

SERVICE BULLETIN

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Supersedes Service Information Notice HN-2, dated 29 June 1982.

FUEL SYSTEM SERVICING, MAINTENANCE, AND TESTING



Failure to comply with the following procedures can result in engine flameout or power loss.

1. PLANNING INFORMATION

A. Models Affected:

PARTS I AND II: All 500 Model 369HE, 369HM and 369HS Series helicopters

PART III: All 500 Model 369HE, 369HM and 369HS Series helicopters equipped with Detroit Diesel Allison (DDA) 250-C20 Turboshift Engine.

B. Preface:

PART I of this Service Information Notice lists a procedure for a periodic function and operational check of the operational integrity of the engine fuel pump filter pressure (bypass) switch assembly.

It is noted that compliance with Part I of this Notice is to be accomplished in conjunction with the periodic operational check of the fuel pump filter bypass valve, as specified in the DDA Commercial Service Letter CSL-1088 reprinted

Part II of this Service Information Notice lists procedures for purging (bleeding) trapped air from the upper portion of the low pressure fuel filter housing. If not removed, the trapped air can interrupt fuel flow causing fuel starvation and subsequent engine flameout.

Part III of this Service Information Notice gives operational and maintenance guidelines and requirements for the DDA 250-C20 turboshift engine fuel system. Suggested and/or required time of compliance is included with each requirement.

The information given in this Notice is to be considered as part of the HMI and will be incorporated at the next scheduled revision of the below referenced handbooks.

C. Time of Compliance:

PART I - Shall be accomplished at each 300-hour Periodic Inspection interval.

Shall be accomplished whenever engine fuel pump filter is replaced or has been subjected to contamination.

PART II - Shall be accomplished:

1. After each replacement of the low pressure fuel filter element or fuel pump assembly.
2. After each opening, removal or replacement of any part of the engine and/or aircraft fuel system between the aircraft fuel tank and the engine fuel nozzle.
3. After any engine flameout caused by fuel exhaustion.
4. After motoring the helicopter engine without fuel in the fuel tanks.
5. After draining fuel filter bowl, if done without start pump

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6. After engine shutdown using emergency fuel shutoff valve,
PART III - Shall be accomplished as specified in each requirement.

D. Reference:

500 Model 369H Basic HMI (CSP-H-2), Reissued 15 September 1981.

500 Model 369H Basic HMI Appendix B (CSP-H-4), Reissued 15 April 1981; Revision No. 1, 15 January 1982.

Hughes Service Information Letter HL-44, dated 10 August 1976.

Hughes Service Information Letter HL-64, dated 1 August 1979.

Hughes Service Information Notice HN-120, dated 3 October 1977.

*Detroit Diesel Allison Commercial Service Letter CSL-1080, dated 11 May 1979.

Detroit Diesel Allison Commercial Service Letter, CSL-1081 (250-C20 Engine), or CSL-98 (250-C18 Engine), dated 15 June 1979.

Detroit Diesel Allison Commercial Service Letter CSL-1088, dated 7 February 1980.

Detroit Diesel Allison Engine Operation and Maintenance Manual for Model 250-C20 or 250-C18 Turboshift Engine (as applicable).

*Reprinted as part of Hughes Letter HL-64.

E. Weight and Balance Data:

Weight and balance not affected.

F. FAA Approval:

The resultant alteration to affected helicopters by the procedure for inspecting, testing and maintaining the helicopter and engine fuel system as described in this Notice has been shown to comply with Federal Aviation Regulations and is FAA Approved.

G. Tools and Equipment:

TOOLS AND EQUIPMENT	
Nomenclature	Source
Tubing, Tygon 3/8", 3-feet	Commercial
Funnel	Commercial

H. Parts/Supplies:

REPLACEMENT PARTS/SUPPLIES			
Nomenclature	Part No.	Qty.	Source
Pressure Switch Engine Fuel Filter	369H8144-3*	A/R	HHI
Packing (O-Ring)	MS 29512- 03	A/R	Commercial

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REPLACEMENT PARTS/SUPPLIES (Cont.)			
Nomenclature	Part No.	Qty.	Source
Packing (O-Ring)	MS29512-02	2	Commercial
Plug	AN814-2	1	Commercial
**PN 369H8144-3 switch applicable if 5-micron filter element is incorporated in Allison pump filter system, and supersedes PN 369H8144 switch for all spares replacement.			

2. PART I -OPERATIONAL CHECK OF ENGINE FUEL PUMP FILTER PRESSURE (BYPASS) SWITCH ASSEMBLY.

A. PROCEDURE

- (1). Check that all electrical power is OFF; disconnect battery.
- (2). Gain access to engine accessory section; locate fuel filter pressure (bypass) switch on front of engine driven fuel pump. (See Figure 1.)
- (3). Remove protective sleeving and disconnect knife splice on bypass switch wiring.
- (4). Disconnect and cap bypass hose assembly at AN894-3-2 bushing.
- (5). Remove switch (with bushing intact) from 369H8020 adapter fitting at after filter port (AF).Cap adapter fitting, using AN814-2 plug and MS29512-02 O-ring.
- (6). Perform function test of bypass switch as follows:
 - (a). Remove bushing and O-ring from bypass switch. (See Figure 1.)
 - (b). Fabricate test setup per Figure 2.
 - (c). Pressurize inlet port of switch by adding fuel to the tube; watch ohm-meter or continuity tester for indication of switch actuation.

NOTE: Switch actuation (closing) pressure should be 24.5 to 35.0 inches of fuel.

- (d). Check switch diaphragm for leakage. Replace switch if leakage is noted.
- (e). Reinstall bushing with new O-ring on bypass switch.
- (7). Remove cap from bypass hose and reconnect bushing (with switch) in hose fitting.
- (8). Perform operational check of switch as follows.
 - (a). Plug the 369H8020 adapter with AN814-2 plug; connect knife splice on switch wiring; connect jumper wire to ground the bypass switch to airframe ground (E-12).
 - (b). Have assistant hold switch clear; connect battery and electrical power and activate start pump.
 - (c). Check caution light panel to verify that fuel filter bypass light illuminates.

NOTE: If fuel filter bypass caution light does NOT illuminate, perform electrical troubleshooting of caution and warning light indicators, per Section 17 of Basic HMI.

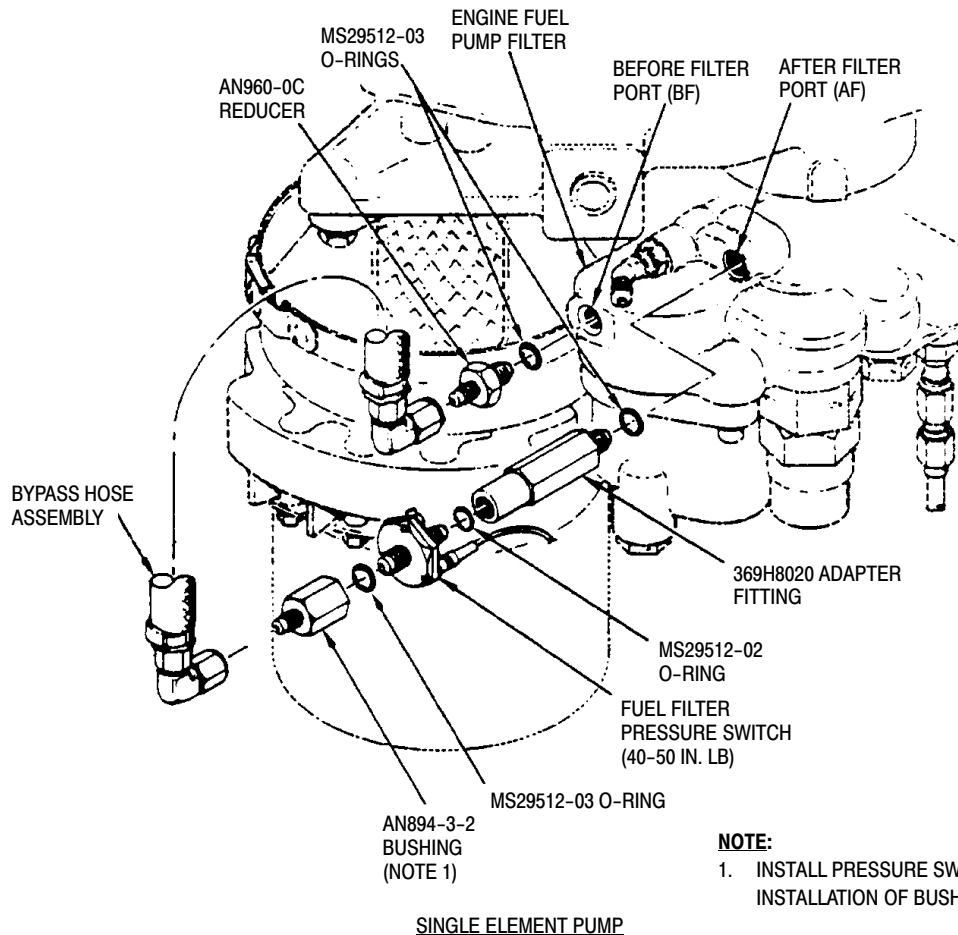
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- (d). Check switch diaphragm through open port for leakage. Replace switch if leakage noted.



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Figure 1. Fuel Filter Pressure Switch Installation

- (e). Shut off electrical power, start pump, battery switch; disconnect battery and jumper wire.

NOTE: If fuel filter bypass caution light did NOT illuminate and electrical system is not faulty, install new fuel filter pressure switch (with new O-ring) at bushing and repeat operational check of switch.

- (9). Disconnect bushing at bypass hose; cap assembly.
- (10). Remove plug from adapter fitting; install bypass-switch; install bypass switch with new O-ring adapter fitting; torque switch 40 to 50-inch pounds.
- (11). Remove plug from bypass hose; reconnect bushing at bypass hose.
- (12). Reconnect knife splice on switch and reinstall protective sleeving.
- (13). Bleed fuel filter housing (Part II of this Notice).
- (14). Run up engine and perform operational check of engine and fuel system; check for leaks and non-activation of fuel filter bypass caution light when start pump is activated.

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- (15). Record compliance with Part I of this Service Information Notice in Compliance Record of helicopter Log Book.

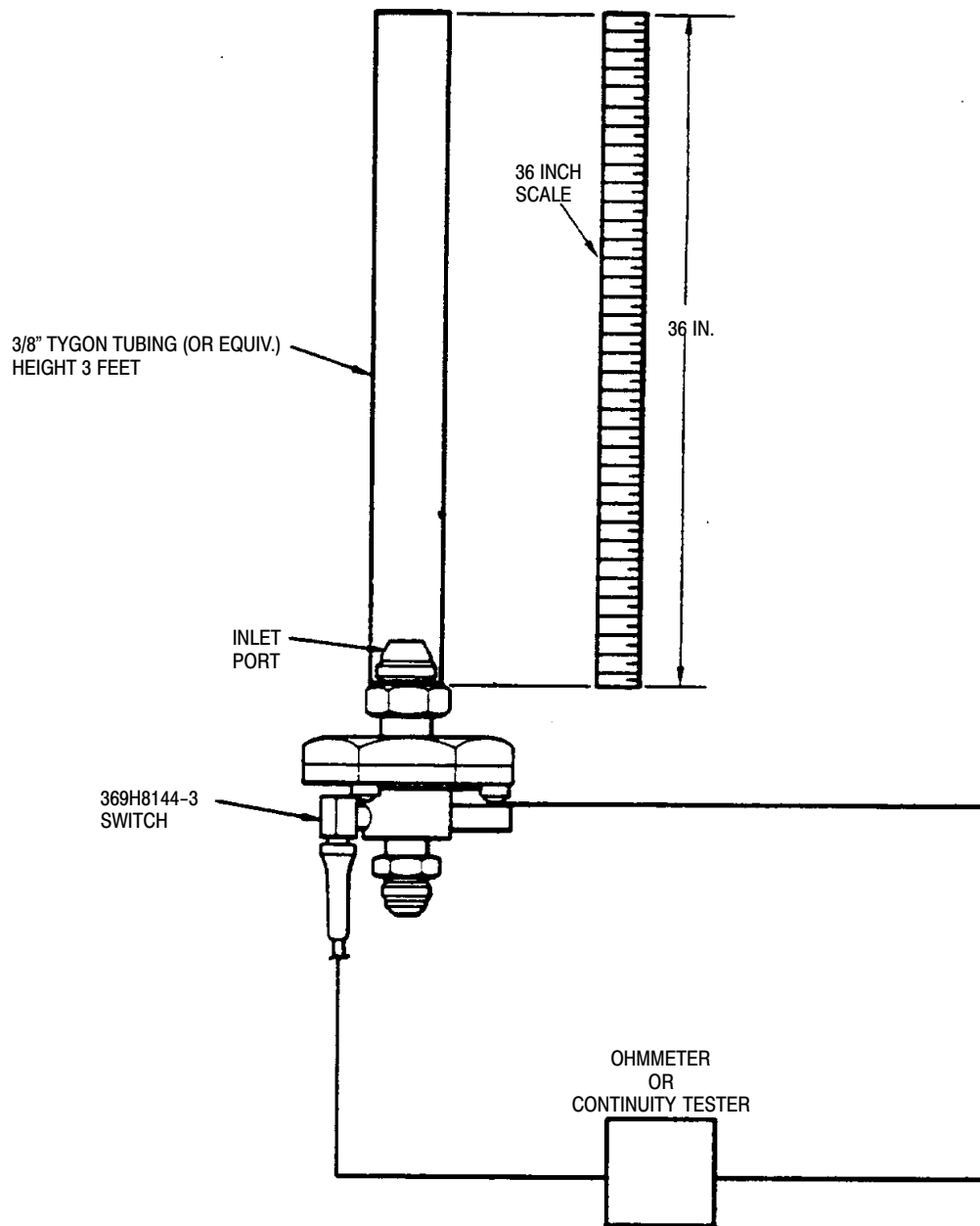
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**NOTE:**

PRESSURE SWITCH SHOULD
ACTIVATE (CLOSED) WHEN
24.5 TO 35 INCHES OF FUEL
IS ADDED TO TUBE.

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Figure 2. Function Test of Engine Filter Pressure Switch

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3. PART II - BLEEDING LOW PRESSURE FUEL FILTER HOUSING

WARNING

- **Observe all fuel handling/servicing safety precautions when performing the following procedure. Pay particular attention to the following:**
- **Ensure helicopter is electrically grounded throughout the bleeding procedure.**
- **Do not allow fuel/air mixture discharged during bleeding to enter the eyes. This discharge can irritate and injure the eyes.**
- **The discharged fuel/air mixture is highly flammable. Use properly installed helicopter battery to operate start pump while performing the bleeding procedure. Do not use any external power source. Perform the bleeding procedure in an open area, not in a hangar or enclosed space where fuel fumes can accumulate.**

- (1). a. Bleed air from low pressure fuel filter housing.
 - (a). Set BATT - EXT switch to BATT and START PUMP switch to on (up).
 - (b). Place empty container under overboard drain line on underside of fuselage.

NOTE: On helicopters with optional 369H92255 drain kit installed, drain valve is located on fire wall fitting. If optional kit is not installed, drain valve is on station 124 fitting.

- (c). Open fuel supply drain valve at fire wall or station 124 fitting. When an uninterrupted stream of fuel flows from the drain tube, close drain valve.
 - (d). Purge air from engine fuel system (Para. 3.77, DDA Operations and Maintenance Manual).
 - (e). Set START PUMP switch to off (down) and BATT - EXT switch to OFF.
 - (f). Replace any safety wire removed during purging procedure.
 - (g). Remove any fuel splashed on helicopter during bleeding process (Section 2, Basic HMI) and remove container from under helicopter.
- (2). Record compliance with Part II of this Service Information Notice in Compliance Record of helicopter Log Book.

4. PART III - FUEL SYSTEM MAINTENANCE, INSPECTION AND TESTING

The following cleaning, inspection, operational check and test requirements shall be accomplished at the intervals specified for all helicopters equipped with the Detroit Diesel Allison 250-C20 turboshaft engine. Performance of these functions will enable early detection of fuel system problems that can allow air to enter the system, which can interrupt fuel flow and result in engine flameout. These requirements are in addition to, and supplement those requirements listed in the Basic HMI, HMI Appendix B, Hughes Service Information Notices and Letters, DDA Operation and Maintenance Manual and DDA Commercial Service Letters and Bulletins.

- (1). Preflight, inflight, postflight and daily requirements.

NOTE: Use only clean, dry fuels in the helicopter. Fuels authorized for use are specified in DDA Operation and Maintenance Manual and DDA CSL-1003.

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- (a). Ensure START PUMP is on whenever instructed in the applicable Pilot's Flight Manual, and as instructed in any maintenance procedure.
- (b). Avoid maneuvers specified in the applicable Pilots Flight Manual to be avoided when FUEL LOW warning indicator is lit.
- (c). After the last flight each day, perform an engine deceleration check (applicable Pilot's Flight Manual). Perform check using pilot's, then copilot's controls if dual controls are installed, to verify proper rigging of each.



Helicopter engines equipped with CECO fuel control system should have a high pressure fuel filter installed to prevent fuel control damage from fuel contaminants. (Refer to Hughes Letter HL-44.)

- (2). Clean or replace high pressure fuel filter and inspect the high pressure filter bypass valve at each 100 hours of operation if engine is equipped with CECO fuel control per DDA CSL-1080. (Refer to Hughes Letter HL-64.)
- (3). Accomplish the following at each 300 hour or annual inspection, in addition to times or at occurrence of events specified:
 - (a). Perform operational check of fuel filter bypass switch (Part I of this Notice). Additionally, perform this operational check whenever the engine fuel pump filter is replaced for any reason or has been contaminated.
 - (b). Check torque of all engine/helicopter fuel line connections. If fuel line is disconnected or replaced for any reason, ensure proper torque is applied when the line is reconnected. Check torque of reconnected line at 25 hours of operation. (Refer to DDA Operation and Maintenance Manual for engine hardware torque values, and to Section 12, Basic HMI for helicopter hardware torque values.)
 - (c). Check torque of all engine/helicopter pneumatic lines, double check valves and accumulators. When hardware that has been removed is reconnected, use care applying torque, to avoid twisting the lines. After re-connection, check torque at 25 hours of operation. (Refer to DDA Operation and Maintenance Manual for engine hardware torque values, and to Section 12, Basic HMI for helicopter hardware torque values.)



Use only a 5-micron filter (PN 6895177) as replacement for the fuel pump low pressure fuel filter. This filter contains a white filter element surrounded by wire mesh. The 10-micron filter which is NOT to be used has a brown filter element.

- (d). Replace fuel pump filter (low pressure). Additionally, replace filter any time FUEL FILTER indicator has been lit.
- (e). Clean pneumatic (air) circuit of Bendix fuel control system. (Refer to DDA Operation and Maintenance Manual.)
- (f). Check rigging and operation of gas producer controls and power turbine governor (Section 11, Basic HMI).
- (4). Check engine driven fuel pump as specified in DDA Operation and Maintenance Manual.
- (5). Inspect and clean or replace fuel control system components as specified in DDA Operation and Maintenance Manual after fuel pump filter bypass is known or suspected to have taken place.

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- (6). Clean, inspect, and maintain fuel lines, fuel cells, and other fuel system components as specified in the Basic HMI and HMI Appendix B.

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