 N·m)
- (b) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - 1) If the GROUND TEST procedure shows PASS, then you corrected the fault.
  - If the GROUND TEST procedure continues to show COMPENSATOR LO-Z OP/GND, then repair or replace the FQIS wire harness (AMM TASK 28-41-44-400-801).
- (c) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - 1) If the GROUND TEST procedure shows PASS, then you corrected the fault.

	——— END OF TASK ———		
EFFECTIVITYAKS ALL		28-41	<b>TASK 805</b>



## 806. FQIS Fault Message - COMPENSATOR SHORTED - Fault Isolation

## A. Description

- (1) This task is for these maintenance messages:
  - (a) 28-41107 COMPENSATOR SHORTED
    - 1) This fault code shows a problem with the No. 1 tank.
  - (b) 28-41207 COMPENSATOR SHORTED
    - 1) This fault code shows a problem with the No. 2 tank.
  - (c) 28-41307 COMPENSATOR SHORTED
    - 1) This fault code shows a problem with the center tank.
- (2) This fault shows a short from the compensator Lo-Z wire to the Hi-Z center conductor.
- (3) This fault is shown if the resistance from compensator Lo-Z to the Hi-Z center conductor is less than 220 Kohms (+/- 25 Kohms). If the error in fuel mass calculation caused by the fault is less than 5 percent, then [K-1] is set to the nominal value of 1.1365.
  - NOTE: K is the "dielectric constant". Air, by definition has a K factor of 1. Fuel, depending on density and source, can have a K factor between approximately 2.0 and 2.2.
- (4) If error in fuel mass calculation caused by the fault is more than 5 percent, then the FQIS display in the flight compartment and the refuel indicator become blank. This usually occurs when the resistance from the compensator Lo-Z wire to the Hi-Z center conductor is between 0 and 10 Kohms.
- (5) If the error in the fuel mass calculation is less than 5 percent, then the fuel quantity in the flight compartment and at the refueling station continues to display with [K-1] set to the nominal value of 1.1365.
- (6) This fault can also be shown if the tank unit Lo-Z wire is shorted to ground through less than 100 ohms (28-41 TASK 802).

### B. Possible Causes

- FQIS wire harness
- (2) Out-of-tank wiring (wire bundle) from the wing spar to the FQPU (including the bussing plug)
- (3) Compensator
- (4) Microbial growth in the fuel tank

### C. Circuit Breakers

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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	5	C00398	FUEL QTY 2
Α	6	C00397	FUEL QTY 1

## D. Related Data

EFFECTIVITY

**AKS ALL** 

- (1) (SSM 28-41-11)
- (2) (WDM 28-41-11)

28-41 TASK 806

D633A103-AKS



### E. Initial Evaluation

- (1) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - (a) If the GROUND TEST shows COMPENSATOR SHORTED for the applicable tank, then do the Fault Isolation Procedure below.
  - (b) If the GROUND TEST shows PASS, then there was an intermittent fault.

#### F. Fault Isolation

- (1) Do these steps to do a check for water in the fuel:
  - (a) Get a sample of fuel at the sump of the applicable fuel tank (AMM TASK 12-11-00-680-801).
  - (b) Add one or two drops of water-soluble food coloring to the fuel sample.
    - NOTE: If there is water contamination of the fuel sample, the water in the fuel sample will be identified by the food coloring.
  - (c) If there is water contamination of the fuel sample, continue to get samples of fuel until no water is identified by the food coloring.
    - 1) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
      - a) If the GROUND TEST shows PASS, then you corrected the fault.
      - b) If the GROUND TEST shows COMPENSATOR SHORTED for the applicable tank, then continue.
  - (d) If there is no water contamination of the fuel sample, then continue.
- (2) Do these steps to do a check for microbial growth in the fuel:

WARNING: OBEY THE PRECAUTIONS FOR PURGING AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (a) Go into the No.1 tank (No. 2 tank, center tank) (AMM TASK 28-11-00-910-802).
- (b) Do a check for microbial growth (AMM TASK 28-10-00-200-802).
- (c) Correct any problem that you find (AMM TASK 28-10-00-600-804).
- (d) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
- (e) If the GROUND TEST show PASS, then you corrected the fault.
- (f) If the GROUND TEST shows COMPENSATOR SHORTED for the applicable tank, then continue.
- (3) If there is no microbial growth in the fuel tank, then continue.
- (4) Disconnect the applicable bussing plug and examine the pins for corrosion or damage (AMM TASK 28-41-41-000-801).
  - (a) If there is corrosion or damage, then do these steps:
    - 1) Repair the pins if any of the pins have damage.
    - 2) Clean the connector if there is any corrosion (SWPM 20-60-01).
    - 3) Re-connect the bussing plug (AMM TASK 28-41-41-400-801).
    - 4) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
    - 5) If the GROUND TEST shows PASS, then you corrected the fault.
    - 6) If the GROUND TEST shows COMPENSATOR SHORTED for the applicable tank, then continue.

AKS ALL



- (b) If there is no corrosion or damage, then continue.
- (5) For the applicable tank, do this task: Tank and Compensator Units Test, AMM TASK 28-41-21-710-801
- (6) If the Tank and Compensator Unit test does not show problems, then do this test of the out-of-tank wiring (wire bundle) from the bussing plug to the Fuel Quantity Processor Unit (FQPU) in the radar bay:
  - (a) FOR A FAULT IN THE NO. 1 TANK, do these steps:
    - 1) Disconnect connector D11304 on the FQPU, M1827 in the radar bay.
    - 2) Do a continuity check between these pins of connector D11312 on the front spar and connector D11304 on the FQPU, M1827 in the radar bay:

### AKS 001-013

D11312	2	D11304
pin 1		pin 8
pin 2		pin 22
pin 3		pin 23

### AKS 014-999

D1131	2	D11304
pin 1		pin 8
pin 2		pin 21
pin 3		pin 17

### **AKS ALL**

- 3) Make sure connector D11304 is disconnected.
- 4) Make sure the resistance from D11312, pin 1 to the shield on D11312 is more than 1 megohm.
- 5) Re-connect connectors D11304 and D11312. To re-connect connector D11312, do this task: Bussing Plug Installation, AMM TASK 28-41-41-400-801.
- (b) FOR A FAULT IN THE NO. 2 TANK, do these steps:
  - 1) Disconnect connector D11314 on the FQPU, M1827 in the radar bay.
  - 2) Do a continuity check between these pins of connector D11314 on the front spar and connector D11306 on the FQPU, M1827 in the radar bay:

#### AKS 001-013

D11314	D11306
pin 1	pin 8
pin 2	pin 22
pin 3	pin 23

28-41 TASK 806

EFFECTIVITY AKS ALL



### AKS 014-999

D1131	4	D11306
pin 1		pin 8
pin 2		pin 21
pin 3		pin 17

### **AKS ALL**

- 3) Make sure connector D11306 is disconnected.
- 4) Make sure the resistance from D11314, pin 1 to the shield on D11314 is more than 1 megohm.
- 5) Re-connect connectors D11306 and D11314. To re-connect connector D11314, do this task: Bussing Plug Installation, AMM TASK 28-41-41-400-801.
- (c) FOR A FAULT IN THE CENTER TANK, do these steps:
  - 1) Disconnect connector D11308 on the FQPU, M1827 in the radar bay.
  - 2) Do a continuity check between these pins of connector D11316 on the rear spar and connector D11308 on the FQPU, M1827 in the radar bay:

### AKS 001-013

D11316	D11308
pin 1	pin 8
pin 2	pin 22
pin 3	pin 23

## AKS 014-999

D11316	D11308
pin 1	pin 8
pin 2	pin 21
pin 3	pin 17

# AKS ALL

- 3) Make sure connector D11308 is disconnected.
- 4) Make sure the resistance from D11316, pin 1 to the shield on D11316 is more than 1 megohm.
- 5) Re-connect connectors D11308 and D11316. To re-connect connector D11316, do this task: Bussing Plug Installation, AMM TASK 28-41-41-400-801.
- (d) If you find a problem with the wiring, then repair the problems that you find (SWPM 20-20-00, SWPM 20-60-06).
  - 1) Make sure the out-of-tank wire bundle is shielded and the shield ground is terminated (SWPM 20-10-15, SWPM 20-20-00).



## 28-AWL-04: CDCCL

(e) Do this task: FQIS - Out Tank Connectors - Electrical Bonding Resistance Check, AMM TASK 05-55-54-200-802, for the applicable side of body FQIS connector D39915 or D39916, or main wheel well FQIS connector D4850P, if it is disconnected or if the coupling ring on the connector is loosened or tightened,.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-04.

# 28-AWL-04: CDCCL

(f) Do this task: FQIS Wiring And Bonding - Inspection, AMM TASK 05-55-54-200-801, for the applicable wire bundle if the FQIS wire bundle in the unpressurized zone is replaced or the FQIS wire bundle shield is repaired..

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-04.

- (g) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - 1) If the GROUND TEST procedure shows PASS, then you corrected the fault.
  - 2) If the GROUND TEST procedure continues to show COMPENSATOR SHORTED, then continue.
- (7) If only the compensator shows problems, then do these steps:
  - (a) Replace the compensator.

These are the tasks:

Tank Unit or the Compensator Unit Removal, AMM TASK 28-41-21-000-801,

Tank Unit or Compensator Unit Installation, AMM TASK 28-41-21-400-801.

- (b) Do an inspection of the compensator and the adjacent wiring for these problems:
  - Make sure no parts of the compensator are in electrical contact with the airplane structure.
  - 2) Make sure there are no brackets that are bent or have other problems.
  - 3) Make sure there is no unwanted material in the compensator.
  - 4) Make sure there are no loose terminal connections at the compensator.
  - 5) Make sure there are not other problems with the wiring near the compensator (for example, a wire pinched under a compensator).
- (c) If there are problems with the tank unit or the adjacent wiring, then repair the problems.
- (d) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - 1) If the GROUND TEST procedure shows PASS, then you corrected the fault.
  - If the GROUND TEST procedure continues to show COMPENSATOR SHORTED, then repair or replace the in-tank FQIS wire harness in the applicable tank. To repair or replace the FQIS wire harness, do this task: FQIS Wire Harness Replacement, AMM TASK 28-41-44-400-801.
  - 3) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
    - If the GROUND TEST procedure shows PASS, then you corrected the fault.

AKS ALL



- (8) If two or more tank units show problems, then repair or replace the in-tank FQIS wire harness in the applicable tank. To repair or replace the FQIS wire harness, do this task: FQIS Wire Harness Replacement, AMM TASK 28-41-44-400-801.
  - (a) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
    - 1) If the GROUND TEST procedure shows PASS, then you corrected the fault.

----- END OF TASK -----

# 807. FQIS Fault Message - COMPENSATOR DATA BAD - Fault Isolation

### A. Description

- (1) This task is for these maintenance messages:
  - (a) 28-41108 COMPENSATOR DATA BAD
    - 1) This fault code shows a problem with the No. 1 tank.
  - (b) 28-41208 COMPENSATOR DATA BAD
    - 1) This fault code shows a problem with the No. 2 tank.
  - (c) 28-41308 COMPENSATOR DATA BAD
    - 1) This fault code shows a problem with the center tank.
- (2) This fault message is intended to show a condition that can develop into a fault indicated by the message COMPENSATOR SHORTED. This fault message can indicate some contamination in the compensator or a decrease in the resistance from the Lo-Z to the Hi-Z part of the compensator circuit. This decrease in resistance could be caused by the start of a breakdown in the tank harness insulation or by conductivity across the compensator.
- (3) This fault message is shown for any one of these conditions:
  - (a) If the volume is above the compensator covered volume and the measured [K-1] is less than 1.000 and more than -0.85
  - (b) If the volume is above the compensator covered volume and the measured [K-1] is more than 1.270
  - (c) If the measured resistance from compensator Lo-Z to the Hi-Z Center conductor is less than 800 Kohms but more than 220 Kohms.
- (4) If this fault is shown, the error in the fuel mass calculation is less than +/- 5 percent. The fuel quantity for the applicable tank continues to show in the flight compartment and on the refuel panel. [K-1] is set to a nominal value of 1.1365.

NOTE: K is the "dielectric constant". Air, by definition has a K factor of 1. Fuel, depending on density and source, can have a K factor between approximately 2.0 and 2.2.

### B. Possible Causes

- (1) FQIS wire harness
- Out-of-tank wiring (wire bundle) from the wing spar to the FQPU (including the bussing plug)
- (3) Compensator
- (4) Microbial growth in the fuel tank

28-41 TASKS 806-807

AKS ALL

EFFECTIVITY '



### C. Circuit Breakers

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

# F/O Electrical System Panel, P6-3

Row	<u>Col</u>	Number	<u>Name</u>
Α	5	C00398	FUEL QTY 2
Α	6	C00397	FUEL QTY 1

### D. Related Data

- (1) (WDM 28-41-11)
- (2) (SSM 28-41-11)

### E. Initial Evaluation

- (1) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
- (2) If the GROUND TEST shows COMPENSATOR DATA BAD for the applicable tank, then do the Fault Isolation Procedure below.
- (3) If the GROUND TEST shows PASS, then there was an intermittent fault.

### F. Fault Isolation

- (1) Do these steps to do a check for water in the fuel:
  - (a) Get a sample of fuel at the sump of the applicable fuel tank (AMM TASK 12-11-00-680-801).
  - (b) Add one or two drops of water-soluble food coloring to the fuel sample.
    - NOTE: If there is water contamination of the fuel sample, the water in the fuel sample will be identified by the food coloring.
  - (c) If there is water contamination of the fuel sample, continue to get samples of fuel until no water is identified by the food coloring.
    - 1) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
      - a) If the GROUND TEST shows PASS, then you corrected the fault.
      - b) If the GROUND TEST shows COMPENSATOR DATA BAD for the applicable tank, then continue.
  - (d) If there is no water contamination of the fuel sample, then continue.
- (2) Do these steps to do a check for microbial growth in the fuel:

WARNING: OBEY THE PRECAUTIONS FOR PURGING AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (a) Go into the No.1 tank (No. 2 tank, center tank) (AMM TASK 28-11-00-910-802).
- (b) Do a check for microbial growth (AMM TASK 28-10-00-200-802).
- (c) Correct any problem that you find (AMM TASK 28-10-00-600-804).
- (d) Do this task: FQIS BITE Procedure, 28-41 TASK 801FQIS BITE Procedure, 28-41 TASK 801.
- (e) If the GROUND TEST shows PASS, then you corrected the fault.
- (f) If the GROUND TEST shows COMPENSATOR DATA BAD for the applicable tank, then continue.
- (3) If there is no microbial growth in the fuel tank, then continue.

AKS ALL



- (4) Disconnect the applicable bussing plug and examine the pins for corrosion or damage. To do this, do this task: Bussing Plug Removal, AMM TASK 28-41-41-000-801
  - (a) If there is corrosion or damage, then do these steps:
    - 1) Repair the pins if any of the pins have damage.
    - 2) Clean the connector if there is any corrosion (SWPM 20-60-01).
    - 3) Re-connect the bussing plug (AMM TASK 28-41-41-400-801).
    - 4) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
    - 5) If the GROUND TEST shows PASS, then you corrected the fault.
    - 6) If the GROUND TEST shows COMPENSATOR DATA BAD for the applicable tank, then continue.
  - (b) If there is no corrosion or damage, then continue.
- (5) For the applicable tank, do this task: Tank and Compensator Units Test, AMM TASK 28-41-21-710-801
- (6) If the Tank and Compensator Unit Test does not show problems, then do this test of the out-of-tank wiring (wire bundle) from the bussing plug to the Fuel Quantity Processor Unit (FQPU) in the radar bay:
  - (a) FOR A FAULT IN THE NO. 1 TANK, do these steps:
    - 1) Disconnect connector D11304 on the FQPU, M1827 in the radar bay.
    - Do a continuity check between these pins of connector D11312 on the front spar and connector D11304 on the FQPU, M1827 in the radar bay:

### AKS 001-013

D1131	2	D11304
pin 1		pin 8
pin 2		pin 22
pin 3		pin 23

## AKS 014-999

D11312	D11304
pin 1	pin 8
pin 2	pin 21
pin 3	pin 17

### **AKS ALL**

- 3) Make sure connector D11304 is disconnected.
- Make sure the resistance from D11312, pin 1 to the shield on D11312 is more than 1 megohm.
- 5) Reconnect connectors D11304 and D11312 To re-connect connector D11312, do this task: Bussing Plug Installation, AMM TASK 28-41-41-400-801..
- (b) FOR A FAULT IN THE NO. 2 TANK, do these steps:
  - 1) Disconnect connector D11306 on the FQPU, M1827 in the radar bay.
  - Do a continuity check between these pins of connector D11314 on the front spar and connector D11306 on the FQPU, M1827 in the radar bay:

AKS ALL



### AKS 001-013

D11314	D11306
pin 1	pin 8
pin 2	pin 22
pin 3	pin 23

## AKS 014-999

D11314	D11306
pin 1	pin 8
pin 2	pin 21
pin 3	pin 17

### **AKS ALL**

- 3) Make sure connector D11306 is disconnected.
- 4) Make sure the resistance from D11314, pin 1 to the shield on D11314 is more than 1 megohm.
- 5) Re-connect connectors D11306 and D11314. To re-connect connector D11314, do this task: Bussing Plug Installation, AMM TASK 28-41-41-400-801.
- (c) FOR A FAULT IN THE CENTER TANK, do these steps:
  - 1) Disconnect connector D11308 on the FQPU, M1827 in the radar bay.
  - 2) Do a continuity check between these pins of connector D11316 on the rear spar and connector D11308 on the FQPU, M1827 in the radar bay:

## AKS 001-013

D11316	D11308
pin 1	pin 8
pin 2	pin 22
pin 3	pin 23

### AKS 014-999

D11316	D11308
pin 1	pin 8
pin 2	pin 21
pin 3	pin 17

#### **AKS ALL**

- 3) Make sure connector D11308 is disconnected.
- 4) Make sure the resistance from D11316, pin 1 to the shield on D11316 is more than 1 megohm.
- Re-connect connectors D11308 and D11316. To re-connect connector D11316, do this task: Bussing Plug Installation, AMM TASK 28-41-41-400-801.
- (d) If you find a problem with the wiring, then repair the problems that you find (SWPM 20-20-00, SWPM 20-60-06).

— EFFECTIVITY •

**AKS ALL** 

28-41 TASK 807

Page 236 Jun 15/2016



 Make sure the out-of-tank wire bundle is shielded and the shield ground is terminated (SWPM 20-10-15, SWPM 20-20-00).

## 28-AWL-04: CDCCL

(e) Do this task: FQIS - Out Tank Connectors - Electrical Bonding Resistance Check, AMM TASK 05-55-54-200-802, for the applicable side of body FQIS connector D39915 or D39916, or main wheel well FQIS connector D4850P, if it is disconnected or if the coupling ring on the connector is loosened or tightened,.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-04.

## 28-AWL-04: CDCCL

(f) Do this task: FQIS Wiring And Bonding - Inspection, AMM TASK 05-55-54-200-801, for the applicable wire bundle if the FQIS wire bundle in the unpressurized zone is replaced or the FQIS wire bundle shield is repaired.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-04.

- (g) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - 1) If the GROUND TEST procedure shows PASS, then you corrected the fault.
  - 2) If the GROUND TEST procedure continues to show COMPENSATOR DATA BAD, then continue.
- (7) If only the compensator shows problems, then do these steps:
  - (a) Replace the compensator.

These are the tasks:

Tank Unit or the Compensator Unit Removal, AMM TASK 28-41-21-000-801, Tank Unit or Compensator Unit Installation, AMM TASK 28-41-21-400-801.

- (b) Do an inspection of the compensator and the adjacent wiring for these problems:
  - Make sure no parts of the compensator are in electrical contact with the airplane structure.
  - 2) Make sure there are no brackets that are bent or have other problems.
  - 3) Make sure there is no unwanted material in the compensator.
  - 4) Make sure there are no loose terminal connections at the compensator.
  - 5) Make sure there are not other problems with the wiring near the compensator (for example, a wire pinched under the compensator).
- (c) If there are problems with the compensator or the adjacent wiring, repair the problems.
- (d) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - 1) If the GROUND TEST procedure shows PASS, then you corrected the fault.
  - If the GROUND TEST procedure continues to show COMPENSATOR DATA BAD, then repair or replace the in-tank FQIS wire harness in the applicable tank. To repair or replace the FQIS wire harness, do this task: FQIS Wire Harness Replacement, AMM TASK 28-41-44-400-801.

AKS ALL



- 3) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - a) If the GROUND TEST procedure shows PASS, then you corrected the fault.
- (8) If two or more tank units show problems, then repair or replace the in-tank FQIS wire harness in the applicable tank (AMM TASK 28-41-44-400-801).
  - (a) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
    - 1) If the GROUND TEST procedure shows PASS, then you corrected the fault.

----- END OF TASK -----

## 808. FQIS Fault Message - PROCESSOR FAILED - Fault Isolation

# A. Description

- (1) This task is for these maintenance messages:
  - (a) 28-41109 PROCESSOR FAILED
  - (b) 28-41209 PROCESSOR FAILED
  - (c) 28-41309 PROCESSOR FAILED
- (2) This message is shown if the circuitry in the Fuel Quantity Processor Unit (FQPU) has failed and will cause a fuel mass calculation error of more than +/- 5 percent.
- (3) The FQIS display in the flight compartment and the refuel indicator become blank when this fault message is shown.

#### B. Possible Causes

(1) Fuel quantity processor unit (FQPU), M1827

#### C. Circuit Breakers

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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	5	C00398	FUEL QTY 2
Α	6	C00397	FUEL QTY 1

# D. Related Data

- (1) (SSM 28-41-11)
- (2) (WDM 28-41-11)

### E. Initial Evaluation

- (1) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
- (2) If the GROUND TEST shows PROCESSOR FAILED for the applicable tank, then do the Fault Isolation Procedure below.
- (3) If the GROUND TEST shows PASS, then there was an intermittent fault.

### F. Fault Isolation Procedure

- (1) Do these steps to replace the processor and confirm that you corrected the fault:
  - (a) Replace the fuel quantity processor unit (FQPU), M1827.

These are the tasks:

Fuel Quantity Processor Unit Removal, AMM TASK 28-41-81-000-801,

Fuel Quantity Processor Unit Installation, AMM TASK 28-41-81-400-801.

EFFECTIVITY AKS ALL

28-41 TASKS 807-808

Page 238 Jun 15/2016



- (b) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
- (c) If the GROUND TEST shows PASS, then you corrected the fault.

----- END OF TASK -----

# 809. FQIS Fault Message - PROCESSOR FAULT - Fault Isolation

### A. Description

- (1) This task is for these maintenance messages:
  - (a) 28-41002 PROCESSOR FAILED
  - (b) 28-41110 PROCESSOR FAILED
  - (c) 28-41210 PROCESSOR FAILED
  - (d) 28-41310 PROCESSOR FAILED
  - (e) 28-41114 PROCESSOR FAILED
  - (f) 28-41214 PROCESSOR FAILED
  - (g) 28-41314 PROCESSOR FAILED
- (2) This message is shown if the circuitry in the Fuel Quantity Processor Unit (FQPU) has a problem that will cause a fuel mass calculation error of less than +/- 5 percent.
- (3) The FQIS display in the flight compartment and the refuel indicator continue to show with an accuracy of +/- 5 percent when this fault message is shown.

### B. Possible Causes

(1) Fuel quantity processor unit (FQPU), M1827

## C. Circuit Breakers

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

# F/O Electrical System Panel, P6-3

Row	<u>Col</u>	Number	<u>Name</u>
Α	5	C00398	FUEL QTY 2
Α	6	C00397	FUEL QTY 1

### D. Related Data

- (1) (WDM 28-41-11)
- (2) (SSM 28-41-11)

### E. Initial Evaluation

- (1) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - (a) If the GROUND TEST shows PROCESSOR FAULT for the applicable tank, then do the Fault Isolation Procedure below.
  - (b) If the GROUND TEST shows PASS, then there was an intermittent fault.

## F. Fault Isolation

- (1) Do these steps to replace the processor and confirm that you corrected the fault:
  - (a) Replace the fuel quantity processor unit, M1827.

These are the tasks:

Fuel Quantity Processor Unit Removal, AMM TASK 28-41-81-000-801,

Fuel Quantity Processor Unit Installation, AMM TASK 28-41-81-400-801.

AKS ALL

28-41 TASKS 808-809



- (b) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
- (c) If the GROUND TEST shows PASS, then you corrected the fault.

----- END OF TASK -----

# 810. FQIS Fault Message - ARINC OUTPUT BUS FAILED - Fault Isolation

## A. Description

- (1) This task is for these maintenance messages:
  - (a) 28-41115 ARINC OUTPUT BUS FAILED
  - (b) 28-41215 ARINC OUTPUT BUS FAILED
  - (c) 28-41315 ARINC OUTPUT BUS FAILED
- (2) This fault message is shown if the ARINC display hardware or wiring has a problem.

#### B. Possible Causes

- (1) Wiring
- (2) Fuel quantity processor unit (FQPU), M1827
- (3) Display electronics unit (DEU) No. 1 or No. 2, M1808 or M1809
- (4) Flight management computer (FMC)
- (5) Refuel quantity indicator, N193, N194, or N195

### C. Circuit Breakers

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

# F/O Electrical System Panel, P6-3

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	5	C00398	FUEL QTY 2
Α	6	C00397	FUEL QTY 1

#### D. Related Data

- (1) (WDM 28-41-11)
- (2) (SSM 28-41-11)

## E. Initial Evaluation

- (1) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - (a) If the GROUND TEST shows ARINC OUTPUT BUS FAILED, then do the Fault Isolation Procedure below.
  - (b) If the GROUND TEST shows PASS, then there was an intermittent fault.

## F. Fault Isolation

- (1) Do these steps to do a check of the refuel quantity indicators on the P15 panel:
  - (a) Open this access panel:

Number Name/Location
621GB Refuel Access Panel - Slat Station 143.27

- (b) Make sure the display on each load select indicator shows the quantity of fuel in each fuel tank
- (c) Push the FUELING INDICATION TEST SWITCH on the refuel control panel.

AKS ALL

28-41 TASKS 809-810



Make sure all of the fueling quantity indicators operate correctly.

NOTE: The test blanks the fueling indicators display for two seconds, then all LED segments go on for two seconds. This sequence continues as long as you hold the TEST SWITCH. If you hold the TEST SWITCH for more than 20 seconds, the test mode will time out and the indicator will go back to its usual operating mode. If an internal fault is found during the test, the indicator will show Ind FAIL.

- (d) Make sure the display on each load select indicator shows the quantity of fuel in each fuel tank.
- (e) If the load select indicators are not OK, then, do this task: Refuel Quantity Indicator Displays Incorrectly When Test Switch is Pressed Fault Isolation, 28-21 TASK 802
- (f) If the load select indicators are OK, then continue. Close this access panel:

Number Name/Location

621GB Refuel Access Panel - Slat Station 143.27

- (2) Do these steps to do a check of the Display Electronics Units (DEUs):
  - (a) For each of the two DEUs, do this task: DEU Self-Test Procedure, 31-62 TASK 802
  - (b) If one of the two DEUs fails the self-test, then do these steps:
    - 1) Replace the bad 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.

- 2) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - a) If the GROUND TEST shows PASS, then you corrected the fault.
- (c) If the two DEUs pass the self-test, then continue.
- (3) Do these steps to do a check of the Flight Management Computer (FMC):
  - (a) Do this task: Flight Management Computer System Operational Test, AMM TASK 34-61-00-710-801.
  - (b) If the FMC Operational test shows problems, do these steps:
    - Do the fault correction shown. To do this, do this task: Flight Management Computer System BITE Procedure, 34-61 TASK 801.
    - 2) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
    - 3) If the GROUND TEST shows PASS, then you corrected the fault.
  - (c) If the FMC Operational Test does not show problems, then continue.
- (4) Replace the fuel quantity processor unit (FQPU).

These are the tasks:

Fuel Quantity Processor Unit Removal, AMM TASK 28-41-81-000-801,

Fuel Quantity Processor Unit Installation, AMM TASK 28-41-81-400-801.

- (a) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - 1) If the GROUND TEST shows PASS, then you corrected the fault.
  - If the GROUND TEST continues to show, ARINC OUTPUT BUS FAILED, then continue.

AKS ALL



(5) Do these steps to do a check of the ARINC wiring from the FQPU:

### AKS 001-013

- (a) Disconnect connector D11304 on the FQPU, M1827 in the radar bay.
- (b) Disconnect connector D3973A on DEU No. 1 on the E3-1 shelf in the Electronic Equipment Bay.
- (c) Do a continuity check between these pins of connector D11304 and connector D3973A:

D11304	D3973A
pin 24	pin K5
pin 25	pin J5

(d) Disconnect connector D3975A on DEU No. 2 on the E3-1 shelf in the Electronic Equipment Bay. Do a continuity check between these pins of connector D11304 and connector D3975A:

D11304	D3975A
pin 24	pin K5
pin 25	pin J5

- (e) Disconnect connector D11308 on the FQPU, M1827 in the radar bay.
- (f) Disconnect connector D3973B on DEU No. 1 on the E3-1 shelf in the Electronic Equipment Bay.
- (g) Do a continuity check between these pins of connector D11308 and connector D3973B:

D11308	D3973B
pin 24	pin K5
pin 25	pin J5

(h) Disconnect connector D3975B on DEU No. 2 on the E3-1 shelf in the Electronic Equipment Bay. Do a continuity check between these pins of connector D11308 and connector D3975B:

D11308	D3975B
pin 24	pin K5
pin 25	pin J5

- (i) Disconnect connector D11306 on the FQPU, M1827 in the radar bay.
- (j) Disconnect connector D3973D on DEU No. 1 on the E3-1 shelf in the Electronic Equipment Bay.
- (k) Do a continuity check between these pins of connector D11306 and connector D3973D:

D11306	D3973D
pin 24	pin K5
pin 25	pin J5

- (I) Disconnect connector D3975D on DEU No. 2 on the E3-1 shelf in the Electronic Equipment Bay.
- (m) Do a continuity check between these pins of connector D11306 and connector D3975D:

AKS ALL



# AKS 001-013 (Continued)

D11306	D3975D
pin 24	pin K5
pin 25	pin J5

- (n) Disconnect connector D4578J on the P15 panel on the wing.
- (o) Do a continuity check between these pins of connector D11306 and connector D4578J:

D11306	D4578J
pin 24	pin 5
pin 25	pin 4

- (p) Disconnect connector D2179A on the E5-2 shelf in the Electronic Equipment Bay.
- (g) Do a continuity check between these pins of connector D11306 and connector D2179A:

D1130	D2179A	
pin 1		pin D5
pin 3		pin E5

- (r) If applicable, disconnect connector D3261A on the E5-2 shelf in the Electronic Equipment Bay.
  - 1) Do a continuity check between these pins of connector D11306 and connector D3261A:

D1130	D3261A	
pin 1		pin D5
pin 3		pin E5

## AKS 014-999

- (s) Disconnect connector D11354 on the FQPU, M1827 in the radar bay.
- (t) Disconnect connector D3973A on DEU No. 1 on the E3-1 shelf in the Electronic Equipment Bay.
- (u) Do a continuity check between these pins of connector D11354 and connector D3973A:

D1135	D3973A	
pin 1		pin K5
pin 3		pin J5

(v) Disconnect connector D3975A on DEU No. 2 on the E3-1 shelf in the Electronic Equipment Bay. Do a continuity check between these pins of connector D11354 and connector D3975A:

D11354	D3975A
pin 1	pin K5
pin 3	pin J5

(w) Disconnect connector D11352 on the FQPU, M1827 in the radar bay.

AKS ALL



## AKS 014-999 (Continued)

(x)	Disconnect connector D3973B on DEU No. 1 on the E3-1 shelf in the Electronic
	Equipment Bay.

(y) Do a continuity check between these pins of connector D11352 and connector D3973B:

D11352	D3973B
pin 8	pin K5
pin 2	pin J5

(z) Disconnect connector D3975B on DEU No. 2 on the E3-1 shelf in the Electronic Equipment Bay. Do a continuity check between these pins of connector D11352 and connector D3975B:

D1135	D3975B	
pin 8		pin K5
pin 2		pin J5

- (aa) Disconnect connector D15806 on the FQPU, M1827 in the radar bay.
- (ab) Disconnect connector D3973D on DEU No. 1 on the E3-1 shelf in the Electronic Equipment Bay.
- (ac) Do a continuity check between these pins of connector D15806 and connector D3973D:

D15806	D3973D
pin 4	pin K5
pin 12	pin J5

- (ad) Disconnect connector D3975D on DEU No. 2 on the E3-1 shelf in the Electronic Equipment Bay.
- (ae) Do a continuity check between these pins of connector D15806 and connector D3975D:

D15806	D3975D
pin 4	pin K5
pin 12	pin J5

- (af) Disconnect connector D4578J on the P15 panel on the wing.
- (ag) Do a continuity check between these pins of connector D15806 and connector D4578J:

D15806	D4578J
pin 4	pin 5
pin 12	pin 4

- (ah) Disconnect connector D2179A on the E5-2 shelf in the Electronic Equipment Bay.
- (ai) Do a continuity check between these pins of connector D11352 and connector D2179A:

D1135	D2179A	
pin 6		pin D5
pin 7		pin E5

(aj) Disconnect connector D3261A on the E5-2 shelf in the Electronic Equipment Bay.

AKS ALL



# AKS 014-999 (Continued)

 Do a continuity check between these pins of connector D11352 and connector D3261A:

D1135	D3261A	
pin 6		pin D5
pin 7		pin E5

### **AKS ALL**

- (ak) Repair the wiring.
- (al) Reconnect all disconnected connectors.
- (am) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - 1) If the GROUND TEST shows PASS, then you corrected the fault.

## ----- END OF TASK -----

# 811. FQIS Fault Message - PROGRAM PINS INVALID - Fault Isolation

### A. Description

- (1) This task is for these maintenance messages:
  - (a) 28-41111 PROGRAM PINS INVALID
  - (b) 28-41113 PROGRAM PINS INVALID

### AKS 014-999

(c) 28-41119 PROGRAM PINS INVALID

## **AKS ALL**

- (d) 28-41211 PROGRAM PINS INVALID
- (e) 28-41213 PROGRAM PINS INVALID

#### AKS 014-999

(f) 28-41219 PROGRAM PINS INVALID

## AKS ALL

- (g) 28-41311 PROGRAM PINS INVALID
- (h) 28-41313 PROGRAM PINS INVALID

### AKS 014-999

(i) 28-41319 PROGRAM PINS INVALID

### **AKS ALL**

- (2) The Fuel Quantity Processor Unit (FQPU) cannot find the status of one of these:
  - (a) LB/KG discrete
  - (b) densitometer present/absent discrete

## AKS 014-999

(c) other discrete

**AKS ALL** 

AKS ALL

28-41 TASKS 810-811

Page 245 Jun 15/2016



#### B. Possible Causes

### AKS 001-013

(1) Connectors D11306, D11308 and the related wiring

### AKS 014-999

(2) Connectors D11354, D15806 and the related wiring

#### **AKS ALL**

(3) Fuel quantity processor unit (FQPU), M1827

# C. Circuit Breakers

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

# F/O Electrical System Panel, P6-3

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	5	C00398	FUEL QTY 2
Α	6	C00397	FUEL QTY 1

### D. Related Data

- (1) WDM 28-41-11
- (2) SSM 28-41-11

### E. Initial Evaluation

- (1) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - (a) If the GROUND TEST shows PROGRAM PINS INVALID, then do the Fault Isolation Procedure below.
  - (b) If the GROUND TEST shows PASS, then there was an intermittent fault.

# F. Fault Isolation Procedure

### AKS 001-013

- (1) Do these steps to do a check of the connectors D11306 and D11308:
  - (a) Disconnect connectors D11306 and D11308 from the FQPU in the radar bay.
  - (b) AIRPLANES WITH FUEL QUANTITY INDICATION IN POUNDS;

    Do a check of the continuity from connector D11308, pin 10 to connector D11308, pin 11.
  - (c) AIRPLANES WITH FUEL QUANTITY INDICATION IN KILOGRAMS;
    Do a check of the continuity from connector D11308, pin 11 to connector D11308, pin 12.
  - (d) Do a check of the continuity from connector D11306, pin 11 to D11306, pin 12.
  - (e) If there is no continuity, then do these steps:
    - 1) Repair the wiring.
    - 2) Reconnect connectors D11306 and D11308.
    - 3) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
      - a) If the GROUND TEST shows PASS, then you corrected the fault.
      - b) If the GROUND TEST continues to show PROGRAM PINS INVALID, then continue.
  - (f) If there is continuity, then continue.

28-41 TASK 811

EFFECTIVITY



### AKS 014-999

- (2) Do these steps to do a check of the connectors D15806 and D11354:
  - (a) Disconnect connectors D15806 and D11354 from the FQPU in the radar bay.
  - (b) AIRPLANES WITH FUEL QUANTITY INDICATION IN POUNDS;Do a check of the continuity from connector D11354, pin 7 to connector D11354, pin 6.
  - (c) AIRPLANES WITH FUEL QUANTITY INDICATION IN KILOGRAMS; Do a check of the continuity from connector D11354, pin 7 to connector D11354, pin 8.
  - (d) Do a check of the continuity from connector D15806, pin 7 to D15806, pin 8.
  - (e) If there is no continuity, then do these steps:
    - 1) Repair the wiring.
    - 2) Reconnect connectors D15806 and D11354.
    - 3) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
      - a) If the GROUND TEST shows PASS, then you corrected the fault.
      - b) If the GROUND TEST continues to show PROGRAM PINS INVALID, then continue.
  - (f) If there is continuity, then continue.

### **AKS ALL**

- (3) Install a new FQPU (AMM TASK 28-41-81-400-801).
  - (a) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
    - 1) If the GROUND TEST shows PASS, then you corrected the fault.



# 812. FQIS Fault Message - NO FMC DATA ON FQIS 6 - Fault Isolation

### A. Description

- (1) This task is for this maintenance message:
  - (a) 28-41001 NO FMC DATA ON FQIS 6
- (2) This fault message is shown if the Fuel Quantity Processor Unit (FQPU) cannot receive data or cannot control messages from the Flight Management Computer (FMC).
- (3) AIRPLANES WITH FQPU S345A001-010; This condition can occur if the FMC is off (unpowered) while the Fuel Quantity Indicating System is on (powered). The FMC is off and the FQIS is on if the airplane operates on standby or battery power only.

#### B. Possible Causes

- (1) Wiring
- (2) FMCS transfer relays, R475 (No. 1) and R476 (No. 2)
- (3) Fuel quantity processor unit (FQPU), M1827
- (4) Flight management computer, M1175

28-41 TASKS 811-812

**AKS ALL** 

EFFECTIVITY '

Page 247 Jun 15/2016



### C. Circuit Breakers

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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	5	C00398	FUEL QTY 2
Α	6	C00397	FUEL QTY 1

### D. Related Data

- (1) (SSM 28-41-11)
- (2) (WDM 28-41-11)
- (3) (SSM 34-61-14)
- (4) (WDM 34-61-14)

### E. Initial Evaluation

- (1) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - (a) If the GROUND TEST shows NO FMC DATA ON FQIS 6, then do the Fault Isolation Procedure below.
  - (b) If the GROUND TEST shows PASS, then there was an intermittent fault.

### F. Fault Isolation

**AKS ALL** 

- (1) Do this task: Flight Management Computer System BITE Procedure, 34-61 TASK 801.
  - (a) If the FMCS BITE test shows problems, then do these steps:
    - 1) Do the fault correction shown (34-61 TASK 801).
    - 2) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
    - 3) If the GROUND TEST shows PASS, then you corrected the fault.
  - (b) If the FMCS does not show problems, then continue.
- (2) Replace the fuel quantity processor unit (FQPU).

These are the tasks:

Fuel Quantity Processor Unit Removal, AMM TASK 28-41-81-000-801,

Fuel Quantity Processor Unit Installation, AMM TASK 28-41-81-400-801.

- (a) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - 1) If the GROUND TEST shows PASS, then you corrected the fault.
  - 2) If the GROUND TEST continues to show NO FMC DATA ON FQIS 6, then continue.
- (3) Replace FMCS Transfer Relays No. 1 and No. 2.
  - (a) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
    - 1) If the GROUND TEST shows PASS, then you corrected the fault.
    - 2) If the GROUND TEST continues to show NO FMC DATA ON FQIS 6, then continue.
- (4) Do these steps to do a check of the ARINC 6 wiring from the FQPU:
  - (a) Remove the FMC. To remove it, do this task: FMCS Computer Removal, AMM TASK 34-61-02-000-801
  - (b) Remove the FQPU. To remove it, do this task: Fuel Quantity Processor Unit Removal, AMM TASK 28-41-81-000-801

EFFECTIVITY 28-41 TASK 812



### AKS 001-013

(c) Do a continuity check between these pins of connector D11306 for the FQPU and connector D2179A on the FMC:

D11306	D2179A
pin 18	pin G9
pin 31	pin H9

### AKS 014-999

(d) Do a continuity check between these pins of connector D11352 for the FQPU and connector D2179A on the FMC:

D11352	D2179A
pin 9	pin G9
pin 10	pin H9

### **AKS ALL**

- (e) Repair the wiring problems that you find.
- (f) Re-install the FQPU. To do this, do this task: Fuel Quantity Processor Unit Installation, AMM TASK 28-41-81-400-801
- (g) Re-install the FMC. To do this, do this task: FMCS Computer Installation, AMM TASK 34-61-02-400-801
- (h) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - 1) If the GROUND TEST shows PASS, then you corrected the fault.



# 813. Fuel Quantity Indication Blank - Fault Isolation

# A. Description

- (1) The fuel quantity indication in the flight compartment for one or more of the tanks is blank.
- (2) If the fuel quantity indicator is blank because of a problem with the fuel quantity processor unit (FQPU), it is possible that the blank indicator will show pounds (LBS) as the fuel measurement unit. This is possible even if fuel is measured in kilograms (KGS) when the FQIS operates correctly.

# B. Possible Causes

- (1) FQIS wire harness
- Out-of-tank wiring from the wing spar to the FQPU (including the bussing plug)
- (3) FQIS tank unit or compensator
- (4) Fuel quantity processor unit (FQPU), M1827
- (5) Undertorqued or disconnected tank unit terminal.

### C. Circuit Breakers

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

F/O Electrical System Panel, P6-3

Row Col Number Name

A 5 C00398 FUEL QTY 2

AKS ALL

28-41 TASKS 812-813

Page 249 Jun 15/2016



(Continued)

F/O Electrical System Panel, P6-3

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	6	C00397	FUEL QTY 1

# D. Related Data

- (1) (WDM 28-41-11)
- (2) (SSM 28-41-11)

### E. Initial Evaluation

- (1) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - (a) If the GROUND TEST shows a fault message for the applicable tank, then do the Fault Isolation Procedure for the fault shown.
  - (b) If the GROUND TEST shows PASS, then there was an intermittent fault.



## 814. Fuel Quantity Indication Does Not Show the Correct Fuel Quantity - Fault Isolation

## A. Description

(1) The fuel quantity indication in the flight compartment or on the refueling panel does not show the correct fuel quantity for one or more of the tanks. This condition could be found through the fuel measuring sticks or through a disagreement between the fuel added during the refueling operation and the fuel quantity shown in the flight compartment.

### B. Possible Causes

- (1) FQIS wire harness
- (2) Out-of-tank wiring from the wing spar to the FQPU (including the bussing plug)
- (3) FQIS tank unit or compensator
- (4) Fuel quantity processor unit (FQPU), M1827
- (5) Undertorqued or disconnected tank unit terminal
- (6) Water contamination in the fuel tank

### C. Circuit Breakers

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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	5	C00398	FUEL QTY 2
Α	6	C00397	FUEL QTY 1

# D. Related Data

- (1) (WDM 28-41-11)
- (2) (SSM 28-41-11)

# E. Initial Evaluation

- (1) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - (a) If the GROUND TEST shows a fault message for the applicable tank, then do the Fault Isolation Procedure below.

AKS ALL

28-41 TASKS 813-814



(b) If the GROUND TEST shows PASS, then there was an intermittent fault.

### F. Fault Isolation Procedure

- (1) Do these steps to do a check for water in the fuel:
  - (a) Get a sample of fuel at the sump of the applicable fuel tank. To get a sample, do this task: Fuel System Sumping, AMM TASK 12-11-00-680-801.
  - (b) Add one or two drops of water-soluble food coloring to the fuel sample.
    - NOTE: If there is water contamination of the fuel sample, the water in the fuel sample will be identified by the food coloring.
  - (c) If there is water contamination of the fuel sample, continue to get samples of fuel until no water is identified by the food coloring. To get samples, do this task: Fuel System Sumping, AMM TASK 12-11-00-680-801.
    - 1) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
      - a) If the GROUND TEST shows PASS, then you corrected the fault.
      - If the GROUND TEST shows a fault message for the applicable tank, then do the Fault Isolation Procedure for the fault shown.



## 816. FQIS Fault Message - HI/Z OP/SHORT TO SHIELD - Fault Isolation

# A. Description

- (1) This task is for these maintenance messages:
  - (a) 28-41105 HI-Z OP/SHORT TO SHIELD
    - 1) This fault code shows a problem with the No. 1 tank.
  - (b) 28-41205 HI-Z OP/SHORT TO SHIELD
    - 1) This fault code shows a problem with the No. 2 tank.
  - (c) 28-41305 HI-Z OP/SHORT TO SHIELD
    - 1) This fault code shows a problem with the center tank.
- (2) This fault can be caused by an open in the HI-Z center conductor or if the HI-Z center conductor is shorted to the shield. This condition can occur either in the FQIS wire harness in the fuel tank or in the wiring outside the fuel tank from the bussing plug on the wing spar to the Fuel Quantity Processor Unit (FQPU).
- (3) This fault message is shown if the measured capacitance of the tank units and the compensator are both less than 50 percent of their empty tank capacitance value.
- (4) This fault causes the FQIS display and the refuel panel indicator for the tank that has the fault to become blank.
- (5) (SDS SUBJECT 28-41-00)

# B. Possible Causes

- (1) FQIS wire harness
- (2) Out-of-tank wiring (wire bundle) from the wing spar to the FQPU (including the bussing plug)
- (3) FQIS tank unit or compensator

28-41 TASKS 814-816

**AKS ALL** 

EFFECTIVITY



### C. Circuit Breakers

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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	5	C00398	FUEL QTY 2
Α	6	C00397	FUEL QTY 1

### D. Related Data

- (1) (SSM 28-41-11)
- (2) (WDM 28-41-11)

### E. Initial Evaluation

- (1) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
- (2) If the GROUND TEST shows HI-Z OPEN/SHORT TO SHIELD for the applicable tank, then do the Fault Isolation Procedure below.
- (3) If the GROUND TEST shows PASS, then there was an intermittent fault.

### F. Fault Isolation Procedure

- (1) Disconnect the applicable bussing plug and examine the pins for corrosion or damage (AMM TASK 28-41-41-000-801).
  - (a) If there is corrosion or damage, then do these steps:
    - 1) Repair the pins if any of the pins have damage.
    - 2) Clean the connector if there is any corrosion (SWPM 20-60-01).
    - 3) Re-connect the bussing plug (AMM TASK 28-41-41-400-801).
    - 4) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
    - 5) If the GROUND TEST shows PASS, then you corrected the fault.
    - 6) If the GROUND TEST shows HI-Z OPEN/SHORT TO SHIELD for the applicable tank, then continue.
  - (b) If there is no corrosion or damage, then continue.
- (2) For the applicable tank, do this task: Tank and Compensator Units Test, AMM TASK 28-41-21-710-801.
- (3) If the tank and compensator unit test does not show problems, then do this test of the out-of-tank wiring (wire bundle) from the bussing plug to the Fuel Quantity Processor Unit (FQPU) in the radar bay:
  - (a) FOR A FAULT IN THE NO. 1 TANK, do these steps:
    - 1) Disconnect connector D11304 on the FQPU, M1827 in the radar bay.
    - 2) Do a continuity check between these pins of connector D11312 on the front spar and connector D11304 on the FQPU, M1827 in the radar bay:

### AKS 001-013

D11312	D11304
pin 1	pin 8
pin 2	pin 22
pin 3	pin 23

EFFECTIVITY AKS ALL



### AKS 014-999

D1131	2	D11304
pin 1		pin 8
pin 2		pin 21
pin 3		pin 17

### **AKS ALL**

- 3) Make sure connector D11304 is disconnected.
- 4) Make sure the resistance from D11312, pin 1 to the shield on D11312 is more than 1 megohm.
- 5) Re-connect connectors D11304 and D11312. To re-connect connector D11312, do this task: Bussing Plug Installation, AMM TASK 28-41-41-400-801.
- (b) FOR A FAULT IN THE NO. 2 TANK, do these steps:
  - 1) Disconnect connector D11314 on the FQPU, M1827 in the radar bay.
  - 2) Do a continuity check between these pins of connector D11314 on the front spar and connector D11306 on the FQPU, M1827 in the radar bay:

### AKS 001-013

D11314	D11306
pin 1	pin 8
pin 2	pin 22
pin 3	pin 23

## AKS 014-999

D11314	D11306
pin 1	pin 8
pin 2	pin 21
pin 3	pin 17

### **AKS ALL**

- 3) Make sure connector D11306 is disconnected.
- 4) Make sure the resistance from D11314, pin 1 to the shield on D11314 is more than 1 megohm.
- 5) Re-connect connectors D11306 and D11314. To re-connect connector D11314, do this task: Bussing Plug Installation, AMM TASK 28-41-41-400-801.
- (c) FOR A FAULT IN THE CENTER TANK, do these steps:
  - 1) Disconnect connector D11308 on the FQPU, M1827 in the radar bay.
  - 2) Do a continuity check between these pins of connector D11316 on the rear spar and connector D11308 on the FQPU, M1827 in the radar bay:



### AKS 001-013

D11316	D11308
pin 1	pin 8
pin 2	pin 22
pin 3	pin 23

### AKS 014-999

D11316	D11308
pin 1	pin 8
pin 2	pin 21
pin 3	pin 17

### **AKS ALL**

**AKS ALL** 

- 3) Make sure connector D11308 is disconnected.
- 4) Make sure the resistance from D11316, pin 1 to the shield on D11316 is more than 1 megohm.
- 5) Re-connect connectors D11308 and D11316. To re-connect connector D11316, do this task: Bussing Plug Installation, AMM TASK 28-41-41-400-801.
- (d) If you find a problem with the wiring, then repair the problems that you find (SWPM 20-20-00, SWPM 20-60-06).
  - 1) Make sure the out-of-tank wire bundle is shielded and the shield ground is terminated (SWPM 20-10-15, SWPM 20-20-00).

### 28-AWL-04: CDCCL

(e) Do this task: FQIS - Out Tank Connectors - Electrical Bonding Resistance Check, AMM TASK 05-55-54-200-802, for the applicable side of body FQIS connector D39915 or D39916, or main wheel well FQIS connector D4850P, if it is disconnected or if the coupling ring on the connector is loosened or tightened,.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-04.

# 28-AWL-04: CDCCL

(f) Do this task: FQIS Wiring And Bonding - Inspection, AMM TASK 05-55-54-200-801, for the applicable wire bundle if the FQIS wire bundle in the unpressurized zone is replaced or the FQIS wire bundle shield is repaired..

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-04.

- (g) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - 1) If the GROUND TEST procedure shows PASS, then you corrected the fault.
  - If the GROUND TEST procedure continues to show HI/Z OPEN/SHORT TO SHIELD, then continue.



WARNING: OBEY THE PRECAUTIONS FOR PURGING AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (4) If a single tank unit or compensator shows problems, then go into the applicable fuel tank (AMM TASK 28-11-00-910-802) and do these steps:
  - (a) Do an inspection of the tank unit and the adjacent wiring for these problems:
    - 1) Make sure no parts of the tank unit or compensator are in electrical contact with the airplane structure.
    - 2) Make sure there are no brackets that are bent or have other problems.
    - 3) Make sure there is no unwanted material in the tank unit or compensator.
    - 4) Make sure there are no loose terminal connections at either the applicable tank unit or the number 2 tank unit.

NOTE: The number 2 tank unit is the top of a daisy chain. If there is a loose connection at the number 2 tank unit, then a fault message can display for other tank units.

- a) If there are loose terminal connections, then tighten the screws to these torque ranges:
  - <1> LO-Z 29 ±6 in-lb (3 ±1 N·m)
  - <2> SHIELD 17.5 ±2.5 in-lb (2.0 ±0.3 N·m)
  - <3> HI-Z 13.5 ±1.5 in-lb (1.5 ±0.2 N·m)
- 5) Make sure there are not other problems with the wiring near the applicable tank unit or the number 2 tank unit (for example, a wire pinched under a tank unit).
- (b) If there are problems with the tank unit or the adjacent wiring, then repair the problems.
- (c) If the tank unit wiring is repaired or replaced, then make sure the wire slack between the wire and components or structure maintains a clearance of 0.5 in. (12.7 mm).

# 28-AWL-09: CDCCL

EFFECTIVITY '

**AKS ALL** 

(d) If 0.5 in. (12.7 mm) is not possible, then you must maintain a minimum clearance of 0.125 in. (3.175 mm).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-09.

- (e) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - 1) If the GROUND TEST procedure shows PASS, then you corrected the fault.
  - If the GROUND TEST procedure continues to show HI/Z OPEN/SHORT TO SHIELD, then replace the tank unit or compensator.

These are the tasks:

Tank Unit or the Compensator Unit Removal, AMM TASK 28-41-21-000-801 Tank Unit or Compensator Unit Installation, AMM TASK 28-41-21-400-801

- 3) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - a) If the GROUND TEST procedure shows PASS, then you corrected the fault.



b) If the GROUND TEST procedure continues to show HI/Z OPEN/SHORT TO SHIELD, then repair or replace the in-tank FQIS wire harness in the applicable tank (AMM TASK 28-41-44-400-801).

WARNING: OBEY THE PRECAUTIONS FOR PURGING AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (5) If two or more tank units show problems, then go into the applicable fuel tank (AMM TASK 28-11-00-910-802) and do these steps:
  - (a) Make sure there are no loose terminal connections at each tank unit within the applicable tank.

NOTE: The number 2 tank unit is the top of a daisy chain. If there is a loose connection at the number 2 tank unit, then a fault message can display for other tank units.

- 1) If there are loose terminal connections, then tighten the screws to these torque ranges:
  - a) LO-Z 29 ±6 in-lb (3 ±1 N·m)
  - b) SHIELD 17.5 ±2.5 in-lb (2.0 ±0.3 N·m)
  - c) HI-Z 13.5 ±1.5 in-lb (1.5 ±0.2 N·m)
- (b) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - 1) If the GROUND TEST procedure shows PASS, then you corrected the fault.
  - If the GROUND TEST procedure continues to show HI/Z OPEN/SHORT TO SHIELD, then repair or replace the FQIS wire harness (AMM TASK 28-41-44-400-801).
- (c) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - 1) If the GROUND TEST procedure shows PASS, then you corrected the fault.



# 818. FQIS Fault Message - 1 OR MORE TANK UNIT OPEN - Fault Isolation

## A. Description

- (1) This task is for these maintenance messages:
  - (a) 28-41101 1 OR MORE TANK UNIT OPEN
    - 1) This fault message shows a problem in the No. 1 tank.
  - (b) 28-41201 1 OR MORE TANK UNIT OPEN
    - 1) This fault message shows a problem in the No. 2 tank.
  - (c) 28-41301 1 OR MORE TANK UNIT OPEN
    - 1) This fault message shows a problem in the center tank.
- (2) The capacitance from one or more of the tank units is missing from the total capacitance received at the processor.
- (3) This message will show if the measured (total) tank unit capacitance is less the 97.5 percent of the (total) tank unit empty capacitance and more than 13 percent of the (total) empty tank capacitance.
- (4) This fault causes the FQIS display and the refuel panel indicator for the tank that has the fault to become blank.

AKS ALL

28-41 TASKS 816-818



### B. Possible Causes

- (1) FQIS wire harness
- (2) Out-of-tank wiring (wire bundle) from the wing spar to the FQPU (including the bussing plug)
- (3) FQIS tank unit or compensator

#### C. Circuit Breakers

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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	5	C00398	FUEL QTY 2
Α	6	C00397	FUEL QTY 1

### D. Related Data

- (1) (SSM 28-41-11)
- (2) (WDM 28-41-11)

### E. Initial Evaluation

- (1) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
- (2) If the GROUND TEST shows 1 OR MORE TANK UNITS OPEN for the applicable tank, then do the Fault Isolation Procedure below.
- (3) If the GROUND TEST shows PASS, then there was an intermittent fault.

### F. Fault Isolation

- Disconnect the applicable bussing plug and examine the pins for corrosion or damage (AMM TASK 28-41-41-000-801).
  - (a) If there is corrosion or damage, then do these steps:
    - 1) Repair the pins if any of the pins have damage.
    - 2) Clean the connector if there is any corrosion (SWPM 20-60-01).
    - 3) Reconnect the bussing plug (AMM TASK 28-41-41-400-801).
    - 4) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
    - 5) If the GROUND TEST shows PASS, then you corrected the fault.
    - 6) If the GROUND TEST shows 1 OR MORE TANK UNITS OPEN for the applicable tank, then continue.
  - (b) If there is no corrosion or damage, then continue.
- (2) For the applicable tank, do this task: Tank and Compensator Units Test, AMM TASK 28-41-21-710-801
- (3) If the tank and compensator unit test does not show problems, then do this test of the out-of-tank wiring (wire bundle) from the bussing plug to the fuel quantity processor unit (FQPU) in the radar bay:
  - (a) FOR A FAULT IN THE NO. 1 TANK, do these steps:
    - 1) Disconnect connector D11304 on the FQPU, M1827 in the radar bay.
    - 2) Do a continuity check between these pins of connector D11312 on the front spar and connector D11304 on the FQPU, M1827 in the radar bay:



### AKS 001-013

D11312	D11304
pin 1	pin 8
pin 2	pin 22
pin 3	pin 23

## AKS 014-999

D11312	D11304
pin 1	pin 8
pin 2	pin 21
pin 3	pin 17

### **AKS ALL**

- 3) Make sure connector D11304 is disconnected.
- 4) Make sure the resistance from D11312, pin 1 to the shield on D11312 is more than 1 megohm.
- 5) Re-connect connectors D11304 and D11312 To re-connect connector D11312, do this task: Bussing Plug Installation, AMM TASK 28-41-41-400-801.
- (b) FOR A FAULT IN THE NO. 2 TANK, do these steps:
  - 1) Disconnect connector D11306 on the FQPU, M1827 in the radar bay.
  - Do a continuity check between these pins of connector D11314 on the front spar and connector D11306 on the FQPU, M1827 in the radar bay:

## AKS 001-013

D11314	D11306
pin 1	 pin 8
pin 2	 pin 22
pin 3	 pin 23

### AKS 014-999

D11314	D11306
pin 1	pin 8
pin 2	pin 21
pin 3	pin 17

#### **AKS ALL**

- 3) Make sure connector D11306 is disconnected.
- 4) Make sure the resistance from D11314, pin 1 to the shield on D11314 is more than 1 megohm.
- 5) Re-connect connectors D11314 and D11306. To re-connect connector D11314, do this task: Bussing Plug Installation, AMM TASK 28-41-41-400-801.
- (c) FOR A FAULT IN THE CENTER TANK, do these steps:
  - 1) Disconnect connector D11308 on the FQPU, M1827 in the radar bay.

AKS ALL



 Do a continuity check between these pins of connector D11316 on the rear spar and connector D11308 on the FQPU, M1827 in the radar bay:

### AKS 001-013

D1131	6	D11308
pin 1		pin 8
pin 2		pin 22
pin 3		pin 23

#### AKS 014-999

D11316	D11308
pin 1	pin 8
pin 2	pin 21
pin 3	pin 17

#### **AKS ALL**

- 3) Make sure connector D11308 is disconnected.
- 4) Make sure the resistance from D11316, pin 1 to the shield on D11316 is more than 1 megohm.
- 5) Re-connect connectors D11308 and D11316. To re-connect connector D11316, do this task: Bussing Plug Installation, AMM TASK 28-41-41-400-801.
- (d) If you find a problem with the wiring, then do these steps:
  - 1) Repair the the problems that you find (SWPM 20-20-00, SWPM 20-60-06).
    - a) Make sure the out-of-tank wire bundle is shielded and the shield ground is terminated (SWPM 20-10-15, SWPM 20-20-00).

## 28-AWL-04: CDCCL

2) Do this task: FQIS - Out Tank Connectors - Electrical Bonding Resistance Check, AMM TASK 05-55-54-200-802, for the applicable side of body FQIS connector D39915 or D39916, or main wheel well FQIS connector D4850P, if it is disconnected or if the coupling ring on the connector is loosened or tightened,.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-04.

### 28-AWL-04: CDCCL

3) Do this task: FQIS Wiring And Bonding - Inspection, AMM TASK 05-55-54-200-801, for the applicable wire bundle if the FQIS wire bundle in the unpressurized zone is replaced or the FQIS wire bundle shield is repaired.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-04.

- 4) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - a) If the GROUND TEST procedure shows PASS, then you corrected the fault.

AKS ALL 28-41 TASK 818

Page 259 Jun 15/2016



b) If the GROUND TEST procedure continues to show 1 OR MORE TANK UNITS OPEN, then continue.

WARNING: OBEY THE PRECAUTIONS FOR PURGING AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (4) If a single tank unit or compensator shows problems, then go into the applicable fuel tank (AMM TASK 28-11-00-910-802) and do these steps:
  - (a) Do an inspection of the tank unit and the adjacent wiring for these problems:
    - 1) Make sure no parts of the tank unit or compensator are in electrical contact with the airplane structure.
    - 2) Make sure there are no brackets that are bent or have other problems.
    - 3) Make sure there is no unwanted material in the tank unit or compensator.
    - 4) Make sure there are no loose terminal connections at either the applicable tank unit or the number 2 tank unit.

NOTE: The number 2 tank unit is the top of a daisy chain. If there is a loose connection at the number 2 tank unit, then a fault message can display for other tank units.

- a) If there are loose terminal connections, then tighten the screws to these torque ranges:
  - <1> LO-Z 29 ±6 in-lb (3 ±1 N·m)
  - <2> SHIELD 17.5 ±2.5 in-lb (2.0 ±0.3 N·m)
  - <3> HI-Z 13.5 ±1.5 in-lb (1.5 ±0.2 N·m)
- 5) Make sure there are not other problems with the wiring near the applicable tank unit or the number 2 tank unit (for example, a wire pinched under a tank unit).
- (b) If there are problems with the tank unit or the adjacent wiring, then repair the problems.
- (c) If the tank unit wiring is repaired or replaced, then make sure the wire slack between the wire and components or structure maintains a clearance of 0.5 in. (12.7 mm).

### 28-AWL-09: CDCCL

(d) If 0.5 in. (12.7 mm) is not possible, then you must maintain a minimum clearance of 0.125 in. (3.175 mm).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, AMM TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-09.

- (e) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - 1) If the GROUND TEST procedure shows PASS, then you corrected the fault.
  - If the GROUND TEST procedure continues to show 1 OR MORE TANK UNITS OPEN, then replace the tank unit or compensator.

These are the tasks:

Tank Unit or the Compensator Unit Removal, AMM TASK 28-41-21-000-801 Tank Unit or Compensator Unit Installation, AMM TASK 28-41-21-400-801

- 3) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - a) If the GROUND TEST procedure shows PASS, then you corrected the fault.

AKS ALL



b) If the GROUND TEST procedure continues to show 1 OR MORE TANK UNITS OPEN, then repair or replace the in-tank FQIS wire harness in the applicable tank (AMM TASK 28-41-44-400-801).

WARNING: OBEY THE PRECAUTIONS FOR PURGING AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (5) If two or more tank units show problems, then go into the applicable fuel tank (AMM TASK 28-11-00-910-802) and do these steps:
  - (a) Make sure there are no loose terminal connections at each tank unit within the applicable tank.

NOTE: The number 2 tank unit is the top of a daisy chain. If there is a loose connection at the number 2 tank unit, then a fault message can display for other tank units.

- 1) If there are loose terminal connections, then tighten the screws to these torque ranges:
  - a) LO-Z 29 ±6 in-lb (3 ±1 N·m)
  - b) SHIELD 17.5 ±2.5 in-lb (2.0 ±0.3 N·m)
  - c) HI-Z 13.5 ±1.5 in-lb (1.5 ±0.2 N·m)
- (b) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - 1) If the GROUND TEST procedure shows PASS, then you corrected the fault.
  - If the GROUND TEST procedure continues to show 1 OR MORE TANK UNITS OPEN, then repair or replace the FQIS wire harness (AMM TASK 28-41-44-400-801).
- (c) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - 1) If the GROUND TEST procedure shows PASS, then you corrected the fault.



# 819. FQIS BITE INOP Message Shown on the CDU - Fault Isolation

## A. Description

(1) If the Flight Management Computer (FMC) does not receive a valid signal from the Fuel Quantity Processor Unit (FQPU) at any time during the FQIS BITE test, the CDU shows this message:

FQIS BITE TEST

FQIS BITE INOP

CHECK FQIS OR INTERFACE

(a) You do the FQIS BITE Test from the control display unit (CDU) in the flight compartment (28-41 TASK 801). There are two CDUs on the forward electronics panel in the flight compartment.

### B. Possible Causes

- Fuel Quantity Processor Unit (FQPU), M1827
- (2) FMCS Transfer Relay 1, R475
- (3) Wiring

AKS ALL

28-41 TASKS 818-819



## C. Circuit Breakers

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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	4	C01441	FUEL FUELING IND
Α	5	C00398	FUEL QTY 2
Α	6	C00397	FUEL QTY 1

## D. Related Data

- (1) (SSM 34-61-14)
- (2) (SSM 28-41-11)
- (3) (WDM 34-61-14)
- (4) (WDM 28-41-11)

### E. Initial Evaluation

- (1) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - (a) If the CDU display shows the FQIS BITE INOP message, then do the Fault Isolation Procedure below.
  - (b) If the CDU display does not show the FQIS BITE INOP message, then there was an intermittent fault.

# F. Fault Isolation

- (1) Do these steps to do a check of the FQPU, M1827:
  - (a) Do this task: Fuel Quantity Processor Unit Removal, AMM TASK 28-41-81-000-801.
  - (b) Do a check of the pins for connectors D11304, D11306, D11352, D11354 for corrosion or damage.
  - (c) If there is corrosion or damage to the pins, then do these steps:
    - 1) Repair the pins if any of the pins have damage.
    - 2) Clean the connector if there is any corrosion (SWPM 20-60-01).
  - (d) If there is no corrosion or damage to the pins, then continue.
  - (e) Install a new FQPU (AMM TASK 28-41-81-400-801).
  - (f) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
    - 1) If the CDU display does not show the FQIS BITE INOP message, then you corrected the fault.
    - 2) If the CDU display shows the FQIS BITE INOP message, then continue.
- (2) Replace the FMCS Transfer Relay 1, R475 (WDM 34-61-14).
  - (a) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
    - If the CDU display does not show the FQIS BITE INOP message, then you corrected the fault.
    - 2) If the CDU display shows the FQIS BITE INOP message, then continue.
- (3) Do these steps to do a check of the wiring:

28-41 TASK 819

**AKS ALL** 

EFFECTIVITY



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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	6	C01017	FMCS CMPTR 1

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	16	C01262	FMCS CMPTR 2

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	4	C01441	FUEL FUELING IND
Α	5	C00398	FUEL QTY 2
Α	6	C00397	FUEL QTY 1

- (b) Remove the two FMCs, M1175 and M1632. To remove them, do this task: FMCS Computer Removal, AMM TASK 34-61-02-000-801.
- (c) Remove the fuel quantity processor unit (FQPU), M1827. To remove it, do this task: Fuel Quantity Processor Unit Removal, AMM TASK 28-41-81-000-801.

### AKS 001-013

(d) Do a continuity check between these pins of connector D2179A for the left FMC or connector D3261A for the right FMC and connector D11306 for the FQPU:

D2179/	A OR	
D3261	A	D11306
pin D5		pin 1
pin E5		pin 3

## AKS 014-999

(e) Do a continuity check between these pins of connector D2179A for the left FMC or connector D3261A for the right FMC and connector D11352 for the FQPU:

D2179A OR				
D3261A	<u> </u>	D11352		
pin D5		pin 6		
pin E5		pin 7		

## **AKS ALL**

EFFECTIVITY •

- (f) If there is not continuity between these pins, then do these steps:
  - 1) Repair the wiring.
  - 2) Re-install the two FMCs. To install them, do this task: FMCS Computer Installation, AMM TASK 34-61-02-400-801.
  - 3) Re-install the FQPU. To install it, do this task: Fuel Quantity Processor Unit Installation, AMM TASK 28-41-81-400-801.

28-41 TASK 819

AKS ALL



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

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	6	C01017	FMCS CMPTR 1

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

Row	<u>Col</u>	Number	<u>Name</u>
D	16	C01262	FMCS CMPTR 2

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

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Α	4	C01441	FUEL FUELING IND
Α	5	C00398	FUEL QTY 2
Α	6	C00397	FUEL QTY 1

- 5) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - a) If the CDU display does not show the FQIS BITE INOP message, then you corrected the fault.



# 820. Unexpected Fuel Configuration Messages - Fault Isolation

# A. Description

- (1) Three fuel configuration messages can show on the fuel quantity indication page of the Common Display System (CDS) during flight. It is possible that the flight crew will report these messages if they show unexpectedly:
  - (a) CONFIG
  - (b) IMBAL
  - (c) LOW
- (2) The CONFIG message comes on if all these conditions are true:
  - (a) At least one of the two engines is operating.
  - (b) The two center tank boost pumps both show low pressure.
  - (c) There is a minimum of 1600 lb (726 kg) in the center tank.
- (3) If the CONFIG message comes on, it continues to show until one or more of these conditions are true:
  - (a) The center tank quantity decreases to less than 800 lb (363 kg).
  - (b) A minimum of one center tank pump is producing high pressure.
  - (c) The two engines are not in operation.
- (4) The IMBAL message comes on if there is a difference of 1000 lb (454 kg) between the No. 1 tank and No. 2 tank. The message IMBAL goes off again when the difference between the two tanks decreases to less than 200 lb (91 kg). The imbalance condition must exist for 60 seconds before the IMBAL message shows.
- (5) The LOW message comes on when the No. 1 tank or the No. 2 tank has less than 2000 lb (907 kg) of fuel. This message goes off when the quantity in that tank increases to more than 2500 lb (1134 kg). The low fuel condition must exist for 30 seconds before the LOW message shows.

EFFECTIVITY
AKS ALL

28-41 TASKS 819-820

Page 264 Jun 15/2016



(6) For information on fuel imbalance exceedance (more 1000 lb (454 kg)), refer to this task: Fuel Imbalance Exceedance - Conditional Inspection, AMM TASK 05-51-48-211-801.

### B. Possible Causes

- Unusual fuel configuration (for example, trapped fuel in the center tank, actual fuel imbalance, leaking crossfeed valve)
- (2) Fuel Quantity Indicating System (FQIS)
- (3) Common Display System (CDS)

#### C. Initial Evaluation

- (1) Do these steps to find if the fuel configuration message (CONFIG, IMBAL or LOW) showed because of the actual fuel configuration:
  - (a) Examine the fuel quantities in the No. 1 tank, the No. 2 tank, and the center tank.
  - (b) Look at all available data related to the fuel quantities in the No. 1 tank, the No. 2 tank, and the center tank for the flight leg where the reported fault occurred.
  - (c) If the available fuel data explains why the fuel configuration message showed, then do the procedure below: Fault Isolation Unexpected Fuel Configuration.
  - (d) If the available fuel data does not explain why the fuel configuration message showed, then do the procedure below: Fault Isolation Configuration Indication Problem.

## D. Fault Isolation Procedure - Unexpected Fuel Configuration

- (1) Do these steps to look for boost pumps with low pressure:
  - (a) Look for more fault reports related to the fuel feed system (ATA 28-22) (for example, low pressure lights, boost pump circuit breakers).
  - (b) If there are fault reports for ATA 28-22 that show no corrective action taken, do the fault isolation for these faults.
  - (c) If there are no fault reports for ATA 28-22, then do these steps:
    - Do this task: Fuel Boost Pump Output Pressure Test, AMM TASK 28-22-00-720-803.
      - a) If there are problems with one or more boost pumps, replace the applicable pump(s).

These are the tasks:

Motor Impeller Removal, AMM TASK 28-22-41-000-801.

Motor Impeller Installation, AMM TASK 28-22-41-400-801.

- 2) If there are no problems with the boost pump pressure, then do the applicable procedure to look for unwanted fuel transfer related to the fuel data that you found:
  - a) Do this task: Unwanted Fuel Transfer into the Center Tank Source Unknown -Fault Isolation, 28-21 TASK 812.
  - Do this task: Unwanted Fuel Transfer from the No. 1 Tank to the Center Tank -Fault Isolation, 28-21 TASK 803.
  - Do this task: Unwanted Fuel Transfer from the No. 2 Tank to the Center Tank -Fault Isolation, 28-21 TASK 813.
  - d) Do this task: Unwanted Fuel Transfer from the Center Tank to the No. 1 Tank -Fault Isolation, 28-21 TASK 814.
  - Do this task: Unwanted Fuel Transfer from the Center Tank to the No. 2 Tank -Fault Isolation, 28-21 TASK 815.

AKS ALL



- If no problems are found, do this task: Crossfeed Valve Functional Test, AMM TASK 28-22-00-730-802.
  - a) Correct any problems that you find.
- 4) If the problem continues, then do these steps:
  - Remove the crossfeed valve actuator. To remove it, do this task: Actuator of the Engine Fuel Crossfeed Valve Removal, AMM TASK 28-22-21-000-804.
    - NOTE: Do not remove the lower index plate screw. If this screw is removed, then the index plate will need to be realigned (AMM TASK 28-22-21-820-801).
  - b) Install the fuel shutoff valve alignment equipment, SPL-1771.
  - Make sure the spline on the fuel shutoff valve alignment equipment, SPL-1771, engages with the spline on the adapter shaft.
  - d) Turn the fuel shutoff valve alignment equipment, SPL-1771, in the clockwise direction until the resistance decreases.
  - Turn the fuel shutoff valve alignment equipment, SPL-1771, in the counterclockwise direction until the resistance starts to increase.
  - f) Record the position of the fuel shutoff valve alignment equipment, SPL-1771.
  - g) Turn the fuel shutoff valve alignment equipment, SPL-1771, in the counterclockwise direction until the resistance decreases.
  - Turn the fuel shutoff valve alignment equipment, SPL-1771, in the clockwise direction until the resistance starts to increase.
  - i) Record the position of the fuel shutoff valve alignment equipment, SPL-1771.
  - j) Turn the fuel shutoff valve alignment equipment, SPL-1771, clockwise to the average position of those previously recorded above.
    - NOTE: This will center the valve disk within the seal near the point of maximum resistance.
  - Turn the fuel shutoff valve alignment equipment, SPL-1771, back and forth without rotating the valve disk.
    - <1> Measure the free play of the driveline in degrees.
  - I) If the driveline free play is greater than 16 degrees, then the crossfeed valve should be replaced.
  - m) If the driveline free play is less than 16 degrees, then do this task: Crossfeed Valve Alignment, AMM TASK 28-22-21-820-801.
  - n) Remove the fuel shutoff valve alignment equipment, SPL-1771.
  - Install the crossfeed valve actuator. To install it, do this task: Actuator of the Engine Fuel Crossfeed Valve Installation, AMM TASK 28-22-21-400-804.

### E. Fault Isolation Procedure - Configuration Indication Problem

- (1) Do this task: FQIS BITE Procedure, 28-41 TASK 801.
  - (a) If the FQIS BITE test does not show any problems, then continue.
- (2) Do this task: CDS BITE Procedure, 31-62 TASK 801.
  - (a) If the CDS BITE test does not show any problems, then the system is OK.

	חוו	OF	TA	$\sim$	

AKS ALL



## 801. Fuel Temperature Indicator Does Not Operate Correctly - Fault Isolation

# A. Description

(1) The FUEL TEMPERATURE indicator on the P5-2 panel does not show the correct fuel temperature.

### B. Possible Causes

- (1) Fuel temperature sensor, T434
- (2) Fuel temperature indicator, N42
- (3) Wiring
- (4) Ground connection GD476-DC

### C. Circuit Breakers

(1) This is the primary circuit breaker related to the fault:

F/O Electrical System Panel, P6-3

Row Col Number Name
A 7 C00355 FUEL TEMP IND

## D. Related Data

- (1) (SSM 28-42-11)
- (2) (WDM 28-42-11)

## E. Initial Evaluation

- (1) Do this test of the fuel temperature indicating system: Fuel Temperature Indicating System Test (Master Thermometer), AMM TASK 28-43-00-710-801.
  - (a) If the fuel temperature indicating system test shows a problem, then do the Fault Isolation Procedure below.
  - (b) If the fuel temperature indicating system test is OK, then there was an intermittent fault.

### F. Fault Isolation Procedure

- (1) Do this check of the fuel temperature indicator, N42:
  - (a) Do this task: Fuel Temperature Indicator Functional Test (Spare Temperature Indicator), AMM TASK 28-43-00-720-801.
    - If the test shows a problem, then replace the fuel temperature indicator, N42, and do the Repair Confirmation at the end of this task. To replace the fuel temperature indicator, do these tasks:

Fuel Temperature Indicator Removal, AMM TASK 28-43-21-020-801,

Fuel Temperature Indicator Installation, AMM TASK 28-43-21-020-802.

- 2) If the the test is OK, then continue.
- (b) Open this circuit breaker:

F/O Electrical System Panel, P6-3

RowColNumberNameA7C00355FUEL TEMP IND

(c) Remove the fuel temperature indicator, N42, from the P5-2 panel.

AKS ALL

28-43 TASK 801



(d) Close this circuit breaker:

F/O Electrical System Panel, P6-3

Row Col Number Name

A 7 C00355 FUEL TEMP IND

- (e) Do a check for 28 VAC from pin 2 to pin 5 (ground) on connector D616.
  - 1) If there is not 28 VAC from pin 2 to pin 5 (ground) on connector D616, then do these steps:
    - a) Repair the wiring from pin 2, connector D616 to pin 16 D40536P.
    - b) Do the Repair Confirmation at the end of this task.
  - f there is 28 VAC from pin 2 to pin 5 (ground) on connector D616, then continue.
- (2) Do this check of the fuel temperature sensor, T434, and the related wiring:
  - (a) Do this task: Fuel Temperature Bulb Resistance Test, AMM TASK 28-43-00-760-801.
  - (b) If the resistance test is not satisfactory, then do these steps:
    - 1) Remove the fuel temperature sensor, T434. To remove it, do this task: Fuel Temperature Bulb Removal, AMM TASK 28-43-11-000-801.
    - 2) Disconnect connector D616 from the fuel temperature indicator.
    - 3) Put a jumper between the two loose wires that go to the fuel temperature sensor.
    - 4) On connector D616, do a continuity check from pin 3 to pin 4.
    - 5) If there is no continuity between pin 3 and pin 4 on connector D616, then do these steps:
      - a) Repair the wiring from pin 3 to pin 4 on connector D616.
      - Remove the jumper between the loose wires that go to the temperature sensor.
      - c) Re-install the fuel temperature sensor, T434. To install it, do this task: Fuel Temperature Bulb Installation, AMM TASK 28-43-11-400-801.
      - d) Do the Repair Confirmation at the end of this task.
    - 6) If there is continuity between pin 3 and pin 4 on connector D616, then do these steps:
      - Remove the jumper between the loose wires that go to the temperature sensor.
      - b) Install a new fuel temperature sensor. To install it, do this task: Fuel Temperature Bulb Installation, AMM TASK 28-43-11-400-801.
      - c) Do the Repair Confirmation at the end of this task.
  - (c) If the resistance test is satisfactory, then continue.
- (3) Do this check of the ground at GD476-DC:
  - (a) Disconnect the connector D616 from the fuel temperature indicator.
  - (b) Do a continuity check from pin 4 on connector D616 to structure ground.
  - (c) If there is not continuity from pin 4 on connector D616 to structure ground, then repair the wiring from splice SP172 to the ground connection GD476-DC.
  - (d) If there is continuity from pin 4 on connector D616 to structure ground, then do these steps:

AKS ALL

28-43 TASK 801



- 1) Install a new fuel temperature indicator, N42.
- 2) Do the Repair Confirmation at the end of this task.

# G. Repair Confirmation

- (1) Do this test of the fuel temperature indicating system: Fuel Temperature Indicating System Test (Master Thermometer), AMM TASK 28-43-00-710-801.
  - (a) If the fuel temperature indicating system test is OK, then you corrected the fault.

----- END OF TASK -----

AKS ALL 28-43 TASK 801