MAINT	RII/INSP

Execution / Start Date:	
End Date:	

Pos	Mat. Type	P/N	IDN	Description	Qty	Unit
1	CONSUM	F70010–4		ENGINE MOUNT BOLTS	3.00	EA
1	FL & CH	EASE OFF 990		ANTI SEIZE COMPOUND	0.00	–
1	STRUCT	F70142		ENG HANDLING KIT	1.00	EA
1	STRUCT	F71141–501		ENG INST SLINK ASSY	1.00	EA
1	TOOL	F71418		REVERSIBLE RATCHET WRENCH	1.00	EA
1	TOOL	.		RIGGING PIN	0.00	

Nr.	Hardtime	Task	Spec.	Related Documents	MAINT	RII/INSP
1.			MEC	AMM 71–5–00 rev 27/08/78		

Check:

Zones: 451, 452, 453, 454

Access: 1715, 1747, 3703, 3712, 3714, 3717

ENGINE REMOVAL AND INSTALLATION.

DATE REPLACEMENT ENG.	
POSITION ENG. NBR.	
SERIAL NBR. OFF.	
SERIAL NBR. ON.	
TAG SERVICEABLE.	
REASON OF REMOVAL.	

A. PREPARATION FOR ENGINE REMOVAL:

NOTE: ***FREE THE WORKING AREA OF FOREIGN OBJECTS. (FOR EXAMPLE: STAIRS, TOOLS, ...ETC. NOT NECESSARY FOR ENGINE REMOVAL.).***

1. Pull **ENGINE FIRE SWITCH** and following C/B:
   - **– IGNITION**.
   - **– FUEL VALVE**.
   - **– FUEL FLOW**.
   - **– OIL PRESSURE**.
   - **– OIL TEMPERATURE**.
   - **– OIL QUANTITY**.
   - **– EPR**.
2. Check that start levers are in **CUTOFF** position.
3. Remove inboard dry bay panel.
4. Check that applicable engine fuel shutoff valve, located in inboard dry bay is **CLOSED**.
5. Depressurize utility hydraulic supply system. ***Only for eng. 2 & 3.***
6. Remove main side cowl panels on left and right side.
7. Remove fan cowl panels on left and right side.
8. Remove T/C fairing. (Nacelle forward fairing).
9. Remove upper fairing panels, fan upper fixed fairings, on left and right side.
10. Drain fuel supply line to engine.

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B. ENGINE REMOVAL:

1. Disconnect engine start control rod from start control shaft lever arm.
2. Disconnect control rod from power control shaft lever arm and install 4 rig pin to hold linkage in position.
3. Remove bolts from both ends of fan reverser control rod and remove rod.
4. Remove duct clamps from thermal anti–icing duct and pneumatic duct to engine starter. (Fig 401, Item 14 & 15).
5. Disconnect starter high pressure air supply line. (Fig 401, Item 16).
6. Uncouple pneumatic hose at right side of strut vertical bulkhead. (Fig 401, Det A, Item 6).
7. Engine with T/C. Remove clamp on T/C output duct and disconnect T/C pressure sensing line at T– fitting. (Fig 401, Det A, Item 7 & 26).
8. Uncouple fan reverser actuator pneumatic supply line at control valve and at fitting slightly fwd of strut vertical bulkhead. (Fig 401, Det A, Item 10).
9. Disconnect thrust reverser control valve pneumatic supply line at flex hose. (Fig 401, Det B).
10. Uncouple hydraulic reservoir pressurizing line on left side of engine. ***Only for eng 2 & 3.*** (Fig 401, Det C).
11. At disconnect panel, right side of engine, uncouple hydraulic pump return line, delivery line and pump inlet supply line. ***Only for eng 2 & 3.*** (Fig 401, Det B, Item 11, 12 & 13).
12. Remove clamps that support hoses from engine casing.
13. At disconnect panel, left side of engine, uncouple fuel supply line and strut drain line. When fitted on airplane, water injection line. (Fig 401, Det F, Item 23, 24 & 25).
14. Uncouple and remove 2 aft thrust reverser follow–up control rods. (Fig 401, Det D, Item 18 & 19).
15. Uncouple exhaust pressure sensing line at horizontal firewall and 2 thrust reverser pneumatic lines at bracket mounted above engine diffuser section. Uncouple combustion chamber drain tank pressurizing line. (Fig 401, Det D, Item 17 & 22).
16. Disconnect 2 aft thrust reverser actuator lines at brackets mounted on horizontal firewall. (Fig 401, Det D, Item 21).
17 Disconnect electrical connector on engine anti–ice valve.
18. Disconnect electrical plug on pneumatic duct motor operated valve.
19. Disconnect 2 large connectors and exhaust gas temperature disconnect plug at horizontal fire wall. When fitted to airplane, disconnect 2 single wire fire detection system electrical connectors locatted aft of plug. Undo clamp supporting wiring harness from engine fwd mount brace. (Fig 401, Det A, Item 8 & 9).
20. Disconnect 2 large electrical connectors oil quantity indicating system and interphone connectors from strut vertical bulkhead. Unbolt 2 generator grond leads and conduit grounding lead from right side of bulkhead. Unclamp electrical raceway duct on vertical bulkhead. (Fig 401, Det A, Item 1, 2, 3, 4 & 5).
21. Install engine hoisting fitting on each side of engine.

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22. Install sling attaching shackles on engine hoisting fitting. (Fig 403).		
23. Position dolly under engine. Raise dolly to level of engine hoisting fittings, locate engine fittings in fixtures on each dolly post and insert locking pins.		
24. Attach hoisting sling to shackles and take up slack in cables. (Fig 403).		
25. Adjust fwd cables with hand hoist until taut.		
WARNING: LIGHTLY LOADED LEVER CHAIN HOISTS MAY RELEASE LOAD CONTROL LEVER OR KNOB IS FORCED INTO NEUTRAL OR FREE CHAIN POSITION. ONLY PERSONNEL INSTRUCTED IN PROPER USAGE SHOULD OPERATE LEVER CHAIN HOIST.		
26. Loosen nuts on engine fwd mount fitting. (2 each) (Fig 404).		
27. Loosen nut on engine rear mount fitting. (1 each) (Fig 404).		
28. Adjust hoist cables until engine is supported.		
29. Remove nuts from engine mount fitting and install thread protector and lower engine and dolly from strut.		
30. Remove hoisting sling from engine dolly.		
C. AFTER ENGINE REMOVAL:		
NOTE: ***Only applicable when nose cowl is not installed on new engine.***		
1. Remove nose cowl from old engine.		
2. Inspect nose cowl: Visible and auditive check.		
3. Install nose cowl on new engine.		
D. INSPECTION:		
1.Inspect: – Fire wall. – Engine mounts. (Fwd & Aft). – Thrust reverser systems and ducts. – Engine controls. – Electrical receptacles and upper loop and connectors. – Strut (support structure, including strut to wing attachments at the front spar, mid spar diagonal brace fittings and engine hoist attach points for evidence of loose fasteners nicks cracks, gouges, chipped finish and/or signs of visible damage). – Fwd and Aft engine mount fitting assy's. – Strut lower spar on STA. 157. – Engine cowlings and T/C fairings.		
2. Perform engine fuel **SOV** internal leak check with booster pump **ON**.		
3. Perform fire **SOV** internal leak check.		

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E. ENGINE INSTALLATION:

1. Attach engine sling to crane and attach sling hooks to engine hoisting rings. A suitable load scale should be interposed between the sling and crane. (Fig 403).
   WARNING: LIGHTLY LOADED LEVER CHAIN HOISTS MAY RELEASE LOAD CONTROL LEVER OR KNOB IS FORCED INTO NEUTRAL OR FREE CHAIN POSITION. ONLY PERSONNEL INSTRUCTED IN PROPER USAGE SHOULD OPERATE LEVER CHAIN HOIST.
2. Adjust hoist and sling until all cables are taut. Fwd cables are adjusted with hand hoist. raise hoist until weight of engine and dolly are taken on sling.
3. Install thread protectors on engine mount fitting.
4. Ensure that three engine mounting bolts and the mounting bolt holes in the strut fitting are clean.
5. Hoist engine into place. Guiding the 2 Fwd and single aft mount fittings the mount support.

NOTE: ***REPLACE NUTS BY NEW ONE.***

6. Ensure correct mating of starter air duct and thermal anti–icing air duct, T/C (When fitted on on engine) and guide tracks for aft thrust reverser sleeve.
7. Remove thread protectors.
8. Apply antiseize compound to engine mount fittings.
9. Install correct washer and correct nut on all 3 mount fittings. Snug up all 3 nuts before making final torque.
10. Tighten aft fitting nut, fwd left fitting nut, fwd right fitting nut and and lateral bolts (2 each), I.A.W table bellow:

ENGINE	BOLT	EXTENSION	TORQUE FT/LBS
JT–3D	FWD LH	–––	292–330
	FWD RH	–––	166–208
	AFT	–––	183–208
	LATERAL	–––	200–258

11. Remove pins locking engine hoist fitting into dolly posts.
12. Slack off hoist and remove dolly assembly from engine.
13. Remove the Fwd and Aft engine hoisting fittings from engine.

NOTE: ***STOW ENGINE HOISTINGS FITTINGS ON ENGINE TRANSPORTATION DOLLY. KEEP PINS WITH FITTINGS.***

14. Reconnect electrical connector on engine anti–ice valve.
15. Reconnect electrical plug on starter valve.

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16. Reconnect 2 large electrical connectors and exhaust gas temperature disconnect plug at horizontal fire wall. When fitted to airplane, reconnect 2 single wire fire detection system electrical connectors located aft of plug and install clamp supporting wiring harness from engine fwd mount brace. (Fig 401, Det A, Item 8 & 9).		
17. Reconnect 2 large electrical connectors oil quantity indicating system and interphone connectors from strut vertical bulkhead. Install bolts on 2 generators ground leads and install grounding lead on right side of bulkhead, reclamp electrical raceway duct on vertical bulkhead. (Fig 401, Det A, Item 1, 2, 3, 4 and 5).		
18. After installation connectors, lockwire all connectors.		
19. Adjust and install fan reverser control rod. (Fig 402).		
20. Adjust and bolt engine start control rod to start control shaft lever arm. (Fig 402).		
21. Adjust and bolt the power control rod to power control shaft lever arm.		
22. Connect fan reverseractuator pneumatic supply line to control valve and to fitting slightly fwd of strut vertical bulkhead. (Fig 401, Det A, Item 10).		
23. Connect thrust reverser control valve pneumatic supply line to flex hose. (Fig 401, Item 27).		
24. On engine with T/C, install T/C output duct and connect T/C pressure sensing line to T–fitting. (Fig 401, Det A, Item 7 & 26).		
25. Connect pneumatic line on right side of bulkhead. (Fig 401, Item 6).		
26. Install duct clamps on wing anti–icing air duct and engine starter low pressure air duct locted between horizontal firewall and engine diffuser. (Fig 401, Item 14 & 15).		
27. Connect starter high pressure air supply. (Fig 401, Item 16).		
28. Couple exhaust pressure sensing line to horizontal firewall connection located above diffuser section. (Fig 401, Det D, Item 17).		
29. Couple 2 aft thrust reverser pneumatic lines to engine thrust reverser system at bracket mounted on underside firewall. (Fig 401, Det D, Item 21).		
30. Adjust and connect 2 aft thrust reverser follow–up control rods. (Fig 401, Det D, Item 18 & 19).		
31. Connect hydraulic reservoir pressurizing line on left side of engine. ***Only for eng 2 & 3.*** (Fig 401, Det C).		
32. At disconnect panel on left side of engine, connect fuel supply line and strut drain line. (Fig 401, Det F, Item 23 & 25).		
33. If fitted on airplane, connect water injection line and install clamps holding flexible lines to engine casing.		

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34. Reconnect hydraulic system as follows: ***Only for eng 2 & 3.***		
– Completely fill hydraulic pump with hydraulic fluid, by removing plug from filler port and filling case of pump.		
– Depress valve in hydraulic supply self–sealing coupling and fill hydraulic supply line with hydraulic fluid.		
– Connect hydrauli supply line, hydraulic pressure line and hydraulic pump return line at disconnect panel. (Fig 401, Det A, Item 11, 12 & 13).		
35. Check for security and installation of all engine controls and install part power stop (fuel control)		
36. Remove all rigging pins.		
37. Open all applicable fuel SOV, located in inboard dry bay.		
38. When engine fuel SOV is in OPEN position, install dry bay panel.		
39. Install upper fairing panels (fan upper fixed fairings) on left and right side of engine.		
40. Reposition utility hydraulic bypass valve in right–hand wheel well to CLOSED and retighten utility hydraulic reservoir filler cap in left–hand wheel well. ***Only for eng 2 & 3.***		
41. Check that start levers are in CUTOFF position.		
42. Push in **ENGINE FIRE SWITCH** and following C/B: **– IGNITION.**		
– FUEL VALVE.		
– FUEL FLOW.		
– OIL PRESSURE.		
– OIL TEMPERATURE.		
– OIL QUANTITY.		
– EPR.		
F. SERVICING:		
1. Drain: – Starter.		
– Turbocompressor.		
– Constant Speed Drive. (CSD).		
– CSD Wet spline cavity.		
2. Fill and adjust: – Engine oil level.		
– Starter oil level.		
– Turbocompressor oil level.		
– CSD Wet spline cavity.		
– Constant Speed Drive oil filling + priming.		
G. OPERATIONAL CHECK:		
1. Fire detection system.		
2. Ignition system.		
3. Fuel heater valve.		
4. Thrust reverser.		
5. Starter.		
6. CSD disconnect. **(STATIC)**		
7. Hydraulic EDP depressurizing valve.		

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7. Reconnect **CSD** and lockwire the **CSD** disconnect switch.

8. Bleed the low oil pressure switch. **(ENGINE CRANCK).**

9. With the fuel pressure **ON**: Check for fuel leaks.

H. ENGINE RUN–UP:

1. Perform run–up of engine and check for oil, fuel and air leaks.

2. Record:

SER N°	DATA PLATE SPEED %	TRIM SPEED %	P am ("Hg)	T am (°C)	EPR/TRIM (PP)	EPR/TO

3. Part power trim stop ——> **ACTIVE**.

4. 5 Min idle check: **ANTI–ICE VALVES**.

5. 2 Min part power: **EPR TARGET STABILIZED**.

EPR	N1	EGT	N2	FF	OIL T°	OIL PRESS

6. JT3–D, **EPR 1.37 (L.D) –––> N2:.....**
1.36 (S.D)
NOTE: ***Correction N2 limit: +2.1, –1.***

7. Part power trim stop ——> **INACTIVE**.

8. 1 Min T.O Power – **EPR TARGED**:

EPR	N1	EGT	N2	FF	OIL T°	OIL PRESS

IDLE CHECK							CHECK (ENGINE CHANGE ONLY)				
EPR	N1	EGT	N2	FF	OIL T°	OIL Pr	HYD Pr	ALT	AVM	T/C	REV

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I. ENGINE LIMITS: JT3D–7:

	IDLE	TAKE–OFF
N1		110.8 %
N2	58 % +0 – 2 (T/C ON)	106.7 %
EGT	340 ˚ C MAX 450˚C in starting	575 ˚C
OIL PRESS	41–43 PSI normal 35 PSI min	40–60 PSI
OIL TEMP	40–132˚c	40–132 ˚C 143˚ max –15˚ min
FUEL FLOW	400–500 kg/h	+/– 5000 kg/h

J. AFTER ENGINE RUN–UP:

1. Check: – Main oil filter. (Engine OH. since overhaul only).
   – CSD magnetic plug.
   – T/C magnetic plug. (If installed).
   – Starter magnetic plug. (If installed).

2. Check oil level of: – Engine.
   – T/C.
   – CSD.
   – Starter.

3. Part power trim stop ——> **INACTIVE**.

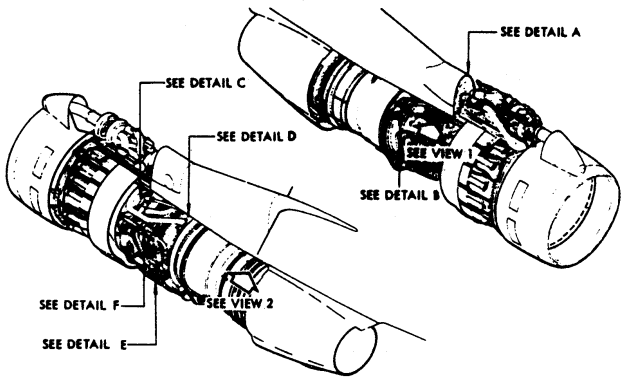
4. Check for leaks.

K. CHECK AFTER FIRST FLIGHT.

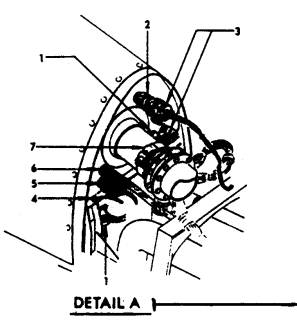
NOTE: TO DO WHEN ENGINE WAS OVERHAULED.

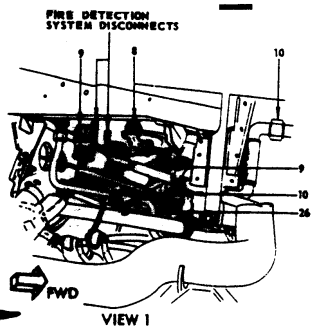
1. Check: – Main oil filter. (Engine OH. since overhaul only).
   – CSD magnetic plug.
   – T/C magnetic plug. (If installed).
   – Starter magnetic plug. (If installed).

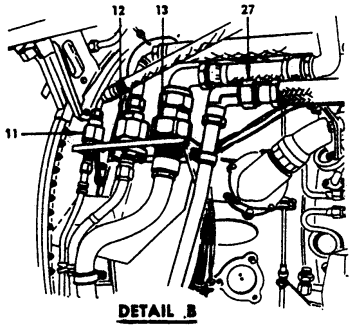
2. Check oil level of: – Engine.
   – T/C.
   – CSD.
   – Starter.

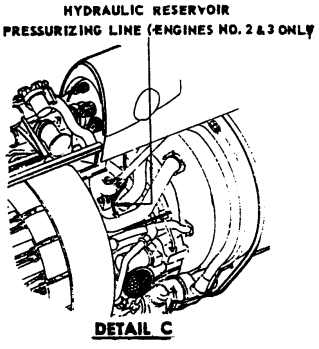


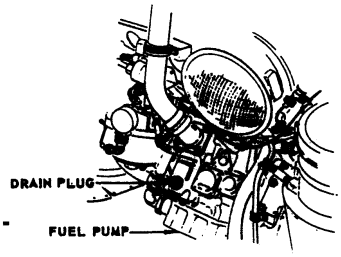
1 GENERATOR GROUND LEAD
2 INTERPHONE CONNECTOR
3 ELECTRICAL CONNECTOR
4 GROUND LEAD
5 OIL QUANTITY SYSTEM ELECTRICAL CONNECTOR
6 PNEUMATIC LINE
7 DUCT CLAMP
8 EXHAUST GAS TEMPERATURE DISCONNECT PLUG
9 ELECTRICAL CONNECTOR
10 REVERSER PNEUMATIC LINE
11 HYDRAULIC RETURN LINE
12 HYDRAULIC DELIVERY LINE
13 HYDRAULIC SUPPLY LINE
14 DUCT CLAMP
15 DUCT CLAMP
16 HIGH PRESSURE AIR LINE (WHEN FITTED TO ENGINE)
17 EXHAUST PRESSURE LINE
18 REVERSER CONTROL ROD
19 REVERSER CONTROL ROD
20 DELETED
21 REVERSER PNEUMATIC LINE
22 REVERSER PNEUMATIC LINE
23 FUEL SUPPLY LINE
24 STRUT DRAIN LINE
25 WATER INJECTION LINE (WHEN FITTED TO ENGINE)
26 PRESSURE SENSING LINE
27 REVERSER PNEUMATIC LINE

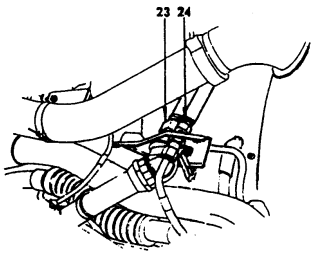


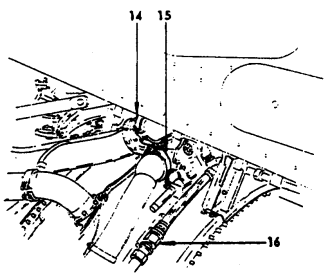












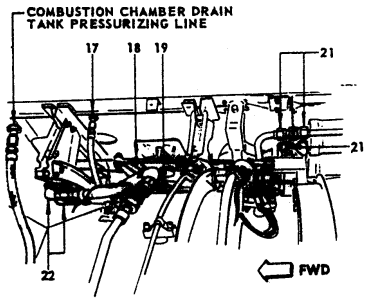


FIG. 401

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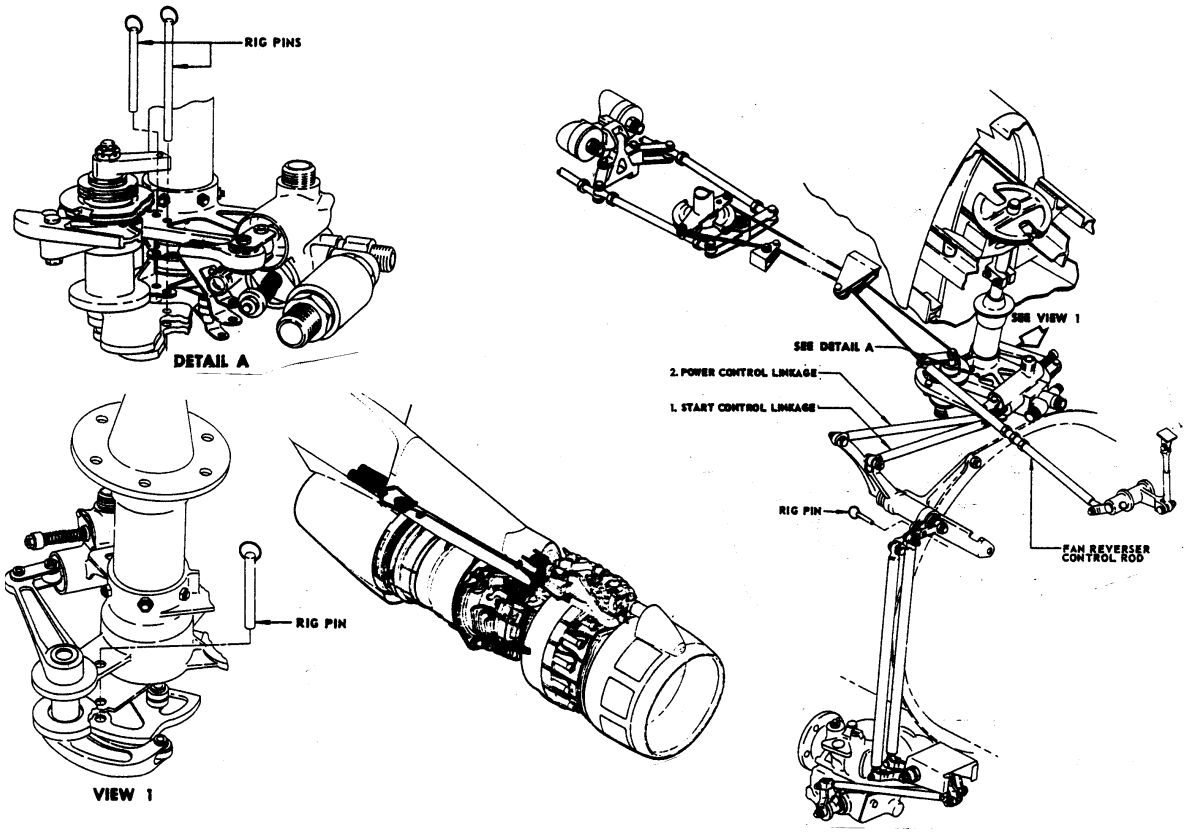
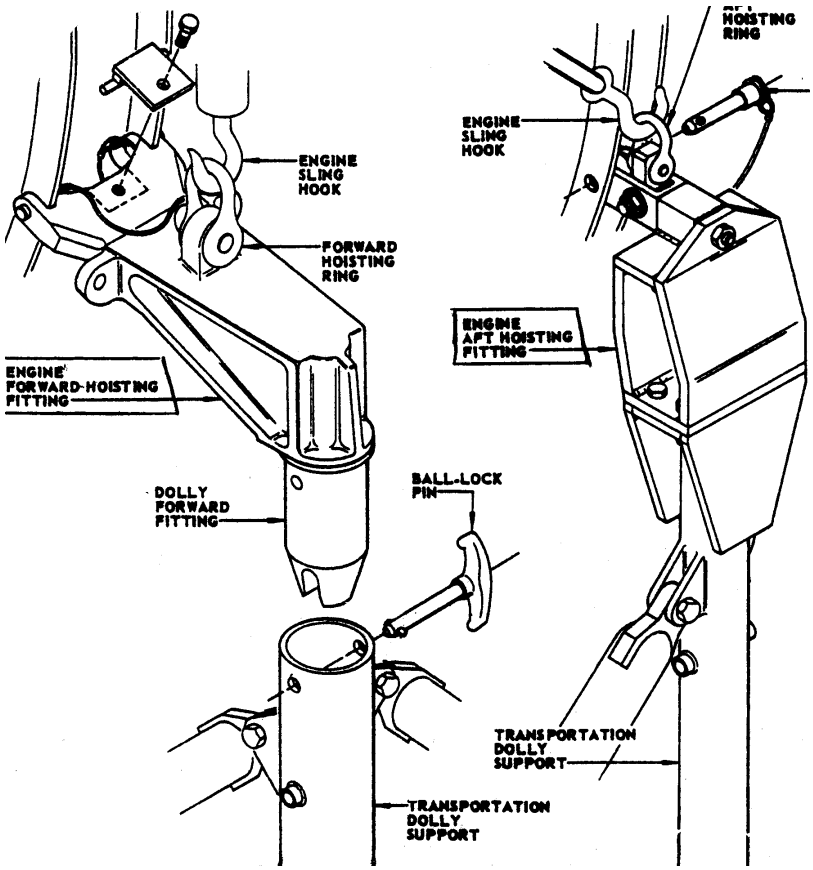


FIG. 402

MAINT | RII/INSP



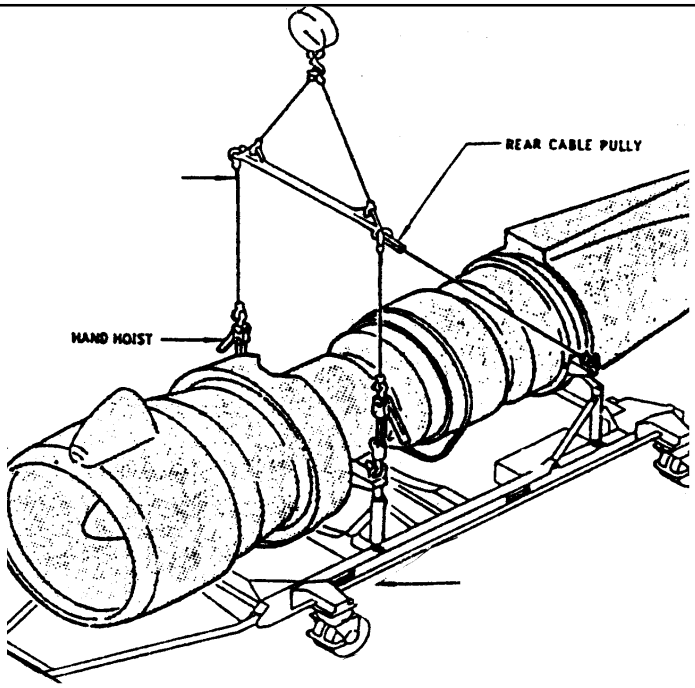


FIG. 403

MAINT | RII/INSP

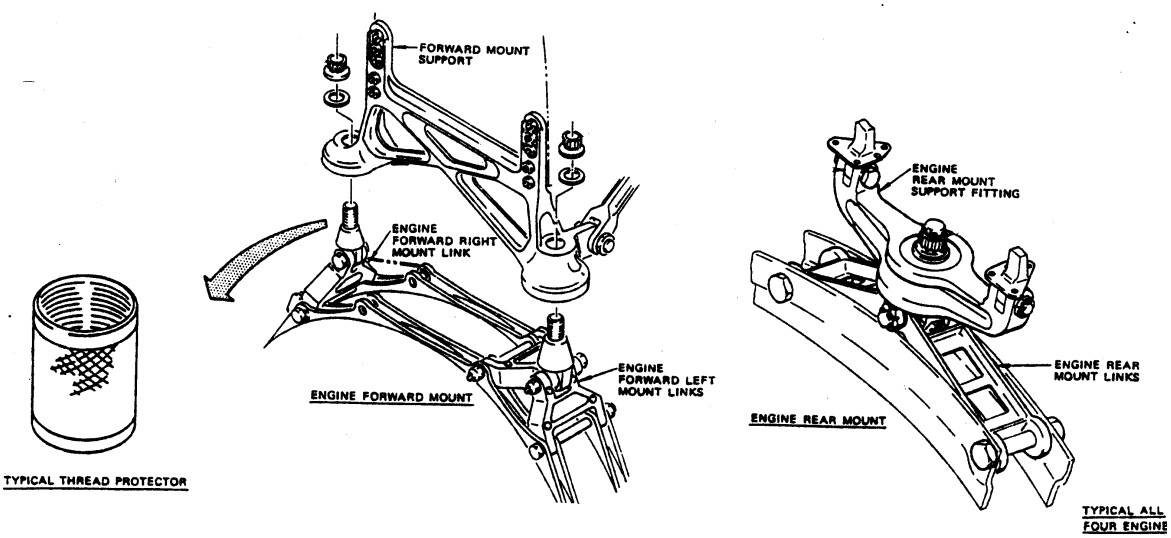


FIG.404

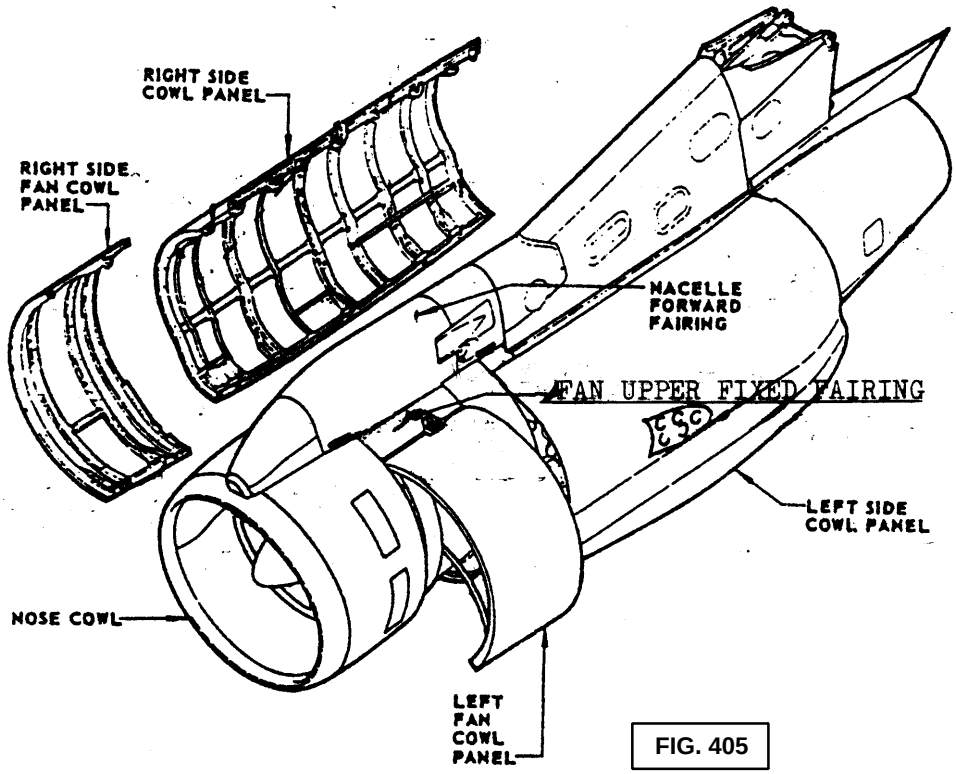


FIG. 405