CHAPTER

80

STARTING

(CFM56 ENGINES (CFM56-7))

CHAPTER 80
STARTING

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

80-EFFECTIVE PAGES

737-600/700/800/900
AIRCRAFT MAINTENANCE MANUAL

CHAPTER 80
STARTING

80-CONTENTS

CHAPTER 80
STARTING

STARTING - DDG MAINTENANCE PROCEDURES

1. General

A. This procedure has the maintenance tasks for the Master Minimum Equipment List (MMEL) maintenance requirements as shown in the Dispatch Deviations Procedures Guide (DDPG). These tasks prepare the airplane for flight with systems/components that are inoperative.

B. This procedure also has the tasks to put the airplane back to its usual condition.

C. These are the tasks for the components in the starting system:

(1) MMEL 80-3 (DDPG) Preparation - Start Valve Inoperative

(2) MMEL 80-3 (DDPG) Restoration - Start Valve Inoperative.

TASK 80-00-00-040-801-F00

2. MMEL 80-3 (DDPG) Preparation - Start Valve Inoperative

A. General

(1) This task prepares the airplane for flight with the start valve inoperative.

B. References

Reference	Title
71-00-00-800-809-F00	Start the Engine Procedure (Manual Override of the Engine Start Valve) (P/B 201)

C. Procedure

SUBTASK 80-00-00-980-001-F00

(1) Do this task: Start the Engine Procedure (Manual Override of the Engine Start Valve), TASK 71-00-00-800-809-F00.

——— END OF TASK ———

TASK 80-00-00-440-801-F00

3. MMEL 80-3 (DDPG) Restoration - Start Valve Inoperative

A. General

(1) This task puts the airplane back to its usual condition after operation with the start valve inoperative.

B. Procedure

SUBTASK 80-00-00-810-001-F00

(1) Do the applicable fault isolation task in the FIM to correct the problem.

——— END OF TASK ———

START SWITCH - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) Start Switch Removal

(2) Start Switch Installation.

TASK 80-11-00-000-801-F00

2. Start Switch Removal

(Figure 401)

A. General

(1) The task gives the instructions on how to remove the start switch.

(2) The start switch is referred to as the switch and is located on the P5 overhead panel.

B. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right

C. Prepare for the Removal

SUBTASK 80-11-00-860-012-F00

(1) For Engine 1, open this circuit breaker and install a safety tag:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 80-11-00-860-013-F00

(2) For Engine 2, open this circuit breaker and install a safety tag:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

SUBTASK 80-11-00-860-006-F00

(3) Make sure that the start lever is in the CUTOFF position and install a DO-NOT-OPERATE tag.

SUBTASK 80-11-00-860-007-F00

(4) Make sure that the engine start switch is off and install a DO-NOT-OPERATE tag.

D. Start Switch Removal

SUBTASK 80-11-00-860-008-F00

(1) Unlatch the P5 overhead panel and put it in the open position.

SUBTASK 80-11-00-030-001-F00

(2) Disconnect the applicable wire from the switch [1].

(a) Remove each wire lug from the terminal.

SUBTASK 80-11-00-020-001-F00

(3) Remove the knob from the switch [1].

SUBTASK 80-11-00-020-002-F00

(4) If installed, remove the spacer [2].

SUBTASK 80-11-00-020-003-F00

(5) Remove the nut [3] and the washer [4] from the switch [1].

SUBTASK 80-11-00-020-004-F00

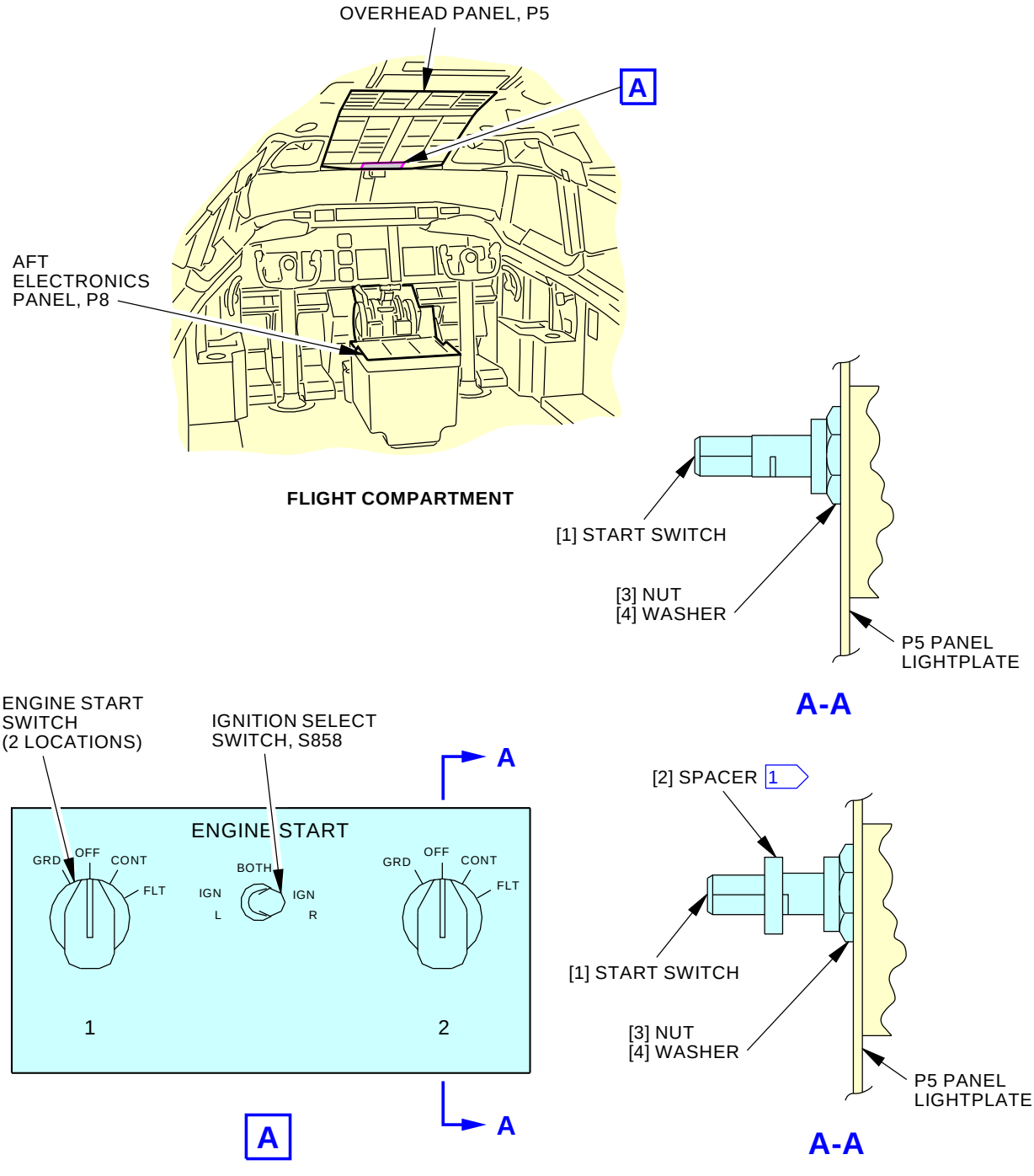
(6) Remove the switch [1].

SUBTASK 80-11-00-020-005-F00

(7) If it is necessary, remove the diode from the X1 and X2 terminals of the switch.

NOTE: Keep the diode for installation on the new starter switch.

——— END OF TASK ———



1 SPACER INSTALLED ON START SWITCH WITH LONGER SHAFT

1442976 S0000260399_V3

Start Switch Installation
Figure 401/80-11-00-990-801-F00

TASK 80-11-00-400-801-F00

3. Start Switch Installation

(Figure 401)

A. General

(1) The task gives the instructions on how to install the start switch.

(2) The start switch is referred to as the switch and is located on the P5 overhead panel.

B. References

Reference	Title
80-11-00-730-801-F00	Start Switch Test (P/B 501)

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Switch	74-31-52-01-060	AKS 001-010
		74-31-52-01-105	AKS 011, 012
		74-31-52-01-135	AKS 013-999
2	Spacer	31-11-94-05S-008	AKS 007, 008
		31-11-94-13G-008	AKS 001-006, 009, 010

D. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right

E. Start Switch Installation

SUBTASK 80-11-00-420-001-F00

(1) Install the start switch [1] as follows:

(a) Put the start switch [1] in its position in the P5 overhead panel.

(b) Install the washer [4] and the nut [3].

1) Tighten the nut [3].

(c) If it is necessary, install the spacer [2] .

(d) Install the knob.

1) Tighten the knob.

(e) Connect the applicable wire back to the switch [1].

1) Install each wire lug to its terminal.

(f) If the start switch does not have a diode installed at the X1 and X2 terminals, do these steps:

1) Use a new diode or the diode from the removed switch.

2) Install the cathode end of the diode to the X2 terminal.

3) Install the anode of the diode to the X1 terminal.

(g) Close and latch the P5 overhead panel.

F. Put the Airplane Back to Its Usual Condition

SUBTASK 80-11-00-860-010-F00

(1) For Engine 1, remove the safety tag and close this circuit breaker:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 80-11-00-860-011-F00

(2) For Engine 2, remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

SUBTASK 80-11-00-860-009-F00

(3) Remove the DO-NOT-OPERATE tag from the applicable start lever.

G. Start Switch Installation Test

SUBTASK 80-11-00-700-002-F00

(1) Do this task: Start Switch Test, TASK 80-11-00-730-801-F00.

——— END OF TASK ———

START SWITCH - ADJUSTMENT/TEST

1. General

A. This procedure has one task:

(1) Start Switch Test.

TASK 80-11-00-730-801-F00

2. Start Switch Test

A. General

(1) This task provides the instructions on how to test the start switch.

(a) Use this test after you replace the engine start switch or to examine the operation of the switch.

(b) The engine start switch S266 (Eng 1) or S267 (Eng 2) is located on the P5 overhead panel.

B. References

Reference	Title
36-00-00-860-801	Supply Pressure to the Pneumatic System (Selection) (P/B 201)
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)
71-00-00-700-819-F00	Stop the Engine Procedure (Usual Engine Stop) (P/B 201)
71-00-00-800-808-F00	Start the Engine Procedure (Normal Start) (P/B 201)
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
73-21-00-740-803-F00	EEC BITE TEST - RECENT FAULTS (P/B 501)
SSM 74-31-11	System Schematics Manual

C. Tools/Equipment

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

Reference	Description
COM-1793	Multimeter - Digital/Analog (or equivalent meter meets task requirements) Part #: 117 Supplier: 89536 Part #: 260-8XPI Supplier: 55026 Part #: 260-8XPI Supplier: 88277 Part #: 287 Supplier: 89536 Part #: 289 Supplier: 89536 Part #: 87V Supplier: 89536 Part #: FLUKE 27 II Supplier: 89536 Part #: FLUKE-77-4 Supplier: 89536 Opt Part #: 187 Supplier: 89536 Opt Part #: 189 Supplier: 89536 Opt Part #: 21 Supplier: 89536 Opt Part #: 77 SERIES III Supplier: 89536 Opt Part #: 87 Supplier: 89536 Opt Part #: FLUKE 27 Supplier: 89536

D. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right

E. Start Switch Test

SUBTASK 80-11-00-860-001-F00

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

SUBTASK 80-11-00-860-002-F00

(2) Move the applicable engine start switch to the GRD position and make sure the switch holds in this position.

(a) Move the switch back to the OFF position.

SUBTASK 80-11-00-860-003-F00

(3) Get access to the Display Electronics Unit (DEU) input monitoring of the discreet display screen on the FMCS CDU as follows:

(a) Push the INIT REF key two times.

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

NOTE: This causes the INIT REF INDEX to show.

(c) Push the MAINT LSK.

NOTE: This causes the MAINT BITE INDEX to show.

(d) Push the CDS LSK.

NOTE: This causes the CDS BITE INDEX to show.

(e) Push the line select key for one of the DEU's, DEU 1 or DEU 2.

(f) Push the INPUT MONITORING LSK.

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

SUBTASK 80-11-00-860-004-F00

(4) Examine the parameters for the applicable Engine Start Switch position on the applicable DEU:

(a) For Engine 1, Push the SELECT B LSK.

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

(b) For Engine 2, Push the SELECT E LSK.

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

1) Push the NEXT PAGE key.

2) Record the values that shows in column F, row 9.

3) Record the values that shows in column C, row 14.

(c) Make sure that the values agree with this table for the noted switch positions:

Table 501/80-11-00-993-801-F00

ENGINE START SWITCH POSITION	COLUMN F ROW 9	COLUMN C ROW 14
OFF	O	O
GRD	G	O

Table 501/80-11-00-993-801-F00 (Continued)

ENGINE START SWITCH POSITION	COLUMN F ROW 9	COLUMN C ROW 14
CONT	G	O
FLT	O	G

1) Move the start switch to the other positions in the table and do the above steps again to record the values.
2) The CDU screen updates once per second. The status of the discrete may take as long as two seconds to update.
3) G is for ground, O is for open, V is for 28 VDC, X is for invalid and - is for no discrete.

(d) Push the INDEX LSK until the CDS BITE INDEX shows.
1) Do the steps again to examine the other DEU, DEU 1 or DEU 2.

(e) If the values agree, then the engine start switch circuit is satisfactory from the switch to the DEUs (SSM 74-31-11).

(f) If the values do not agree and you find an O when a G is expected, then look for an open circuit in the switch or on the wire and connector between the engine start switch and the DEU.

(g) If the values do not agree and you find an G when an O is expected, then look for a short to ground in the switch, or on the wire and connector between the engine start switch and the DEU.

SUBTASK 80-11-00-860-005-F00

(5) Do one of the steps that follows (engine operation or wiring check) to do a check of the start switch.

(a) Do this engine operation to examine the ARINC parameters of the applicable engine start switch:
1) Do this task: Supply Pressure to the Pneumatic System (Selection), TASK 36-00-00-860-801Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.
2) Start the applicable engine with the effected start switch (TASK 71-00-00-800-808-F00).
3) Operate the engine at idle.
4) Move the effected start switch to the CONT position for at least ten seconds.
5) Move the effected start switch to the FLT position for at least ten seconds.
6) Move the start switch to the OFF position.
7) Do this task: Stop the Engine Procedure (Usual Engine Stop), TASK 71-00-00-700-819-F00.
8) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

(b) Do a wiring check of the applicable engine start switch.

1) For engine 1, open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

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

2) For engine 2, open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

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

3) For the applicable engine, open the fan cowl panels (TASK 71-11-02-010-801-F00).

4) Disconnect EEC connector, DP0303.

5) With a digital/analog multimeter, COM-1793, make sure there is continuity between pins W and r on the airplane side of connector DP0303 with the start switch in these positions:

NOTE: There should be no continuity with the start switch in the OFF or AUTO position.

a) GND

b) CONT

c) FLT.

6) Connect EEC Connector DP0303.

7) For engine 1, remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

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

8) For engine 2, remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

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

SUBTASK 80-11-00-740-001-F00

(6) For the applicable engine, do this task: EEC BITE TEST - RECENT FAULTS, TASK 73-21-00-740-803-F00.

(a) Look in Flight Leg 0 for these maintenance messages for Start Switch Signals and ARINC Bus Data Disagree:

1) 73-10311, 73-10312, 73-20311, 73-20312, 73-30311 or 73-30312.

(b) If one of the above messages show, use the 73 FIM to correct the fault.

1) Find the fault code or description of the fault that occurred.

2) Go to the applicable index or list in the FIM and find the FIM task number.

3) Go to the task in the FIM and do the steps in the task.

(c) If the above messages do not show, then the start switch is satisfactory.

F. Put the Airplane Back to Its Usual Condition

SUBTASK 80-11-00-410-002-F00

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

——— END OF TASK ———

STARTER - SERVICING

1. General

A. This procedure has two tasks:

(1) Starter Oil Servicing (Oil Drain)

(2) Starter Oil Servicing (Oil Fill).

TASK 80-11-01-680-801-F00

2. Starter Servicing (Oil Drain)

(Figure 301)

A. General

(1) This task provides the instructions on how to drain the starter before you remove it from the engine.

(2) This procedure uses a tool at the magnetic plug housing to drain the oil from the starter.

(3) The starter is on the forward side of the accessory gearbox.

B. References

Reference	Title
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
80-11-01-200-801-F00	Starter Magnetic Plug Inspection (P/B 601)

C. Tools/Equipment

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

Reference	Description
COM-2464	Adapter - Starter Drain, Engine Part #: DB75 Supplier: 0R3X9
STD-203	Container - Oil Resistant, 1 U.S.-Gal (3.8 l)

D. Consumable Materials

Reference	Description	Specification
D00599 [CP2442]	Oil - Engine (CFMI SB 79-0001)	CFM CP2442

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Packings	80-11-01-01A-070	AKS ALL
2	Magnetic plug	80-11-01-01A-060	AKS ALL

F. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

G. Prepare for the Servicing

SUBTASK 80-11-01-860-023-F00

(1) For Engine 1, open this circuit breaker and install a safety tag:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 80-11-01-860-024-F00

(2) For Engine 2, open this circuit breaker and install a safety tag:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

SUBTASK 80-11-01-010-018-F00

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

H. Procedure

SUBTASK 80-11-01-020-005-F00

(1) Remove the magnetic plug [2]:

NOTE: The magnetic plug is a bayonet type. Do not remove the magnetic plug housing and the safety cable to drain the oil.

(a) Push the magnetic plug [2] with your hand and turn it counterclockwise until it stops.

(b) Pull the magnetic plug [2] from the magnetic plug housing.

SUBTASK 80-11-01-210-009-F00

(2) Examine the magnetic plug [2] for the quantity and type of contamination (TASK 80-11-01-200-801-F00).

SUBTASK 80-11-01-680-003-F00

WARNING: DO NOT LET OIL STAY ON YOUR SKIN. YOU CAN ABSORB POISONOUS MATERIALS FROM THE OIL THROUGH YOUR SKIN.

(3) Drain the oil from the starter:

(a) Put a 1 U.S.-gal (3.81 l) oil resistant container, STD-203 below the starter to catch the oil.

(b) Put the hose end of the adapter, COM-2464 into the container.

(c) Install the adapter into the magnetic plug housing.

(d) Drain the oil into the container.

(e) If you will not fill the starter immediately, remove the adapter from the magnetic plug housing.

NOTE: The fill procedure uses the tool to pressure fill the starter.

SUBTASK 80-11-01-420-007-F00

(4) Install the magnetic plug [2]:

(a) If not already done, remove and discard the old packings [1].

(b) Apply clean oil, D00599 [CP2442], to the packings [1].

(c) Install the two packings [1] on the magnetic plug [2].

(d) Put the magnetic plug [2] in the magnetic plug housing and align the bayonet pins with the slots.

(e) Push the magnetic plug [2] until the pins touch the bottom of the slots and turn the plug clockwise until it locks.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 80-11-01-410-006-F00

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

SUBTASK 80-11-01-860-025-F00

(2) For Engine 1, remove the safety tag and close this circuit breaker:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

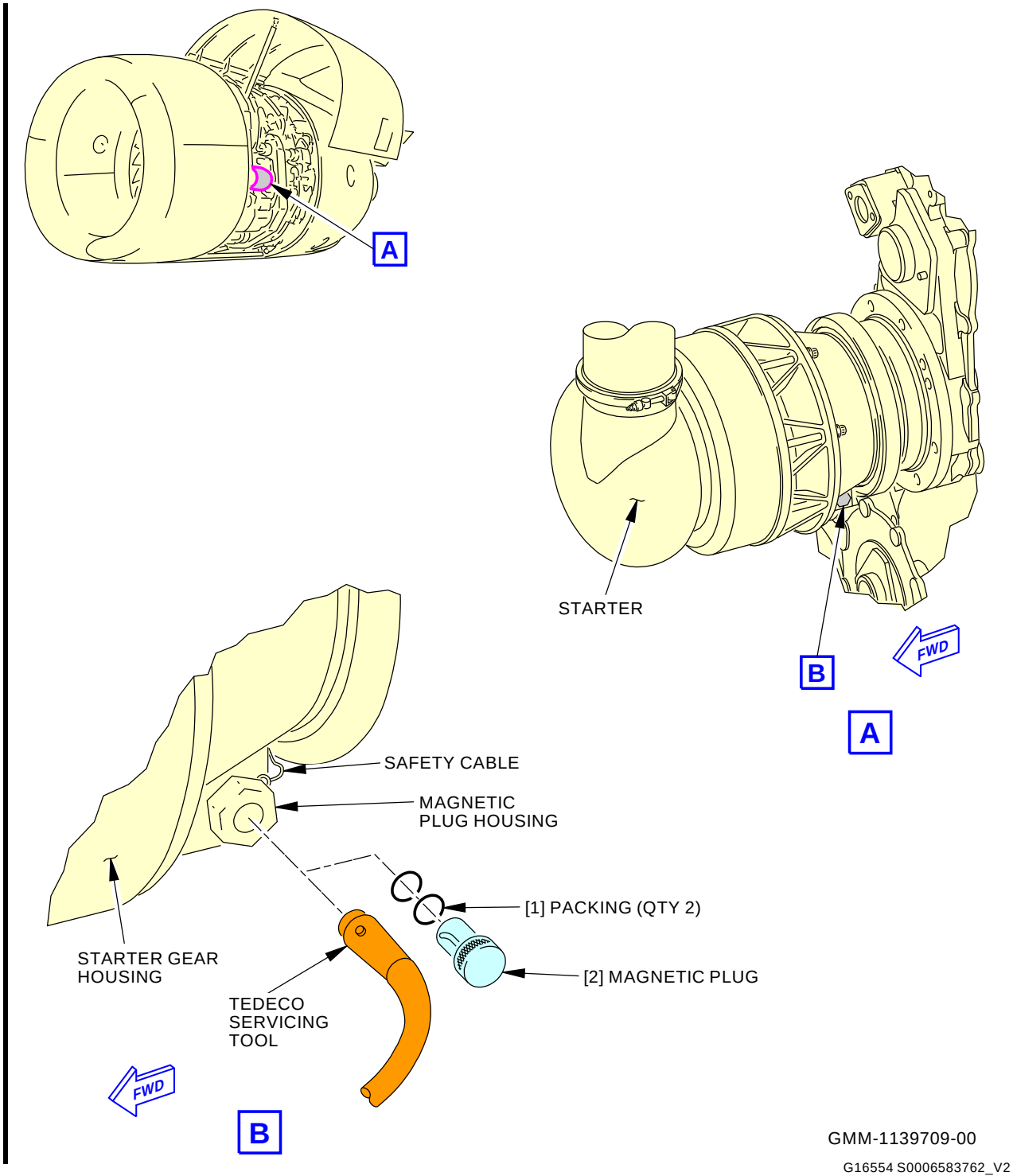
SUBTASK 80-11-01-860-026-F00

(3) For Engine 2, remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

——— END OF TASK ———



Starter Servicing
Figure 301/80-11-01-990-805-F00

TASK 80-11-01-610-801-F00

3. Starter Servicing (Oil Fill)

(Figure 301)

A. General

(1) This task provides the instructions on how to service the starter with oil.

(a) The Preferred Method uses a tool installed in the magnetic plug housing.

1) Do this procedure after you install the starter on the engine.

(b) The Alternate Method removes the magnetic plug housing to gravity fill the starter.

1) If the service tools are not available, do the alternate method before you install the starter on the engine.

(2) For this task, use the same type of oil that is used in the engine oil tank.

(3) After you do this task, it is not necessary to fill the starter again unless you remove the starter or drain the oil. The starter is supplied engine oil from the accessory gearbox.

(4) The starter is on the forward side of the accessory gearbox.

B. References

Reference	Title
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
80-11-01-360-801-F00	Starter Magnetic Plug Housing Packing Replacement (P/B 801)
80-11-01-400-801-F00	Starter Installation (P/B 401)

C. Tools/Equipment

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

Reference	Description
COM-2464	Adapter - Starter Drain, Engine Part #: DB75 Supplier: 0R3X9
STD-4051	Dispenser - Pressurized Oil Source

D. Consumable Materials

Reference	Description	Specification
D00599 [CP2442]	Oil - Engine (CFMI SB 79-0001)	CFM CP2442

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Packings	80-11-01-01A-070	AKS ALL
2	Magnetic plug	80-11-01-01A-060	AKS ALL

F. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

G. Prepare for the Servicing

SUBTASK 80-11-01-010-017-F00

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

SUBTASK 80-11-01-860-019-F00

(2) For Engine 1, open this circuit breaker and install a safety tag:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 80-11-01-860-020-F00

(3) For Engine 2, open this circuit breaker and install a safety tag:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

H. Starter Servicing (Preferred Method)

SUBTASK 80-11-01-020-006-F00

(1) If not already done, do these steps to remove the magnetic plug [2]:

NOTE: Do not remove the magnetic plug housing or the safety cable. The removal of the magnetic plug housing will drain the oil from the starter.

(a) Push the magnetic plug [2] with your hand and turn it counterclockwise until it stops.

NOTE: The magnetic plug is a bayonet type.

(b) Pull the magnetic plug [2] from the magnetic plug housing.

SUBTASK 80-11-01-680-004-F00

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

(2) Fill the starter with oil, D00599 [CP2442] as follows:

(a) Install the adapter, COM-2464 into the magnetic plug housing.

(b) Connect the hose of the adapter to the pressurized oil source dispenser, STD-4051.

(c) Fill the starter with 10.1-16.9 fluid ounces (300-500 cc) of oil, D00599 [CP2442].

1) Use the same type of engine oil as in the engine accessory gearbox.

NOTE: The accessory gearbox supplies engine oil to the starter.

(d) Remove the adapter from the magnetic plug housing.

SUBTASK 80-11-01-420-008-F00

(3) Install the magnetic plug [2] as follows:

(a) If not already done, remove and discard the old packings [1].

(b) Apply clean oil, D00599 [CP2442] to the two new packings [1].

(c) Install the packings [1] on the magnetic plug [2].

(d) Put the magnetic plug [2] in the magnetic plug housing and align the bayonet pins with the slots.

(e) Push the magnetic plug [2] until the pins touch the bottom of the slots and turn the plug clockwise until it locks.

I. Starter Servicing (Alternate Method)

SUBTASK 80-11-01-610-003-F00

WARNING: DO NOT LET OIL STAY ON YOUR SKIN. YOU CAN ABSORB POISONOUS MATERIALS FROM THE OIL THROUGH YOUR SKIN.

(1) Gravity fill the starter with oil, D00599 [CP2442] as follows:

NOTE: Fill the oil to the starter before you install the starter.

(a) Remove the magnetic plug housing (TASK 80-11-01-360-801-F00).

(b) Fill the starter with 10.1-16.9 fluid ounces (300-500 cc) of oil, D00599 [CP2442] as follows:

1) Use the same type of engine oil as in the engine accessory gearbox.

NOTE: The accessory gearbox supplies engine oil to the starter.

(c) Install the magnetic plug housing with a new packing (TASK 80-11-01-360-801-F00).

(d) Continue with the starter installation steps (TASK 80-11-01-400-801-F00).

J. Put the Airplane Back to Its Usual Condition

SUBTASK 80-11-01-410-005-F00

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

SUBTASK 80-11-01-860-021-F00

(2) For Engine 1, remove the safety tag and close this circuit breaker:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 80-11-01-860-022-F00

(3) For Engine 2, remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

——— END OF TASK ———

STARTER - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) Starter Removal

(2) Starter Installation.

TASK 80-11-01-000-801-F00

2. Starter Removal

(Figure 401)

A. General

(1) This task provides the instructions on how to remove the starter.

B. References

Reference	Title
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
80-11-01-200-801-F00	Starter Magnetic Plug Inspection (P/B 601)
80-11-01-680-801-F00	Starter Servicing (Oil Drain) (P/B 301)
80-11-02-000-801-F00	QAD Adapter Removal (P/B 401)
80-11-02-400-801-F00	QAD Adapter Installation (P/B 401)

C. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

D. Prepare for the Removal

SUBTASK 80-11-01-860-027-F00

(1) For Engine 1, open this circuit breaker and install a safety tag:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 80-11-01-860-028-F00

(2) For Engine 2, open this circuit breaker and install a safety tag:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

SUBTASK 80-11-01-010-015-F00

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

E. Starter Removal

SUBTASK 80-11-01-200-001-F00

WARNING: DO NOT LET OIL STAY ON YOUR SKIN. YOU CAN ABSORB POISONOUS MATERIALS FROM THE OIL THROUGH YOUR SKIN.

(1) If you remove the starter for a cause, examine the starter magnetic plug to find if the engine oil has contamination (TASK 80-11-01-200-801-F00).

SUBTASK 80-11-01-680-001-F00

(2) Do this task: Starter Servicing (Oil Drain), TASK 80-11-01-680-801-F00.

SUBTASK 80-11-01-010-006-F00

(3) Remove the coupling [2] to disconnect the starter duct [1] from the starter [9].

SUBTASK 80-11-01-020-002-F00

(4) Remove the starter [9] from the AGB [6]:

(a) Remove the clamp [7] that attaches the starter [9] to the QAD adapter [5].

(b) Pull the starter [9] forward until the splines of the shaft disengage from the AGB [6].

NOTE: You can lightly push the starter duct up to disengage the duct flanges.

(c) Remove the seal [10] from the starter duct [1].

NOTE: Keep the seal for the installation.

(d) Remove the packing [3] and the packing [4] from the starter shaft and the starter flange.

1) Discard the packing [3] and the packing [4].

(e) Install the protective covers on all the pneumatic openings.

SUBTASK 80-11-01-020-007-F00

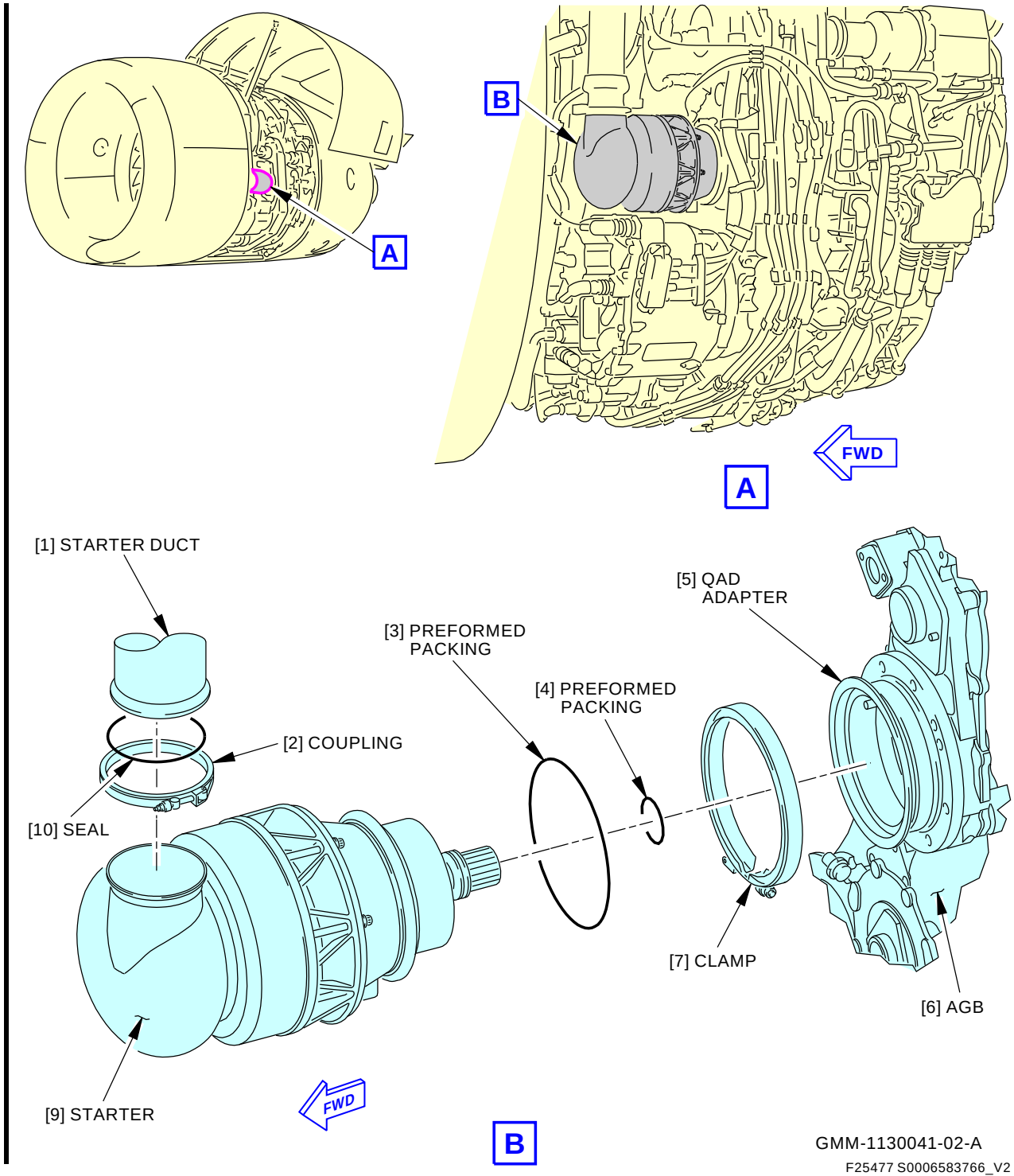
(5) If you remove the starter for damage, leakage or the results of a starter magnetic plug inspection, remove the QAD adapter (TASK 80-11-02-000-801-F00).

(a) Examine the area behind the QAD adapter for debris or the magnetic particles.

(b) If you find debris behind the QAD adapter, do this task: Starter Magnetic Plug Inspection, TASK 80-11-01-200-801-F00.

(c) If you did not find debris or the magnetic particles, install the QAD adapter (TASK 80-11-02-400-801-F00).

——— END OF TASK ———



Starter Installation
Figure 401/80-11-01-990-803-F00

TASK 80-11-01-400-801-F00

3. Starter Installation

(Figure 401)

A. General

(1) This task provides the instructions on how to install the starter.

B. References

Reference	Title
71-00-00-800-811-F00	Power Plant Test Reference Table (P/B 501)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
80-11-01-610-801-F00	Starter Servicing (Oil Fill) (P/B 301)

C. Tools/Equipment

Reference	Description
STD-3906	Mallet - Rubber

D. Consumable Materials

Reference	Description	Specification
D00599 [CP2442]	Oil - Engine (CFMI SB 79-0001)	CFM CP2442

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
3	Packing	80-11-01-01A-090	AKS ALL
4	Packing	80-11-01-01A-085	AKS ALL
9	Starter	80-11-01-01A-055	AKS ALL
10	Seal	36-11-01-03B-065	AKS ALL

F. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

G. Starter Installation

SUBTASK 80-11-01-020-003-F00

(1) Remove the protective covers from the starter [9] and the starter duct [1].

SUBTASK 80-11-01-210-008-F00

(2) Examine the seal [10] for damage.

(a) If you find cracks, dents or other damage, replace the seal [10].

SUBTASK 80-11-01-610-004-F00

(3) Do this task: Starter Servicing (Oil Fill), TASK 80-11-01-610-801-F00..

NOTE: You can fill the starter with oil before you install the starter.

SUBTASK 80-11-01-420-002-F00

(4) Install the seal [10] on the bottom flange of the starter duct [1].

NOTE: The seal [10] has an oval shape and will "snap" into its position.

SUBTASK 80-11-01-420-003-F00

WARNING: DO NOT LET OIL STAY ON YOUR SKIN. YOU CAN ABSORB POISONOUS MATERIALS FROM THE OIL THROUGH YOUR SKIN.

(5) Install the packing [3] and the packing [4] on the starter [9] as follows:

(a) Lubricate the packing [3] and the packing [4] with oil, D00599 [CP2442].

(b) Install the packing [3] on the starter flange.

(c) Install the packing [4] on the starter shaft.

SUBTASK 80-11-01-420-004-F00

(6) Install the starter [9] on the AGB [6] as follows:

NOTE: The dowel pins of the QAD adapter and the pin holes of the starter will only align one way.

(a) Align the starter shaft with the splines of the AGB [6].

(b) Align the dowel pins on the QAD adapter [5] with the pin holes in the starter [9].

(c) Put the starter shaft into the AGB [6] until the starter flange engages the QAD adapter [5].

NOTE: You can lightly push the starter duct up to engage the duct flanges.

(d) Install the clamp [7] to attach the starter [9] to the QAD adapter [5] as follows:

NOTE: There are two types of starter clamps used in the fleet. One type is a V-band clamp which is a sheet metal design and uses spot weld connections. The second type, released by CFM56–7B SB80–0016, has fully machined components.

1) Carefully examine the weld joints and adjacent metal of the clamp [7] for cracks.

a) If you find cracks, replace the clamp [7].

2) Install the clamp [7] with its fastener at the bottom.

AKS ALL PRE SB 737-CFM56-7B-80-0016

CAUTION: DO NOT TIGHTEN THE NUT TO MORE THAN THE MAXIMUM TORQUE. DAMAGE TO THE PARTS CAN OCCUR.

(e) Tighten the nut on the clamp [7] to 49-55 pound-inches (5.5-6.2 Newton-meters).

AKS ALL POST SB 737-CFM56-7B-80-0016

CAUTION: DO NOT TIGHTEN THE NUT TO MORE THAN THE MAXIMUM TORQUE. DAMAGE TO THE PARTS CAN OCCUR.

(f) Tighten the nut on the clamp [7] to 115–125 pound-inches (13.0-14.1 Newton-meters), as shown on the clamp.

AKS ALL

SUBTASK 80-11-01-420-005-F00

(7) Connect the starter duct [1] to the starter [9] as follows:

(a) Attach the starter duct [1] to the starter [9] with the coupling [2].

NOTE: Make sure that the key on the starter is aligned with the keyway on the duct.

(b) Tighten the nut on the coupling [2] to the torque given on the part.

(c) Lightly hit the outer surface of the coupling [2] with a rubber mallet, STD-3906.

(d) Tighten the nut on the coupling [2] again to the torque given on the part.

SUBTASK 80-11-01-610-001-F00

(8) If it has not done so, do this task: Starter Servicing (Oil Fill), TASK 80-11-01-610-801-F00.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 80-11-01-410-004-F00

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

SUBTASK 80-11-01-860-042-F00

(2) For Engine 1, remove the safety tag and close this circuit breaker:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 80-11-01-860-043-F00

(3) For Engine 2, remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

I. Starter Installation Test

SUBTASK 80-11-01-700-002-F00

(1) Do the test(s) listed in the Power Plant Test Reference Table (TASK 71-00-00-800-811-F00).

——— END OF TASK ———

STARTER - INSPECTION/CHECK

1. General

A. This procedure has two tasks:

(1) Starter Inspection

(2) Starter Magnetic Plug Inspection.

TASK 80-11-01-200-802-F00

2. Starter Inspection

(Figure 601)

A. General

(1) This task provides the instructions to examine the starter for oil leaks and also to examine the magnetic plug on the starter.

(2) The starter is on the forward side of the accessory gearbox.

B. References

Reference	Title
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
80-11-01-000-801-F00	Starter Removal (P/B 401)
80-11-01-360-801-F00	Starter Magnetic Plug Housing Packing Replacement (P/B 801)
80-11-01-400-801-F00	Starter Installation (P/B 401)

C. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

D. Prepare for the Inspection

SUBTASK 80-11-01-860-038-F00

(1) For Engine 1, open this circuit breaker and install a safety tag:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 80-11-01-860-039-F00

(2) For Engine 2, open this circuit breaker and install a safety tag:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

SUBTASK 80-11-01-010-019-F00

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

E. Starter Inspection

SUBTASK 80-11-01-210-002-F00

(1) Examine the starter gear housing and the exhaust housing for oil leaks.

(a) Oil leaks are not serviceable, replace the starter (TASK 80-11-01-000-801-F00 and TASK 80-11-01-400-801-F00).

SUBTASK 80-11-01-210-003-F00

(2) Examine for oil leaks between the starter gear housing and the magnetic plug housing.

(a) Oil leaks are not serviceable, do this task: Starter Magnetic Plug Housing Packing Replacement, TASK 80-11-01-360-801-F00.

SUBTASK 80-11-01-210-004-F00

(3) Examine for oil leaks between the starter gear housing and the QAD adapter.

(a) Carefully examine the weld joints and adjacent metal of the starter clamp [4] for cracks.

1) If you find cracks, remove and replace the starter clamp [4].

(b) Oil leaks are not serviceable, replace the packing on the starter flange (TASK 80-11-01-000-801-F00 and TASK 80-11-01-400-801-F00).

SUBTASK 80-11-01-210-005-F00

(4) Examine the exhaust housing diffuser for wet areas with oil.

(a) If the exhaust area is wet with oil, the turbine seal can be damaged.

NOTE: After so many cycles, the exhaust area will usually be dirty because of contamination in the air supply. Make sure that it is oil that you find and not dirt.

(b) A damaged turbine seal is not serviceable, replace the starter (TASK 80-11-01-000-801-F00 and TASK 80-11-01-400-801-F00).

SUBTASK 80-11-01-210-006-F00

(5) Examine for oil leaks between the magnetic plug housing and the magnetic plug.

(a) Oil leaks are not serviceable, replace the packing on the magnetic plug (TASK 80-11-01-200-801-F00).

SUBTASK 80-11-01-210-007-F00

(6) To look for internal damage of the starter, do this task: Starter Magnetic Plug Inspection, TASK 80-11-01-200-801-F00.

F. Put the Airplane Back to Its Usual Condition

SUBTASK 80-11-01-410-007-F00

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

SUBTASK 80-11-01-860-040-F00

(2) For Engine 1, remove the safety tag and close this circuit breaker:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 80-11-01-860-041-F00

(3) For Engine 2, remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

END OF TASK

TASK 80-11-01-200-801-F00

3. Starter Magnetic Plug Inspection

(Figure 601 and Figure 602)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task provides the instructions on how to examine and identify possible internal damage to the starter.

(2) The starter is on the forward side of the accessory gearbox.

B. References

Reference	Title
71-00-00-700-819-F00	Stop the Engine Procedure (Usual Engine Stop) (P/B 201)
71-00-00-800-807-F00	Start the Engine Procedure (Selection) (P/B 201)
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
79-00-00-200-804-F00	Chip Detectors and Scavenge Screens Inspection (P/B 601)
80-11-01-000-801-F00	Starter Removal (P/B 401)
80-11-01-400-801-F00	Starter Installation (P/B 401)
80-11-02-000-801-F00	QAD Adapter Removal (P/B 401)
80-11-02-400-801-F00	QAD Adapter Installation (P/B 401)

C. Tools/Equipment

Reference	Description
STD-1070	Lens - Magnifying, 10X, Hand Held

D. Consumable Materials

Reference	Description	Specification
D00599 [CP2442]	Oil - Engine (CFMI SB 79-0001)	CFM CP2442

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Magnetic plug	80-11-01-01A-060	AKS ALL
2	Packing	80-11-01-01A-070	AKS ALL

F. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

G. Prepare for the Inspection

SUBTASK 80-11-01-860-031-F00

(1) For Engine 1, open this circuit breaker and install a safety tag:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 80-11-01-860-032-F00

(2) For Engine 2, open this circuit breaker and install a safety tag:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

SUBTASK 80-11-01-010-016-F00

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

H. Starter Magnetic Plug Inspection

SUBTASK 80-11-01-020-001-F00

CAUTION: DO NOT REMOVE THE MAGNETIC PLUG HOUSING OR THE SAFETY CABLE. THE REMOVAL OF THE MAGNETIC PLUG HOUSING WILL DRAIN THE OIL FROM THE STARTER. THE OPERATION OF THE STARTER WITHOUT OIL CAN CAUSE DAMAGE TO THE STARTER.

(1) Remove the magnetic plug [1] as follows:

NOTE: The magnetic plug [1] is a bayonet type.

(a) Push the magnetic plug [1] with your hand and turn it counterclockwise until it stops.

(b) Pull the magnetic plug [1] from the magnetic plug housing.

SUBTASK 80-11-01-211-001-F00

(2) Examine the magnetic plug for the type and quantity of contamination:

(a) Use 10x hand held magnifying lens, STD-1070 to examine the particles:

1) If you find one or more magnetic particles that are larger than 0.10 inch (2.54 mm) in all directions or an unacceptable amount of magnetic particles, replace the starter (TASK 80-11-01-000-801-F00 and TASK 80-11-01-400-801-F00).

NOTE: Large amounts or large magnetic particles indicate possible internal starter damage.

a) Send the debris or the magnetic particles to lab for analysis.

2) If you find a moderate amount or more magnetic particles that are smaller than 0.10 inch (2.54 mm) or debris in all directions, do these steps:

a) Remove the starter (TASK 80-11-01-000-801-F00).

b) Remove the QAD adapter [3] (TASK 80-11-02-000-801-F00).

c) Look for debris or the magnetic particles behind the QAD adapter.

d) If you find the magnetic particles, do this task: Chip Detectors and Scavenge Screens Inspection, TASK 79-00-00-200-804-F00.

<1> Send the debris or the magnetic particles to lab for analysis.

e) If the magnetic particles are not found, do these steps:

<1> Clean away all debris or the or magnetic particles and components.

<2> Install the QAD adapter [3] (TASK 80-11-02-400-801-F00).

<3> Install the starter (TASK 80-11-01-400-801-F00).

f) Start the engine (TASK 71-00-00-800-807-F00).

g) Operate the engine at idle for five minutes.

h) Stop the engine (TASK 71-00-00-700-819-F00).

i) Examine the starter magnetic plug again after the engine run.

<1> Remove the starter, QAD adapter and look for debris or the magnetic particles behind the QAD adapter.

<2> If you find a moderate or more amount of magnetic particles smaller than 0.10 inch (2.54 mm), replace the starter (TASK 80-11-01-000-801-F00 and TASK 80-11-01-400-801-F00).

<a> Carefully clean away all debris or the magnetic particles.

<b> Send the debris or the magnetic particles to lab for analysis.

<3> If the magnetic plug is clean or there is less than a moderate amount of magnetic particles, re-examine the magnetic plug in the next 10-20 cycles.

<a> At the 10-20 cycles examination, If you find a moderate amount of magnetic particles, replace the starter (TASK 80-11-01-000-801-F00 and TASK 80-11-01-400-801-F00).

<4> Install the QAD adapter and the starter (TASK 80-11-02-400-801-F00 and TASK 80-11-01-400-801-F00).

SUBTASK 80-11-01-420-001-F00

(3) Install the magnetic plug [1] as follows:

(a) Remove and discard the two packings [2] on the magnetic plug.

(b) Apply clean oil, D00599 [CP2442] to the two packings [2].

(c) Install the two packing [2] on the magnetic plug [1].

(d) Put the magnetic plug [1] in the magnetic plug housing and align the bayonet pins with the slots.

(e) Push the magnetic plug until the pins touch the bottom of the slots and turn the plug clockwise until it locks.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 80-11-01-410-003-F00

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

SUBTASK 80-11-01-860-033-F00

(2) For Engine 1, remove the safety tag and close this circuit breaker:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

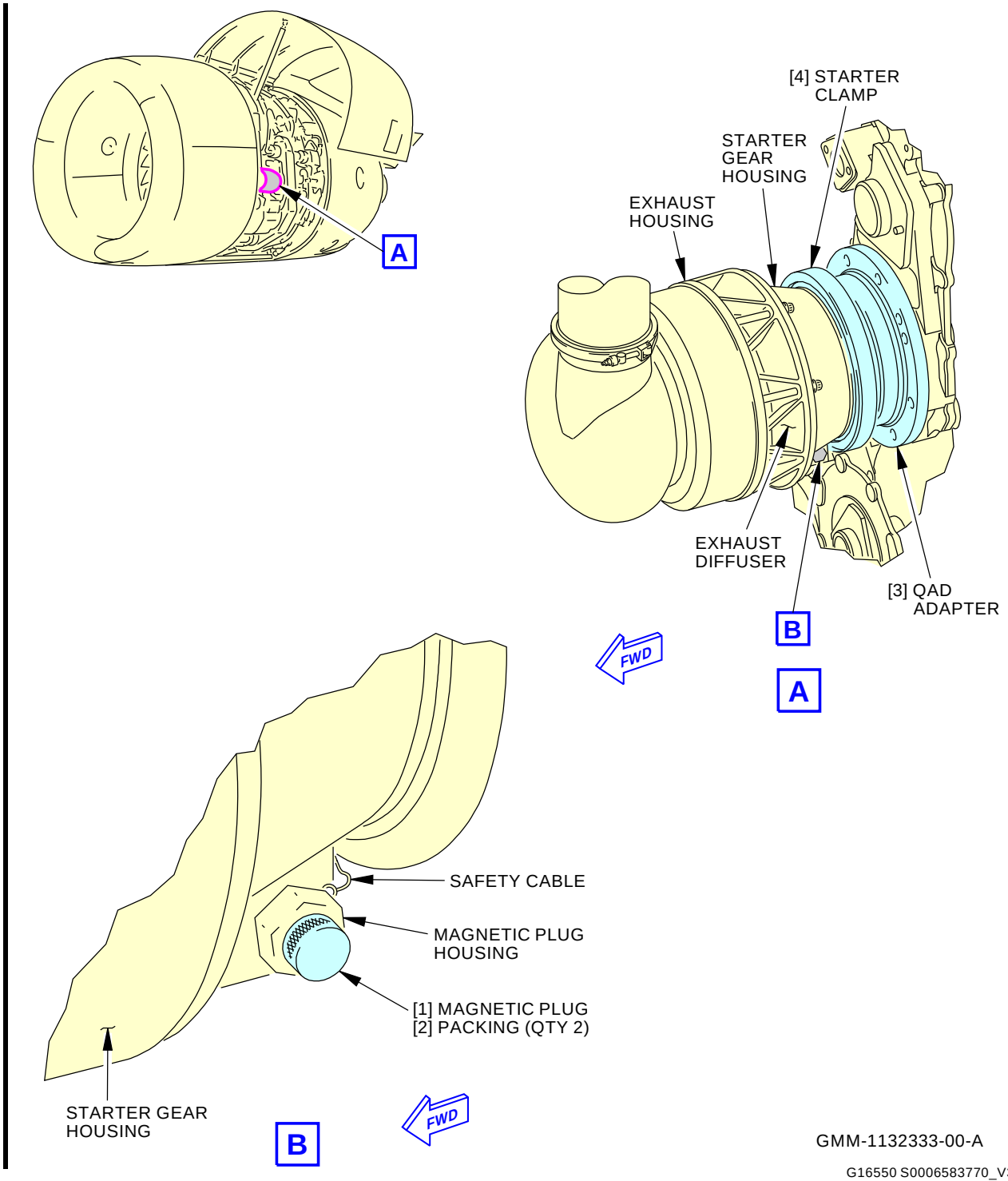
SUBTASK 80-11-01-860-034-F00

(3) For Engine 2, remove the safety tag and close this circuit breaker:

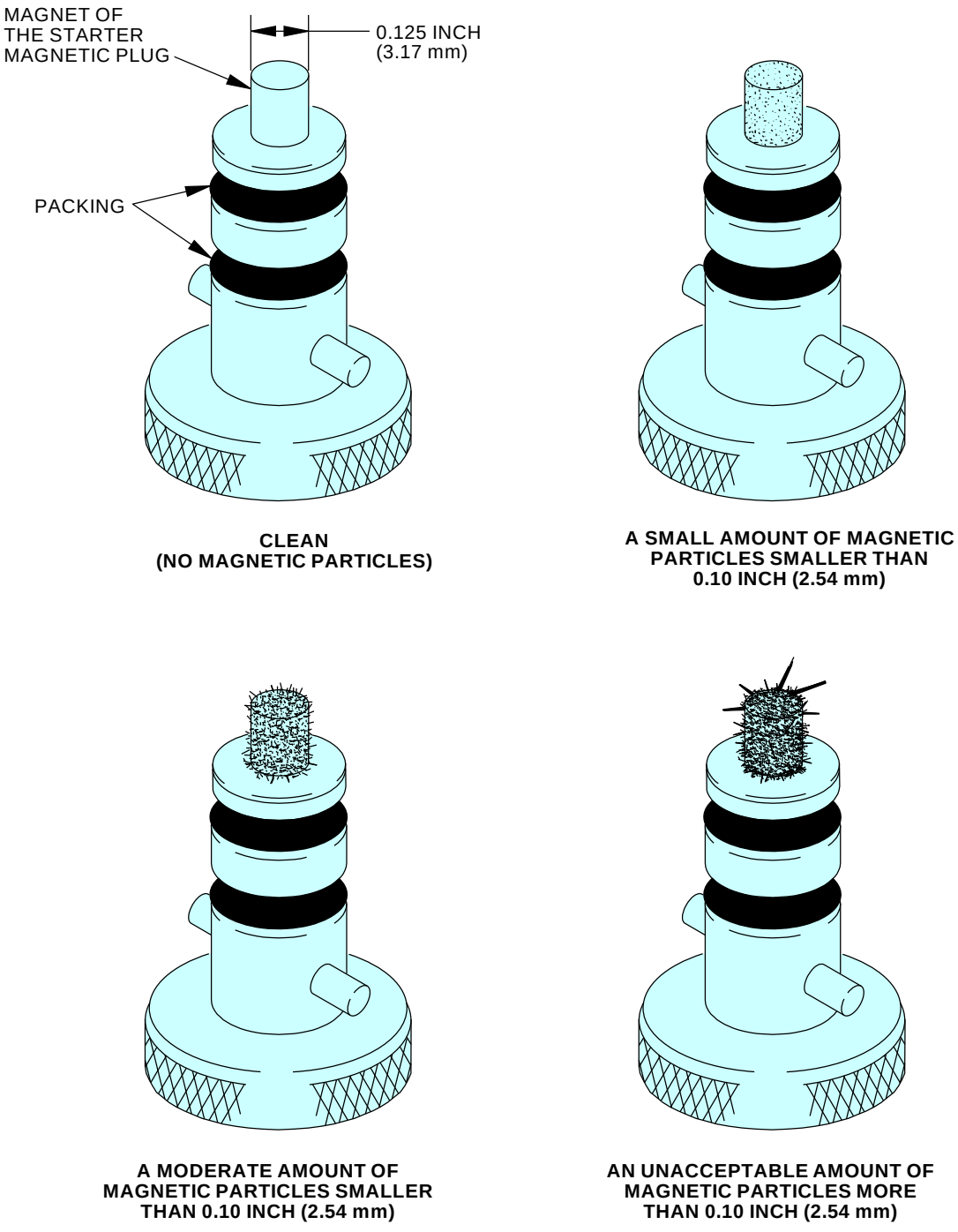
F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

——— END OF TASK ———



Starter Inspection
Figure 601/80-11-01-990-801-F00



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Starter Magnetic Plug Inspection
Figure 602/80-11-01-990-806-F00

STARTER - REPAIRS

1. General

A. This procedure has one task:

(1) Starter Magnetic Plug Housing Packing Replacement.

TASK 80-11-01-360-801-F00

2. Starter Magnetic Plug Housing Packing Replacement

(Figure 801)

A. General

(1) This task provides the instructions on how to replace the packing on the magnetic plug housing.

(2) Do this task if you find an oil leak between the magnetic plug housing and the starter housing.

B. References

Reference	Title
71-00-00-800-811-F00	Power Plant Test Reference Table (P/B 501)
80-11-01-610-801-F00	Starter Servicing (Oil Fill) (P/B 301)
80-11-01-680-801-F00	Starter Servicing (Oil Drain) (P/B 301)

C. Consumable Materials

Reference	Description	Specification
D00599 [CP2442]	Oil - Engine (CFMI SB 79-0001)	CFM CP2442
G02345 [CP8001]	Wire - Safety, 0.032 Inch (0.8 mm) Diameter	CFM CP8001, AMS 5687
G50065 [CP8006]	Cable, Safety, Stainless Steel, 0.032 inch (0.813 mm) Diameter	M50 TF 9 CL-A

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
2	Packing	80-11-01-01A-075	AKS ALL
3	Magnetic plug housing	80-11-01-01A-060	AKS ALL

E. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

F. Prepare for the Replacement

SUBTASK 80-11-01-680-002-F00

(1) Do this task: Starter Servicing (Oil Drain), TASK 80-11-01-680-801-F00.

SUBTASK 80-11-01-860-035-F00

(2) For Engine 1, open this circuit breaker and install a safety tag:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 80-11-01-860-036-F00

(3) For Engine 2, open this circuit breaker and install a safety tag:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

G. Magnetic Plug Housing Packing Replacement

SUBTASK 80-11-01-020-004-F00

(1) Remove the magnetic plug housing [3] from the starter [1] as follows:

(a) Cut and remove the safety cable from the magnetic plug housing [3].

(b) Remove the magnetic plug housing [3].

(c) Remove and discard the packing [2].

SUBTASK 80-11-01-420-006-F00

WARNING: DO NOT LET OIL STAY ON YOUR SKIN. YOU CAN ABSORB POISONOUS MATERIALS FROM THE OIL THROUGH YOUR SKIN.

(2) Install the magnetic plug housing [3] as follows:

(a) Apply clean oil, D00599 [CP2442] to a new packing [2].

(b) Install the new packing [2] on the magnetic plug housing [3].

(c) Install the magnetic plug housing [3] into the starter gear housing.

AKS ALL PRE SB 737-CFM56-7B-80-0011; AIRPLANES WITH MAGNETIC DRAIN PLUG ASSEMBLY PN 572-8510-9008 or PN 572-8510-9028

1) Tighten the magnetic plug housing [3] to 65.0 in-lb (7.3 N·m) - 85.0 in-lb (9.6 N·m).

AKS ALL POST SB 737-CFM56-7B-80-0011; AIRPLANES WITH MAGNETIC DRAIN PLUG ASSEMBLY PN 3507975-1

2) Tighten the magnetic plug housing [3] to 20.00 in-lb (2.26 N·m) - 40.00 in-lb (4.52 N·m).

AKS ALL

(d) Install the safety wire, G02345 [CP8001] or the cable, G50065 [CP8006] on the magnetic plug housing [3].

H. Put the Airplane Back to Its Usual Condition

SUBTASK 80-11-01-610-002-F00

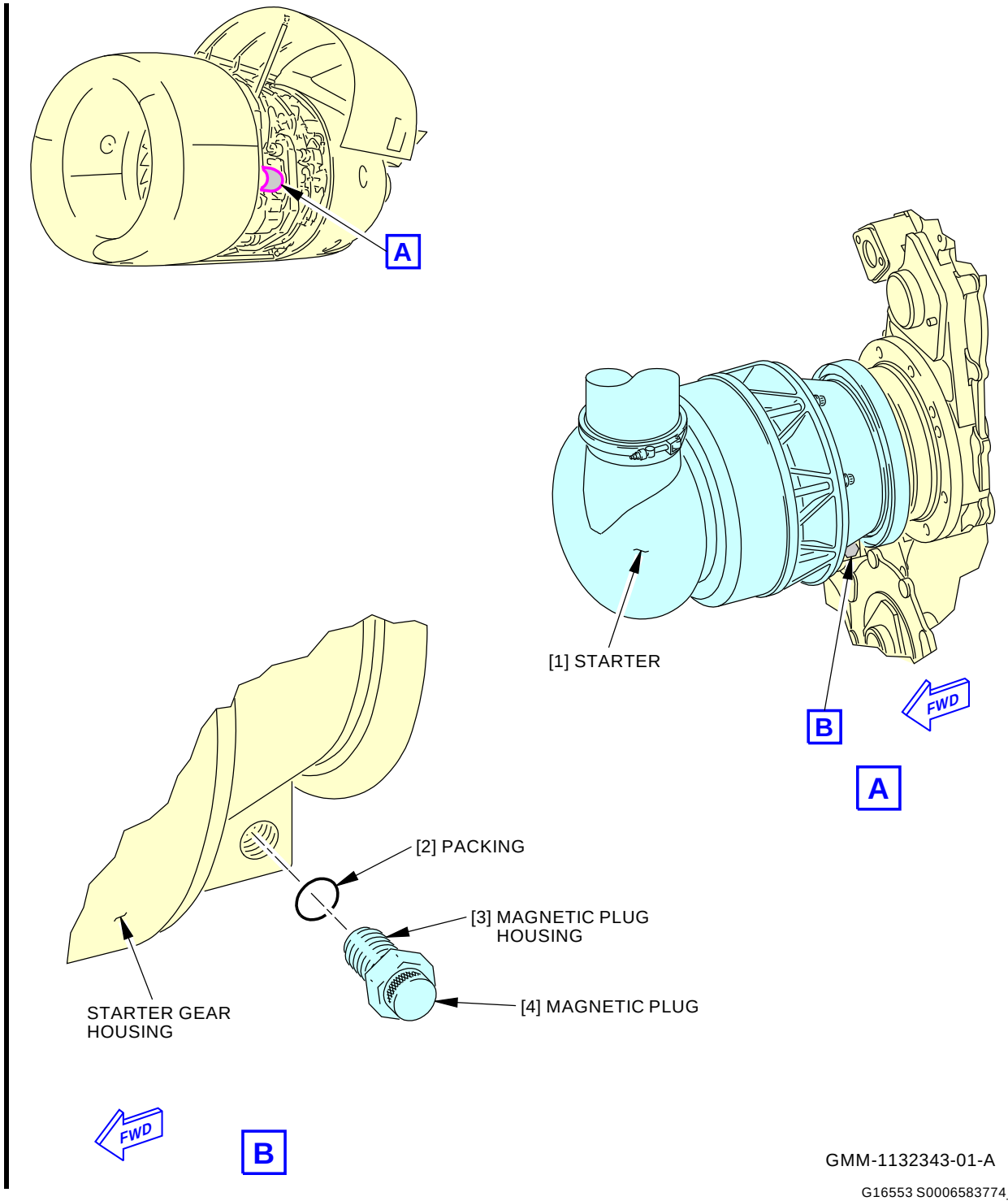
(1) Do this task: Starter Servicing (Oil Fill), TASK 80-11-01-610-801-F00.

I. Starter Magnetic Plug Housing (Packing) Test

SUBTASK 80-11-01-860-037-F00

(1) Do the test(s) listed in the Power Plant Test Reference Table (TASK 71-00-00-800-811-F00).

——— END OF TASK ———



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Starter Magnetic Plug Housing Packing Replacement
Figure 801/80-11-01-990-804-F00

QAD ADAPTER - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) QAD Adapter Removal

(2) QAD Adapter Installation.

TASK 80-11-02-000-801-F00

2. QAD Adapter Removal

(Figure 401)

A. General

(1) This task provides the instructions on how to remove the QAD adapter.

B. References

Reference	Title
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
80-11-01-000-801-F00	Starter Removal (P/B 401)

C. Tools/Equipment

Reference	Description
STD-1280	Source - Air, Regulated, Dry Filtered, 0-30 PSIG

D. Consumable Materials

Reference	Description	Specification
B00682 [CP2011]	Solvent - Stoddard	P-D-680 Type I, II or III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A

E. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

F. Prepare for the Removal

SUBTASK 80-11-02-010-002-F00

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

SUBTASK 80-11-02-020-001-F00

(2) Do this task: Starter Removal, TASK 80-11-01-000-801-F00.

G. QAD Adapter Removal

SUBTASK 80-11-02-000-001-F00

(1) Remove the QAD adapter [1]:

(a) Remove the eight bolts [4] and the washers [3] that attach the QAD adapter [1] to the AGB.

(b) Remove the QAD adapter [1] from the AGB.

(c) Remove and discard the packing [2].

SUBTASK 80-11-02-210-001-F00

(2) Examine the QAD adapter area for metal chips:

(a) If the particles are found, carefully remove and keep the particles with a cotton wiper, G00034 or thin sheet of paper.

(b) Send the particles to the laboratory for analysis.

SUBTASK 80-11-02-110-001-F00

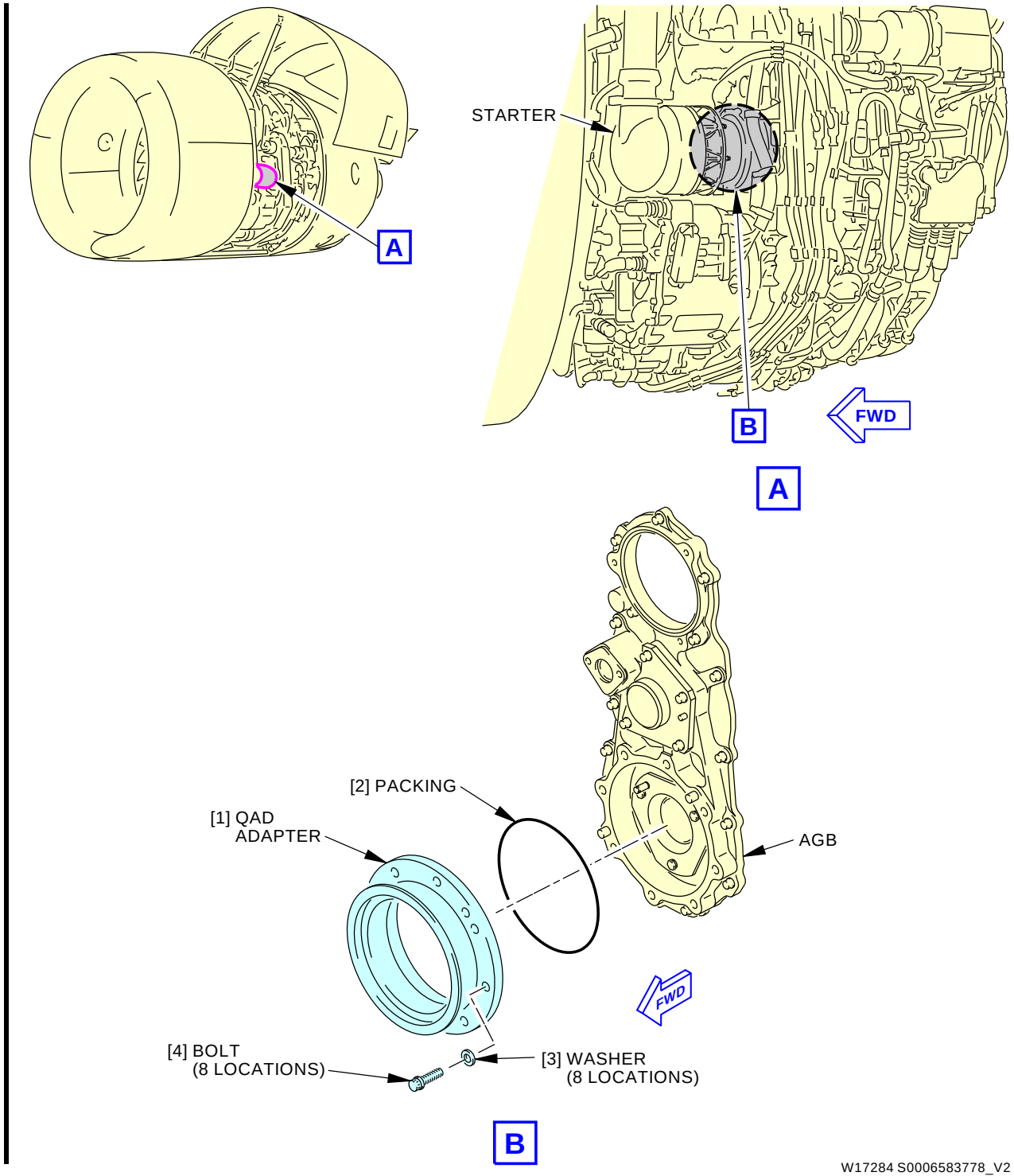
WARNING: DO NOT GET SOLVENT IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE SOLVENT. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE THE SOLVENT. KEEP THE SOLVENT AWAY FROM SPARKS, FLAME AND HEAT. SOLVENT IS POISONOUS AND FLAMMABLE WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(3) After you remove all of the particles, clean the QAD adapter [1] with the solvent, B00682 [CP2011].

(a) Dry the QAD adapter [1] with an 0-30 psig dry filtered regulated air source, STD-1280.

(b) Make sure that the QAD adapter [1] is free of all particles.

——— END OF TASK ———



QAD Adapter Installation
Figure 401/80-11-02-990-801-F00

TASK 80-11-02-400-801-F00

3. QAD Adapter Installation

(Figure 401)

A. General

(1) This task provides the instructions on how to install the QAD adapter.

B. References

Reference	Title
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
80-11-01-400-801-F00	Starter Installation (P/B 401)

C. Consumable Materials

Reference	Description	Specification
D00599 [CP2442]	Oil - Engine (CFMI SB 79-0001)	CFM CP2442
D00601 [CP2101]	High-temperature graphite compound	SAE AMS 2518

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	QAD adapter	80-11-01-01A-105	AKS ALL
2	Packing	80-11-01-01A-110	AKS ALL

E. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

F. QAD Adapter Installation

SUBTASK 80-11-02-400-001-F00

(1) Install the QAD adapter [1] as follows:

WARNING: DO NOT LET OIL STAY ON YOUR SKIN. YOU CAN ABSORB POISONOUS MATERIALS FROM THE OIL THROUGH YOUR SKIN.

(a) Lightly lubricate a new packing [2] with the oil, D00599 [CP2442].

(b) Install the packing [2] in the QAD adapter [1].

(c) Install the QAD adapter [1] in the AGB.

(d) Lightly lubricate the threads of the bolts [4] with the graphite compound, D00601 [CP2101].

(e) Install the eight bolts [4] and the washers [3] in the AGB.

(f) Tighten the bolts [4] to 95-110 inch-pounds (11-12.5 Newton-meters).

G. Put the Airplane Back to Its Usual Condition

SUBTASK 80-11-02-410-001-F00

(1) Do this task: Starter Installation, TASK 80-11-01-400-801-F00.

SUBTASK 80-11-02-410-003-F00

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

END OF TASK

START VALVE - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) Start Valve Removal

(2) Start Valve Installation.

TASK 80-11-03-000-801-F00

2. Start Valve Removal

(Figure 401)

A. General

(1) This task provides the instructions on how remove the start valve.

B. References

Reference	Title
70-10-02-910-801-F00	General Precautions During the Removal and Installation of Engine Components (P/B 201)
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)

C. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

D. Prepare for the Removal

SUBTASK 80-11-03-860-013-F00

(1) For Engine 1, open this circuit breaker and install a safety tag:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 80-11-03-860-014-F00

(2) For Engine 2, open this circuit breaker and install a safety tag:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

SUBTASK 80-11-03-860-003-F00

(3) Make sure that the start lever is in the CUTOFF position and install a DO-NOT-OPERATE tag.

SUBTASK 80-11-03-860-004-F00

(4) Make sure that the engine start switch is off and install a DO-NOT-OPERATE tag.

SUBTASK 80-11-03-860-005-F00

(5) Make sure that the BLEED ISOLATION VALVE switch on the P5 Forward Overhead Panel is in the CLOSE position:

SUBTASK 80-11-03-840-001-F00

(6) If you remove the Engine 1 start valve, make sure that the BLEED APU switch on the P5 Forward Overhead Panel is in the OFF position:

SUBTASK 80-11-03-860-006-F00

(7) If you remove the Engine 2 start valve, make sure that ground pneumatic power is not applied.

SUBTASK 80-11-03-010-004-F00

(8) On the applicable engine, open the left fan cowl panel (TASK 71-11-02-010-801-F00).

E. Start Valve Removal

SUBTASK 80-11-03-020-001-F00

(1) Disconnect the MWO312 harness electrical connector [4] from the start valve [10] receptacle.

SUBTASK 80-11-03-020-002-F00

(2) Disconnect the bonding jumper [6] from the start valve [10].

(a) Remove the bolt [8], the washer [7], and the nut [5] from the bonding jumper [6].

SUBTASK 80-11-03-010-002-F00

(3) Remove the couplings [2] from the upper pneumatic starter duct [3] and the lower pneumatic starter duct [9].

SUBTASK 80-11-03-020-003-F00

(4) Remove the start valve [10].

SUBTASK 80-11-03-020-004-F00

(5) Remove the seal rings [1].

NOTE: The seal rings are in the ID between the start valve and duct flanges.

(a) Examine the seal rings [1] for damage.

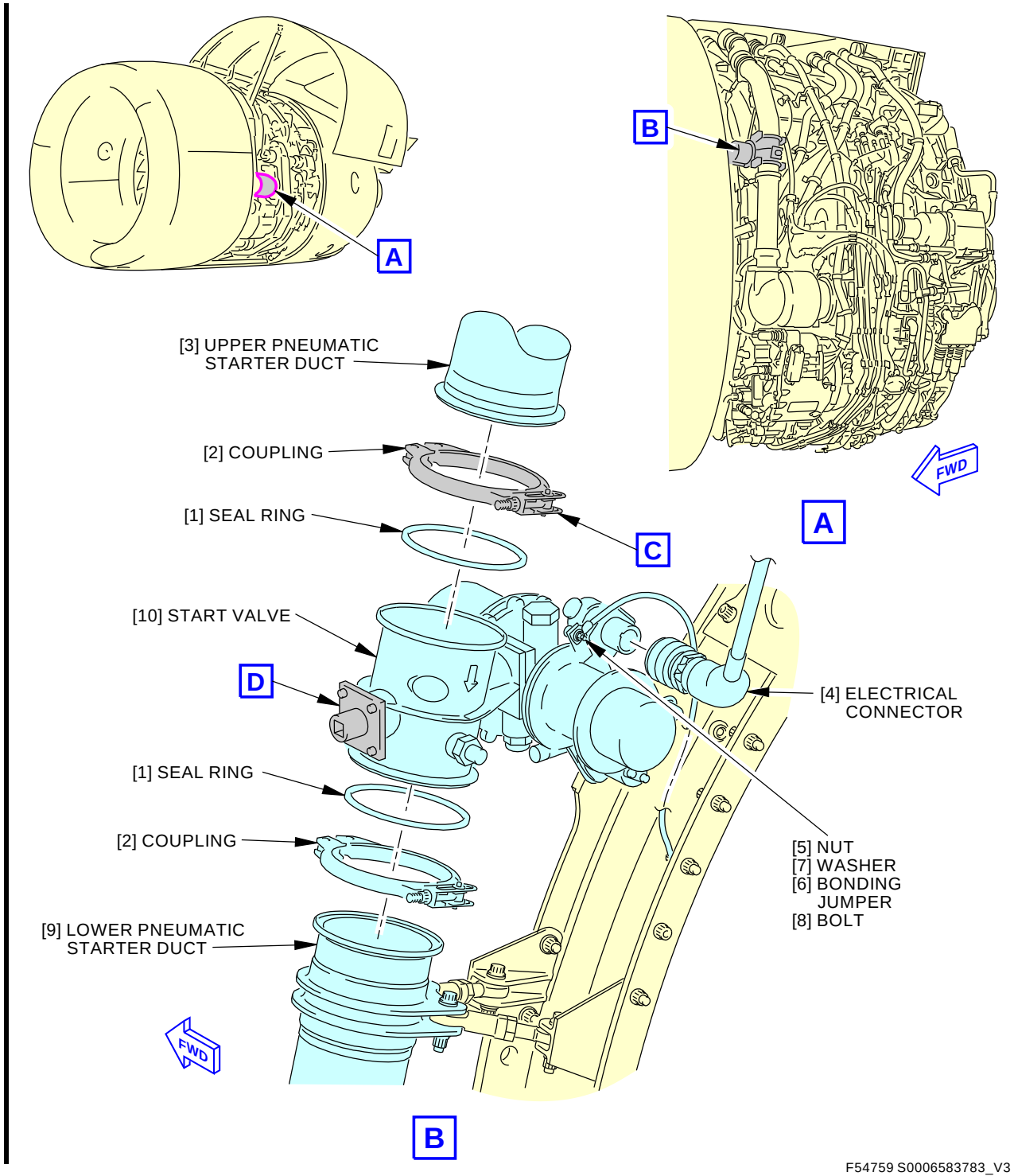
1) If you find cracks, dents or other damage, replace the seal rings [1].

2) If a seal ring [1] is serviceable, keep it for the installation with the replacement valve.

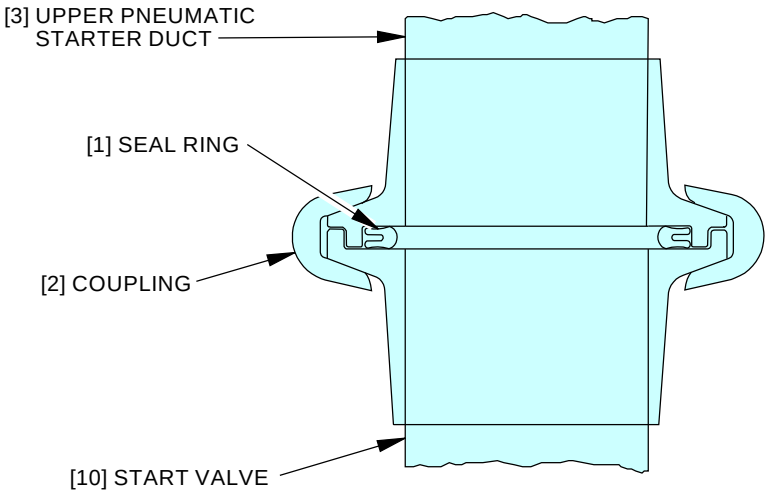
SUBTASK 80-11-03-860-007-F00

(6) Put the protective covers on the openings to the start valve and the ducts (TASK 70-10-02-910-801-F00).

——— END OF TASK ———

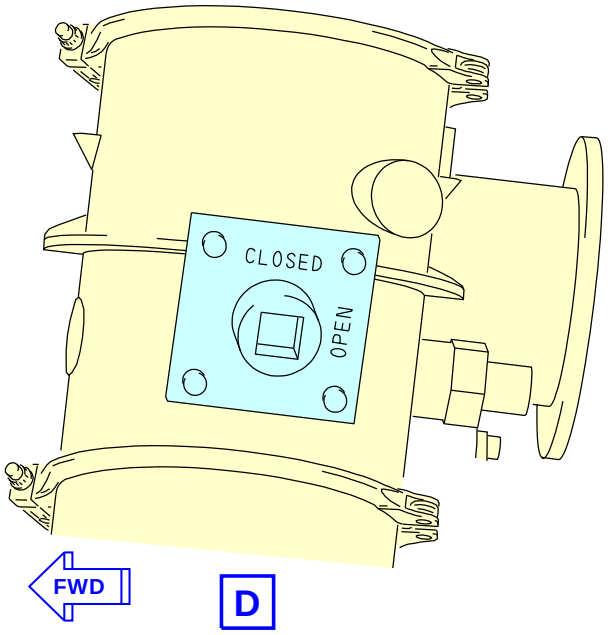


Start Valve Installation
Figure 401/80-11-03-990-801-F00 (Sheet 1 of 2)



SEAL INSTALLATION (EXAMPLE)

C



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Start Valve Installation
Figure 401/80-11-03-990-801-F00 (Sheet 2 of 2)

TASK 80-11-03-400-801-F00

3. Start Valve Installation

(Figure 401)

A. General

(1) This task provides the instructions on how to install the start valve.

B. References

Reference	Title
71-00-00-800-811-F00	Power Plant Test Reference Table (P/B 501)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)

C. Tools/Equipment

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

Reference	Description
COM-1550	Bonding Meters - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: C15292 (MODEL T477W) Supplier: 01014 Part #: M1 Supplier: 3AD17 Opt Part #: M1B Supplier: 3AD17
STD-583	Mallet - Non-metallic

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Seal ring	80-11-03-01A-010	AKS ALL
10	Start valve	80-11-03-01A-030	AKS ALL

E. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

F. Start Valve Installation

SUBTASK 80-11-03-020-005-F00

(1) Remove the protective covers from the start valve [10], the upper pneumatic starter duct [3] and the lower pneumatic starter duct [9].

SUBTASK 80-11-03-160-001-F00

(2) Clean the flanges on the upper pneumatic starter duct [3] and the lower pneumatic starter duct [9].

SUBTASK 80-11-03-160-002-F00

(3) Clean the flanges on the start valve [10].

SUBTASK 80-11-03-410-001-F00

(4) Install the start valve [10] as follows.

(a) Install the seal ring [1] in the ID between the start valve [10] and the upper pneumatic starter duct [3]

(b) Install the seal ring [1] in the ID between the start valve [10] and the lower pneumatic starter duct [9].

(c) Install the start valve [10] between the upper pneumatic starter duct [3] and the lower pneumatic starter duct [9].

NOTE: Make sure that the key-slot in the valve flange mates with the key on the duct flange. A maximum clearance of 0.03 inch (0.76mm) is necessary at all points around the flange before the coupling is installed.

SUBTASK 80-11-03-410-002-F00

(5) Install the couplings [2] as follow:

(a) Loosely install the couplings [2] on the upper pneumatic starter duct [3] and lower pneumatic starter duct [9].

(b) Tighten the coupling [2] to the torque specified on the part.

NOTE: If the torque range is not specified on the part, or it is illegible, tighten the coupling [2] to 85 in-lb (9.6 N·m) – 100 in-lb (11.3 N·m). Overtightening of the coupling [2] may cause deformation of the upper pneumatic starter duct [3] and lower pneumatic starter duct [9].

(c) Lightly tap the outer surface of the coupling with a non-metallic mallet, STD-583.

(d) Tighten the couplings [2] again to the torque specified on the part.

SUBTASK 80-11-03-020-006-F00

(6) Connect the MWO312 harness electrical connector [4] to the start valve [10] receptacle.

SUBTASK 80-11-03-410-003-F00

(7) Connect the bonding jumper [6] to the start valve [10].

(a) Install the bolt [8], the bonding jumper [6], the washer [7], and the nut [5] to the start valve [10].

SUBTASK 80-11-03-700-001-F00

(8) Measure the resistance of the bonding jumper [6] with an intrinsically safe approved bonding meter, COM-1550.

NOTE: The maximum resistance of the bonding jumper [6] from the start valve to the engine bracket is 0.008 ohm.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 80-11-03-860-008-F00

(1) If you removed and installed the Engine 2 start valve, you can connect the ground pneumatic power.

SUBTASK 80-11-03-860-015-F00

(2) For Engine 1, remove the safety tag and close this circuit breaker:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 80-11-03-860-016-F00

(3) For Engine 2, remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

SUBTASK 80-11-03-410-005-F00

(4) On the applicable engine, close the left fan cowl panel (TASK 71-11-02-410-801-F00).

SUBTASK 80-11-03-860-011-F00

(5) Remove the DO-NOT-OPERATE tag from the start lever and the engine start switch.

SUBTASK 80-11-03-860-012-F00

(6) Make sure that the manual override to the start valve is in the usual (closed) position.

H. Start Valve Test

SUBTASK 80-11-03-700-002-F00

(1) Do the test(s) listed in the Power Plant Test Reference Table (TASK 71-00-00-800-811-F00).

——— END OF TASK ———