

CHAPTER 95

INSTRUMENT SYSTEM

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CHAPTER 95

INSTRUMENT SYSTEM

95-00 Description

Standard primary instruments include an airspeed indicator, engine (N₂) and rotor dual tachometer, altimeter, torquemeter, and magnetic compass. Engine gages include an N₁ tachometer, measured gas (turbine) temperature, oil pressure, oil temperature, and fuel quantity. Also standard are a clock, an ammeter, a digital outside air temperature gage/voltmeter, and an hourmeter. An additional hourmeter is located outboard of the pilot's seat. Both hourmeters require main gearbox oil pressure to activate. The outboard hourmeter is collectively activated and may be used to determine time in service.

For instrument panels with electronic flight displays, a P/N D327 light filter may be used to reduce reflections in the windshield at night. The light filter is installed by clipping it to the front of the display. Filter use is at pilot discretion.

The pitot-static system supplies air pressure to operate the airspeed indicator, altimeter, and vertical speed indicator. The pitot tube is located on the front edge of the mast fairing. The static sources are located on each side of the cabin, aft of the rear doors.

Water can be drained from pitot-static lines by removing the plastic drain plugs which are accessible through the aft inspection panel on the underside of the cabin. Draining lines should be required only if the airspeed indicator or altimeter appears erratic.

Pitot and static sources should be inspected frequently for bugs or other obstructions.

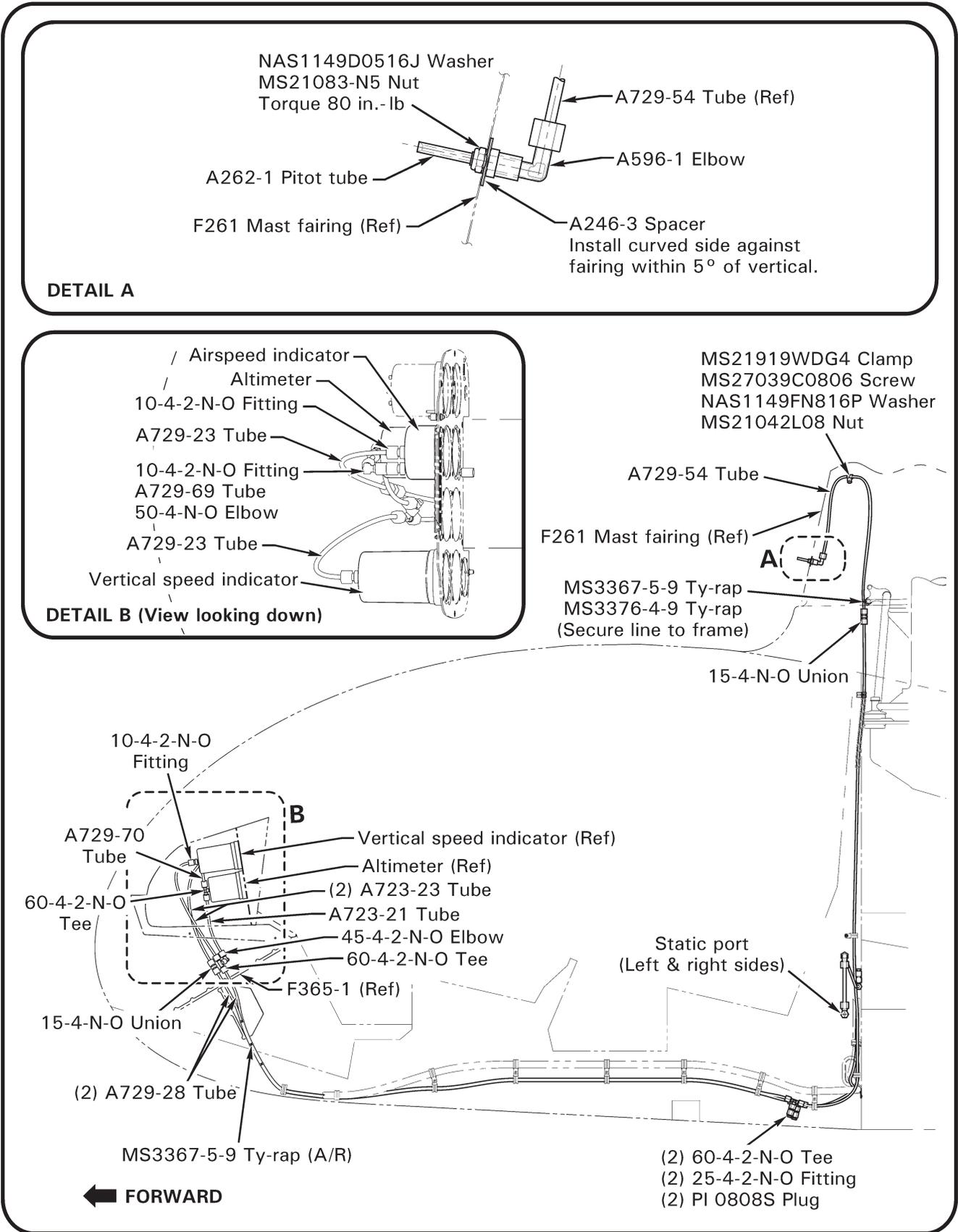


FIGURE 95-1 PITOT - STATIC SYSTEM INSTALLATION

95-10 Pitot-Static System**A. Pitot System Leak Test****CAUTION**

Do not apply suction to pitot system or pressure to static system.

1. Open mast fairing per § 53-22.
2. Refer to Figures 95-1 and 95-2. Seal drain hole in elbow aft of pitot tube with pressure sensitive tape. Connect a medical syringe, with plunger withdrawn, to pitot tube via flexible tubing.
3. SLOWLY apply pressure to pitot line by depressing syringe plunger until airspeed indicator reads 70 knots. Release force on plunger; plunger will remain in place without need to pinch flexible tubing.
4. Gently tap airspeed indicator glass to remove friction effects.
5. If airspeed indication drops more than 10 knots in one minute, an unacceptable leak is indicated. SLOWLY release pressure. Locate and repair any leak(s). Retest after any repairs.
6. Remove tape from pitot tube drain hole and verify airspeed indicator has returned to zero.
7. Remove test equipment.

B. Static System Leak Test**CAUTION**

Airspeed indicator, altimeter, and vertical speed indicator may be damaged if suction to static line is applied or removed rapidly.

1. Refer to Figures 95-1 and 95-2. Set altimeter to location elevation.
2. Temporarily seal left or right side static opening with pressure sensitive tape. Cover remaining static port with a suction cup attached to a medical syringe.
3. SLOWLY apply suction to static port by withdrawing syringe plunger until altimeter indicates 500 feet greater than location elevation. Release force on plunger, wait one minute, and note any change in altimeter indication.
4. Change of less than 100 feet indication in one minute is acceptable. SLOWLY remove suction from static port. Locate and repair leak(s) if altimeter indication changes 100 or more feet in one minute. Retest after any repairs.
5. Remove test equipment.

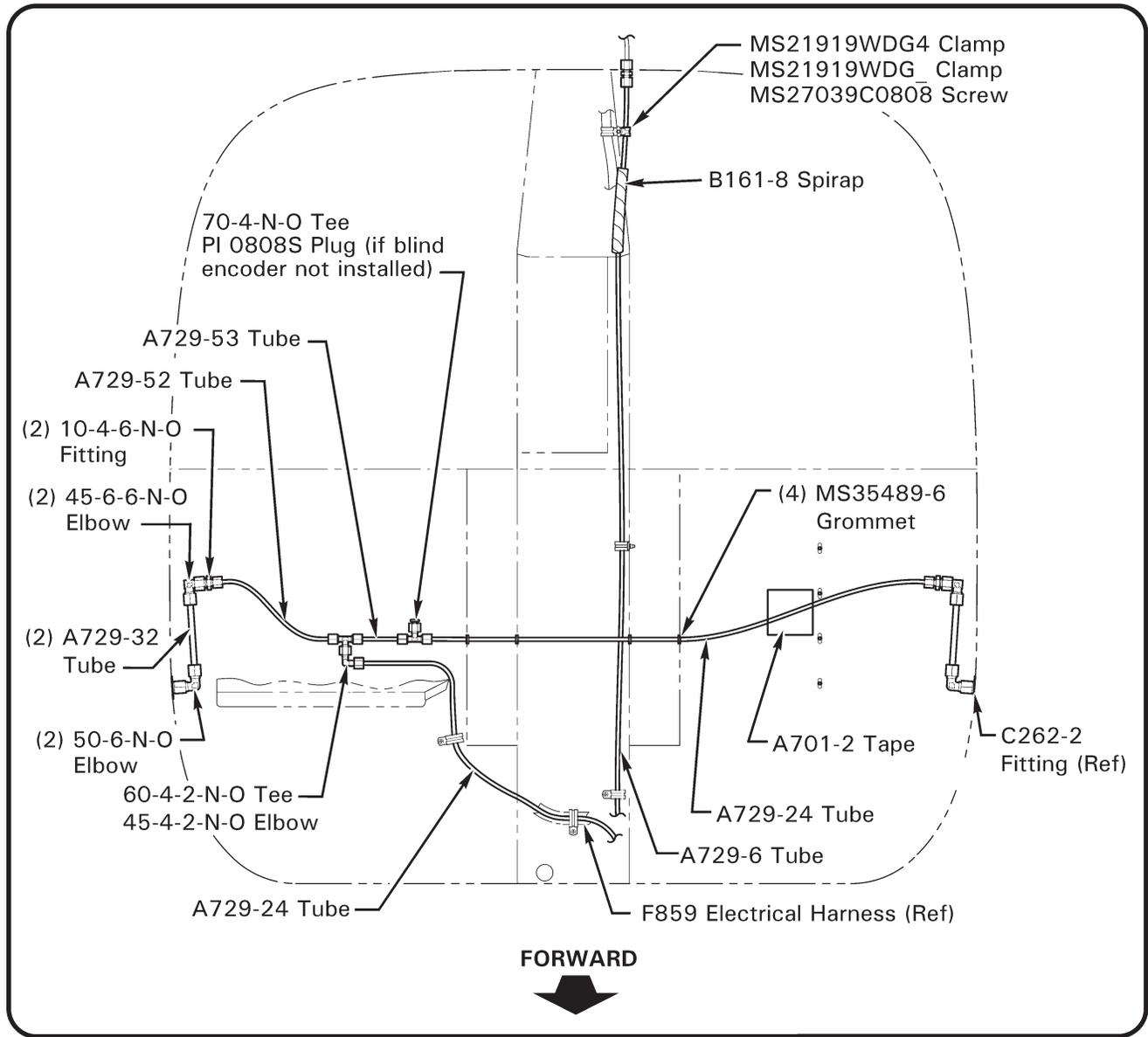


FIGURE 95-2 PITOT - STATIC SYSTEM INSTALLATION

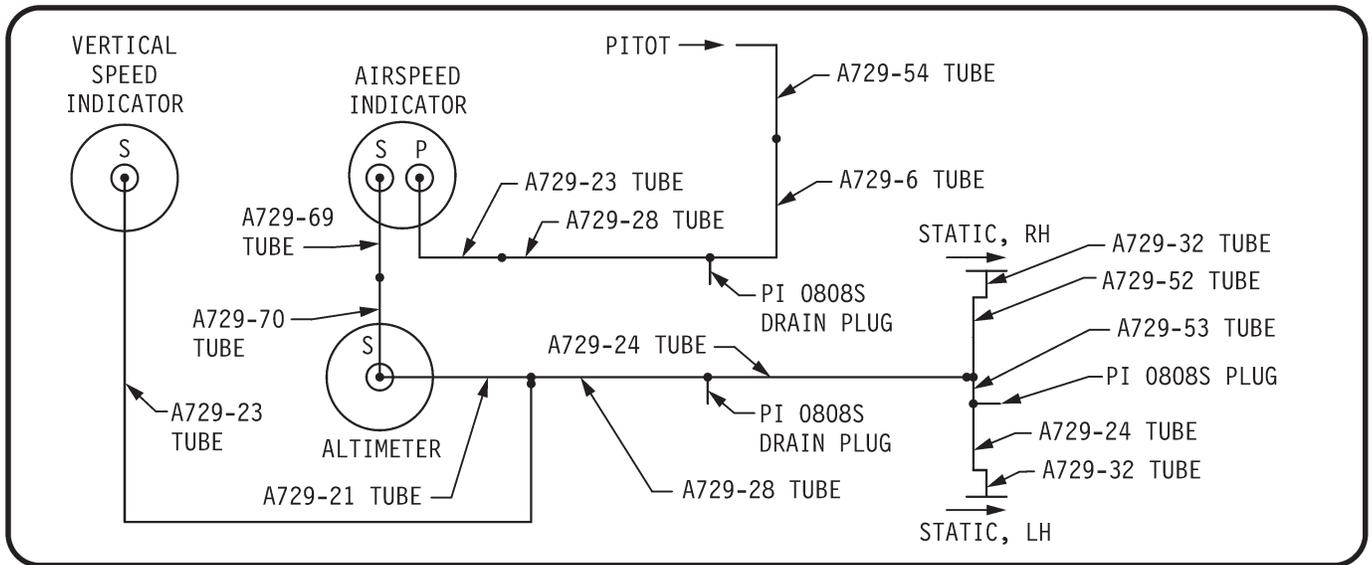


FIGURE 95-3 PITOT - STATIC SYSTEM SCHEMATIC

95-20 Primary Instruments

95-21 Vertical Speed Indicator

A. Description

The vertical speed indicator indicates rate of ascent or descent. Check vertical speed indicator for a zero-rate needle indication when rotorcraft is in a stationary hover.

B. Schematic

Refer to Figure 95-3 for pitot-static system schematic.

C. Removal

CAUTION

Protect instrumentation using foam padding or equivalent. Handle instruments like eggs.

1. Turn battery switch off and pull out applicable circuit breaker(s).
2. Remove perimeter screws securing face to console and pull face aft.
3. Remove screws securing instrument to face.
4. Disconnect wiring as applicable.
5. Disconnect pitot/static lines and cap & plug instrument and system fittings, as applicable.
6. Remove instrument and place on foam padding.

95-21 Vertical Speed Indicator (continued)**D. Installation****CAUTION**

Protect instrumentation using foam padding or equivalent.
Handle instruments like eggs.

1. Turn battery switch off and pull out applicable circuit breaker(s).
2. Remove caps and plugs and connect pitot/static lines. Verify security.
3. Connect wiring as applicable. Verify security.
4. Install screws securing instrument to face. Verify security.
5. Install perimeter screws securing face to console. Verify security.
6. Perform pitot-static system checks as required per § 95-10.
7. Perform appropriate function checks per § 5-40.

E. Scheduled Maintenance and Inspections

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

F. Special Maintenance and Inspections

1. If vertical speed indicator displays climb indication but does not return to zero in level flight, or if indication is erratic:
 - a. Inspect static system for water or obstructions, and remove water or obstructions if found.
 - b. Perform pitot-static system checks as required per § 95-10.
2. Perform appropriate function checks per § 5-40. If vertical speed indicator still displays erratic indication, or displays no indication, remove indicator per Part C, and return to RHC for inspection.
3. Install airworthy indicator per Part D.

95-22 Airspeed Indicator

A. Description

The airspeed indicator displays airspeed in knots and either miles or kilometers per hour. The airspeed indicator operates properly in forward flight only; backward or lateral flight will not indicate correct airspeed.

B. Schematic

Refer to Figure 95-3 for pitot-static system schematic.

C. Removal

Remove airspeed indicator per § 95-21 Part C.

D. Installation

Install airspeed indicator per § 95-21 Part D.

E. Scheduled Maintenance and Inspections

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

F. Special Maintenance and Inspections

1. If airspeed indicator displays no indication:
 - a. Inspect pitot tube for obstructions and remove obstructions if found.
 - b. Inspect pitot tube connection, and tighten connection if loose.
 - c. Open upper console and inspect pitot line for kinks or bends.
 - d. Perform pitot-static system checks as required per § 95-10.
 - e. Perform appropriate function checks per § 5-40. If indicator still displays no indication, remove indicator per Part C, and return to RHC for inspection.
 - f. Install airworthy indicator per Part D.
2. If airspeed indicator displays erratic indication:
 - a. Inspect pitot-static system connection(s), and tighten connection(s) if loose.
 - b. Inspect pitot-static system lines and verify no lines are cracked or broken.
 - c. Inspect pitot-static system for water, and remove water if found.
 - d. Open upper console and inspect pitot lines for kinks or bends.
 - e. Perform pitot-static system checks as required per § 95-10.
 - f. Perform appropriate function checks per § 5-40. If indicator still displays erratic indication, remove indicator per Part C, and return to RHC for inspection.
 - g. Install airworthy indicator per Part D.

95-23 Engine (N₂) and Rotor Dual Tachometer**A. Description****CAUTION**

Installation of electrical devices can affect accuracy and reliability of electronic tachometers.

An electronic engine (N2) and rotor dual tachometer is standard. Engine tachometer signal is provided by a transducer on the engine gearbox. Rotor tachometer signal is provided by magnets on the main gearbox tail rotor driveline yoke. Each tachometer is on a separate circuit with its own circuit breaker.

The tachometer bus receives power from the avionics bus or through the battery relay bypass circuit as long as the main rotor gearbox has oil pressure. Therefore, the tachometers will receive power through the bypass circuit whenever the rotors are turning even if the avionics bus is not powered. The bypass circuit is disconnected from the tachometer bus when the annunciator test button is depressed. Pressing the test button while the helicopter is running will confirm that the tachometers are receiving power from the avionics bus.

NOTE

Do not use magnetized tools.

CAUTION

Protect instrumentation using foam padding or equivalent. Handle instruments like eggs.

B. Removal

1. Turn battery switch off and pull out TACHS N₂ (2 amp) and R (2 amp) circuit breakers on circuit breaker panel.
2. Remove perimeter screws securing instrument face to console and pull face aft.
3. Remove screws securing console harness connector to F792-1 dual tachometer and unplug connector.
4. Supporting instrument, remove screws securing tachometer to face, and remove tachometer.

95-23 Engine (N₂) and Rotor Dual Tachometer (continued)**C. Installation**

1. Turn battery switch off and pull out TACHS N₂ (2 amp) and R (2 amp) circuit breakers on circuit breaker panel.
2. Install screws securing F792-1 dual tachometer to instrument face. Verify security.
3. Plug in console harness connector to tachometer and install connector screws. Verify security.
4. Install perimeter screws securing face to console. Verify security.
5. Perform accuracy check and needle synchronization per Part D.

D. Accuracy Check and Needle Synchronization**CAUTION**

Inadvertent engine overspeed can occur if accuracy check is not performed.

1. Perform PTG rigging check per § 76-22.
2. Install magnetic pickup (or photocell) portion of calibrated main rotor balancing equipment per § 18-11.
3. Push in TACHS N₂ (2 amp) and R (2 amp) circuit breakers on circuit breaker panel. Turn battery switch on, open throttle, and "beep" actuator to minimum (RPM) setting. Close throttle and turn battery switch off.
4.
 - a. Start engine and run-up helicopter per R66 Pilot's Operating Handbook (POH) Section 4, establish stable idle, and record dual tachometer's % N₂ indication. Also record RPM displayed on balancer.
 - b. Multiply dual tachometer's % N₂ indication (use 0.69 for 69%, 0.70 for 70%, etc.) by 408 RPM. Verify calculated RPM is within ± 8 RPM displayed on balancer.
 - c. If calculated RPM is more than ± 8 RPM displayed on balancer, shut down helicopter per POH Section 4. Do not proceed further; contact RHC Technical Support.
5. Monitor RPM displayed on balancer and increase throttle to full open. Immediately close throttle and shut down helicopter per POH Section 4 if balancer indication exceeds 412 RPM.
6. Monitor RPM displayed on balancer and "beep" actuator until dual tachometer indicates 100% N₂. Verify RPM displayed on balancer is 408 ± 4 RPM; do not exceed 412 RPM.

95-23 Engine (N₂) and Rotor Dual Tachometer (continued)**D. Accuracy Check and Needle Synchronization (continued)**

7. Verify dual tachometer's % NR indication is within 1% of % N₂ indication. If required, adjust % NR by turning screw on back of tachometer. Turning screw clockwise increases % NR and turning screw counterclockwise decrease % NR; one-half turn equals approximately 1% change. Adjusting screw is accessed by removing instrument face perimeter screws and pulling face aft.
8. Shut down helicopter per R66 POH Section 4.
9. Install perimeter screws securing face to console. Verify security.

E. Scheduled Maintenance and Inspections

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

Refer to § 4-22 for recommended replacement time between overhauls.

F. Special Maintenance and Inspections

1. Perform accuracy check and needle synchronization per Part D.
2. If tachometer cannot be adjusted, remove tachometer per Part B, and return to RHC for inspection.
3. Install airworthy tachometer per Part C.

95-24 Altimeter**A. Description**

The sensitive altimeter provides altitude information relative to mean sea level when the barometric pressure correction scale is properly set. Check altimeter calibration by setting correction scale to the current altimeter setting and checking the altimeter reading against field elevation; they must agree within 70 feet.

B. Schematic

Refer to Figure 95-3 for pitot-static system schematic.

C. Removal

Remove altimeter per § 95-21 Part C.

D. Installation

Install altimeter per § 95-21 Part D.

E. Scheduled Maintenance and Inspections

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

F. Special Maintenance and Inspections

1. If altimeter displays no indication:
 - a. Inspect static lines for obstructions and remove obstructions if found.
 - b. Perform pitot-static system checks as required per § 95-10.
 - c. Perform appropriate function checks per § 5-40. If altimeter still displays no indication, remove altimeter per Part C, and return to RHC for inspection.
 - d. Install airworthy altimeter per Part D.
2. If altimeter displays erratic indication:
 - a. Inspect static system for water, and remove water if found.
 - b. Perform pitot-static system checks as required per § 95-10.
 - c. Perform appropriate function checks per § 5-40. If altimeter still displays erratic indication, remove altimeter per Part C, and return to RHC for inspection.
 - d. Install airworthy altimeter per Part D.

95-25 Torquemeter

A. Description

The electronic torquemeter indicates percent torque. The torque sensor is an oil pressure transducer mounted on the front of the engine’s accessory gearbox.

B. Schematic

Refer to Figure 98-1 for electrical schematic.

C. Removal

Remove torquemeter per § 95-21 Part C.

D. Installation

Install torquemeter per § 95-21 Part D.

E. Scheduled Maintenance and Inspections

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

F. Special Maintenance and Inspections

1. Inspect wiring for loose, chafed, frayed, or broken wires. Verify no damaged connectors. Verify wiring neatness, proper routing and installation, and security.
2. Perform appropriate function checks per § 5-40. If accuracy of torquemeter is suspected, remove torquemeter per Part C, and check calibration per Figure 95-3A.
3. Install airworthy torquemeter per Part D.

PIN	FUNCTION	% TORQUE*	SIGNAL (VDC)*
1	SPARE	0	0.480
2	GND	20	0.914
3	CASE GND	40	1.347
4	SHIELD	60	1.781
5	SPARE	80	2.214
6	+ POWER	83	2.279
7	+ POWER	100	2.648
8	SIGNAL LO	120	3.081
9	SIGNAL HI		

* Accuracy is ± 0.5% at 20% and 100%;
± 2% elsewhere.

FIGURE 95-3A TORQUEMETER CALIBRATION CHECK

95-26 Magnetic Compass**A. Description**

An internally illuminated, wet-type compass is attached to the center bow between the windshields above the instrument panel.

B. Schematic

Refer to Figure 98-1 for electrical schematic.

C. Removal

1. Remove hardware securing B339-2 mount to windshield bow.
2. Remove hardware securing B148-5 compass assembly to mount.
3. Remove heat shrink as required and disconnect light bar wires from airframe harness. Remove compass.

D. Installation

1. Install heat shrinks over wires and connect B148-5 compass assembly's light bar wires to airframe harness. Verify security. Activate heat shrinks.
2. Install hardware securing compass to B339-2 mount. Verify security.
3. Install hardware securing mount to windshield bow. Verify security.
4. Using the airport compass rose, align the helicopter skids on the rose lines, and record the indicated compass headings at 30° increments. Adjust compass compensator magnets as required until the maximum error at any heading is 5° or less with all avionics operating, all exterior lights on, and dimmer full bright. Record the final readings on the aircraft compass card. Re-check 4 cardinal headings with lights off and all avionics off except COM radio 1 and transponder. Verify maximum error remains 5° or less.

E. Scheduled Maintenance and Inspections

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

F. Special Maintenance and Inspections

1. Perform compass deviation check per Part D step 4.
2. If compass cannot be adjusted to limits specified, remove compass per Part C, and install airworthy compass per Part D.

95-30 Engine Gages95-31 N₁ Tachometer**A. Description**

The electronic N₁ tachometer indicates percent RPM of the engine's gas producer section. The N₁ sensor is a sealed variable-reluctance, permanent-magnet device mounted atop the engine's accessory gearbox adjacent to the hoisting lug.

B. Schematic

Refer to Figure 98-1 for electrical schematic.

C. Removal

1. Turn battery switch off and pull out applicable circuit breaker(s).
2. Remove screws securing upper console to lower console and tilt upper console aft.
3. Loosen screws securing console wiring connector to G144-6 instrument cluster and disconnect wiring.
4. Remove screws securing instrument cluster to G051 shell assembly's face plate and remove instrument cluster.

D. Installation

1. Turn battery switch off and pull out applicable circuit breaker(s).
2. Remove screws securing upper console to lower console and tilt upper console aft.
3. Position G144-6 instrument cluster on G051 shell assembly's face plate and install screws. Verify security.
4. Connect console wiring connector to G144-6 instrument cluster tighten connector screws. Verify security.
5. Tilt console forward and install screws securing upper console to lower console. Verify security.
6. Perform appropriate function checks per § 5-40.

E. Scheduled Maintenance and Inspections

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

95-31 N₁ Tachometer (continued)**F. Special Maintenance and Inspections**

1. Inspect wiring for loose, chafed, frayed, or broken wires. Verify no damaged connectors. Verify wiring neatness, proper routing and installation, and security.
2. Perform appropriate function checks per § 5-40. If accuracy of engine gage is suspected, remove G144-6 instrument cluster per Part C, and return to RHC for inspection.
3. Install airworthy instrument cluster per Part D.

95-32 Measured Gas (Turbine) Temperature (MGT) Gage**A. Description**

The measured gas temperature (MGT) gage connects to the engine's thermocouple harness via different size connectors to ensure correct polarity. Refer to RR300 Series Operation and Maintenance Manual (OMM) for periodic calibration requirements.

B. Schematic

Refer to Figure 98-1 for electrical schematic.

C. Removal

Remove G144-6 instrument cluster per § 95-31 Part C.

D. Installation

Install G144-6 instrument cluster per § 95-31 Part D.

E. Scheduled Maintenance and Inspections

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

F. Special Maintenance and Inspections

Perform special maintenance and inspections per § 95-31 Part F.

95-33 Engine Oil Pressure Gage**A. Description**

The engine oil pressure gage is electronic. The oil pressure sensor is a transducer mounted on the lower front of the engine's accessory gearbox.

B. Schematic

Refer to Figure 98-1 for electrical schematic.

C. Removal

Remove G144-6 instrument cluster per § 95-31 Part C.

D. Installation

Install G144-6 instrument cluster per § 95-31 Part D.

E. Scheduled Maintenance and Inspections

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

F. Special Maintenance and Inspections

Perform special maintenance and inspections per § 95-31 Part F.

95-34 Engine Oil Temperature Gage**A. Description**

The engine oil temperature gage is electronic. The oil temperature sensor is a transducer mounted on the inboard wall of the oil tank.

B. Schematic

Refer to Figure 98-1 for electrical schematic.

C. Removal

Remove G144-6 instrument cluster per § 95-31 Part C.

D. Installation

Install G144-6 instrument cluster per § 95-31 Part D.

E. Scheduled Maintenance and Inspections

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

F. Special Maintenance and Inspections

Perform special maintenance and inspections per § 95-31 Part F.

95-35 Fuel Quantity Gage**A. Description**

The electric fuel quantity gage indicates relative fuel quantity. The variable resistance sender is mounted near the fuel cap.

B. Schematic

Refer to Figure 98-1 for electrical schematic.

C. Removal

Remove G144-6 instrument cluster per § 95-31 Part C.

D. Installation

Install G144-6 instrument cluster per § 95-31 Part D.

E. Scheduled Maintenance and Inspections

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

F. Special Maintenance and Inspections

Perform special maintenance and inspections per § 95-31 Part F.

95-40 Additional Standard Indicating Equipment95-41 Clock**A. Description**

A manually set electric analog clock is standard equipment; a digital clock is optional.

B. Schematic

Refer to Figure 98-1 for electrical schematic.

C. Removal

1. Remove perimeter screws securing face to console and pull face aft, or remove screws securing upper console to lower console and tilt upper console aft, as applicable.
2. Remove screws securing clock to face.
3. Disconnect console wiring from clock wiring at connectors, and remove clock.

D. Installation

1. Connect console wiring to clock wiring at connectors. Verify security.
2. Install screws securing clock to face. Verify security.
3. Install perimeter screws securing face to console and verify security, or tilt console forward and install screws securing upper console to lower console and verify security, as required.

E. Scheduled Maintenance and Inspections

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

F. Special Maintenance and Inspections

1. Check AGC-3 (3 amp) fuse at firewall for evidence of melting and replace fuse as required.
2. Inspect wiring for loose, chafed, frayed, or broken wires. Verify no damaged connectors. Verify wiring neatness, proper routing and installation, and security.
3. If clock is still inoperative, remove clock per Part C, and install airworthy clock per Part D.

95-42 Ammeter**A. Description**

The ammeter indicates electrical system loads. System load is measured across the A780-71 cable (shunt; cable is calibrated, do not alter cable) located between the starter/generator and relay on right side of engine compartment.

B. Schematic

Refer to Figure 98-1 for electrical schematic.

C. Removal

1. Remove perimeter screws securing face to console and pull face aft, or remove screws securing upper console to lower console and tilt upper console aft, as applicable.
2. Remove screws securing ammeter to face.
3. Disconnect console wiring from ammeter wiring at connectors, and remove ammeter.

D. Installation

1. Connect console wiring to ammeter wiring at connectors. Verify security.
2. Install screws securing ammeter to face. Verify security.
3. Install perimeter screws securing face to console and verify security, or tilt console forward and install screws securing upper console to lower console and verify security, as required.

E. Scheduled Maintenance and Inspections

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

F. Special Maintenance and Inspections

1. Check continuity across two 3-amp fuses in B304-16 fuse assembly (in airframe harness on right side of engine compartment) and replace fuse assembly as required.
2. Inspect wiring for loose, chafed, frayed, or broken wires. Verify no damaged connectors. Verify wiring neatness, proper routing and installation, and security.
3. If ammeter is still inoperative, remove ammeter per Part C, and install airworthy ammeter per Part D.

95-43 Outside Air Temperature (OAT) Gage/Voltmeter**A. Description****NOTE**

No cutting or splicing of OAT probe wires is permitted.

The outside air temperature gage is connected via a calibrated, twisted pair wiring harness to a stainless steel probe protruding from the chin.

B. Schematic

Refer to Figure 98-1 for electrical schematic.

C. Removal

1. Remove perimeter screws securing face to console and pull face aft, or remove screws securing upper console to lower console and tilt upper console aft, as applicable.
2. Remove screws securing OAT gage to face.
3. Disconnect console wiring from OAT gage wiring at connectors, and remove gage.

D. Installation

1. Connect console wiring to OAT gage wiring at connectors. Verify security.
2. Install screws securing OAT gage to face. Verify security.
3. Install perimeter screws securing face to console and verify security, or tilt console forward and install screws securing upper console to lower console and verify security, as required.

E. Scheduled Maintenance and Inspections

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

F. Special Maintenance and Inspections

1. Inspect wiring for loose, chafed, frayed, or broken wires. Verify no damaged connectors. Verify wiring neatness, proper routing and installation, and security.
2. If OAT gage is still inoperative, remove OAT gage per Part C, and install airworthy OAT gage per Part D.

95-44 Hourmeters**A. Description**

Two hourmeters are standard. One hourmeter is mounted above the ammeter and is activated by main gearbox oil pressure. Another hourmeter on the horizontal panel outboard of the pilot's seat is activated by a combination of main gearbox oil pressure and a raised collective and is approved for recording time in service.

B. Schematic

Refer to Figure 98-1 for electrical schematic.

C. RemovalCollective-Activated Hourmeter

1. Remove screws securing hourmeter, faceplate, and carpet to F353-2 panel.
2. Disconnect airframe wiring from hourmeter wiring at connectors, and remove hourmeter.

Console Hourmeter

1. Remove screws securing hourmeter to F640 face assembly, remove screws securing face to lower console, and supporting hourmeter, remove face.
2. Disconnect airframe wiring from hourmeter, and remove hourmeter.

D. InstallationCollective-Activated Hourmeter

1. Connect airframe wiring to hourmeter wiring at connectors. Verify security.
2. Install screws securing hourmeter, faceplate, and carpet to F353-2 panel. Verify security.

Console Hourmeter

1. Connect airframe wiring to hourmeter (F859-2053 to positive terminal). Verify security.
2. Install screws securing F640 face assembly to lower console. Install screws securing hourmeter to face. Verify security.

E. Scheduled Maintenance and Inspections

On condition.

F. Special Maintenance and Inspections

1. Inspect wiring for loose, chafed, frayed, or broken wires. Verify no damaged connectors. Verify wiring neatness, proper routing and installation, and security.
2. If hourmeter is still inoperative, remove hourmeter per Part C, and install airworthy hourmeter per Part D. Make appropriate maintenance record entries.

95-50 Console Assemblies**NOTE**

Refer to R66 Pilot's Operating Handbook Section 7 for views of typical instrument panels, and the Optional Avionics Supplement for views of panels with electronic flight displays.

A. Opening Console

Upper instrument panels that do not include Electronic Flight Displays (EFDs) or other avionics may be "opened" by removing screws securing console assembly to forward keel panels and hinging console aft. Secure console by hinging forward and installing screws. If an EFD or any other avionics are installed in the upper instrument panel, remove console per Part B.

B. Removing Console

1. Remove EFD if installed per § 95-70.
2. Remove avionics if installed and located in upper instrument console per Chapter 97.
3. Remove HeliSAS control panel if installed and located in upper instrument console (not required if control panel is located at top of avionics stack).
4. Remove perimeter screws securing instrument face to console.
5. Disconnect instrument pitot-static lines. Plug lines.
6. Remove screws securing console assembly to forward keel panels and lower panel. Remove console and disconnect console harness from airframe harness.

C. Installing Console

1. Connect console assembly harness to airframe harness and install screws securing console to forward keel panels and lower panel.
2. Position instrument face in helicopter, remove plugs, and connect pitot-static lines.
3. Install perimeter screws securing face to console. Verify security.
4. Install HeliSAS control panel, if removed.
5. Install avionics per Chapter 97, if removed.
6. Install EFD per § 95-70, if removed.
7. Perform pitot-static system leak check per § 95-10.

95-60 Instrument Markings

See R66 Pilot's Operating Handbook (POH) Section 2 for instrument markings.

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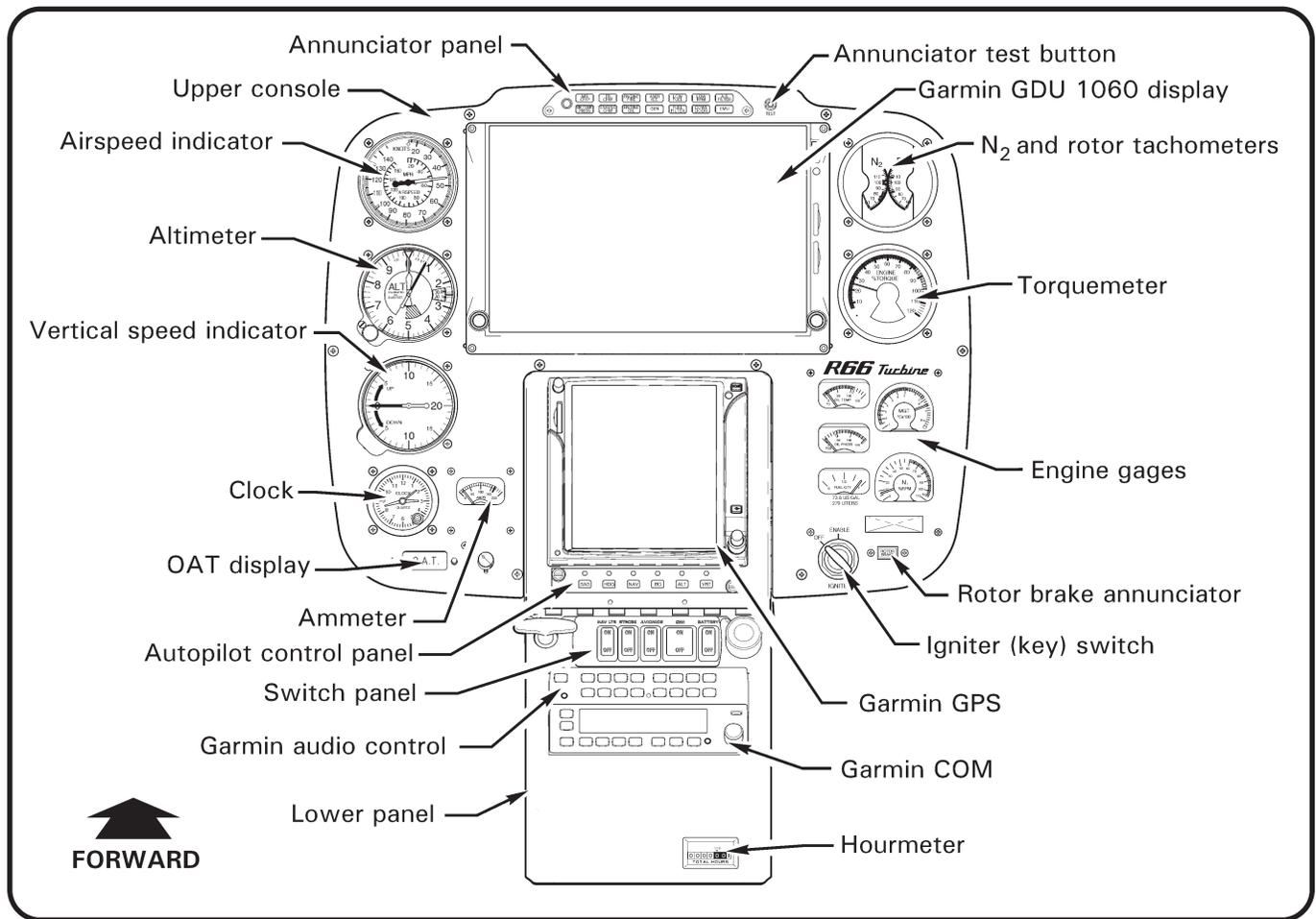


FIGURE 95-4 GARMIN G500H UPPER CONSOLE (GDU 1060 SHOWN)

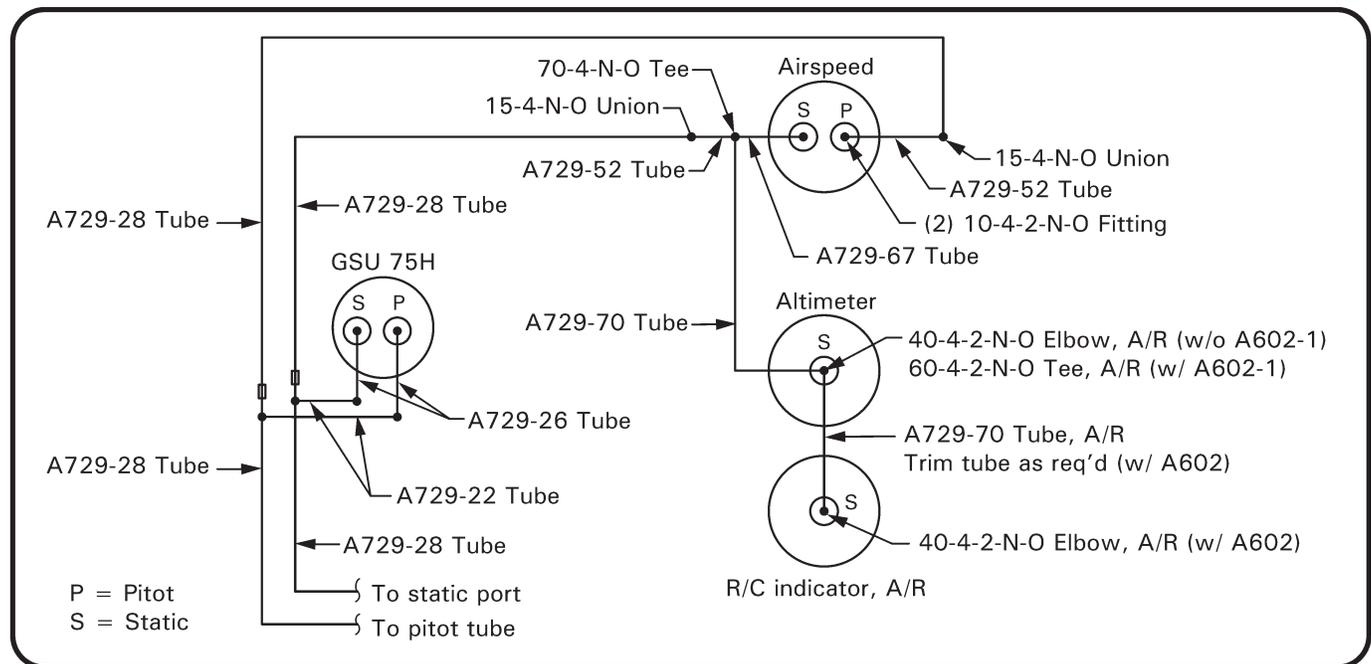


FIGURE 95-5 GARMIN G500H UPPER CONSOLE PITOT-STATIC SCHEMATIC

95-70 Electronic Flight Displays

95-71 Garmin Display Unit (GDU) 700L TXi or 1060 TXi

NOTE

Refer to Garmin G500H Instructions for Continued Airworthiness.

A. Description

The GDU 700L TXi or 1060 TXi is integrated with the Garmin G500H Electronic Flight Instrument System (EFIS). GDU 700L & 1060 electronically displays primary flight instrumentation via a primary flight display (PFD), and moving map, weather, traffic, terrain, and other functionality via a multifunction display (MFD) that includes touch-screen technology on one 7 inch (700L) or 10.6 inch (1060) display.

Refer to § 97-10 for Garmin G500H EFIS system components.

B. Schematics

Refer to Figure 98-9 for GDU 700L/1060 installation electrical schematic.

Refer to Figures 95-3 & 95-5 for Garmin G500H upper console pitot-static schematic.

C. Removal

1. Turn battery & avionics switches off and pull out EFIS circuit breaker (5 amp) on circuit breaker panel.
2. Remove screws securing GDU to console face.
3. Pull out and support display, unplug console harness connectors, and remove display.

D. Installation

1. Turn battery & avionics switches off and pull out EFIS circuit breaker (5 amp) on circuit breaker panel.
2. Visually inspect console harness connectors and verify no bent or damaged pins. Support display and plug in console harness connectors.
3. Place GDU in console, then install and tighten screws. Verify security.
4. Push in EFIS circuit breaker on circuit breaker panel. Turn battery & avionics switches on.
5. Perform appropriate functional checks per Garmin G500H Instructions for Continued Airworthiness. Turn battery & avionics switches off.

95-71 Garmin Display Unit (GDU) 700L TXi or 1060 TXi (continued)

E. Pitch/Roll Offset Calibration

NOTE

A Garmin Installer Unlock card is required to perform this procedure.

NOTE

All factory-installed Garmin units are configured to each helicopter. Perform only the steps outlined in this procedure without making additional changes.

1. Ensure GDU is off, then insert Garmin's Installer Unlock card in lower/left slot.
2. Press and hold right-inner knob, then press and release power button. After screen turns on, release right-inner knob.
3. Ensure external LRUs are online, indicated by green boxes on left side of display.
4. Press *Attitude/Heading, Calibration/Test*.
5. Select **Pitch/Roll Offset** procedure.
6. Follow and confirm each on-screen instruction.

NOTE

Verify aircraft is positioned on skids on level ground.

7. Press **Calibrate** and confirm successful calibration.
8. Press **Close**, power off GDU, then remove Installer Unlock card.

F. Magnetometer Calibration

NOTE

This procedure must be performed during a flight check.

NOTE

A Garmin Installer Unlock card is required to perform this procedure.

NOTE

All factory-installed Garmin units are configured to each helicopter. Perform only the steps outlined in this procedure without making additional changes.

95-71 Garmin Display Unit (GDU) 700L TXi or 1060 TXi (continued)**F. Magnetometer Calibration (continued)**

NOTE

If helicopter has Garmin GFC 600H Helicopter Flight Control System (FCS) installed, refer to § 22-16-2 Part D and perform FCS and GDU magnetometer calibration simultaneously.

1. If not previously accomplished, perform Pitch/Roll Offset Calibration per Part E.
2. Ensure GDU is off, then insert Garmin's Installer Unlock card in lower/left slot.
3. Press and hold right-inner knob, then press and release power button. After screen turns on, release right-inner knob.
4. Ensure external LRUs are online, indicated by green boxes on left side of display.
5. Press *Attitude/Heading, Calibration/Test*.
6. Select **Magnetometer** procedure.
7. Read thru on-screen checklist and confirm each instruction.
8. Press **Calibrate**.
9. With appropriately rated person at controls, start helicopter. Follow on-screen procedure until **Calibration Successful** is displayed, then press close to exit.
10. Have pilot land the helicopter. Press and hold power button to power off, then remove the Installer Unlock card.
11. Press power button to power on GDU in normal mode. Have pilot rotate helicopter and verify alignment with analog compass.
12. Have pilot complete flight check if required, or land and shut down helicopter.

95-71 Garmin Display Unit (GDU) 700L TXi or 1060 TXi (continued)**G. Scheduled Maintenance and Inspections**

Refer to Garmin G500H Instructions for Continued Airworthiness.

NOTE

All factory-installed Garmin units are “on condition” and do not require scheduled periodic maintenance. Units feature a BIT (Built-In Test) function during each initial power-up that will detect internal failure(s) and alert pilot.

NOTE

Refer to § 97-60 for avionics software information.

H. Special Maintenance and Inspections

1. Remove GDU per Part C.
2. Open circuit breaker panel and upper console.
3. Inspect condition of and verify no obvious damage to GDU, copper bus bars, circuit breaker, and wiring. Verify no loose, chafed, or broken wires or terminals. Verify no evidence of arcing. Verify installed equipment security.
4. Secure circuit breaker panel and upper console.
5. Install GDU per Part D.

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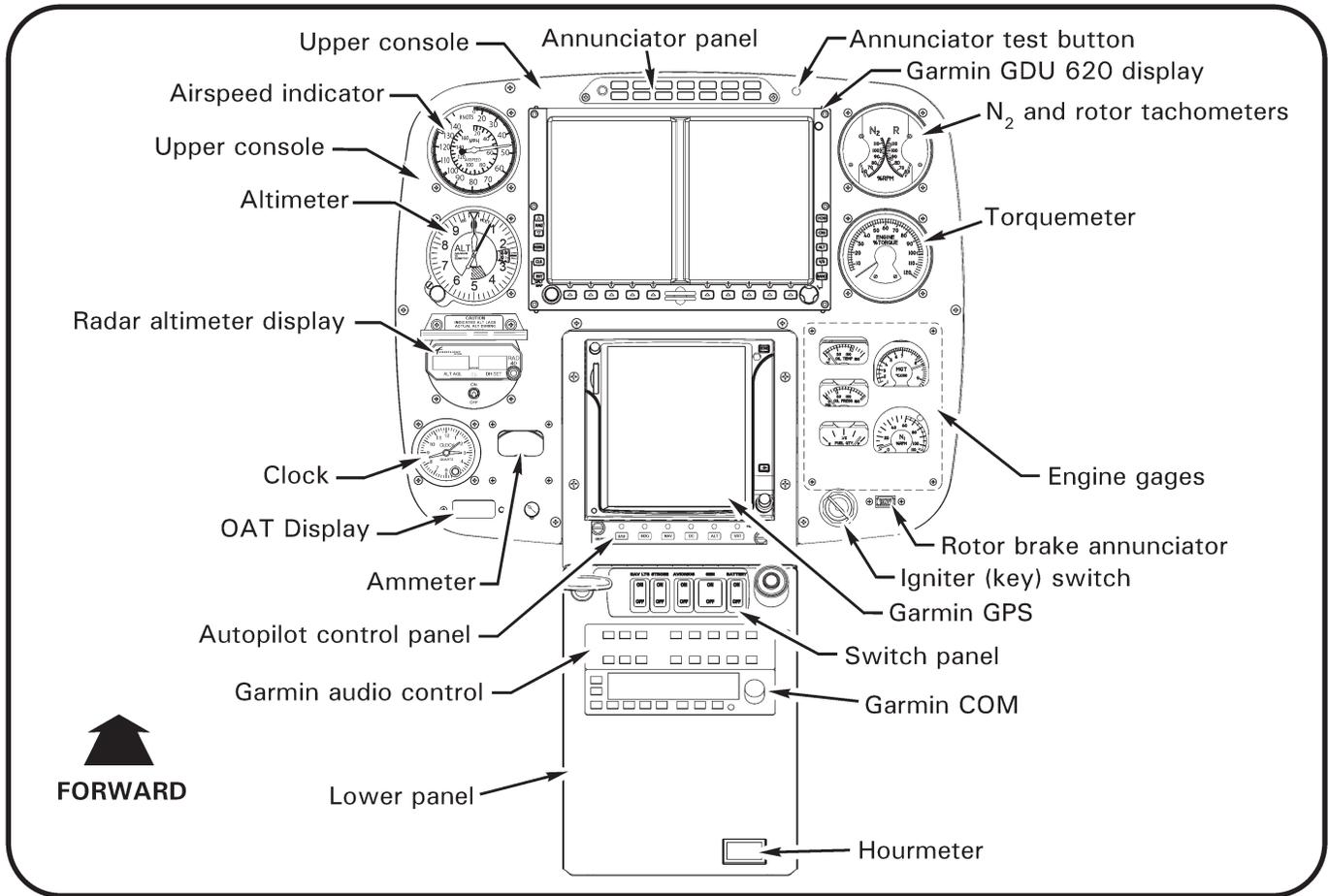


FIGURE 95-6 GARMIN G500H UPPER CONSOLE WITH GDU 620

95-72 Garmin Display Unit (GDU) 620 Installation**NOTE**

Refer to Garmin G500H Instructions for Continued Airworthiness.

A. Description

The GDU 620 integrates with the Garmin G500H Electronic Flight Instrument System (EFIS). The GDU 620 electronically displays primary flight instrumentation via a primary flight display (PFD), and moving map, weather, traffic, terrain and other functionality via a multifunction display (MFD) on dual 6.5 inch displays.

Refer to § 97-10 for Garmin G500H EFIS system components.

B. Schematics

Refer to Figure 98-10 for GDU 620 installation electrical schematic.

Refer to Figures 95-3 & 95-5 for Garmin G500H upper console pitot-static schematic.

C. Removal

1. Turn battery & avionics switches off and pull out EFIS circuit breaker (5 amp) on circuit breaker panel.
2. Remove screws securing GDU to console face.
3. Pull out and support display, unplug console harness connectors, and remove display.

D. Installation

1. Turn battery & avionics switches off and pull out EFIS circuit breaker (5 amp) on circuit breaker panel.
2. Visually inspect console harness connectors and verify no bent or damaged pins. Support display and plug in console harness connectors.
3. Place GDU in console, then install and tighten screws. Verify security.
4. Push in EFIS circuit breaker on circuit breaker panel. Turn battery & avionics switches on.
5. Perform appropriate functional checks per Garmin G500H Instructions for Continued Airworthiness. Turn battery & avionics switches off.

E. Scheduled Maintenance and Inspections

Refer to Garmin G500H Instructions for Continued Airworthiness.

F. Special Maintenance and Inspections

Refer to § 95-71 Part F.

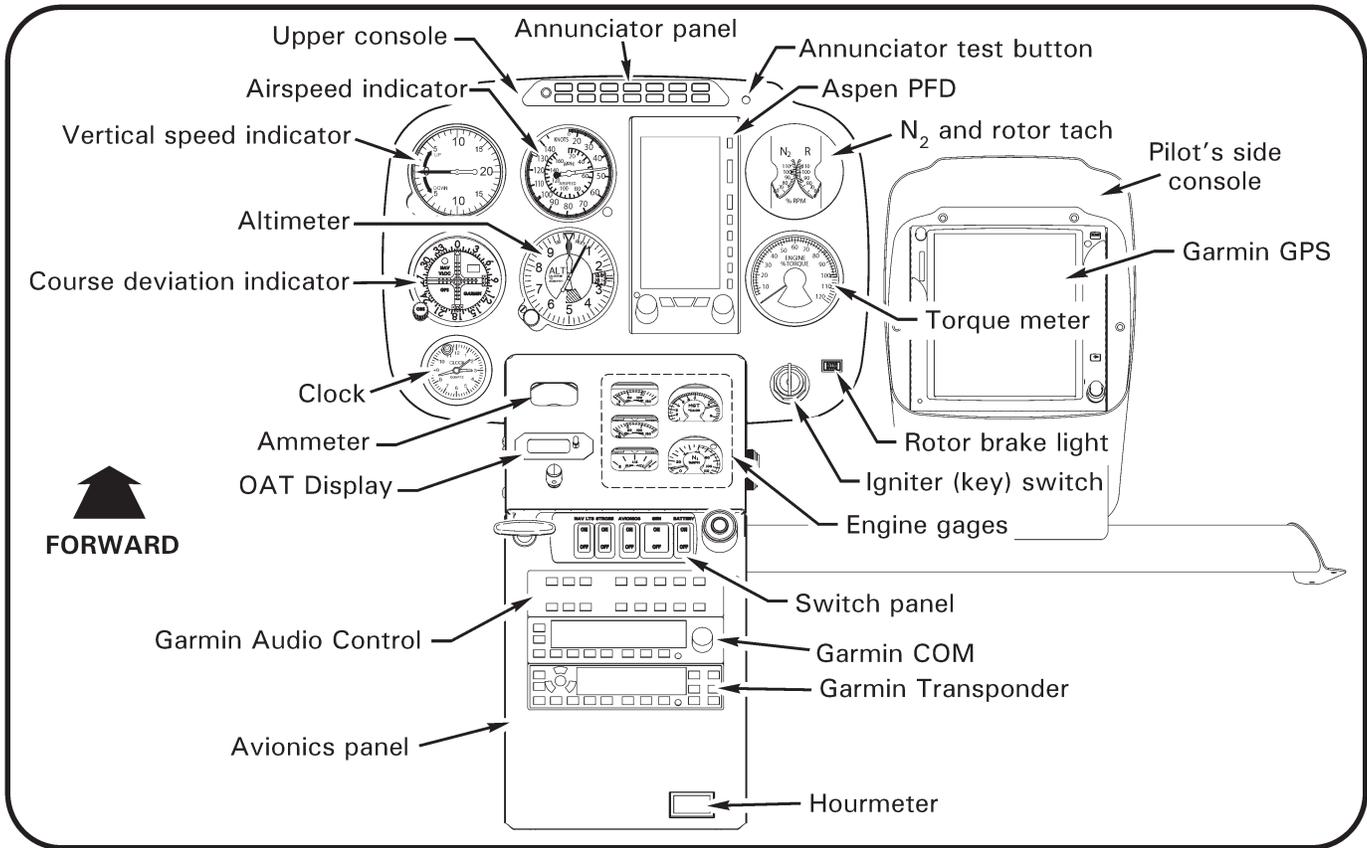


FIGURE 95-7 EIGHT-INSTRUMENT CONSOLE WITH ASPEN PFD

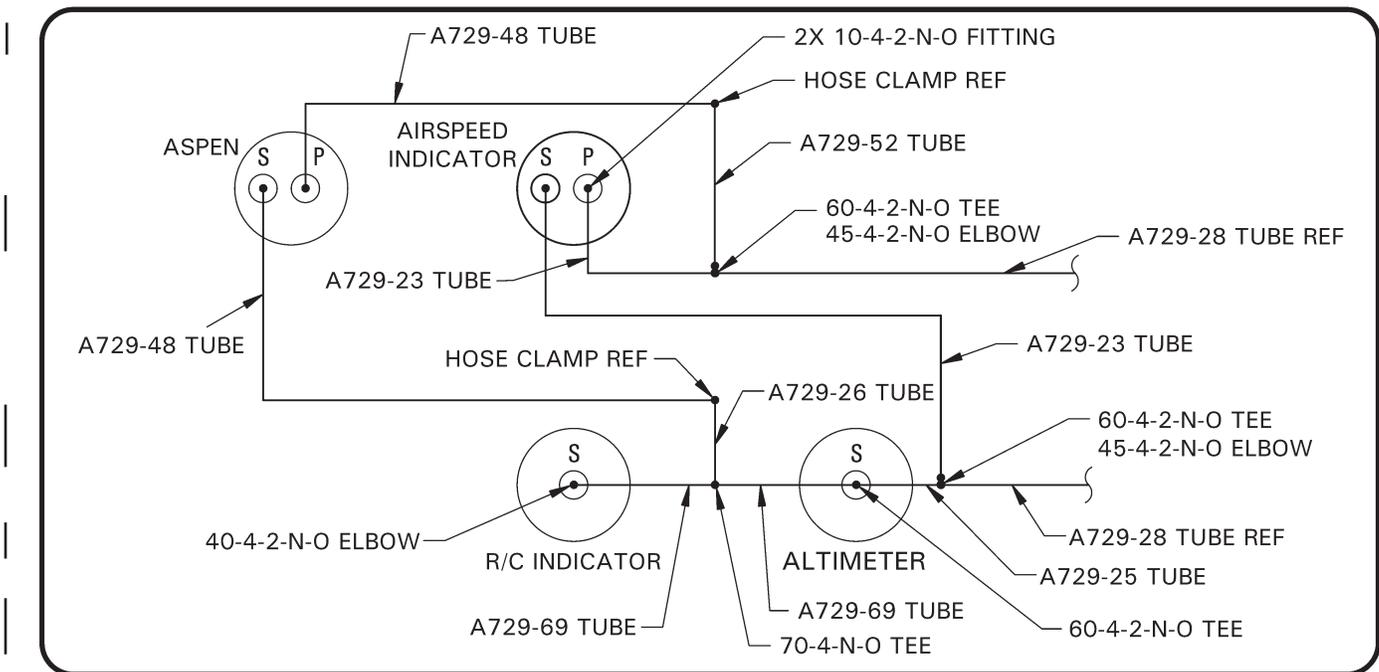


FIGURE 95-8 EIGHT-INSTRUMENT CONSOLE WITH ASPEN PFD PITOT-STATIC SCHEMATIC

95-73 Aspen EFD500H & EFD1000H Display(s) Installation

A. Description

R66 options include a single screen Aspen PFD, or a dual-screen Aspen PFD and MFD.

The Aspen PFD (Primary Flight Display) is an LCD unit with displays for attitude, altitude, airspeed, heading, and optional NAV (HSI/CDI). The Aspen PFD is a situational awareness aid, to be used in conjunction with required VFR instruments (altimeter, airspeed indicator, and magnetic compass).

The standard Aspen PFD installation configures the lower half of the display as a directional gyro. An optional installation configures the lower half of the display to a Horizontal Situation Indicator (HSI). Primary GPS position data is provided by GTN-series GPS. Heading and outside air temperature data is received from the Aspen remote sensor module (RSM). The RSM provides backup GPS position data if primary GPS fails.

The Aspen MFD (Multifunction Display) is an LCD unit with displays for moving map navigation data, terrain, and traffic. Terrain and traffic may also be overlaid on moving map. GPS position data is provided by Garmin GTN-series GPS for moving map and terrain displays. Aspen MFD also includes an internal terrain database. TIS-A traffic data may be received from Garmin GTX330 transponder for moving map display.

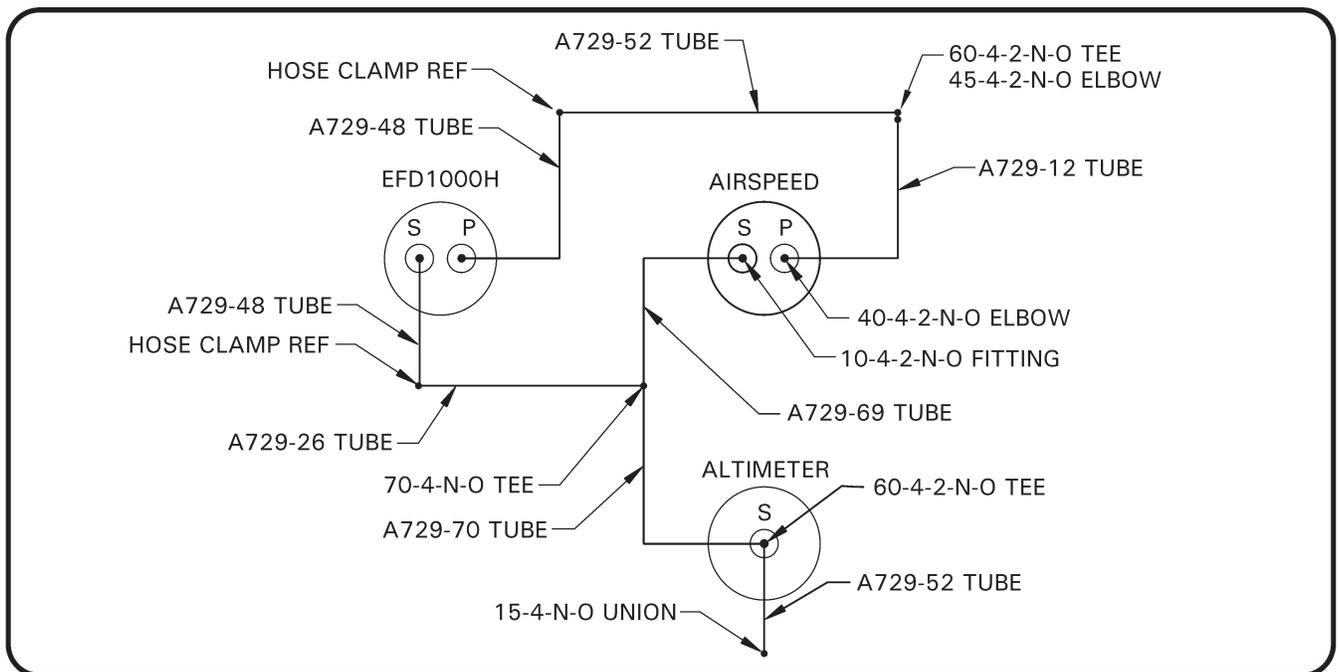


FIGURE 95-9 SIX-INSTRUMENT CONSOLE WITH ASPEN PFD PITOT-STATIC SCHEMATIC

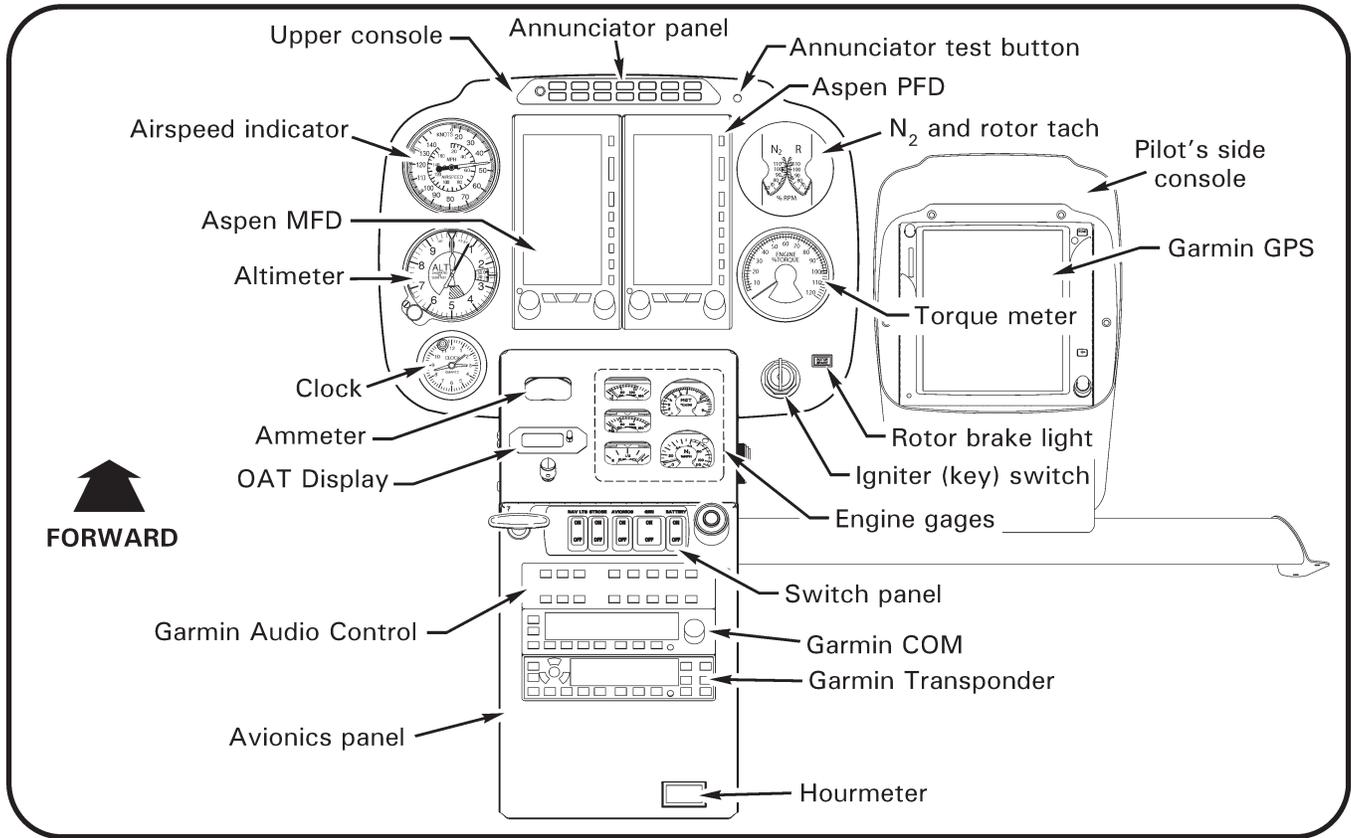


FIGURE 95-10 EIGHT-INSTRUMENT CONSOLE WITH ASPEN PFD AND MFD

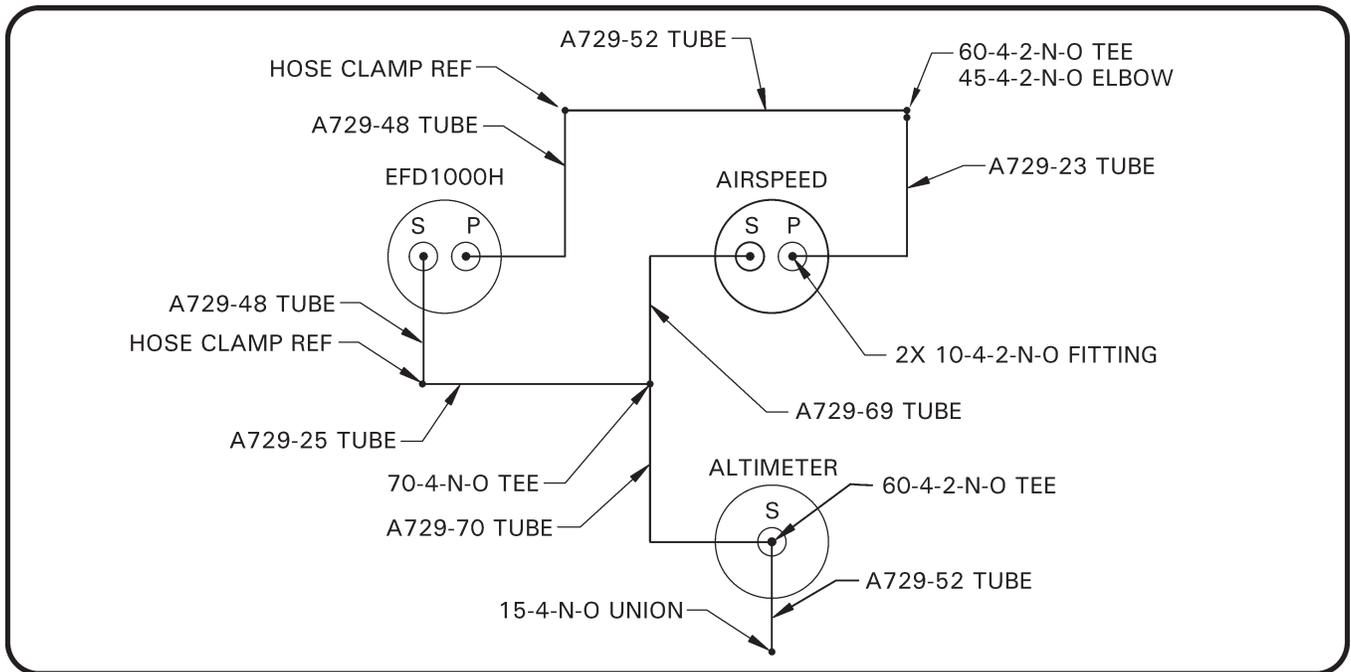


FIGURE 95-11 EIGHT-INSTRUMENT CONSOLE WITH ASPEN PFD AND MFD PITOT-STATIC SCHEMATIC

95-73 Aspen EFD500H & EFD1000H Display(s) Installation (continued)**B. Schematics**

Refer to Figure 98-19 for Aspen EFD500H Display Installation electrical schematic, and Figure 98-18 for Aspen EFD1000H Display Installation electrical schematic.

Refer to Figures 95-3, 95-8, and 95-9 for Aspen PFD pitot-static schematic, and Figures 95-3 and 95-11 for Aspen MFD pitot-static schematic.

C. Removal

1. Turn battery switch off and pull-out EFIS circuit breaker (7.5 amp) on circuit breaker panel.
2. Gently depress blue tab(s) at top of Aspen PFD/MFD to release display(s) from mounting bracket(s).
3. PFD only: Disconnect pitot and static lines from display using quick-disconnect couplers. Temporarily cap pitot and static line fittings at display and in aircraft to prevent contamination.
4. Loosen screws securing airframe wiring harness connector(s) to display(s), unplug connector(s), and remove display(s).

D. Installation

1. Turn battery switch off and pull-out EFIS circuit breaker (7.5 amp) on circuit breaker panel.
2. Plug airframe wiring harness connector(s) into Aspen PFD/MFD display(s) and tighten screws. Verify security.
3. PFD only: Remove temporary fitting caps and connect pitot and static lines to display using quick-disconnect couplers.
4. Insert display(s) into mounting bracket(s) until blue tab(s) snap(s) into place. Verify security.
5. Push-in EFIS circuit breaker (7.5 amp) on circuit breaker panel. Turn battery & avionics switches on.
6. Perform appropriate functional checks per Aspen EFD1000H PFD / EFD500H MFD Pilot's Guide. Turn battery and avionics switches off.
7. Perform pitot-static leak check.

95-73 Aspen EFD500H & EFD1000H Display(s) Installation (continued)**E. Remote Sensor Module (RSM) Antenna****NOTE**

Do not use magnetized tools.

Removal

1. Turn battery switch off and pull-out EFIS circuit breaker (7.5 amp) on circuit breaker panel.
2. Refer to § 6-80 for antenna locations. Using plastic scraper, remove B270-1 sealant from around EFIS antenna at corners where it attaches to tailcone.
3. Cut and discard ty-raps as required and disconnect antenna cable at connectors (secured to frame). Remove screws securing antenna and antenna ground wire to tailcone and remove antenna.

Installation

1. Turn battery switch off and pull-out EFIS circuit breaker (7.5 amp) on circuit breaker panel.
2. Remove paint & primer from antenna and antenna ground wire mating surfaces to ensure electrical ground.
3. Install screws securing antenna and antenna ground wire to tailcone. Verify security.
4. Apply small bead B270-1 sealant (0.1 inch max in height) around antenna at corners where it attaches to tailcone and allow to dry.
5. Connect antenna cable at connectors; secure to frame using ty-raps. Verify security.
6. Perform ground checks per Part D steps 5 and 6.

F. Scheduled Maintenance and Inspections

Maintenance is on condition. Contact Aspen Avionics at www.aspenavionics.com for instructions for continued airworthiness.

NOTE

Refer to § 97-60 for avionics software information.

G. Special Maintenance and Inspections

1. Turn battery and avionics switches off. Open circuit breaker panel and upper console.
2. Inspect condition of and verify no obvious damage to Aspen displays, pitot-static lines, metal braiding, copper bus bars, circuit breaker, and wiring. Verify no loose, chafed, or broken wires or terminals. Verify no evidence of arcing. Verify equipment security.
3. Secure circuit breaker panel and upper console. Perform ground checks per Part D steps 5 and 6.