

## CHAPTER 71

## POWERPLANT

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## CHAPTER 71

## POWERPLANT

71-00 Description

One Rolls-Royce model 250-C300/A1 (commercial designation RR300) free-turbine turboshaft engine powers the helicopter. The engine is equipped with an ignition exciter, igniter, starter-generator, two tachometer senders, and additional powerplant instrument senders.

A direct drive, squirrel-cage style cooling fan is mounted to the intermediate shaft and supplies cooling air to the engine and gearbox oil coolers.

Induction air enters through multiple openings in the upper fuselage cowlings and flows into a plenum forward of the firewall. The plenum contains a radial-flow air filter at the engine compressor inlet. The standard filter element is foam. A high-efficiency filter element with pleated media is optional. The high-efficiency filter includes a sight gage inside the upper left cowl door with provides an indication of filter dirt load.

**NOTE**

The high-efficiency filter is recommended for operating in dusty conditions. The filter may not filter fine sand or dust, resulting in reduced engine life.

If the air filter becomes blocked, spring-loaded doors at the front of the filter housing open allowing unfiltered air to the engine. The AIR FILTER annunciator illuminates when filter bypass is occurring.

Periodically performing power assurance checks may provide indication of engine deterioration or air filter blockage. Maintenance actions such as air filter cleaning and compressor wash should be performed if aircraft fails power assurance check.

A temperature switch is mounted to the firewall above the engine to detect a fire in the engine compartment. Abnormally high temperature causes the ENGINE FIRE annunciator to illuminate.

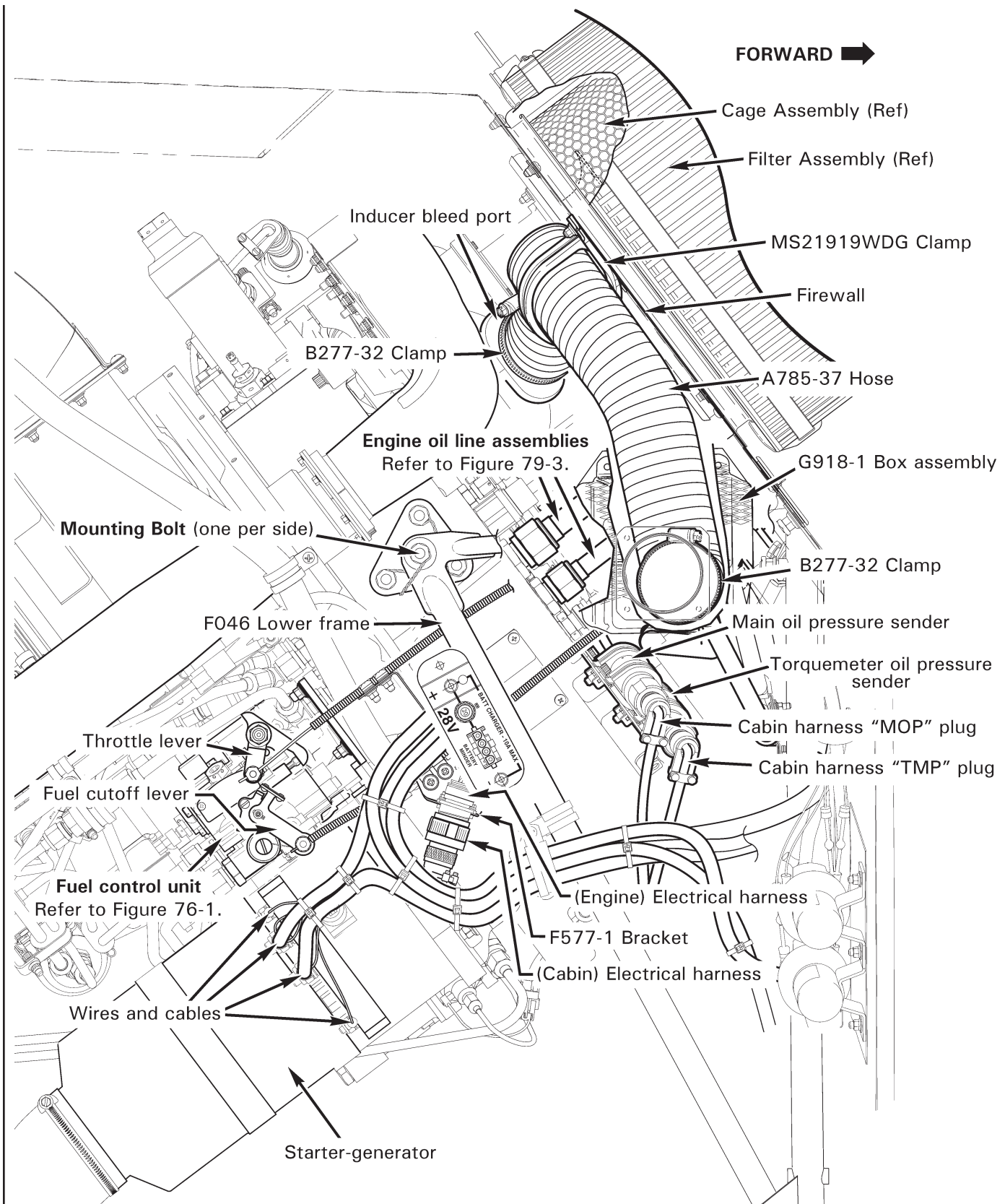


FIGURE 71-1 ENGINE - RIGHT SIDE

71-10 Engine**NOTE**

The electronic monitoring unit (EMU) is a serialized component assigned to the engine. When removing the engine, remove the engine's EMU per § 71-43, as required.

**A. Removal**

1. Remove engine cowling assembly per § 53-21.
2. Refer to Figures 71-1 and 71-2. Verify heat shrink stamping is legible (or mark wires and cables) and remove hardware securing wires and cables to starter-generator studs. Disconnect (cabin) electrical harness from (engine) electrical harness at F577-1 bracket assembly. Disconnect cabin harness "TMP" (torquemeter oil pressure) and "MOP" (main oil pressure) plugs from engine senders; disconnect cabin harness plug from N2 speed sensor.
3. Pull fuel shut off valve OFF. Disconnect B283-12 (fuel) hose assembly B-nut from engine fuel inlet fitting. Cap fitting and plug line.
4. Remove hardware securing MS21919WDG clamp to firewall, and loosen B277-32 clamps securing A785-37 hose to inducer bleed port and G918-1 box assembly. Remove hose and clamps. Install cover on inducer bleed port and tape box assembly to protect openings from contaminants.
5. Remove hardware securing G391-1 (customer air) line assembly clamps. Loosen line assembly B-nut from G391-5 line assembly union and disconnect B-nut from engine compressor union. Cap fitting and plug line.
6. Drain engine oil per § 12-60; drain engine oil per RR300 Operation and Maintenance Manual (OMM). Refer to Figure 79-3. Remove hardware securing F723 oil line assembly clamps. Loosen F723-1, F723-2, and F723-3 line assembly B-nuts from F649-1 oil cooler and G689-1 oil tank assembly unions; disconnect B-nuts from engine fittings. Cap fittings and plug lines.
7. Refer to Figure 63-1. Remove hardware securing F018-1 clutch assembly yoke to (aft) A947-2 plate assembly, noting hardware removed.
8. Refer to Figure 76-1. Remove fasteners securing C522-10 (throttle) and A522-10 (fuel cutoff) control inner wires to FCU throttle and fuel cutoff levers. Remove fasteners securing control housings and AN742-4 clamps to F577 bracket assemblies. Refer to Figure 76-2. Remove cotter pin and washer securing C522-11 (power turbine governor) control inner sleeve and D333-13 fitting to PTG input lever; disconnect control from lever.
9. Remove exhaust per § 71-30.

71-10 Engine (continued)**A. Removal (continued)**

10. Connect engine hoist to G200-1 engine lifting lug. Support engine during mounting hardware removal.
11. Cut and discard safety wire and remove two bolts securing bottom engine mount to F174-1 support weldment. Cut and discard safety wire and remove two bolts (one per side) securing side engine mounts to F046 lower frames.
12. Carefully remove engine; verify F579-1 bellmouth is clear of firewall, and loose wires, cables, fittings and line assemblies are clear of engine during separation. Install bellmouth cover.
13. Prepare engine for Rolls-Royce maintenance facility per § 71-11, as required.

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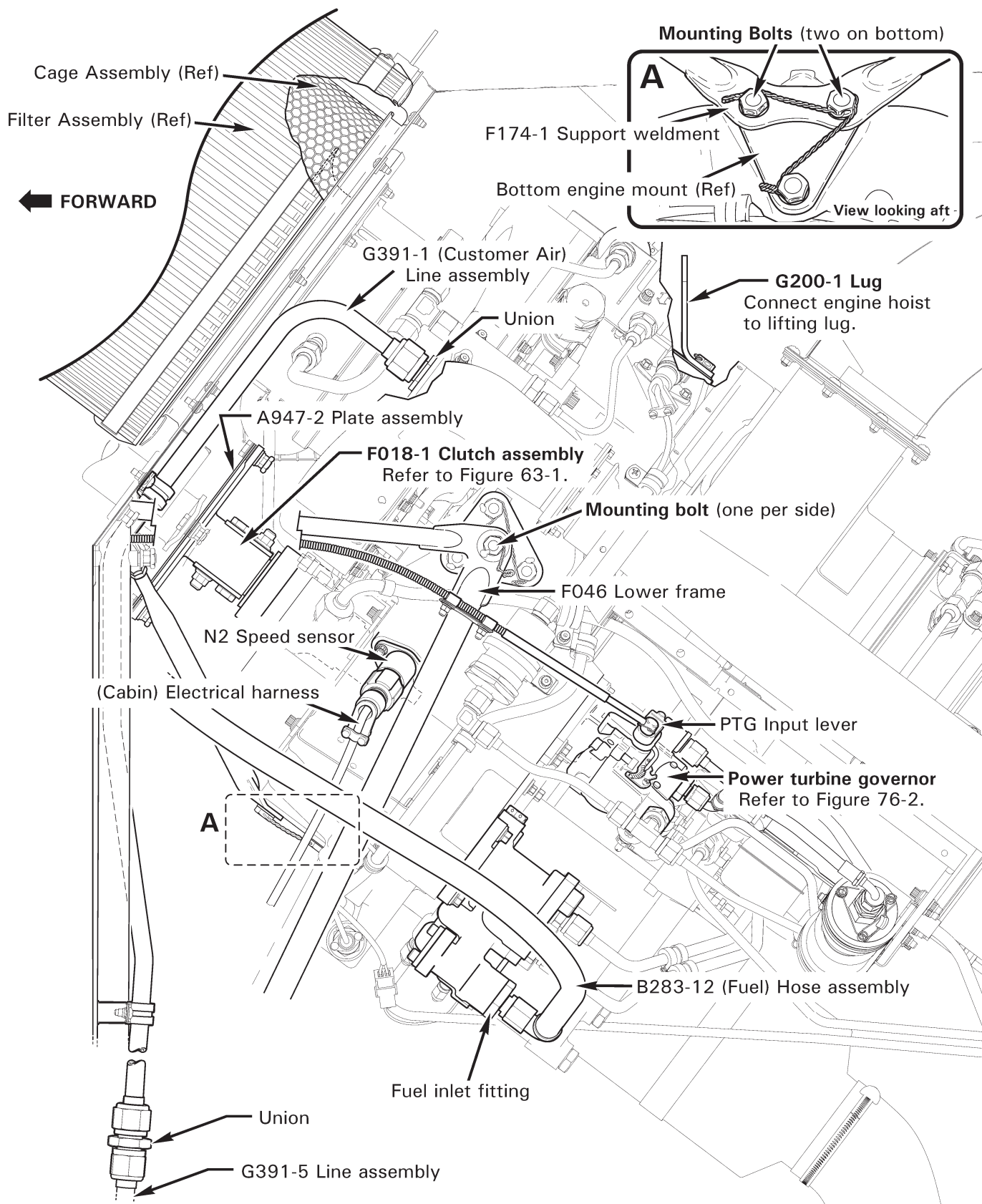


FIGURE 71-2 ENGINE - LEFT SIDE



71-10 Engine (continued)**B. Installation**

1. Prepare engine for installation in helicopter per § 71-12, as required.
2. Refer to Figures 71-1 and 71-2. Connect engine hoist to G200-1 engine lifting lug.
3. Remove F579-1 bellmouth cover. Carefully install engine, inserting bellmouth through firewall. Do not pinch loose wires or cables, or damage fittings or line assemblies. Before installing engine mounting hardware, verify the inlet seal is centered when pressed against the firewall, and that the seal is not twisted or pinched.
4. Install hardware securing side engine mounts to F046 frames. Standard torque bolts (one per side) per § 20-32; install 0.032-inch diameter lockwire and safety bolts to frames.
5. Refer to Figure 63-1. Install hardware securing F018-1 clutch assembly yoke to (aft) A947-2 plate assembly, as removed. Perform engine driveline shimming per § 63-11. Standard torque nuts and palnuts per § 20-32, and torque stripe per Figure 5-1.
6.
  - a. Install hardware securing F174-1 support weldment to bottom engine mount; special torque bolts per § 20-33 (safety wire will be installed in step 7).
  - b. Verify 0.2 inch minimum clearance between F642 shaft weldment and firewall grommet. To adjust clearance:
    - i. Remove two bolts securing support weldment rod ends to engine bottom mount and remove support weldment.
    - ii. Adjust rod end extension on both sides as required per § 5-33, and Figures 5-1 & 5-2; ensure rod extension is no more than 1.10 inches.
    - iii. Repeat steps a & b until minimum shaft-to-firewall grommet clearance is achieved.
7. Install 0.032-inch diameter lockwire & safety three bolts together per Figure 71-2 Detail A. Verify safety is correct direction.
8. Install hardware securing support weldment rod ends to lower frames, standard torque nuts and palnuts per § 20-32, and torque stripe per Figure 5-1. Standard torque jam nuts and palnuts securing rod ends to support weldment per § 20-32, and torque stripe per Figure 5-1.
9. Remove engine hoist.
10. Install exhaust per § 71-30.
11. Remove cap and torque check engine compressor (customer air) union per RR300 Operation and Maintenance Manual (OMM). Remove plug and connect G391-1 line assembly B-nut to engine. Special torque B-nuts per § 20-33 and torque stripe fittings. Install hardware securing line assembly clamps.

71-10 Engine (continued)**B. Installation (continued)**

12. Refer to Figure 79-3. Remove caps and torque check engine (oil line) fittings per RR300 OMM. Remove plugs and connect F723-1, F723-2, and F723-3 line assembly B-nuts to engine. Special torque B-nuts at engine, F649-1 oil cooler, and G689-1 oil tank assembly per § 20-33, and torque stripe fittings. Install hardware securing line assembly clamps. Service engine oil per RR300 OMM; service engine oil per § 12-60.
13. Remove cover and tape and install B277-32 clamps and A785-37 hose onto inducer bleed port and G918-1 box assembly; tighten clamps. Install MS21919WDG clamp around hose, and install hardware securing clamp and hose to firewall. Verify security.
14. Remove cap and torque check engine fuel inlet fitting per RR300 OMM. Remove plug and connect B283-12 (fuel) hose assembly B-nut to inlet fitting. Special torque B-nut per § 20-33 and torque stripe per Figure 5-1. Push fuel shut off valve ON.
15. Connect (cabin) electrical harness plug to N2 speed sensor; connect cabin harness "TMP" (torquemeter oil pressure) and "MOP" (main oil pressure) plugs to engine senders. Connect cabin harness to (engine) electrical harness at F577-1 bracket assembly. Install wires and cables on starter-generator studs according to stamping. Install hardware, special torque nuts, and torque stripe per Figure 5-1.
16. Perform FCU throttle and fuel cutoff control rigging per §§ 76-11 & 76-12. Perform PTG control rigging per § 76-21 (perform PTG rigging check during run-up).
17. Install engine EMU per § 71-43, as required.
18. Perform ground check per § 5-41. Remove the air from the engine fuel system, then perform fuel flow check, per RR300 OMM. Perform run-up per § 5-42, and PTG rigging check per § 76-22.
19. Install engine cowling assembly per § 53-21.

71-11 Preparing Engine for Rolls-Royce Maintenance Facility**NOTE**

Cap and plug Rolls-Royce engine model 250-C300/A1 engine fluid ports, electrical connectors, etc., and in removed components, progressively during procedure to prevent foreign object contamination.

1. Refer to Figures 71-1 and 71-2. Remove hardware securing MS21919WCH clamp(s) to engine vertical firewall and F577-5 bracket (earlier R66s). Loosen B277 clamp(s) and remove A729-68 tubes (if installed), breather hose/tube, and F170 fitting. Install plug.
2. Refer to Figure 76-1. Remove D930-2 spring from fuel control unit.
3. Refer to Figure 71-4. Remove hardware securing F169-2 base (and F577-5 bracket, if installed) to exhaust collector. Remove base (and bracket) and install exhaust collector cover.
4. To remove (engine) electrical harness:
  - a. Disconnect engine harness's plug from engine magnetic plug on bottom of engine accessory gearbox.
  - b. Remove hardware securing harness wire terminal to ignition exciter box stud.
  - c. Cut and discard ty-raps as required, and disconnect G426-1 (fuel differential pressure) switch assembly wire from harness at connectors. Cut and discard stand-off ty-raps at switch wire and F741-1 line assembly.
  - d. Remove hardware securing (2) MS21919WCH4 clamps to (bottom of) engine gearbox.
  - e. Disconnect harness plugs from anti-ice valve assembly solenoid, anti-ice pressure switch assembly, and N<sub>1</sub> speed pick-up assembly.
  - f. Remove hardware securing (2) MS21919WCH4 clamps to (2) engine-supplied MS9592-050 brackets.
  - g. Remove hardware securing harness wire terminals to measured gas temperature (MGT) thermocouple studs.
  - h. Disconnect harness plug from engine magnetic plug near oil line unions.
  - i. Cut and discard ty-raps as required, and disconnect D745-3 pressure switch assembly from harness at connectors.
  - j. Remove hardware securing F577-1 and F577-3 bracket assemblies to (right side of) engine gearbox. Remove harness.
5. Remove engine inlet bellmouth per § 71-23 Part A steps 2 and 3.

71-11 Preparing Engine for Rolls-Royce Maintenance Facility (continued)

6. Disconnect F741-1 line assembly from G426-1 switch assembly and fuel pump's AN919-OD reducer and remove line.
7. Disconnect F727-1 line assembly from fuel pump's AN919-2D reducer. Disconnect F727-2 line assembly from engine fireshield's drain fitting. Remove hardware securing MS21919WCH4 clamp the combustion section's plug flange and remove lines.
8. Remove AN919-OD and AN919-2D reducers, and G426-1 switch assembly, from fuel pump.
9. Remove hardware securing F593-3 plate to bottom of engine gearbox and remove plate.
10. Remove bolt, spacer (if installed), and G732 cap securing F018-1 clutch assembly in engine gearbox and remove clutch assembly.
11. Remove AN815-8D union from engine gearbox TANK VENT port, AN815-8D union or CV26-77 check valve (early R66s) from OIL OUTLET port, and AN815-10D union from OIL INLET port. Remove D745-3 pressure switch assembly from engine gearbox.
12. Cut and discard safety wire (if present) and remove hardware securing G200-1 engine lifting lug and G200-2 cover to engine gearbox, if installed. Remove lug, cover, and any residual B270-1 sealant.

**NOTE**

Removal of RHC-installed fuel-flow transducer (optional equipment) is not required, but may be desired for use in spare engine. Refer to § 28-23.

71-12 Preparing Engine for Helicopter Installation**NOTE**

Remove protective caps and plugs progressively during procedure to prevent foreign object contamination.

1. Refer to Figures 71-1 and 71-2. Position G200-1 engine lifting lug on top of engine gearbox, as desired (optional). Install (2) NAS6605-3 bolts and (2) NAS1149F0532P washers, special torque bolts per § 20-33, and torque stripe per Figure 5-1.
2. Install D745-3 pressure switch assembly on front of engine gearbox, special torque switch per § 20-33, and torque stripe per Figure 5-1.
3. Install NAS617-10 packing on union and install union in engine gearbox OIL INLET port. Special torque union per § 20-33 and torque stripe per Figure 5-1.
4. Install NAS617-8 packing on engine-side of either union or CV26-77 check valve (early R66s) and install union or check valve (flow arrow to point away from engine) in engine gearbox OIL OUTLET port. Special torque union or check valve per § 20-33 and torque stripe per Figure 5-1.

**CAUTION**

Installing CV26-77 check valve incorrectly can damage oil tank.

5. Install NAS617-8 packing on union and install union in engine gearbox TANK VENT port. Special torque union per § 20-33 and torque stripe per Figure 5-1.
6. Install F018-1 clutch per § 63-12.
7. Position F593-3 plate on bottom of engine gearbox and install aft bolt, finger tight.
8. Install G426-1 switch assembly in fuel pump BF (before filter) port. Special torque switch per § 20-33 and torque stripe per Figure 5-1.
9. Install MS29512-3 packing on AN919-0D reducer and install reducer in fuel pump AF (after filter) port. Special torque reducer per § 20-33 and torque stripe per Figure 5-1.
10. Install MS29512-3 packing on AN919-2D reducer and install reducer in fuel pump DRAIN port. Special torque reducer per § 20-33 and torque stripe per Figure 5-1.
11. Connect F727-1 line assembly to fuel pump's AN919-2D reducer. Connect F727-2 line assembly to engine fireshield's drain fitting. Install one MS21919WCH4 clamp around each line, install hardware securing lines to combustion section's plug flange, and tighten screw. Special torque F727-1 line assembly nut at reducer per § 20-33 and torque stripe per Figure 5-1; special torque F727-2 line assembly at fireshield's drain fitting and torque stripe per Figure 5-1. Verify security.

71-12 Preparing Engine for Helicopter Installation (continued)

12. Connect F741-1 line assembly to G426-1 switch assembly and fuel pump's AN919-OD reducer. Special torque nuts per § 20-33 and torque stripe per Figure 5-1.
13. Install engine inlet bellmouth per § 71-23 Part B steps 1 & 2. Install bellmouth cover.
14. To install (engine) electrical harness:
  - a. Position F577-1 bracket assembly on engine harness's D38999-20FC connector so connector's main keyway will face outboard. Install and tighten hardware; verify security. Install bracket on (right side of) engine gearbox, special torque nuts per § 20-33, and torque stripe per Figure 5-1.
  - b. Install MS21919WCH8 clamp around harness assembly and install clamp on F577-3 bracket assembly. Install and tighten hardware. Install bracket on (right side of) engine gearbox, special torque nuts per § 20-33, and torque stripe per Figure 5-1.
  - c. Connect harness to D745-3 pressure switch assembly at connectors. Verify security. Install (2) MS3367-7-9 ty-raps to secure plug. Cinch ty-raps until snug without overtightening and trim tips flush with heads.
  - d. Connect harness plug to engine magnetic plug near oil line unions. Verify plug security.
  - e. Install harness wire terminals (white-to-white, green-to-green) on measured gas temperature (MGT) thermocouple studs. Install hardware, special torque nuts per § 20-33, and torque stripe per Figure 5-1.
  - f. Verify (2) engine-supplied MS9592-050 brackets are installed on engine lube oil filter assembly per Rolls-Royce SB RR300-72-014. Install (2) MS21919WCH4 clamps around harness assembly and install clamps on brackets. Install and tighten hardware; verify security.
  - g. Remove engine supplied O-ring installed in N<sub>1</sub> speed sensor connector and replace with new 1182N111 O-ring. Connect harness plugs to anti-ice valve assembly solenoid, anti-ice pressure switch assembly, and N<sub>1</sub> speed sensor assembly. Special torque D38999/26FB98SA plug at N<sub>1</sub> per § 20-33 (Amphenol® plug only).

**NOTE**

Amphenol® D38999/26FB98SA plug is standard for F049-012 harness assembly Rev Q thru S but may have been used on prior revisions. MT640-2 open-end crow foot is available for use with Amphenol® plugs.

71-12 Preparing Engine for Helicopter Installation (continued)

15. h. Install (2) MS21919WCH4 clamps around harness assembly and install clamps on (bottom of) engine gearbox. Install hardware, special torque nuts per § 20-33, and torque stripe per Figure 5-1.
  - i. Stand-off ty-rap G426-1 (fuel differential pressure) switch assembly's wire from F741-1 line assembly using MS3367-4-9 ty-raps. Connect switch wire to harness at connectors. Install (2) MS3367-5-9 ty-raps to secure connectors to harness. Cinch ty-raps until snug without overtightening and trim tips flush with heads.
  - j. Install harness wire terminal on ignition extender box stud. Install hardware, special torque nut per § 20-33, and torque stripe per Figure 5-1.
  - k. Connect harness plug to engine magnetic plug on bottom of engine gearbox. Verify plug security.
16. Refer to Figure 71-5. Verify F169-2 (exhaust) base and engine exhaust collector mating surfaces are clean and dry, and lay 0.25 inch bead 7020-3 ceramic putty on top of exhaust collector flange. Position F169-2 base, F577-5 bracket (earlier R66s), and F173-2 shield (if installed) on exhaust collector and install hardware. Verify security. Remove excess putty. Install exhaust protective cover.
17. Refer to Figure 76-1. Install D930-2 spring.
18. Install packing (and o-rings, earlier R66s) on F170 fitting and install fitting in engine gearbox OB VENT port. Special torque fitting per § 20-33 and torque stripe per Figure 5-1. Position engine gearbox vent tubes/hose with clamps over fitting and exhaust weldment tube. Orient clamp screw(s) (and any slight bunching of hose, early R66s) on top within 30°, and tighten clamps. Verify security. Position MS21919WCH clamp(s) over tube/hose and install hardware (and spacer) securing clamps to engine vertical fireshield (and F577-5 bracket, earlier R66s). Verify security.



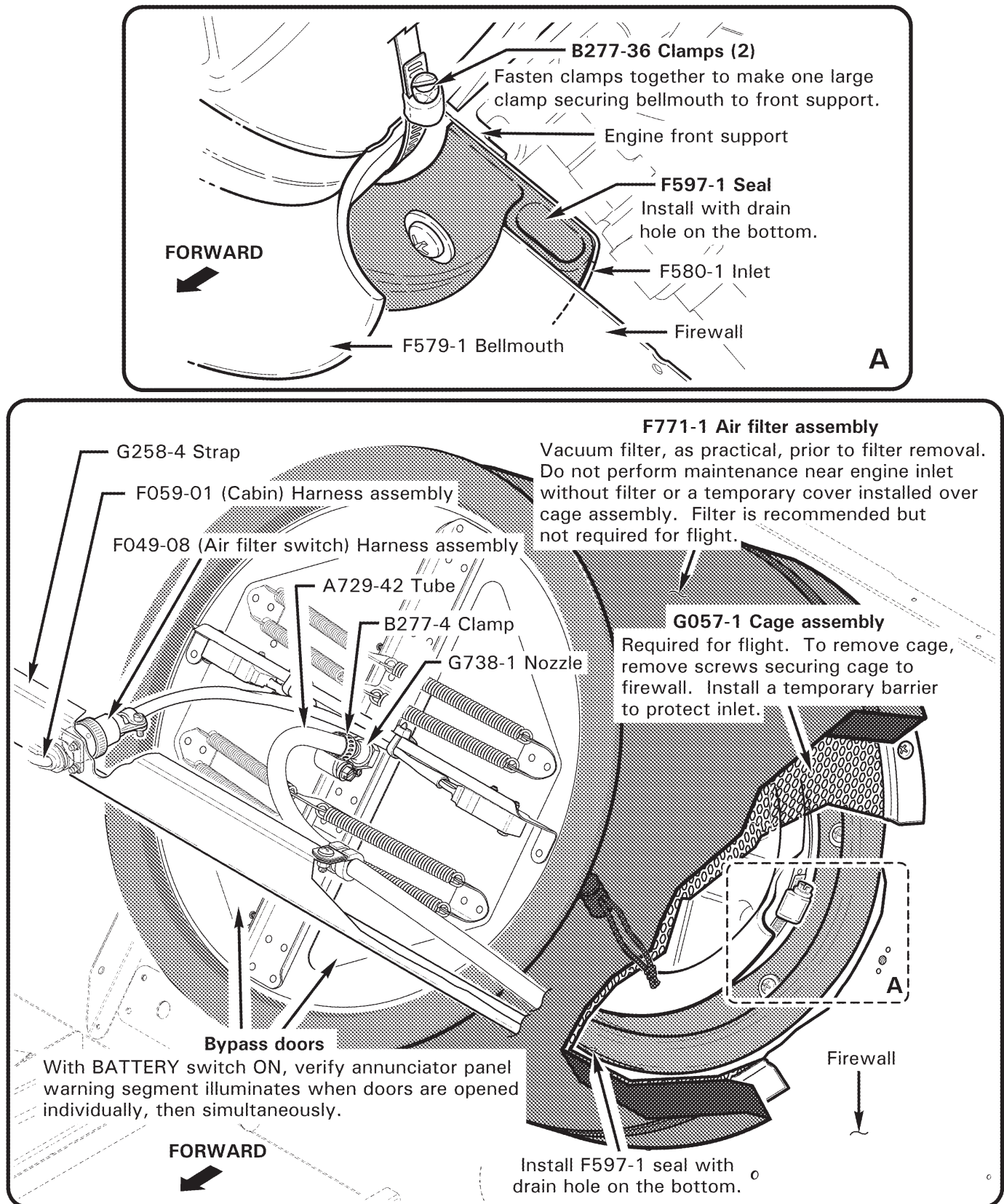


FIGURE 71-3 INDUCTION (STANDARD FILTER SHOWN)



71-20 Induction**NOTE**

Refer to § 12-70 for (Engine) Compressor Rinse and Wash procedures.

**CAUTION**

Never operate engine without G057-1 cage assembly installed. F771-1 (foam) filter assembly not required for flight; 146150-101 (inlet barrier filter) filter assemblies not required for flight.

**CAUTION**

Do not perform maintenance near engine inlet without cage and filter(s) or a temporary cover installed. Contact Rolls-Royce Customer Support if foreign objects enter inlet.

71-21 Air Filter Assembly**A. Description**

The standard reticulated polyurethane foam filter is installed over the G057-1 cage assembly (refer to § 71-22) and secured with locking cords. Filter should be removed & cleaned with water when visibly dirty; replace filter if foam is visibly damaged or deteriorated.

The optional G058-1 inlet barrier filter cage assembly is a separate installation with additional parts that secure the filters to the G057-1 cage assembly and that secure the assembly to the upper frame and firewall. A filter maintenance aid helps to determine if cleaning is required earlier than scheduled (refer to Figure 71-4 and Parts E and F); certain operating environments require more frequent cleaning. The inlet barrier filter may be cleaned 15 times before replacement.

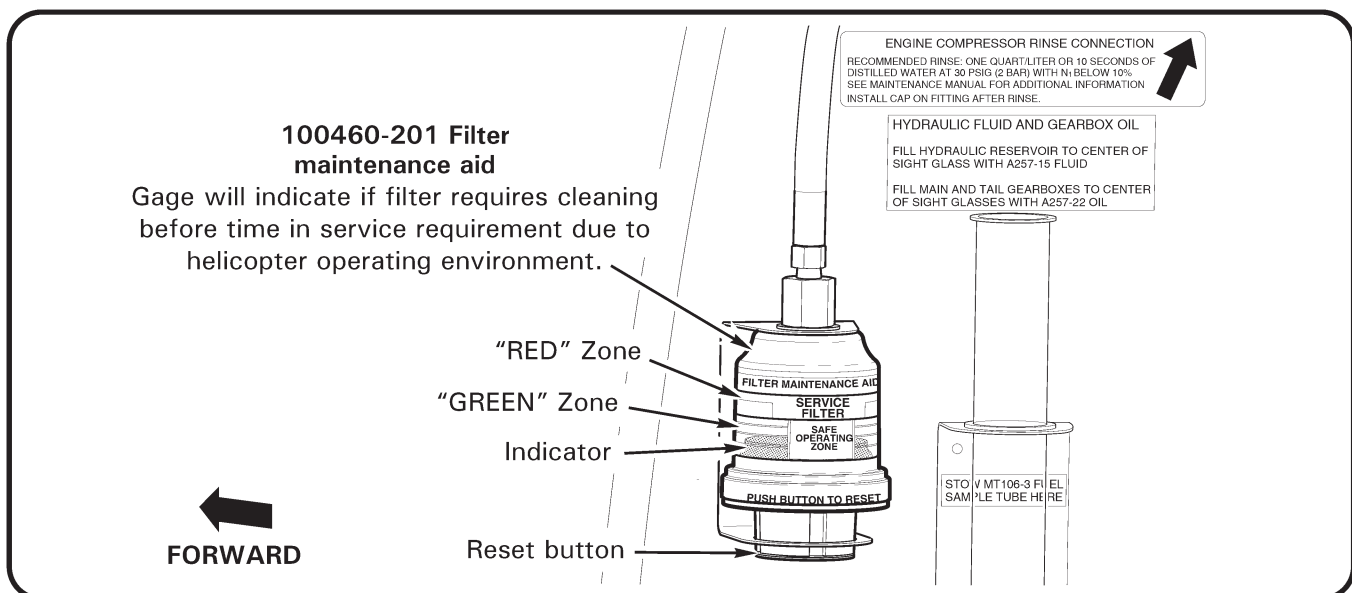
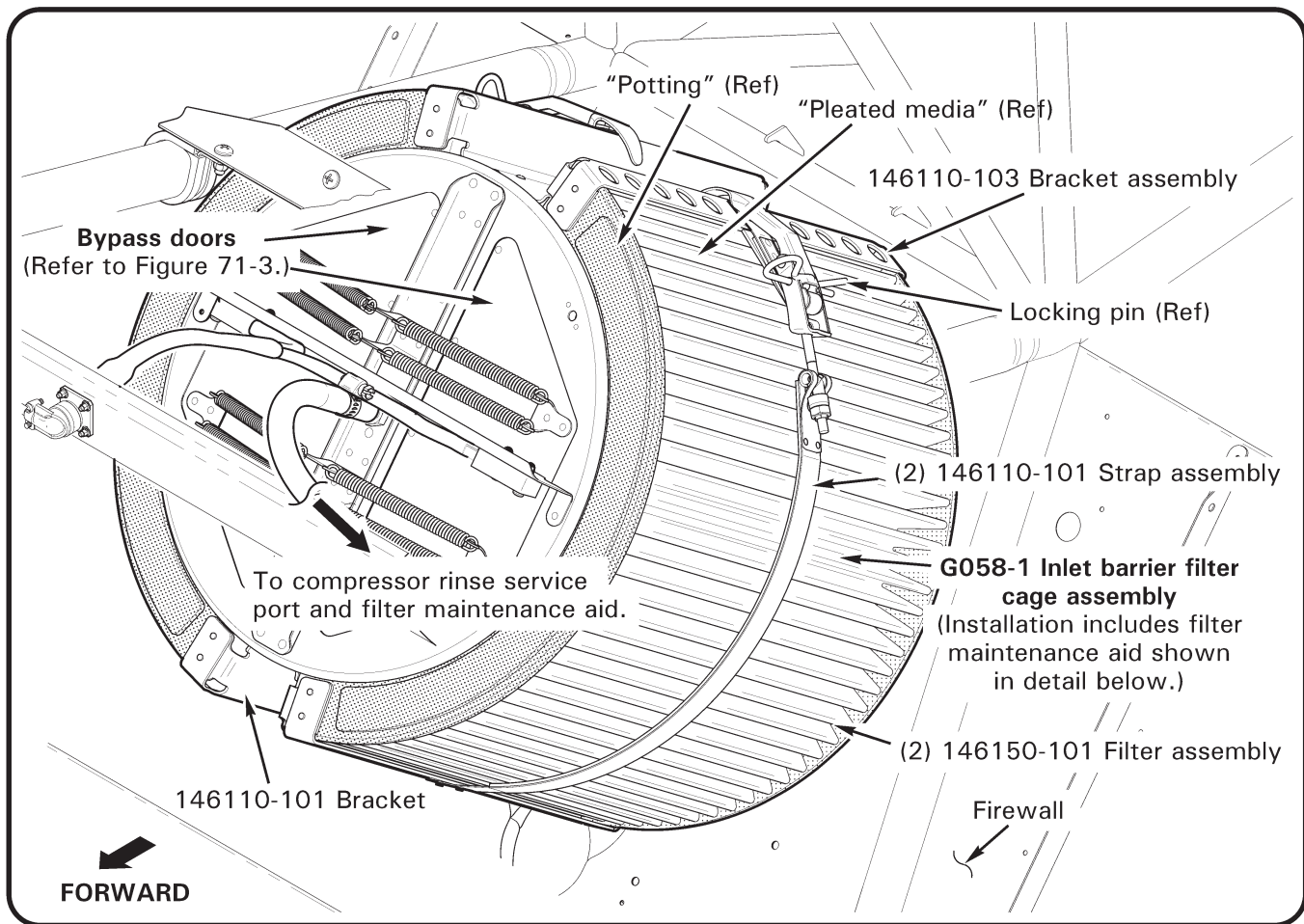


FIGURE 71-4 INDUCTION (INLET BARRIER FILTER SHOWN)

71-21 Air Filter Assembly (continued)**B. Removal**Standard Filter:

1. Remove tailcone cowling assembly per § 53-23.
2. Refer to Figure 71-3. Vacuum exterior of F771-1 filter assembly.
3. Disconnect F049-08 (bypass) switch assembly harness from airframe harness at connectors.
4. Loosen clamp securing tube to compressor rinse nozzle and pull tube off of nozzle.
5. Release cord locks, loosen cords as required, and pull filter forward off of G057-1 cage assembly.
6. Install temporary cover over cage assembly.

Inlet Barrier Filter:

1. Remove tailcone cowling assembly per § 53-23.
2. Refer to Figure 71-4. Remove locking pin from strap assembly, release latch, and move strap assembly aside.
3. Remove 146150-101 filter from G058-1 cage assembly brackets; handle filter by the potting to avoid damaging pleated media.
4. Repeat steps 2 and 3 for other filter.

**C. Installation**Standard Filter:

1. Refer to Figure 71-3. Remove temporary cover. Pull F771-1 filter assembly aft over G057-1 cage assembly and tighten cords as required. Verify security.
2. Install clamp and tube on compressor rinse nozzle and tighten clamp. Verify security.
3. Connect F049-08 (bypass) switch assembly harness to airframe harness at connectors.
4. Turn battery switch on. Verify annunciator panel warning segment illuminates when bypass doors are opened individually, then simultaneously. Turn battery switch off.
5. Install tailcone cowling assembly per § 53-23.

71-21 Air Filter Assembly (continued)**C. Installation (continued)**Inlet Barrier Filter:

1. Service inlet barrier filter per Part D.
2. Refer to Figure 71-4. Remove temporary cover. Insert 146150-101 filter in G058-1 cage assembly brackets; handle filter by the potting to avoid damaging pleated media. Verify filter is properly seated.
3. Latch strap assembly. Adjust strap tension as required to ensure filter security, but without overtightening. Install locking pin.
4. Repeat steps 1 thru 3 for other filter.
5. Install tailcone cowling assembly per § 53-23.

**D. Servicing**Standard Filter:

Filter should be removed & cleaned with water when visibly dirty. Replace filter if foam is visibly damaged or deteriorated.

Inlet Barrier Filter:

1. Visually inspect each filter assembly for obvious damage; replace filter(s) as required per Parts B and C.
2. To clean and dry each filter assembly:
  - a. Remove debris as practical from dirty side of filter assembly using a soft bristle brush.

**CAUTION**

Use only ZOK 27 cleaner to clean filter media.

**CAUTION**

Do not use steam, a high-pressure washer, or compressed air to clean filter assemblies.

- b. Using a spray bottle, apply ZOK 27 cleaner to both sides of filter media until saturated. Allow to soak for minimum 10 minutes (30 minutes or more may be necessary for high-contaminant environments).
- c. Rinse filter with clean water in opposite direction of airflow (from clean side) using low-pressure stream. Orient filter so pleats are vertical; rinse side-to-side starting at the top and working downward. Proceed downward only when water runoff is clear.

71-21 Air Filter Assembly (continued)**D. Servicing (continued)**Inlet Barrier Filter (continued):

2.    d. Rinse filter in direction of airflow per step 2c.
- e. Rotate filter top to bottom and perform steps 2c and 2d.

**CAUTION**

Do not use compressed air, or heat from any source, to dry filter assemblies.

- f. Shake off excess water. Allow filter assembly to dry at ambient temperature (above freezing), protected from contaminants.
3. Using a permanent marker, mark cleaned filter(s) with "X" through last unmarked indented potting number (1–15). Replace 146150-101 filter at the next service interval after 15 cleanings.
4. For each filter: Visually inspect filter pleats for straightness. Visually inspect filter media for small ruptures, tears, or holes. Visually inspect potting compound for cracks, gouges, or gaps between filter and compound. Replace filter(s) as required per Parts B and C.

**CAUTION**

Verify filter media is completely dry before applying oil. Use only approved oil; never put an un-oiled filter in service.

5. Apply 4.5 oz total 100100-045 filter oil to each filter. Using squeeze bottle with tip, apply a small stream of oil (sparingly) along entire peak of each pleat on both sides of filter (save some for final application). Let filter sit for 30 minutes minimum as oil "wicks" into surrounding filter media. Apply remaining oil not to exceed quantity above to any areas that are still white or not yet uniform in color.
6. Push yellow button to reset filter maintenance aid.

71-21 Air Filter Assembly (continued)**E. Scheduled Inspections**Standard Filter:

Refer to § 5-45 100-Hour/Annual Inspection.

Inlet Barrier Filter:

Refer to § 5-45 100-Hour/Annual Inspection.

Service 146150-101 filters per Part D every 300 hours or 1 year, whichever occurs first. Replace 146150-101 filters at the next service interval after 15 cleanings.

**F. Special Inspections**Standard Filter:

If pilot reports **AIR FILTER caution segment illuminates** during engine operation, when engine is shut down, verify proper function of bypass switch. Turn battery switch on. Verify caution segment illuminates when bypass doors are opened individually, then simultaneously. Turn battery switch off. If bypass switch functions properly, replace F771-1 filter assembly per Parts B and C.

If pilot reports a **failed power assurance check** (refer to § 5-43), replace F771-1 filter assembly per Parts B and C.

Inlet Barrier Filter:

If pilot reports **AIR FILTER caution segment illuminates** during engine operation, when engine is shut down, verify proper function of bypass switch. Turn battery switch on. Verify caution segment illuminates when bypass doors are opened individually, then simultaneously. Turn battery switch off. If bypass switch functions properly, service 146150-101 filters per Part D.

If pilot reports a **failed power assurance check** (refer to § 5-43), service 146150-101 filters per Part D.

If **filter maintenance aid indicates in red zone**, service 146150-101 filters per Part D.

## 71-22 Cage Assembly

### **A. Removal**

1. Remove tail rotor drive fan shaft per § 65-10.
2. Remove air filter assembly per § 71-21.
3. Remove hardware securing G057-1 or G058-1 cage assembly to firewall and remove cage. Install suitable barrier to prevent foreign objects from entering engine inlet.

### **B. Installation**

1. Remove barrier, position G057-1 or G058-1 cage assembly against firewall, and install hardware securing cage to firewall. Verify security.
2. Install air filter assembly per § 71-21.
3. Install tail rotor drive fan shaft per § 65-10.

## 71-23 Engine Inlet Bellmouth

### **A. Removal**

1. Remove engine per § 71-10.
2. Refer to Figure 71-3. Remove F579-1 bellmouth cover and loosen B277-36 clamps securing bellmouth to engine front support. Remove bellmouth and clamps.
3. Remove hardware securing F597-1 seal and F580-1 inlet to engine front support. Remove seal and inlet. Install cover over front support.

### **B. Installation**

1. Refer to Figure 71-3. Remove engine front support cover, install F580-1 inlet and F597-1 seal (drain hole on bottom) on front support, and install hardware. Verify security.
2. Install B277-36 clamps and F579-1 bellmouth over front support flange, and tighten clamps. Verify security.
3. Install engine per § 71-10.



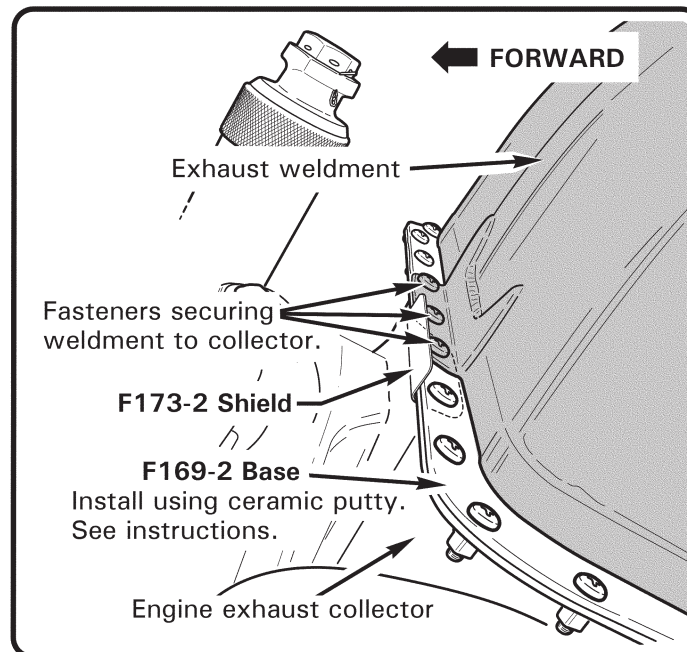
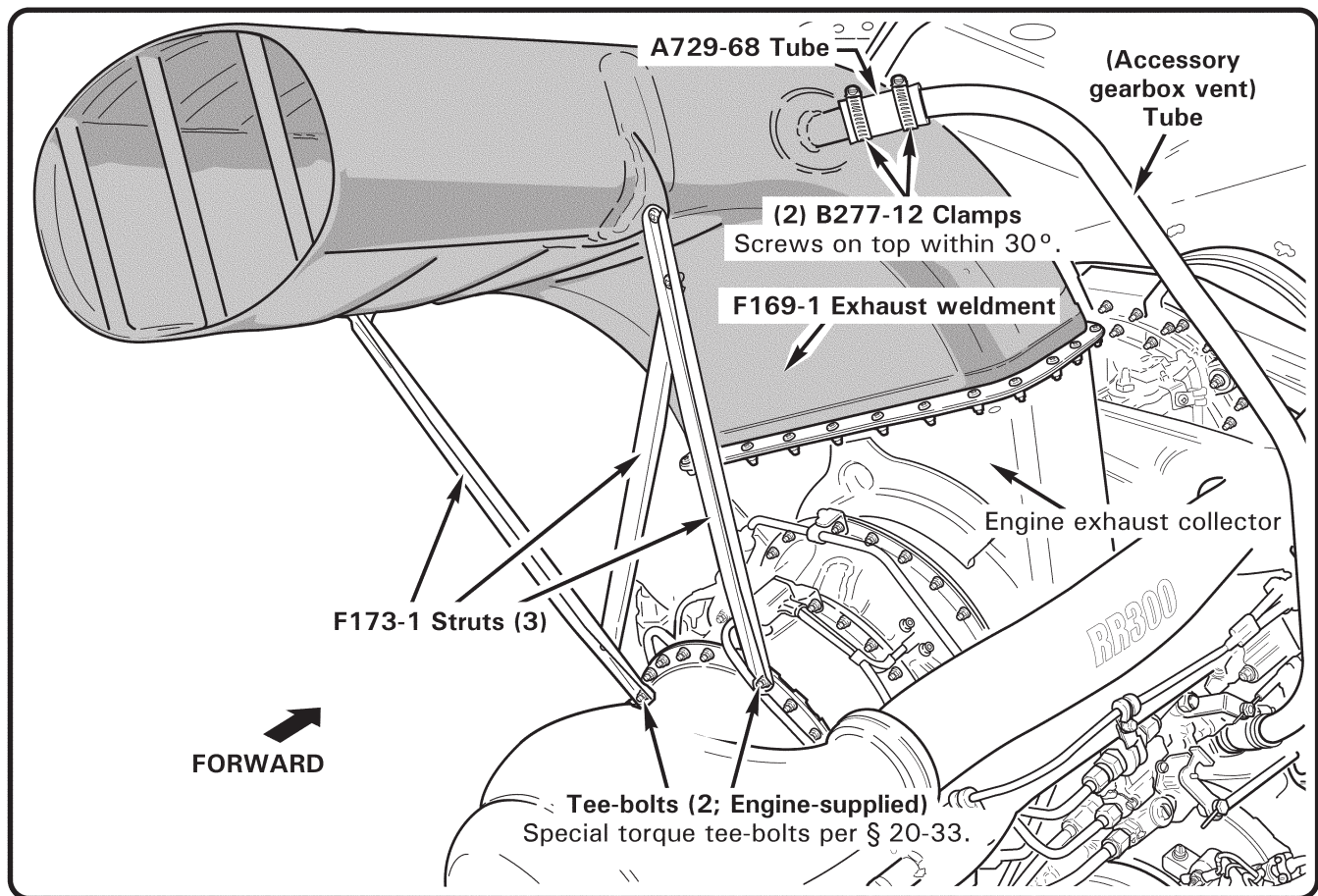


FIGURE 71-5 EXHAUST



## 71-30 Exhaust Weldment

### **A. Removal**

1. Remove engine cowling assembly per § 53-21.
2. Refer to Figure 71-5. Remove hardware securing F173-1 struts to F169-1 exhaust weldment and engine, and remove struts.
3. Loosen clamp(s) securing (accessory gearbox vent) tubes/hose to exhaust; pull tubes/hose off of exhaust weldment.
4. Remove fasteners securing exhaust weldment and F173-2 shield (if installed) to engine exhaust collector and remove shield. Carefully lift exhaust weldment up and off of F169-2 base flange, and remove exhaust weldment.
5. As required, remove hardware securing base and F577-5 bracket (early R66s) to exhaust collector and remove base. Install exhaust collector cover.

<p><b>NOTE</b></p>
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<p>F169-1 exhaust weldment material is Type 321 CRES sheet.</p>
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### **B. Installation**

1. Refer to Figure 71-5. If F169-2 base is installed, proceed to step 3. Verify base and engine exhaust collector mating surfaces are clean and dry, and lay 0.25 inch bead 7020-3 ceramic putty on top of exhaust collector flange.
2. Position F169-2 base, F577-5 bracket (earlier R66s), and F173-2 shield (if installed) on exhaust collector and install hardware. Verify security. Remove excess putty.
3. Position F169-1 exhaust weldment on base and install fasteners securing exhaust weldment to exhaust collector.
4. Install hardware securing F173-1 struts to exhaust weldment and engine. Special torque engine tee-bolts per § 20-33.
5. Position engine gearbox vent tubes/hose with clamps over exhaust weldment tube. Orient clamp screw(s) (and any slight bunching of hose, early R66s) on top within 30°, and tighten clamps. Verify security. As required, position MS21919WCH clamp(s) over tube/hose and install hardware (and spacer) securing clamps to engine vertical fireshield (and F577-5 bracket, earlier R66s). Verify security.
6. Install engine cowling assembly per § 53-21.

71-40 Accessories71-41 Starter-Generator**A. Removal**

1. Remove engine cowling assembly per § 53-21.
2. Refer to Figure 71-1. Verify heat shrink stamping is legible (or mark wires and cables) and remove hardware securing wires and cables to starter-generator studs.
3. Remove starter-generator per RR300 Series Operation and Maintenance Manual (OMM).

**B. Installation**

1. Install starter-generator per RR300 Series Operation and Maintenance Manual (OMM).
2. Refer to Figure 71-1. Install wires and cables on starter-generator studs according to stamping. Install hardware, special torque nuts per § 20-33, and torque stripe per Figure 5-1.
3. Install engine cowling assembly per § 53-21.

71-42 Generator Control Unit (GCU)**A. Removal**

1. Open baggage compartment door. Remove hardware securing G248-1 cover (battery compartment) to inner compartment and remove cover.
2. Disconnect F049 (GCU) electrical harness plug from GCU. Remove mounting hardware, and remove GCU. Cap receptacles.

**B. Installation**

1. Open baggage compartment door. Position GCU on inner compartment shelf and install mounting hardware. Verify security.
2. Remove caps and connect F049 (GCU) electrical harness plug to GCU.

**NOTE**

Verify MS3106R24-28S plug is fully-engaged in GCU receptacle. Rotate plug collar until tight.

3. Install hardware securing G248-1 cover to inner compartment. Close and secure baggage door.

71-43 Engine Monitoring Unit (EMU)

## NOTE

The electronic monitoring unit (EMU) is a serialized component assigned to the engine. When removing the engine, remove the engine's EMU per § 71-43, as required.

**A. Removal**

1. Remove hardware securing F003-4 (RH) seat back assembly to cabin.
2. Disconnect F059-01 (cabin) electrical harness "EMU" plug and F049-07 (USB) harness plug from EMU.
3. Remove hardware securing EMU to bulkhead and remove EMU. Cap receptacles.

**B. Installation**

1. Remove caps, position EMU on bulkhead, and install hardware. Verify security.
2. Connect F059-01 (cabin) electrical harness "EMU" plug and F049-07 (USB) harness plug to EMU.
3. Turn battery switch on. After 10 seconds press annunciator panel test button; verify EMU amber warning segment illuminates, and is solid, indicating normal EMU operation. (See R66 Pilot's Operating Handbook Section 7 for complete description.) Turn battery switch off.
4. Install hardware securing F003-4 (RH) seat back assembly to cabin.

**C. Downloading EMU Data**

## NOTE

An EMU USB receptacle is located inside the aft right seat baggage compartment, on the underside of the aft ledge. Use a flashlight and mirror when inserting USB cable into receptacle.

Download summary or diagnostic data per RR300 Series Operation and Maintenance Manual (OMM).

**D. Troubleshooting**

1. Turn battery switch off and disconnect battery ground cable from battery negative terminal.
2. Open circuit breaker panel and verify integrity of fuse for EMU; replace fuse as required. Close circuit breaker panel.
3. Access annunciator panel plug and verify connector is fully seated on G198 annunciator panel receptacle.

71-43 Engine Monitoring Unit (EMU; continued)**D. Troubleshooting (continued)**

4. Access EMU behind right, aft seatback assembly, then disconnect and reconnect EMU electrical connector.
5. Turn battery switch off and connect battery ground cable to battery negative terminal.
6. While observing the built-in indicator light on the EMU, turn battery switch on and verify light illuminates but does not flash. Steady illumination of built-in indicator light means normal EMU operation. A slow-flashing (0.5 hz) flashing light, or no illumination, indicates EMU or monitored sensor failure; perform RR300 OMM Task 77-51-00-200-801.