Test Project (Offline)

BRICS-FS-21_Aircraft Maintenance

2022 BRICS Skills Competition

Module A: Helicopter Daily Inspection (Sample)

	2022 BRICS Skills Competition **(BRICS Future Skills Challenge)** **Aircraft Maintenance**	Session No.: Workstation No.: Effectivity: All Competition Teams Confidentiality Level: Public

Job Card No.: LINE MAINTENANCE-001	Version: R2	Labor: 2	Developed on: June 20, 2022	Competition Duration: 30min
Work Zone: Helicopter Area	Reference Document: AC311 Flight Manual		Completion Time:	
Job Card Title	Helicopter Daily Inspection			

Tool and Equipment List:

No.	Name	Specs	Qty	Remark
1	Helicopter	AC311	1	/
2	Standard Creepers	General	1	Effectivity: all helicopters
3	Safety Harness	Full body	2	Effectivity: all helicopters
4	Tool Set	General	1 set	Effectivity: all helicopters
5	Tool Box	General	1	Effectivity: all helicopters
6	Steel Ruler	300mm	1	Effectivity: all helicopters

Consumables and Auxiliary Materials:

No.	Name	Specs	Qty	Remark
1	Magnifying Glass	4X	1	Effectivity: all helicopters
2	Towel	General	1	Effectivity: all helicopters
3	Inspection Mirror	General	1	Effectivity: all helicopters
4	Warning Sign	General	2	Effectivity: all helicopters
5	Flashlight	General	1 set	Effectivity: all helicopters

Work Contents:

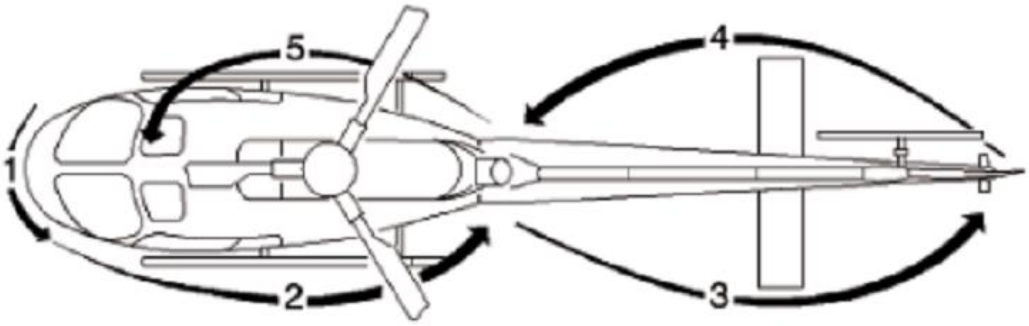
No.	Step	Contents	Operator (√)	Inspector(√)
1	Preparations			
	1.1	Check the Job Card.		

	1.2	Check the tools.		
	1.3	Check if the safety helmet, working clothes and protective shoes are put on.		
	1.4	Inspect the helicopter area.		
2	Station 1 - Inspection of Cockpit Exterior			
	2.1	Visually inspect the status of the transparent window panes.		
	2.2	Visually inspect the status of the windshield wiper blades.		
	2.3	Visually inspect the status of air intake of the engine oil cooler fan at the front of the main gear box.		
	2.4	Visually inspect the status of the fixed landing lights.		
	2.5	Visually inspect the status of the ice detector.		
	2.6	Visually inspect the status of the transponder antenna.		
	2.7	Visually inspect the status of the pitot tube.		
3	Station 2 - Inspection of Fuselage Left Side			
	3.1	Inspect the status of fuselage left-side skin (whether the fuselage left-side skin is damaged and deformed, whether its surface paint peels off, and whether the fixing rivets are loose or fallen off. Fill in the fault report form truthfully, the same below).		
	3.2	Visually inspect the status of the front door (including accessories like hinge, panes and lock, the same below).		
	3.3	Visually inspect the status of the rear door (sliding door).		
	3.4	Open the left luggage hold door, and visually inspect the status of the left cargo interior.		
	3.5	Visually inspect the status of the fuel tank filler cap.		
	3.6	Open the rear luggage hold door, and visually inspect the status of the cargo hold interior.		
	3.7	Visually inspect the status of the landing gear (including support beam, skid and skid protector).		
	3.8	Visually inspect the status of the bottom cowlings.		
	3.9	Visually inspect the status of the main gear box cowling and interior.		

	3.10	Visually inspect the status of the engine cowling and interior.		
	3.11	Visually inspect the status of the main rotor hub.		
	3.12	Visually inspect the status of the main rotor blades.		
4	Station 3 - Inspection of Tail Beam Left Side			
	4.1	Visually inspect the status of the tail drive shaft firewall shield.		
	4.2	Visually inspect the status of the tail beam.		
	4.3	Visually inspect the status of the VOR antenna.		
	4.4	Visually inspect the status of the tail ultrashort wave antennas.		
	4.5	Visually inspect the status of the left-side navigation lights.		
	4.6	Visually inspect the status of the horizontal tail.		
	4.7	Visually inspect the status of the Tail Gear Box (TGB) and its cowling.		
	4.8	Visually inspect the TGB oil level.		
	4.9	Visually inspect the status of the left-side vertical tails.		
	4.10	Visually inspect the status of the tail skid.		
5	Station 4 - Inspection of Tail Beam Right Side			
	5.1	Visually inspect the status of the right-side vertical tails.		
	5.2	Visually inspect the status of the TGB and its cowling.		
	5.3	Visually inspect the status of the tail rotor hub.		
	5.4	Visually inspect the status of the tail rotor blades.		
	5.5	Visually inspect the status of the horizontal tail.		
	5.6	Visually inspect the status of the right-side navigation lights.		
	5.7	Visually inspect the status of the tail drive shaft firewall shield.		
6	Station 5 - Inspection of Fuselage Right Side			
	6.1	Visually inspect the status of the main rotor hub.		
	6.2	Visually inspect the status of the main rotor blades.		
	6.3	Visually inspect the status of the ELT antenna.		

	6.4	Visually inspect the status of the engine air intake.		
	6.5	Visually inspect the status of the engine cowling and interior.		
	6.6	Visually inspect the status of the main gear box cowling and interior.		
	6.7	Visually inspect the status of the ground power socket panel.		
	6.8	Open the right luggage hold door, and visually inspect the status of the cargo hold interior.		
	6.9	Visually inspect the connecting status of the airborne battery.		
	6.10	Visually inspect the status of the right-side rear door (The door does not need to be opened).		
	6.11	Visually inspect the status of the right-side front door.		
	6.12	Inspect the status of the fuselage right-side skin.		
	6.13	Visually inspect the status of the landing gear (including support beam, skid and skid protector).		
	6.14	Visually inspect if the bottom cowlings are all properly locked.		
7	Station 6 - Inspection of Cabin			
	7.1.	Visually inspect the cleanliness of the cabin interior.		
	7.2.	Inspect the status of the cockpit instrument panels.		
	7.3.	Inspect the status of the function switches of each system.		
	7.4.	Inspect the status of the rudder pedals.		
	7.5.	Inspect the status of the control column.		
	7.6.	Visually inspect if the cabin fire extinguisher is in sound status.		
	7.7.	Visually inspect if the fuel cut-off switch is in NORM position.		
	7.8.	Visually inspect if the throttle lever is in PARK position.		
	7.9.	Inspect if the collective pitch level is placed in the lowest position and locked.		

	7.10.	Inspect the status of the seats.		



Module B: Aircraft Engine Components Removal and Installation (Sample)

	2022 BRICS Skills Competition **(BRICS Future Skills Challenge)** **Aircraft Maintenance**	Session No.: Workstation No.: Effectivity: All Competition Teams Confidentiality Level: Public

Job Card No.: **COMBUSTION-001**	Version: R2	Labor: 2	Developed on: June 20, 2022	Competition Duration: 30min
Work Zone: Aircraft engine combustion chamber	Reference Document: 72-40-00		Completion Time:	

Job Card Title	Combustion Assembly Removal and Installation	Operator (Session No.)	Inspector (Workstation No.)

Tool and Equipment List:

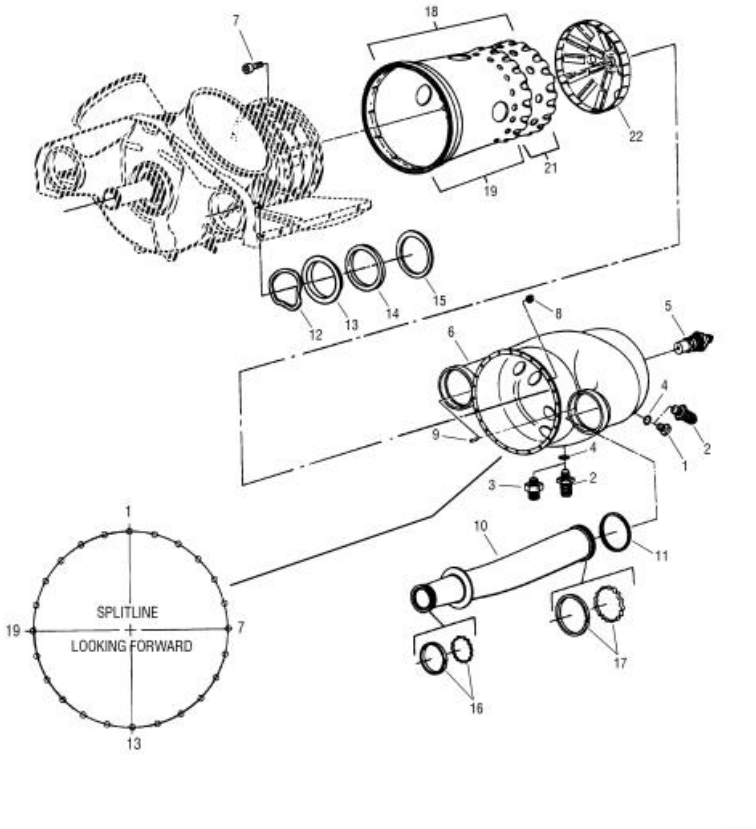
No.	Name	Specs	Qty	Remark
1	Turboshaft Engine	M250-C20	1	
2	Engine Turnover Stand	Special	1	Effectivity: M250-C20
3	Fuel Nozzle Spanner	Special	1	Effectivity: M250-C20
4	Tool Set	General	1 set	Effectivity: all engines
5	Tool Box	General	1	Effectivity: all engines

Consumables and Auxiliary Materials:

No.	Name	Specs	Qty	Remark
1	Lockwire	0.8mm	1 roll	Source: OMM 72-00-00
2	Anti-seize	General	1	Source:

		Lubricant		bottle	OMM 72-00-00	
	3	Inspection Mirror	General	1	Effectivity: all engines	
	4	Warning Sign	General	1	Effectivity: all engines	
	5	Flashlight	General	1	Effectivity: all engines	
Work Contents: **Warning: Make sure that the ignition switch is off before removing the spark igniter or spark igniter lead assembly as dangerous high voltages may be present. Allow five minutes after operation for electrical dissipation before disassembly.**						
Warning: Two operators are not allowed to work simultaneously during the removal and installation of the assembly.						
A. Preparations 1. Carefully read the Job Card and work according to it. 2. Borrow tool sets from the tool storage area. 3. After returning to the workstation, check the tools again and put them onto the desk neatly. 4. Check the calibration intervals and label validity of measuring tools. 5. Make sure that the engine work zone is free of obstacles and work within the zone will not be affected. 6. Hang the Operation Prohibited sign. **7.** Take proper personal protection measures before starting working.						_____ _____
Note: When removing the combustion chamber, strictly follow the steps set out in the Job Card. Select tools reasonably and use them correctly. If torque is large, do not use a ratchet spanner; if two spanners are required to remove a part, do use two spanners. Seal the removed parts with caps or zip lock bags in a timely manner if necessary. Marks will be deducted at discretion if Competitors do not fulfill the above-mentioned requirements. If a part is damaged due to improper operations or incorrect selection of tools, the marks for the corresponding step will all be deducted.						

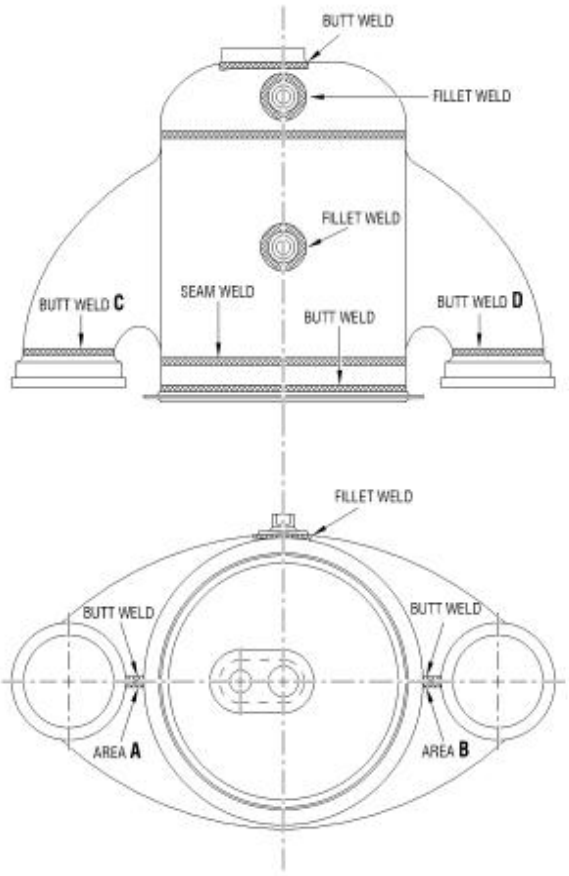
B. Removal of the Combustion Chamber 1. Remove the lockwire fixing the combustion chamber accessories. 2. Remove the manifold. 3. Remove the tube coupling nut of the ignition lead. 4. Remove the spark igniter. 5. Remove the fuel nozzle. 6. Remove the two clamps on the discharge air tubes. 7. Remove the T-shaped bolts fixing the combustion chamber and the turbine.	_____	_____
8. Put the 24 removed bolts into the screw box. 9. Remove the outer combustion case. 10. Remove the combustion liner.	_____	_____
Note: When installing the combustion chamber, strictly follow the steps set out in the Job Card. Select tools reasonably and use them correctly. During the installation of a nut, first tighten at least three threads by hand, and then use a spanner to tighten it. Check the calibration intervals of measuring tools. If torque is large, do not use a ratchet spanner; if two spanners are required to remove a part, do use two spanners. Marks will be deducted at discretion if Competitors do not fulfill the above-mentioned requirements. If a part is damaged due to improper operations or incorrect selection of tools, the marks for the corresponding step will all be deducted.		
C. Installation of the Combustion Chamber 1. Install the combustion liner. 2. Install the outer combustion case. 3. Install the T-shaped bolts to fix the combustion chamber and the turbine. The torque for the T-shaped bolts is _____ (3.9-4.6 N·m). 4. Install the two clamps onto the discharge air tubes.	_____	_____
5. Install the fuel nozzle. 6. Install the spark igniter and the torque for spark igniter is _____ (17-23 N·m). 7. Install the fuel manifold. The torque for tube coupling nut is_____ (9.0-13.6 N·m).		

8. Install the tube coupling nut of the ignition lead. The torque for the tube coupling nut is_____ (7.9-10.2 N·m). 9. Lockwire the combustion chamber accessories.	_____	_____
D. Finishing off 1. Set the torque spanner to zero after use. 2. Remove the warning sign. 3. Check the tools after completing the tasks. 4. Return the tools to the tool storage area.	_____	_____
 COMBUSTION SECTION (250-C20, -C20B, -C20C, -C20F, -C20J) Figure 1 72–40–00 FIG. 01 PAGE 0 Jun 1/10 		

EXPORT CONTROLLED

Rolls-Royce

M250-C20 SERIES OPERATION AND MAINTENANCE

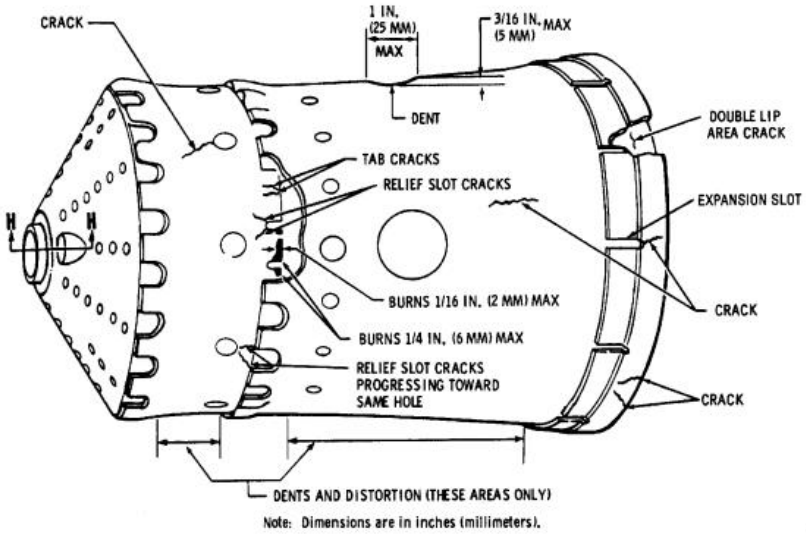


i000042038

Visual Inspection Areas of Outer Combustion Case
Figure 203

72-40-00

Page 209
Jun 1/19



Inspection of Combustion Liner
Figure 202

72–40–00
Page 206
Dec 30/96

Module C: Aircraft Hydraulic System Troubleshooting (Sample)

BRICS 2022 CHINA	**2022 BRICS Skills Competition** **(BRICS Future Skills Challenge)** **Aircraft Maintenance**	Session No.: Workstation No.: Effectivity: All Competition Teams Confidentiality Level: Public

Job Card No.: HYDRAULIC-SYSTEM-001	Version: R2	Labor: 2	Developed on: June 20, 2022	Competition duration: 90min
Work Zone: Aircraft Hydraulic System	Reference Document: 29-00-00		Completion Time:	

Job Card Title	Aircraft Hydraulic System Troubleshooting	Operator (Session No.)	Inspector (Workstation No.)

Tool and Equipment List:

No.	Name	Specs	Qty	Remark
1	Hydraulic System Troubleshooting Trainer	Special	1	
2	Tool Set	General	1 set	Effectivity: all hydraulic systems
3	Tool Box	General	1	Effectivity: all hydraulic systems

Consumables and Auxiliary Materials:

No.	Name	Specs	Qty	Remark
1	Rubber Gloves	General	1 pair	
2	20 AWG Wire	General	1m	Effectivity: all hydraulic systems
3	Pin	General	2	Effectivity: all hydraulic systems
4	Splice	General	1	Effectivity: all hydraulic systems

5	Lockwire	0.8mm	1 roll	Effectivity: all hydraulic systems		
6	Flat Braided Wire	General	1 roll	Effectivity: all hydraulic systems		
Work Contents:						
Warning: If the external power supply has an earth grounded neutral, there must not be an open or floating ground in the neutral circuit wiring of the supply or the aircraft. If an open or floating ground is present, the aircraft can be put at an electrical potential above earth ground. This electrical potential can cause electric shock with possible severe injury to personnel who touch the aircraft.						
A. Preparations 1. Read the Job Card. 2. Check the tools. 3. Make sure that the work zone is free of obstacles. 4. Hang the Operation Prohibited sign. 5. Take proper personal protection measures before starting working.					_____	_____
Warning: When the aircraft is provided power 115V 400HZ by an external power supply or an APU, the spare hydraulic system will work for 4 seconds, causing the rudder and the engine thrust reverser to work. To prevent personnel injuries, before powering on the aircraft, please confirm that the rudder and the engine thrust reverser area are free of people or obstacles.						
B. Powering on the Aircraft with an External Ground Power Supply 1. Start up the aircraft hydraulic system troubleshooting trainer. 2. Connect to the external ground power supply and check if its voltage is 115V 400HZ and make sure the EXTERNAL PWR CONN and EXTERNAL PWR NOT IN USE lights on the external ground power supply panel are on. 3. Set the battery switch on the cockpit P5-13 power supply panel to the ON position.						

4. Make sure the GRD POWER AVAILABLE light on the cockpit P5-4 power supply panel comes on.
5. Set the GRD POWER switch on the P5-4 power supply panel to the ON position.
6. Make sure the 1 SOURCE OFF, 2 SOURCE OFF, 1 TRANSFER BUS OFF and 2 TRANSFER BUS OFF lights on the P5-4 power supply panel go off.
7. Make sure the EXTERNAL PWR NOT IN USE light on the P19 external power supply panel goes off. (Carry out the next step with the consent of the Judge.)

Warning: Unless a fuel tank has at least 165 lb (760kg) fuel, the corresponding electric motor-driven pump (EMDP) should not work longer than 2 minutes. If the EMDP works for 2 minutes without fuel in the tank, make the hydraulic tank return to the ambient temperature before continuing with the test. Continued operation of the EMDP may cause overheating of the hydraulic fluid.

Warning: The EMDP should not work longer than 5 minutes; otherwise the hydraulic pump will be overheated and damaged.

C. Operating the Aircraft Hydraulic System B at the Cockpit

1. Check if the following circuit breaker on the P91 panel is closed.

ROW	COL	NUMBER	NAME
C	8	C00768	ELEC HYD PUMP CONTROL SYS B

Note: Check if the OVERHEAT light of System B on the overhead P5 hydraulic system panel comes on. If yes, please take the following steps.

2. Check if the temperature of the EMDP of the Hydraulic System B is below 85°C.
3. Check from the cockpit upper center display if the amount of the fuel is greater than 250 gal (1675lb or 760kg).
4. Check from the cockpit lower center display if the amount of hydraulic fluid is between 85% and 100%.
5. At the overhead P5 hydraulic system panel, set the HYD PUMPS

B ELEC 1 switch to the ON position.

6. Check from the lower center display if the hydraulic pressure of System B is 3000PSI.
7. At the overhead P5 hydraulic system panel, check if the OVERHEAT light is on.
8. At the overhead P5 hydraulic system panel, set the HYD PUMPS B ELEC 1 switch to the OFF position.
9. Check from the lower center display if the hydraulic pressure of System B is lowered to 0-50PSI.

_____ _____

D. Wiring Practices (See Figure 1)

1. Disconnect the electrical connector of System B overheat switch.
2. Measure the voltage between pin A and pin B of the electrical connector. Voltage: _____
3. If the voltage is not 5V DC, please inspect the wires. The inspection shows SM1 insulated splice is burned. Replace the SM1 insulated splice.

(1) Repair of Wire

1. Part No. of the SM1 splice is D-436-37, please refer to the relevant manual.
2. Splice Operation Chapter No.: _____, Strip Length: _____, Crimping Pliers Part No.: _____.

_____ _____

(2) Wiring Practices

1. Open the following circuit breakers on the P6-3 panel.

ROW	COL	NUMBER	NAME
F	11	C00317	INDICATOR MASTER DIM SECT5
F	12	C00318	INDICATOR MASTER DIM SEC6

2. Re-make the SM1 splice.
3. Remove an appropriate length of insulation layer from the wire and check the quality of the stripped wire.
4. Remove an appropriate length of insulation layer from the wire W5230-0507-20, the wire W5230-0509-20 and the wire W5230-0502-20 and check the quality of the stripped wires.
5. Select a proper tool to connect the three wires with a splice and

check the splicing quality.

6. Use the heat gun to heat and shrink the splice.
7. Use flat braided wires to bind the wires.
8. Close the following circuit breakers on the P6-3 panel.

ROW	COL	NUMBER	NAME
F	11	C00317	INDICATOR MASTER DIM SECT5
F	12	C00318	INDICATOR MASTER DIM SEC6

9. Troubleshoot the hydraulic system according to the steps of the "Operating the Aircraft Hydraulic System B at the Cockpit". If the fault is still not fixed, please take the following steps.

E. Replacement of the Overheat Switch (See Figure 2 and Figure 3)

(1) Removal of the Overheat Switch

1. Open the following circuit breakers on the P6-3 panel.

ROW	COL	NUMBER	NAME
F	11	C00317	INDICATOR MASTER DIM SECT5
F	12	C00318	INDICATOR MASTER DIM SEC6

2. Remove the electrical connector (3) of the overheat switch.
3. Install a cap on the electrical connector.
4. Remove the overheat switch (2).
5. Remove the packing (1) of the electrical connector.
6. Install a cap on the opening of the hydraulic line.

(2) Installation of the Overheat Switch

1. Apply vaseline to the new packing (1).
2. Install the new packing onto the new overheat switch (2).
3. Install the new overheat switch in place and torque it to _____ (17.8-20.2 N·m).
4. Install the electrical connector (3).
5. Close the following circuit breakers on the P6-3 panel.

ROW	COL	NUMBER	NAME
F	11	C00317	INDICATOR MASTER DIM SECT5
F	12	C00318	INDICATOR MASTER DIM SEC6

6. Troubleshoot the hydraulic system according to the steps of the "Operating the Aircraft Hydraulic System B at the Cockpit". If the fault is still not fixed, please take the following steps.

F. Inspection of the Case Drain Filter (See Figures 4, 5 and 6)

(1) Removal of the Case Drain Filter

1. Open the following circuit breaker on the P91 panel.

ROW	COL	NUMBER	NAME
C	8	C00768	ELEC HYD PUMP CONTROL SYS B

2. Place an oil resistant container under the case drain filter.
3. Cut the lockwire of the filter bowl (13).
4. Remove the filter bowl (13).
5. Take out the filter element (12) from the filter bowl (13) and check if the filter element (12) gets clogged.
6. After the filter element (12) is checked normal, put it back into the filter bowl (13).

(2) Installation of the Case Drain Filter

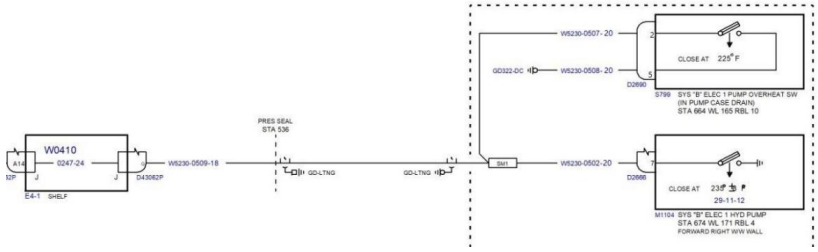
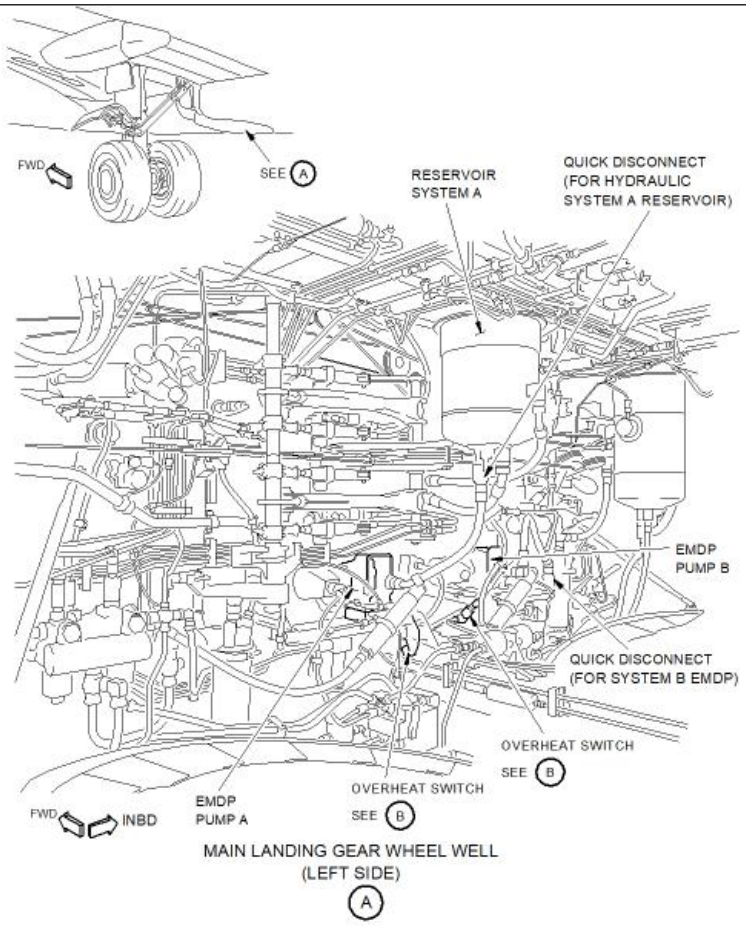
1. Install the filter bowl (13) and tighten it to _____ (10.8-13.6 N·m).
2. Install a lockwire onto the filter bowl.
3. Close the following circuit breaker on the P91 panel.

ROW	COL	NUMBER	NAME
C	8	C00768	ELEC HYD PUMP CONTROL SYS B

4. Operate the EMDP of System B according to the "Operating the Aircraft Hydraulic System B at the Cockpit".
5. Check if there is hydraulic leakage from the EMDP and if the hydraulic pressure of System B is between 2800 and 3000 PSI.
6. Check that the OVERHEAT light is off.

G. Powering off the Aircraft (the aircraft currently uses the external ground power supply)

1. Set the GRD POWER switch on the P5-4 power supply panel to the OFF position.
2. Set the battery switch on the cockpit P5-13 power supply panel to

the OFF position. 3. Cut off the external ground power supply.	_____	_____
H. Finishing off 1. Check the tools. 2. Clean the site.	_____	_____
 Figure 1		
 Figure 2		

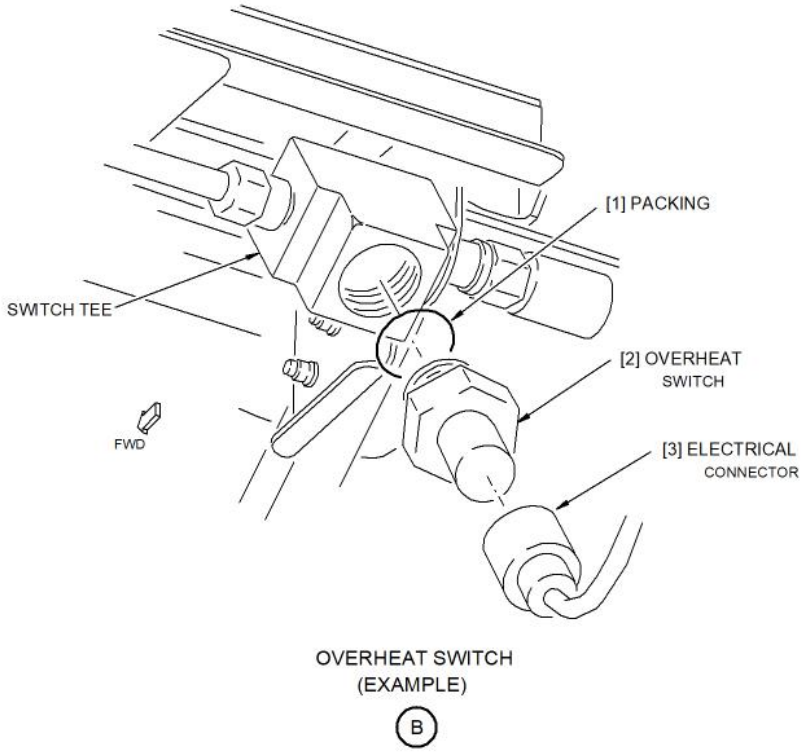


Figure 3

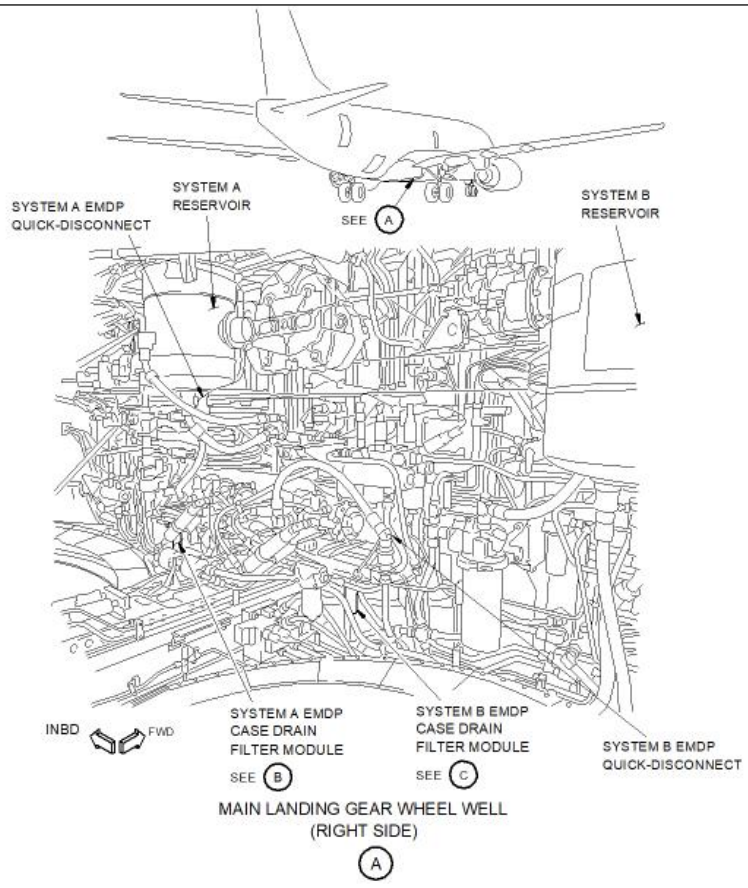


Figure 4

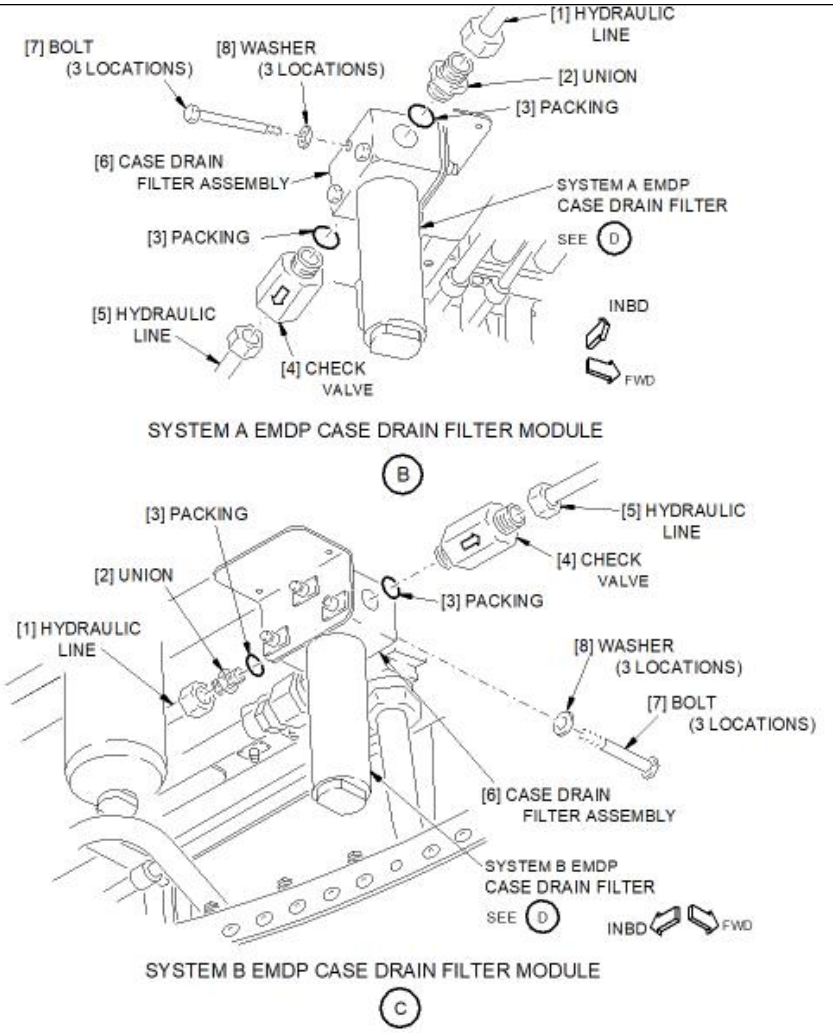

[1] HYDRAULIC LINE
[7] BOLT (3 LOCATIONS)
[8] WASHER (3 LOCATIONS)
[2] UNION
[3] PACKING
[6] CASE DRAIN FILTER ASSEMBLY
SYSTEM A EMDP CASE DRAIN FILTER
[3] PACKING
SEE D
INBD
[5] HYDRAULIC LINE
[4] CHECK VALVE
FWD
SYSTEM A EMDP CASE DRAIN FILTER MODULE
B
[3] PACKING
[5] HYDRAULIC LINE
[4] CHECK VALVE
[2] UNION
[3] PACKING
[1] HYDRAULIC LINE
[8] WASHER (3 LOCATIONS)
[7] BOLT (3 LOCATIONS)
[6] CASE DRAIN FILTER ASSEMBLY
SYSTEM B EMDP CASE DRAIN FILTER
SEE D
INBD
FWD
SYSTEM B EMDP CASE DRAIN FILTER MODULE
C

Figure 5

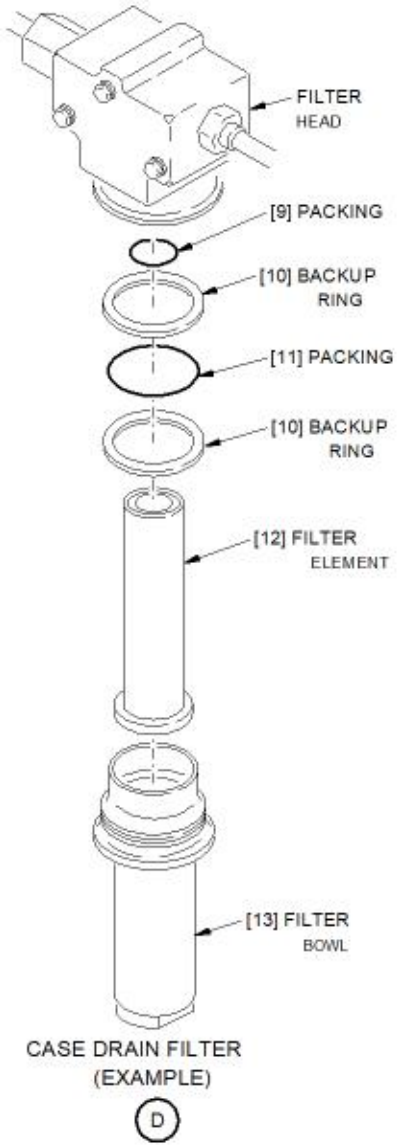

FILTER
HEAD
[9] PACKING
[10] BACKUP
RING
[11] PACKING
[10] BACKUP
RING
[12] FILTER
ELEMENT
[13] FILTER
BOWL
CASE DRAIN FILTER
(EXAMPLE)
D

Figure 6