INSTRUMENT SYSTEMS

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31-1. INSTRUMENT SYSTEMS

All indicators are installed in the main instrument panel, or in the hinged center panel, except the pilot and copilot standby compass, hour meter, outside air temperature indicator and MINISTAB indicators. The standby compasses are mounted on supports on the left and right side of the cabin structure. The hour meter is mounted in the nose compartment, the rotor brake pressure gage is mounted near the top of the windshield center post, and the outside air temperature indicator is mounted in the windshield. The MINISTAB indicators are mounted on a bracket below the right side of the instrument panel. (See Figure 31-1.) Instrument maintenance practices and inspection criteria are contained in the basic manual.

1. The flight instrument systems comprise the pitot-static system with inputs to the air data computer and the following indicators.
   a. Airspeed indicators. (ASI)
   b. Altimeters.
   c. Instantaneous vertical speed indicators. (IVSI)
   d. Turn and slip indicators.
   e. Attitude director indicators. (ADI)
   f. MINISTAB (actuator position) indicators.
2. The navigation instruments include:
   a. Horizontal situation indicator. (HSI)
   b. Radio magnetic indicators. (RMI)
   c. Course deviation indicator. (CDI)
   d. Marker beacon master and slave indicators.
   e. Distance measuring equipment (DME) master and slave indicators.
   f. Radar altimeters.
   g. Standby magnetic compasses.
3. The miscellaneous instrument systems do not differ from the basic configuration, except as listed.
   a. Dual (AC/DC) Voltmeter.
   b. Clock
   c. Rotor brake pressure gage

31-2. INSPECTION PROCEDURES

NOTE

Directions contained in paragraphs 23-2 through 23-4 apply equally to all avionics components, parts, and bits and pieces. Instructions in these paragraphs are cited only one time, but apply throughout Chapter 23.

1. Inspect control panels for completeness, proper installation, cleanliness and security of mounting.
2. Inspect switches, controls and circuit breakers for proper mechanical action.
3. Inspect panel and indicator lights for housing conditions and proper operation.
4. Inspect electrical connectors for corroded or bent pins, proper mating, and cables for frayed or broken insulation.

31-3. GENERAL CLEANING PROCEDURES

1. Remove moisture and loose dirt with a clean, soft cloth.
2. Remove dust and dirt from panels (with or without exterior hardware), and light housings with a soft clean cloth. To remove fingerprints or contaminates not responding to a soft clean cloth; use a cloth dampened with water; if necessary, mild soap may be used to make the cleaning more effective.

WARNING

CLEANING COMPOUND IS FLAMMBLE AND ITS FUMES ARE TOXIC.

3. Remove grease, fungus and ground –in dirt with a soft cloth dampened (not wet) with cleaning compound (C-304).
4. Remove dirt from connectors with a brush, remove moisture with a dry cloth.

31-4. GENERAL REPAIR OR REPLACEMENT

1. Tighten or replace loose or cracked control knobs.
2. Replace defective panel light bulbs or housings.
3. Repairs beyond removal and replacement must be conducted by an authorized repair station.

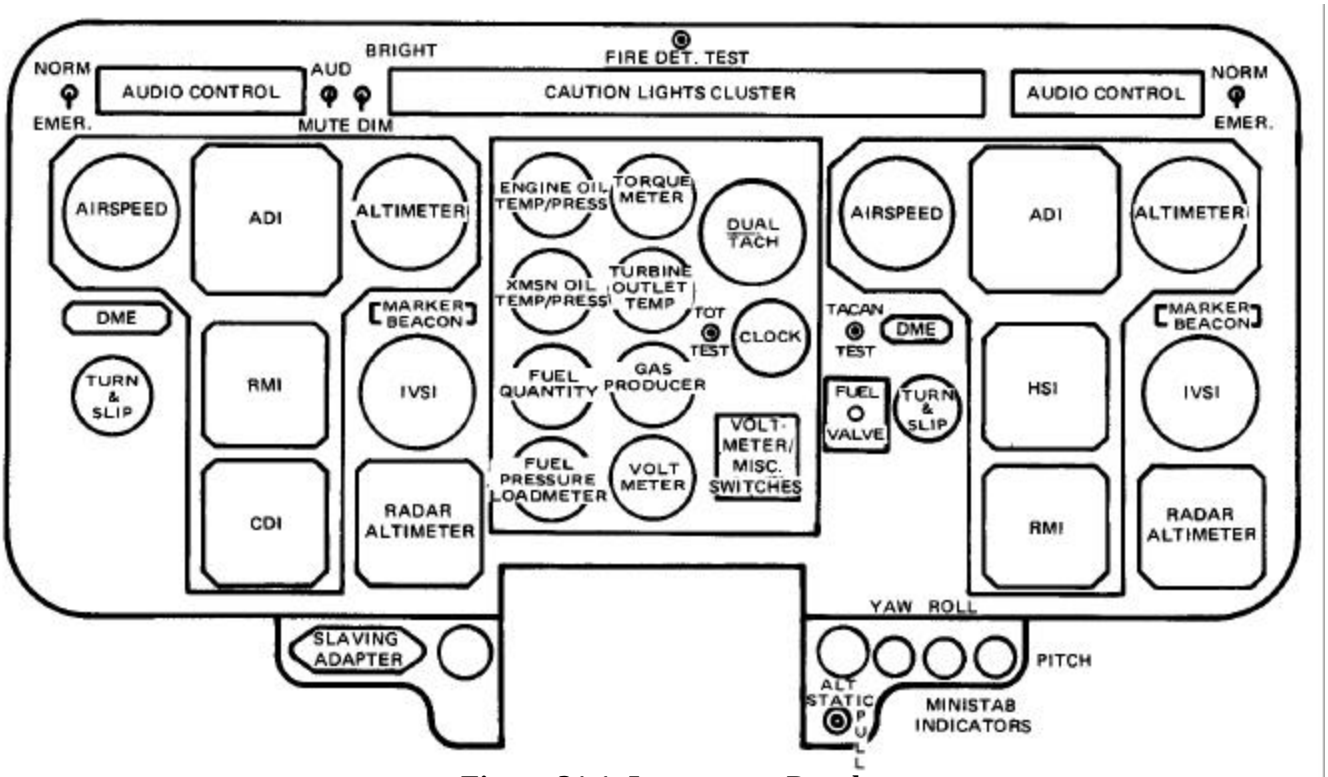


Figure 31-1. Instrument Panel

31-5. INSTRUMENT PANEL

The instrument panel holds all the Pilot / Co-pilot indicators except for the standby compasses, hour meter, outside air temperature indicator or the MINISTAB indicator.

31-6. REMOVAL-MAIN AND CENTER INSTRUMENT PANELS

1. Remove shrouds (7,10,14,18,21, Figure 31-2), bracket (39), and stiffener (41) by removing screws (1,3,5,8,11,12,15,17,19,20) and washers (2,4,6,9,13,16).

2. Disconnect electrical connectors from all instruments, and from switches, caution panel lights, and KMA-24 audio controls, and KA-51B slaving (adapter) selector, mounted in bracket (38). Identify and tag electrical connectors.

3. Disconnect piping (tubes) from instruments and other systems connections (1,2,3,5,6,7 Figure 31-3 and 4.) Identify and tag piping connectors.

4. Disconnect wire bundle clamps from angle (31, Figure 31-2).

5. Install protective caps or place tape on electrical connectors, piping connections, and instrument openings.

6. Remove screws (34) attaching cover (35) to spacers (37) on instrument panel (40). Remove cover with components installed.

7. Remove instruments and remove center panel (28) after removing screws (42).

8. Remove screws (33) attaching instrument panel (40) to center frame (29) and console structure. Remove instrument panel.

9. Remove screws (22,23) from frames (29, 30,32).

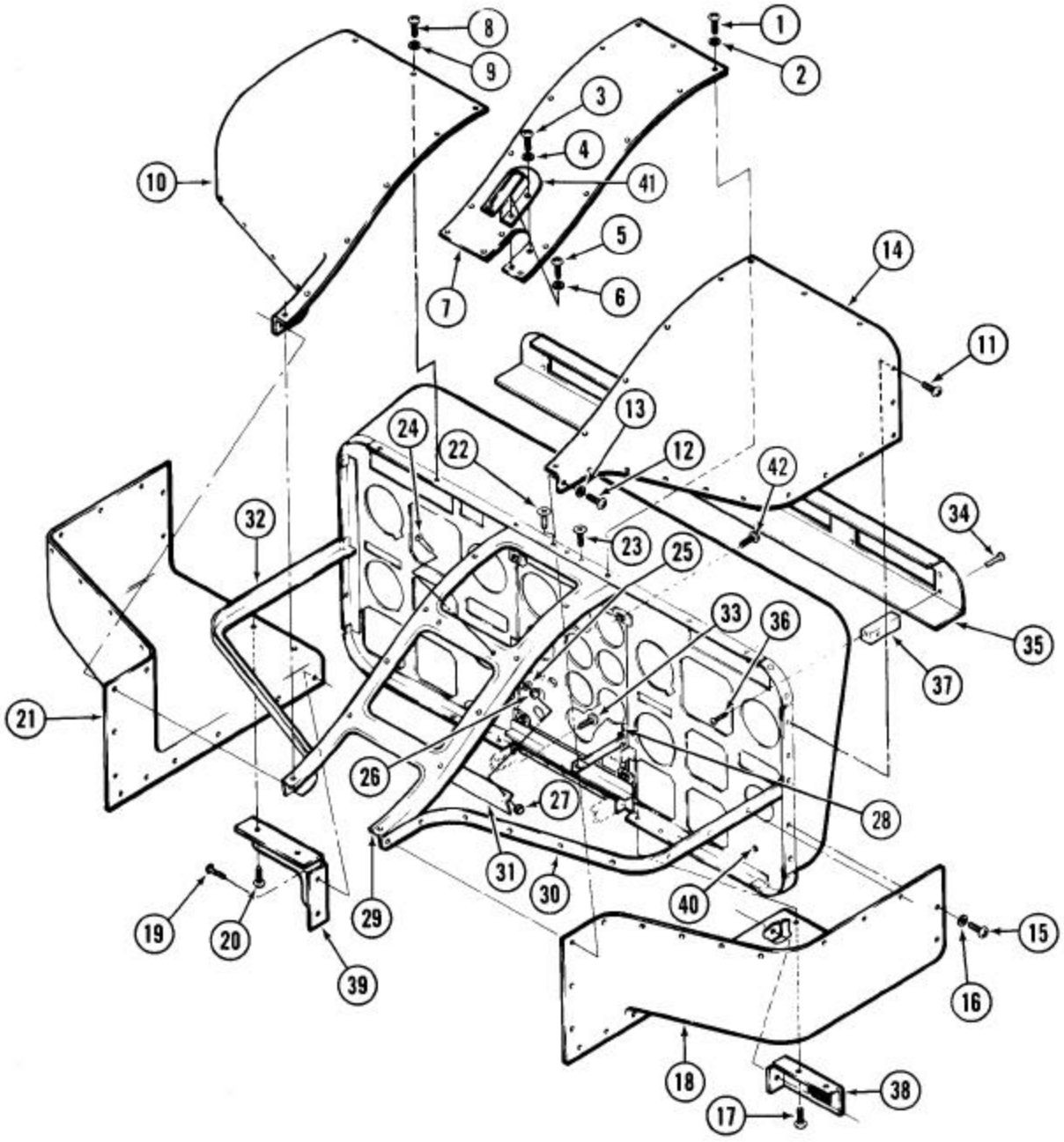
10. If required, remove angle (31) from center frame (29) by removing nuts (27,26), washers (25), and screws (24).

31-7. INSTALLATION-INSTRUMENT PANEL

1. Attach frames (29,30,32, Figure 31-2) to panel using screws (22,23).

2. If required, attach angle (31) to center frame (29), using screws (24), washers (25), and nuts (26,27).

3. Align panel assembly with brackets (38,39) and center console structure. Attach panel assembly to structure using screws (33).



1. Screw
2. Washer
3. Screw
4. Washer
5. Screw
6. Washer
7. Center shroud
8. Screw
9. Washer
10. RH top shroud
11. Screw
12. Screw
13. Washer
14. LH top shroud
15. Screw
16. Washer
17. Screw
18. LH lower shroud
19. Screw
20. Screw
21. RH lower shroud
22. Screw
23. Screw
24. Screw
25. Washer
26. Nut
27. Nut
28. Center instrument panel
29. Center frame
30. LH frame
31. Angle
32. RH frame
33. Screw
34. Screw
35. Cover
36. Screw
37. Spacer
38. Bracket
39. Bracket
40. Instrument panel
41. Stiffener
42. Screw

Figure 31-2. Instrument Panel - Removal / Installation

4. Attach cover (35) to spacers (37) on instrument panel (40) using screws (34).

5. Secure center panel (28) to instrument panel (40) with screws (42), and install instruments.

6. Remove protective caps or tape from electrical connectors, piping connections, and instrument openings. Secure connectors/ connections to corresponding connectors.

7. Attach wire bundle clamps to angle (31).

8. Install shrouds (10,14,18,21) to panel and frames using screws (8,11,12,15,17,19,20) and washers (9,13,16).

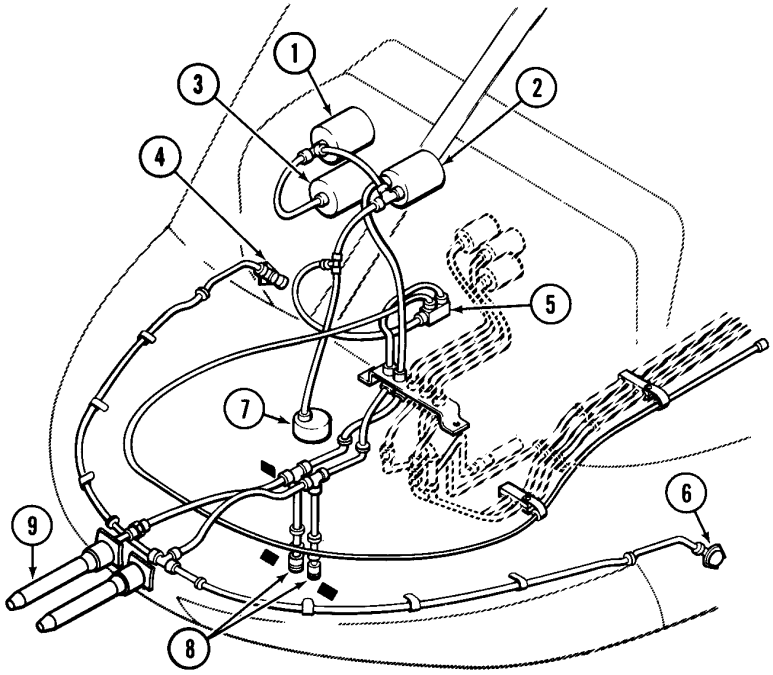
9. Install center shroud (7) and stiffener (41) using screws (1,3,5) and washers (2,4,6).

31-8. FLIGHT INSTRUMENTS.

The flight instrument systems include a dual pitot-static system, two airspeed indicators, two altimeters, two instantaneous vertical speed indicators (IVSI), two attitude director indicators (ADI), and two turn and slip indicators. Three flight control (MINISTAB) actuator position indicators (roll, pitch and yaw) present actual series actuators positioning information to the aircrew.

NOTE

Since pilot and copilot flight instrument systems are basically the same, the subsequent data applies to both or either systems instruments.



1. **Pilot Altimeter**
2. **Pilot Airspeed Indicator**
3. **Pilot Vertical Speed Indicator**
4. **Static Port (Lower RH Side)**
5. **Alternative Static Source Selector Valve**
6. **Static Port (Lower LH Side)**
7. **Blind Encoder**
8. **Moisture Drains**
9. **Pitot Tube**

Figure 31-3. Pitot-Static System - Pilot

31-9. PITOT-STATIC SYSTEM.

The pitot-static system is a dual pitot-static system, consisting of a separate pilot pitot-static system and copilot pitot-static system. Both pitot tubes are equipped with internal heating elements to prevent icing at altitude. Refer to Chapter 24.

NOTE

Maintenance procedures on the pitot-static system is the only recommended maintenance for any flight instrument. If any indicator is suspected of malfunction it must be replaced.

31-10. AIRSPEED INDICATOR.

The airspeed indicator, (1, Figure 31-10, top center of the instrument panel, is a standard pitot static instrument. This single scale indicator provides an airspeed reading in miles per hour, and knots by measuring the difference between impact air pressure from the pitot tube and the static air pressure from the static vents.

31-11. ALTIMETER.

The altimeter, upper right corner of the instrument panel, (2, Figure 31-10,) provides a direct reading of helicopter height in feet above sea level. This indicator is connected to the static air system to sense atmospheric pressure. An external knob is provided to make compensation for variations of prevailing barometric pressure.

31-12. INCLINOMETER.

The inclinometer, lower right corner of instrument panel, (3, Figure 31-10,) is a simple instrument consisting of a covered glass tube, ball, and damping fluid. The ball indicates when the helicopter is in directional balance, either in a turn or straight and level flight. If the helicopter is yawing or slipping, the ball will move off of center.

31-13. PILOT PITOT-STATIC SYSTEM.

The pitot tube is mounted on a support located in the most forward part of the cabin nose bubble just right of the helicopter centerline. The pitot tube supplies impact air to the airspeed indicator. Static air pressure from two vents (ports), is applied to a two-way valve, and then to the encoding altimeter, pilot airspeed indicator, altimeter and vertical speed indicator. The vents are located on the aft edge of the left and right lower plastic panels of the cabin nose bubble. In the event of icing conditions an alternate static source, located under the copilot seat, can be selected by positioning the two-way valve. The source selector is located immediately under the instrument panel, adjacent to the right of the top of the pedestal, and is labeled ALT STATIC-PULL. (Refer to Figure 31-3.)

31-14. COPILOT PITOT-STATIC SYSTEM.

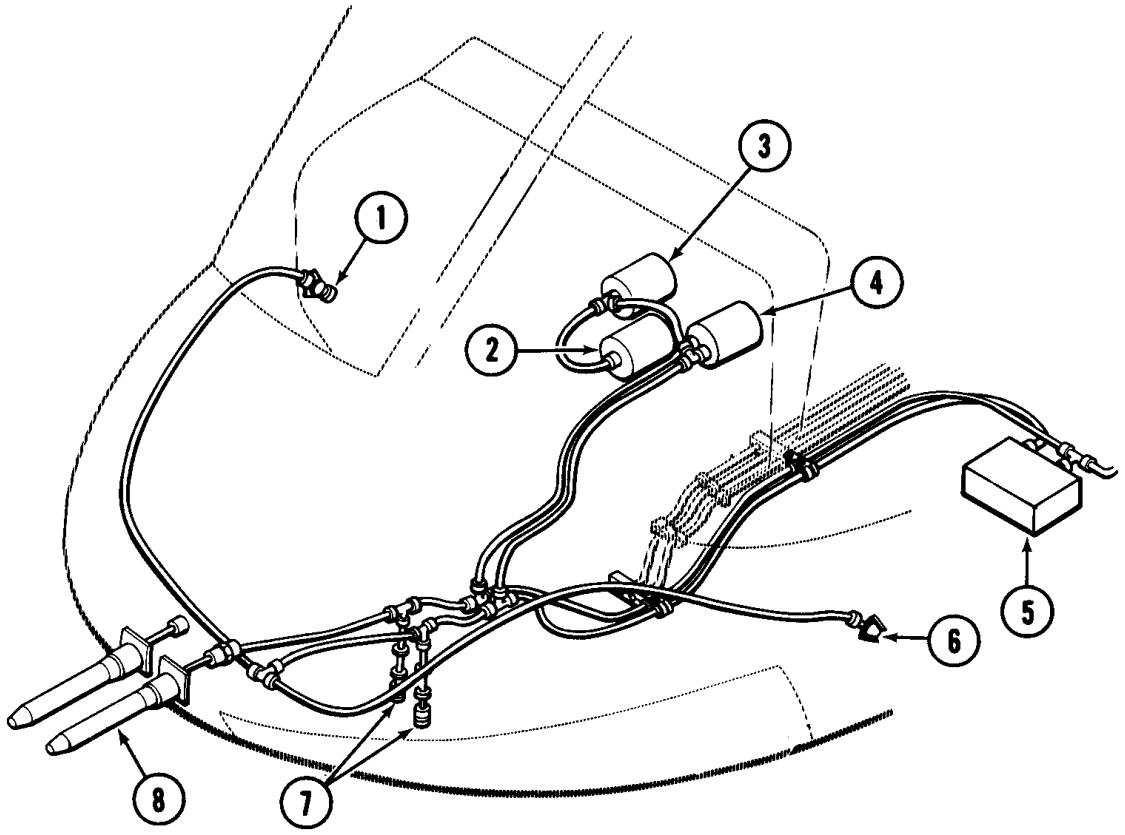
The pitot tube is mounted on a support located in the most forward part of the cabin nose bubble just left of helicopter center line (Figure 31-5). This tube supplies impact air to the copilot airspeed indicator and the air data computer. Static air pressure from two vents (ports) is applied to the copilot altimeter, airspeed indicator, vertical speed indicators, and to the air data computer (ADC). The vents are located immediately above the static vents for the pilot static system in the left and right cabin nose panels. (Refer to Figure 31-4.) (For ADC data refer to Chapter 22.)

NOTE

Removal, cleaning, inspection, and installation procedures for the pilot pitot-static system are identical to those for the copilot pitot-static system.

31-15. REMOVAL - PITOT-STATIC SYSTEM.

1. Ensure electrical power is OFF.
2. Disconnect pitot tube (1, Figure 31-5) from support assembly (2).
3. Disconnect support assembly (2). Cap exposed opening of static line (5) to prevent entrance of foreign particles.
4. Disconnect all associated electrical wiring and cover wire ends with tape (Chapter 24). Remove pitot tube from helicopter.
5. Disconnect static line (5) from tee assembly (4), and union assembly (7)
6. Disconnect static lines (5 & 9) from union at static vents. (3 & 8).
7. Disconnect static vent from baffle assemblies (6 & 10). Remove vents and baffles from helicopter.



1. **Static Port (Upper RH Side)**
2. **Co-pilot Vertical Speed Indicator**
3. **Co-pilot Altimeter**
4. **Co-pilot Airspeed Indicator**
5. **Air Data Computer**
6. **Static Port (Upper LH Side)**
7. **Moisture Drains**
8. **Pitot Tube**

Figure 31-4. Pitot-Static Systems - Co-pilot

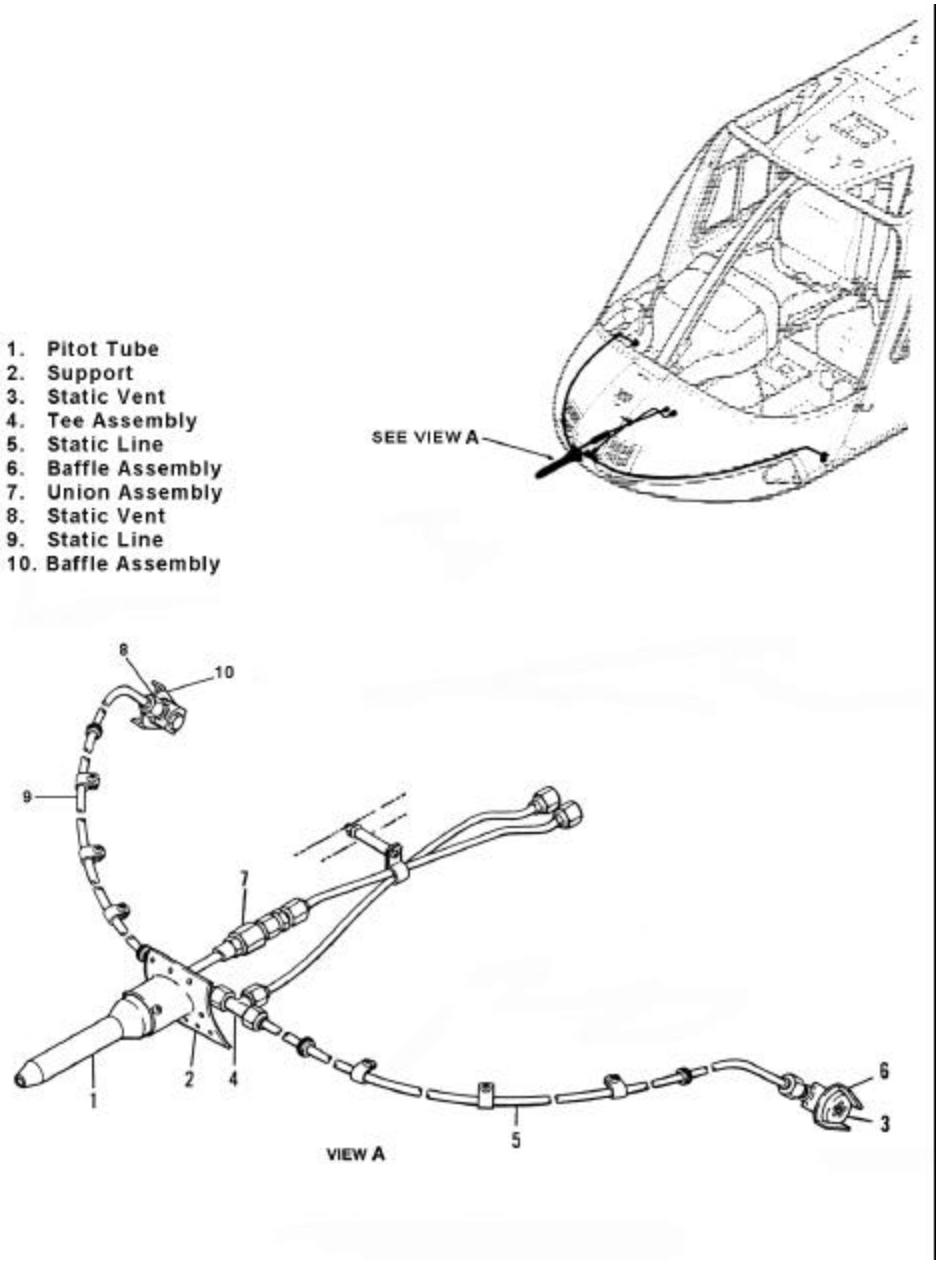


Figure 31-5. Pitot-Static Systems - TH-57B

31-16. CLEANING AND INSPECTION - PITOT-STATIC SYSTEM.

1. Clean pitot tube (1, Figure 31-5) with lint free cloth and an approved cleaning solvent.
2. Drain moisture from static lines (5 & 9) and associated hardware.
3. Inspect all lines and fittings for tightness.
4. Visually check lines for chafing, security, and damage.
5. Inspect pitot tube and static vents (3 & 8) for obstruction and damage.

31-17. INSTALLATION - PITOT-STATIC SYSTEM.

1. Install and connect static vents (3 & 8, Figure 31-5) and baffle assemblies (6 & 10).
2. Connect static lines (5 & 9) to union at static vent.
3. Connect static line to tee assembly (4) and union assembly (7).
4. Remove tape from associated wiring. Install pitot tube (1) and electrical wiring.
5. Remove cap from static line. Connect static line to support (2).
6. Connect pitot tube and support.

31-18. OPERATIONAL CHECK-PITOT-STATIC SYSTEMS.

(Refer to Appendix E.)

Table 31-1. INDICATOR - INSTANTANEOUS VERTICAL SPEED

INDICATION OF TROUBLE	PROBABLE CAUSE	CORRECTIVE ACTION
Pointer response appears to be too slow.	Leak in line and/or connection(s). Defective indicator. Obstruction in line.	Repair or replace line and/or connection(s). Replace indicator. Disconnect and clear/clean line
Pointer remains at zero	Obstructed port or port connection. Defective indicator. Obstructed line.	Clean/repair or re-place port or port connection. Replace indicator. Disconnect and clear/clean line.
Pointer oscillates.	Leak in line and/or connection(s).	Repair or replace line and/or connection(s).
Pointer at zero indication is off center.	Defective indicator. Indicator out of adjustment.	Replace indicator. Adjust pointer to zero with external adjustment screw.

31-19. INSTANTANEOUS VERTICAL SPEED INDICATOR (IVSI).

The instantaneous vertical speed indicator (IVSI) is a fast response indicator, which gives a feet per minute (speed) readout of helicopter ascent or descent. The indicator is connected to a pitot-static source. It uses internal differential pressure, which is varied at the rate of changing atmospheric pressure, to effect vertical speed indications.

31-20. TROUBLESHOOTING – IVSI.

Perform checks necessary to isolate trouble. (See Table 31-1.)

Table 31-2. INDICATOR - TURN AND SLIP

INDICATION OF TROUBLE	PROBABLE CAUSE	CORRECTIVE ACTION
Rate-of-turn pointer erratic or inoperative.	Defective indicator.	Replace indicator.
	Electrical wiring/connection(s) dirty/loose defective.	Clean/tighten/repair electrical wiring/connection(s).

31-21. TURN AND SLIP INDICATOR.

The turn and slip indicator consists of a rate-of-turn pointer and an inclinometer (ball) which operate independently of each other. An indicator gyro is self-contained in the indicator. The rate-of-turn pointer, controlled by the gyro, indicates in which direction and at what rate the helicopter is turning. The inclinometer (ball) oriented to the axis, indicates when the helicopter is in directional balance either in a turn or in straight and level flight. If the helicopter is yawing or slipping, the ball will be off center.

31-22. TROUBLESHOOTING – TURN AND SLIP INDICATOR.

Perform checks as necessary to isolate trouble. (See Table 31-2.)

31-23. ATTITUDE DIRECTOR INDICATOR (ADI) (H-140 JJM1).

The attitude director indicator (ADI) displays helicopter flight attitude relative to the earth. The displayed pitch and roll information is referenced to an internal, self-contained gyroscope, which is aligned with earth coordinates. Pitch attitude is portrayed by the position and motion of the spheroid with respect to the fixed miniature aircraft symbol in the face of the indicator. The sphere can be mechanically caged in pitch and roll at zero by pulling the cage knob fully outward; the knob is located in the lower right corner of the indicator face. Roll attitude (bank angle) is read from the position and motion of the roll pointer with respect to the vertical fixed, semi-circular scale at the top of the display. Dive or climb information is indicated by sphere motion and position against fixed horizontal markings on the face of the sphere. A red-and-black-striped power off flag is located in the upper center portion of the display. The flag will retract when power is applied to the indicator and gyro begins to spin. Any interruption of power will bring the flag into view. The left ADI receives power from essential 2 bus. The right (standby) ADI is powered by input from essential 1 bus under normal inflight and ground operating conditions (no generator and battery output) the standby battery can be selected by positioning STBY ATT IND/OFF switch to STBY ATT IND, to power the ADI. A fully charged standby battery will operate the ADI for 30 minutes.

31-24. TROUBLESHOOTING-ATTITUDE DIRECTOR INDICATOR (ADI).

Perform checks as necessary to isolate trouble. (See Table 31-3).

Table 31-3. ATTITUDE DIRECTOR INDICATOR (ADI

INDICATION OF TROUBLE	PROBABLE CAUSE	CORRECTIVE ACTION
Warning flag will not retract, or retracts intermittently.	Electrical wiring/connection(s) dirty/loose defective.	Clean/tighten/repair or replace wiring/connection(s).
	Defective indicator.	Replace indicator.
Spheroid and/or roll pointer oscillates or does not move.	Defective indicator.	Replace indicator.
	Electrical wiring/connection(s) dirty/loose defective.	Clean/tighten/repair or replace wiring/connection(s).

31-25. NAVIGATION INSTRUMENTS

The navigation instrument systems comprise one horizontal situation indicator (HSI), two radio magnetic indicators (RMIs), one course deviation indicator (CDI), one marker beacon master with one slave indicator, one distance measuring equipment (DME) master with one slave indicator, one radar altimeter, and two standby magnetic compasses.

31-26. HORIZONTAL SITUATION INDICATOR (HSI0 (KI-525A)

The HSI, located on the right side of the instrument panel, consists of a heading card, a course datum (caret), heading select pointer, glidescope pointer, and course deviation bar. The knob in the lower right corner is used to position the course caret; the lower left knob controls the position of the heading select pointer . Two flag circuits are incorporated in the instrument; the HDG (left) flag appears if system power or gyro spin motor speed is inadequate; a NAV (right) flag appears if navigation receiver signal strength is inadequate. The flags appear around the top center of the indicator. A HSI correction card is located below pilot's wet compass.

31-27. TROUBLESHOOTING - HORIZONTAL SITUATION INDICATOR (KI-525A)

The HSI troubleshooting procedures are covered as a portion of the navigation system. (Refer to Chapter 34.)

31-28. RADIO MAGNETIC INDICATOR (RMI) (KNI-582)

The RMI displays bearing toward either ADF or VOR stations by means of two pointers, each of which is read against a servo driven compass card. A flag falls into view in the upper left corner of the display when the helicopter heading information in invalid. Selection of single or double pointer for ADF or VOR representation is effected by two push-buttons in the lower left and right corner of the instrument.

31-29. TROUBLESHOOTING — RADIO MAGNETIC INDICATOR (KNI-582)

The RMI troubleshooting procedures are covered as a portion of the navigation system. (Refer to Chapter 34.)

31-30. TROUBLESHOOTING — DME INDICATORS (KDI-573, KDI-574)

The DME indicator troubleshooting procedures are covered as a portion of the navigation system. (Refer to Chapter 34.)

31-31. RADAR ALTIMETER (KNI-416)

The radar altimeter provides indication of altitude above ground (AGL) in feet. An adjustable cursor in the instrument allows insertion of a target-altitude. When the preselected altitude is reached, a light in the instrument accompanied by an audible warning in the headset(s) alerts the aircrew that target-altitude has been achieved. The test switch on the instrument allows for the test of the instrument, circuit integrity to transceiver, and altitude alert feature.

31-32. TROUBLESHOOTING — RADAR ALTIMETER

The radar altimeter troubleshooting procedures are covered as a portion of the navigation system. (Refer to Chapter 34.)

31-33. STANDYBY MAGNETIC COMPASS.

The standby magnetic compasses are standard, (wet compass), non-stabilized, magnetic instruments mounted on right and left supports which are attached to the forward cabin. A compass correction card, located below each compass has to be used with each compass. The compasses are internally lighted by 28vdc.

31-34. TROUBLESHOOTING — STANDBY MAGNETIC COMPASS INTERNAL LIGHTING

Refer to Chapter 98 for wiring diagram of instrument internal lighting and troubleshooting procedures are covered as a portion of the electrical system. (Refer to Chapter 24.)

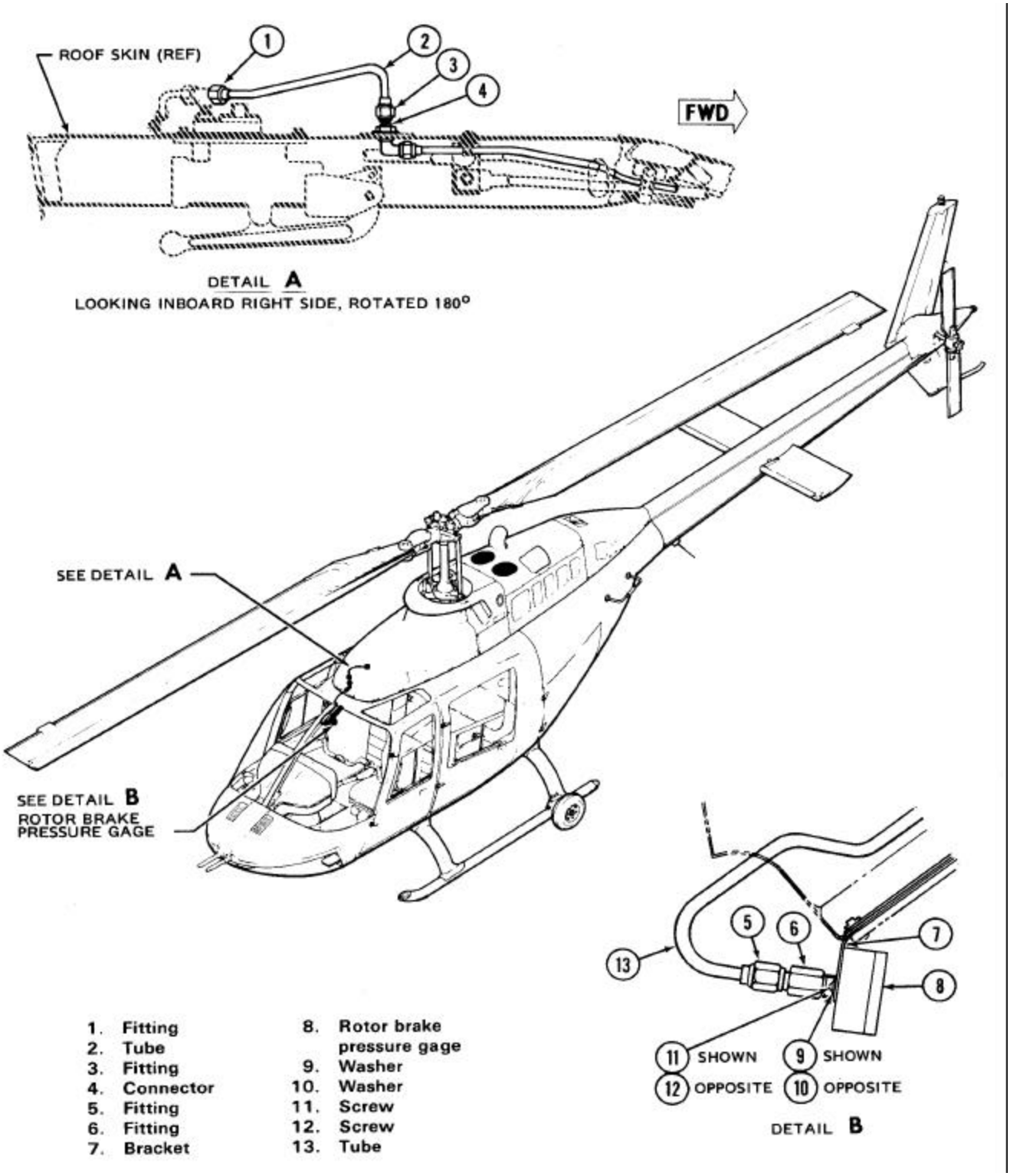


Figure 31-6. Rotor Brake Pressure Gage

31-35. MISCELLANEOUS INSTRUMENTS

Miscellaneous instruments consists of the dc load meter, engine hour meter, eight-day clock, free air temperature indicator, dual (ac/dc) voltmeter, and a rotor brake pressure gage.

31-36. DUAL (AC/DC) VOLTMETER

The dual voltmeter provides ac and dc voltage indications on one instrument, which is mounted in the lower center of the hinged center panel of the instrument panel. The circuits to be monitored are selected by the selector on the voltmeter panel, which is located adjacent and to the right of the hinged center.

31-37. TROUBLESHOOTING - DUAL (AC/DC) VOLTMETER

Dual voltmeter troubleshooting procedures are covered as a portion of the electrical system. (Refer to Chapter 24.)

31-38. CLOCK

One eight-day clock, located in the center, right side of the center panel, is internally lighted by 5 vdc.

31-39. TROUBLESHOOTING — CLOCK INTERNAL LIGHTING

Refer to Chapter 98 for wiring diagram of instrument internal lighting.

31-40. ROTOR BRAKE PRESSURE GUAGE

The rotor brake pressure gage located near the top of the windshield center post, provides a visual indication that the rotor brake is in operation. The rotor brake pressure gage face is marked in steps of 20 graduating marks, with figure intervals every 100. Total range of the rotor brake pressure gage is from 0 to 600 psi. There are no upper or lower limit operating markings on the meter.

31-41. OPERATIONAL CHECK — ROTOR BRAKE PRESSURE GUAGE

1. Ensure that electrical power is off.
2. Gain access to hydraulic service area under forward transmission cowling.
3. Place wiping cloths around the base of connector (4, Figure 31-6) to catch hydraulic fluid.
4. Loosen fitting (3) until it lifts free of connector (4).
5. Place wiping cloths under fitting (1).
6. Loosen fitting (1).
7. Rotate tube (2) to separate fitting (3) from connector (4) to allow hydraulic cart connection.
8. Connect hydraulic cart to connector (4). Apply approximately 150 psig as indicated at hydraulic cart.
9. Verify that rotor brake pressure break gage (8) indicates approximately 150 psig.
10. Reduce pressure to approximately 0 psig as indicated at hydraulic cart.
11. Verify that rotor brake pressure gage indicates approximately 0 psig.
12. Disconnect hydraulic cart from connector (4).
13. Rotate tube (2) and position fitting (3) over connector (4).
14. Tighten fitting (1). Tighten fitting (3).
15. Bleed rotor brake pressure system.
16. Troubleshooting procedures refer to Table 31-4.

Table 31-4. ROTOR BRAKE PRESSURE GAGE

INDICATION OF TROUBLE	PROBABLE CAUSE	CORRECTIVE ACTION
Rotor brake pressure gage indicates a constant 0 indication.	Defective rotor brake pressure gage.	Replace defective rotor brake pressure gage.
Rotor brake pressure gage indicates a constant indication other than 0.	Defective rotor brake pressure gage.	Replace defective rotor brake pressure gage.

31-42. REMOVAL-ROTOR BRAKE PRESSURE GUAGE

1. Ensure that electrical power is off.
2. Place a suitable container under the fitting (5, Figure 31-6) to catch hydraulic fluid.
3. Place a wrench on fitting (5) and another wrench on fitting (6).
4. Loosen fitting (5) until it can be separated from fitting (6).
5. Cap end of fitting (5).
6. Remove screws (11 and 12) and washers (9 and 10).
7. Remove rotor brake pressure gauge (8) from bracket (7).
8. Remove fitting (6) from rotor brake pressure gauge (8).

31-43. INSTALLATION — ROTOR BRAKE PRESSURE GAUGE

NOTE

Prior to installation ensure fitting (6, Figure 31-6) is connected to rotor brake pressure gauge (8).

1. Ensure that electrical power is off.
2. Position rotor brake pressure gauge (8) in bracket (7).
3. Install washers (9 and 10) and screws (11 and 12).
4. Place wiping cloth under fitting (5) and remove cap.
5. Mate fitting (5) to fitting (6) and finger tighten.
6. Place a wrench on fitting (5) and another wrench on fitting (6).
7. Tighten fitting (5) to fitting (6).
8. Bleed rotor brake pressure system.

31-44. OPERATIONAL INSTRUCTIONS FOR MAINTENANCE OF AUTO-FAULT SYSTEM

WARNING

REMOVAL OF THE AUTO-FAULT POWER UNIT P/N 303-0005 FROM THE AIRCRAFT WILL TERMINATE THE OPERATION OF ALL CHIP LIGHT INDICATIONS IN THE CAUTION-WARNING SYSTEM. DO NOT OPERATE THE AIRCRAFT WITH THE AUTO-FAULT POWER UNIT REMOVED.

The Benz Airborne Systems Auto-Fault System incorporates into the rotorcraft chip detector warning system a way to clear nuisance chips less than 0.005 inch cross sectional diameter and continuously monitors the integrity of all chip detector circuits. The Auto-Fault System goes through a self-test each time electrical power is turned on the aircraft.

The Auto-Fault System is interconnected into the rotorcraft chip detector electrical system without compromising the normal operation of the Original Type Certificated (TC) chip detector system.

An internal malfunction of the Auto-Fault System automatically restores normal operation of the aircraft TC chip detector system, however, if the connector at the power unit becomes disconnected, the complete rotorcraft chip detector system is inoperable. This will be evident with the absence of the chip light illumination on the caution-warning panel during the initial application of power.

A "Clear Chip" switch is located on the instrument panel to allow the pilot to manually attempt to clear chips, which will extinguish the corresponding chip light, if successful.

The Power Unit is located on the aft side of the pilots seat back and is easily accessible by the pilot during preflight and post flight checks and by maintenance personnel.

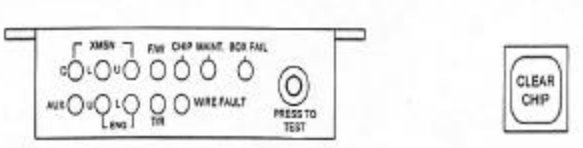


Figure 31-7. Power Unit

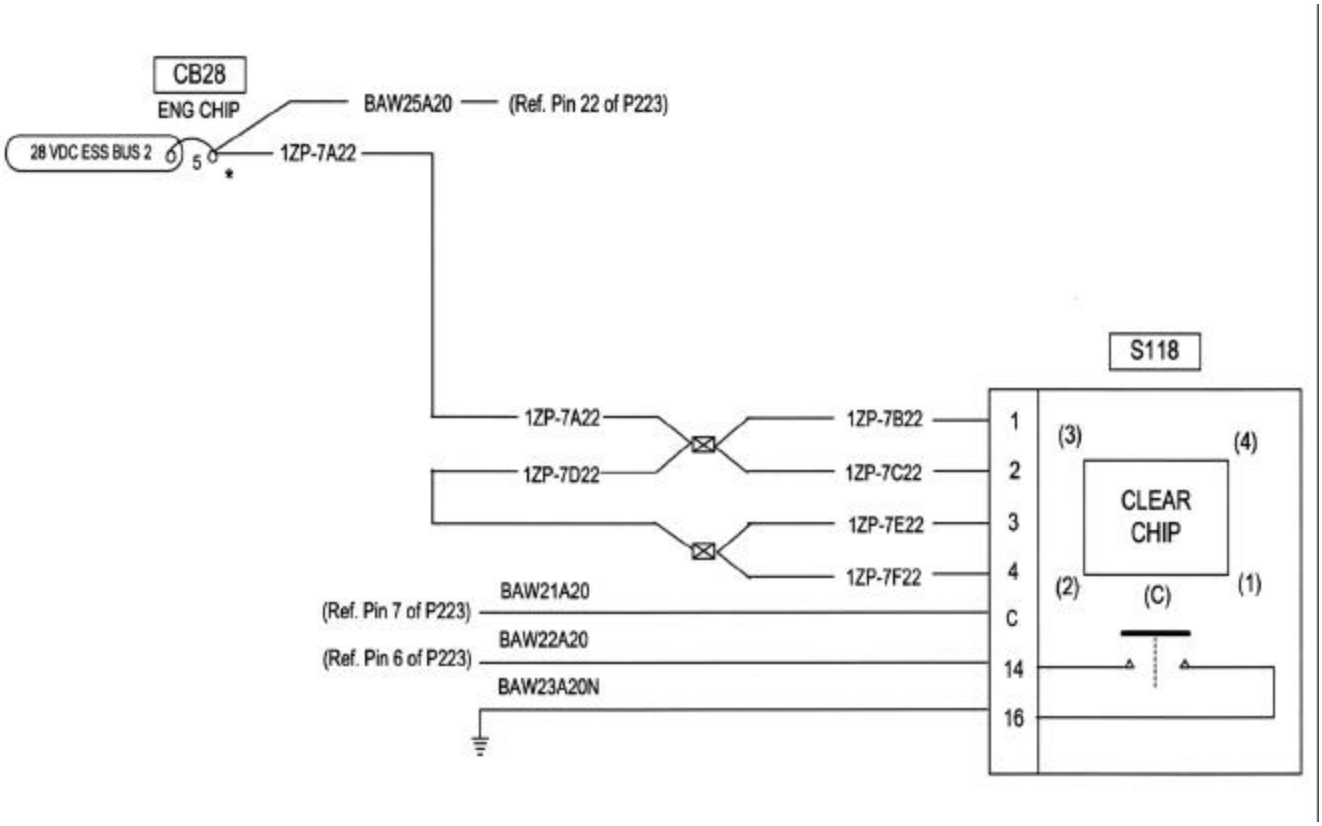


Figure 31-8. Chip Detector Wiring Chart

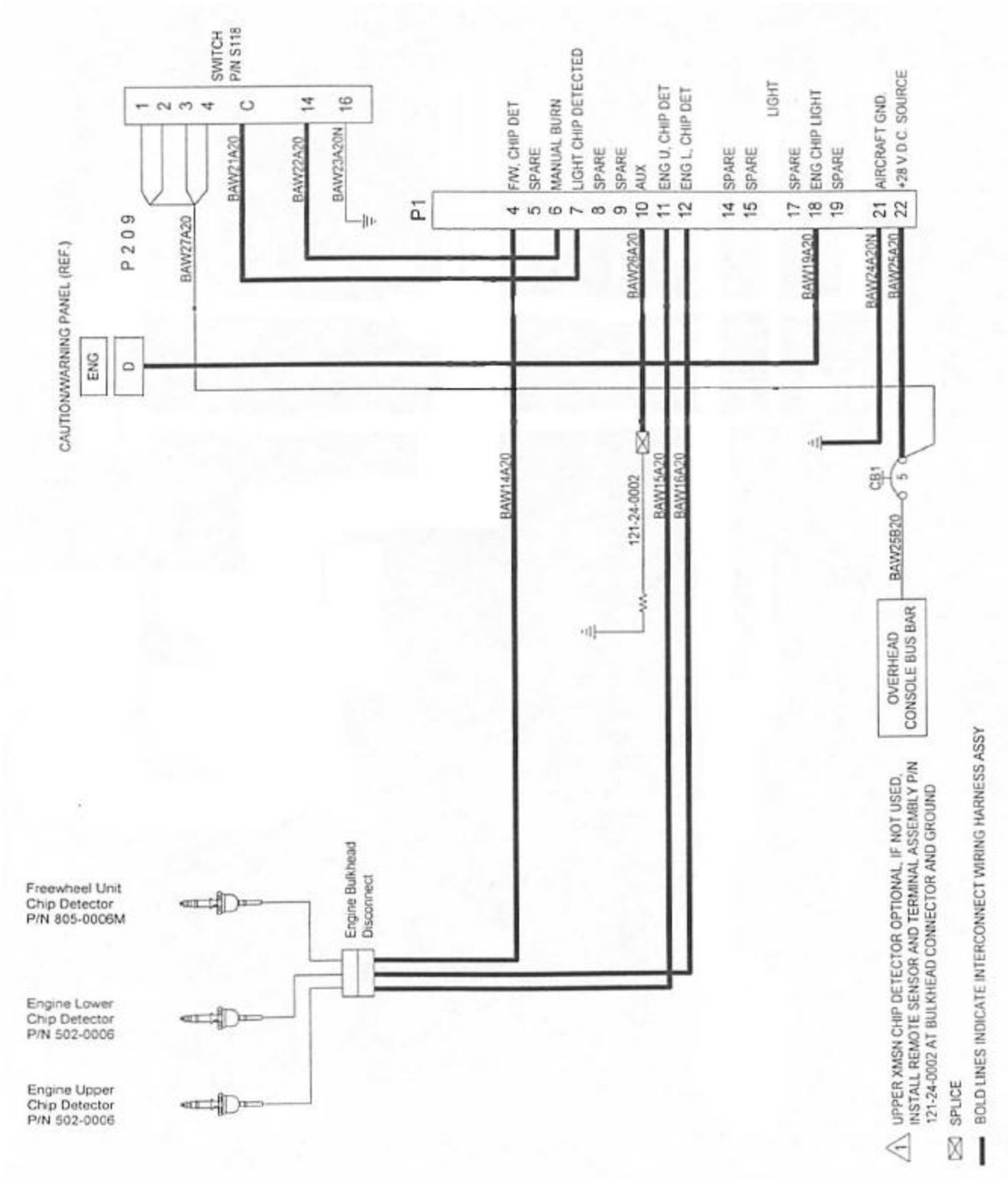


Figure 31-9. Wiring Chart Chip Detector

31-45. NORMAL OPERATING PROCEDURES

1. Turn on electrical power either by the battery switch or APU and observe the Power Unit display Indicator lights, Clear Chip Switch and the Caution Warning Panel Chip Lights for operation. If all cycle, on and off, within seven (7) to ten (10) seconds the system is operating correctly. This test may also be initiated by depressing the "Press to Test" button on the face of the Power Unit.
2. If the Caution Warning Panel Chip Lights and Power Unit Lights stay on, push the "Clear Chip" Switch located adjacent to the Caution Warning Panel. If all lights go out, you have cleared the chip detector that had nuisance debris across the poles. If any lights stay on then the cause must be determined before flight.
3. When viewing the Power Unit display, if one of the chip location lights remains illuminated with the "Chip" light on the Power Unit illuminated, then the chip detector at the location specified should be removed to determine source of chip light.
4. When viewing the Power Unit display, if one of the chip location lights remains illuminated with the "Maint." light on the Power Unit illuminated, then the chip detector at the location specified should be removed and cleaned.
5. When viewing the Power Unit display, if one of the chip location lights remains illuminated with the "Wire Fault" light on the Power Unit illuminated, then the wire between the Power Unit and the chip detector should be inspected for an open condition.
6. When viewing the Power Unit display, if the "Box Fail" light is illuminated, then the Power Unit should be removed and repaired.

31-46. IN-FLIGHT OPERATION PROCEDURE

The Auto-Fault System is functional during all flight operations. The rotorcraft caution-warning system is continuously monitoring all aircraft chip detectors and warns the pilot when a chip is captured. If the caution-warning chip light does not extinguish after depressing the "Clear Chip" Switch then the procedures as outlined in the Emergency Procedure Section of the TH-57 NATOPS must be followed.

When a chip light illuminates, no more than one (1) clear may be accomplished during a single flight on any one oil system within a 30 minute time period.

NOTE

When attempting to clear a chip light, do not press the "Clear Chip" switch adjacent to the caution-warning panel more than three (3) times, waiting 5 seconds between each clear attempt. If chip light does not extinguish after three (3) attempts, follow the EMERGENCY/ MALFUNCTION procedures in the basic TH-57 NATOPS

No more than two (2) CLEARS are permitted on any one oil system within 50 hours of flight time, once 2 or more clears have been recorded investigate the cause for the indication in accordance with the applicable Bell or Rolls Royce Maintenance Manual.

Each chip indication that is cleared must be logged in the rotor and/or engine maintenance logs so that all crewmembers can review data before each flight. If a third indication of a chip in any one oil system is indicated within the 50 hour flight time limit, land as soon as possible. Refer to Rolls Royce/Allison 250-C250 Series Operation and Maintenance Manual for component disposition.

31-47. REMOVAL AND INSTALLATION

1. Remove Power Unit:
   a Aircraft electrical power must be turned off.
   b. Gain access to the Power Unit and disconnect electrical harness.
   c. Remove 4 ea. screws, washers and nuts retaining Power Unit.

2. Install Power Unit:

a. Position Power Unit in proper location and install 4 ea. screws, washers and nuts.

b. Attach electrical harness.

3. Operational Check of Power Unit:

a. Apply electrical power to the aircraft and perform normal operating procedures (Paragraph 31-38).

4. Remove/Installation Chip Detector (Generic)

a. Follow procedures outlined in applicable Bell and Rolls Royce Maintenance Manual for the remove and installation of specific chip detectors.

5. Operational Check of Chip Detector.

This procedure will check the aircraft and the Benz Auto-Fault System Chip Warning system at the same time. For these checks to work, aircraft electrical power must be on and all connectors in the system connected, additionally, all detectors must be clear of any debris and the Power Unit functioning properly.

a. Gain access to the chip detector requiring operational check.

b. Remove the chip detector probe from its installed/grounded position. This condition will cause the corresponding chip location light and “Wire Fault” light to illuminate on the display of the Power Unit. Install chip detector back to ground and the lights should extinguish.

c. Remove the chip detector probe from its installed position and place a section of .003 inch dia. 1010 steel wire across the detector magnets and short out detector. Ground chip detector probe body. This condition will cause the corresponding chip location light and "Chip" light to illuminate on the display of the Power Unit and the corresponding chip light on the caution-warning panel to illuminate. Submerge in oil. Press the "Clear Chip" switch, up to three times, all lights should extinguish. Clean any remaining debris from the chip detector and reinstall.

d. Any unexpected results witnessed during steps B & C will require additional troubleshooting or repair or replacement of the Power Unit or chip detectors.

31-48. ELECTRICAL WIRING ILLUSTRATION

1. Figure 31-9, depicts model TH-57 series helicopters which have a caution-warning panel as part of the caution-warning system.

31-49. INSTRUMENTS

This chapter supplements the basic 206B-III Maintenance Manual. Only the added instruments are covered in this chapter.

31-50. HYDRAULIC LOW PRESSURE CAUTION LIGHT

The hydraulic low pressure caution light receives low pressure indications from the low pressure switch located next to hydraulic filter.

31-51. LOW FUEL INDICATOR

The low fuel indicator on the caution panel receives fuel low indications from a float switch located in the fuel cell between fore and aft fuel pumps.

31-52. ENGINE FIRE DETECTION CAUTION LIGHT

The engine fire detection caution light receives signals from temperature sensing tube routed in upper engine cowling and fire overheat detector.

31-53. DC VOLTMETER.

The DC voltmeter located in left side of the instrument panel (Figure 31-10) is provided to indicate generator output voltage.

31-54. TROUBLESHOOTING - DC VOLTMETER

Perform checks as necessary to isolate trouble. (See Table 31-5).

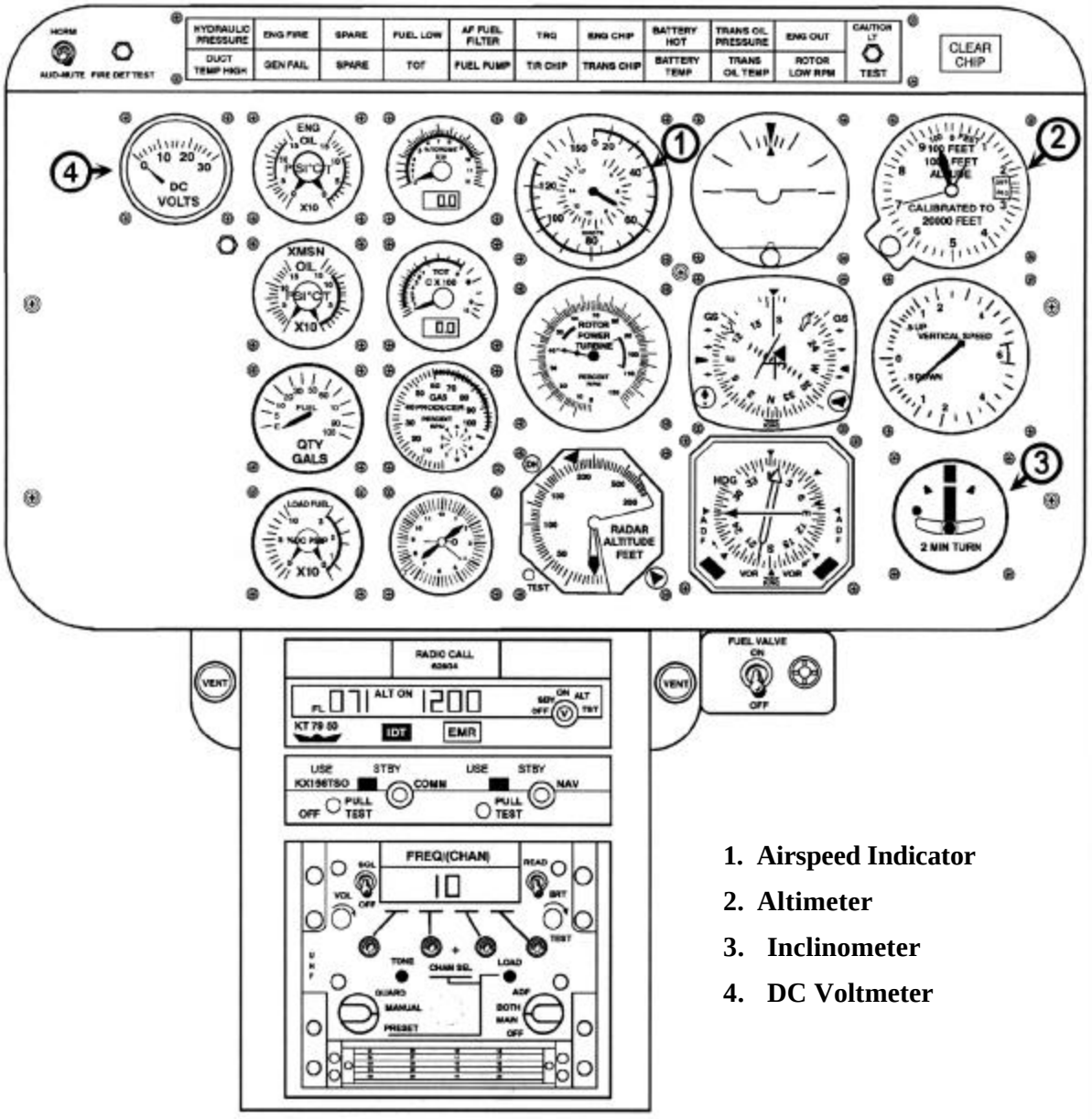


Figure 31-10. TH-57B Instrument Panel

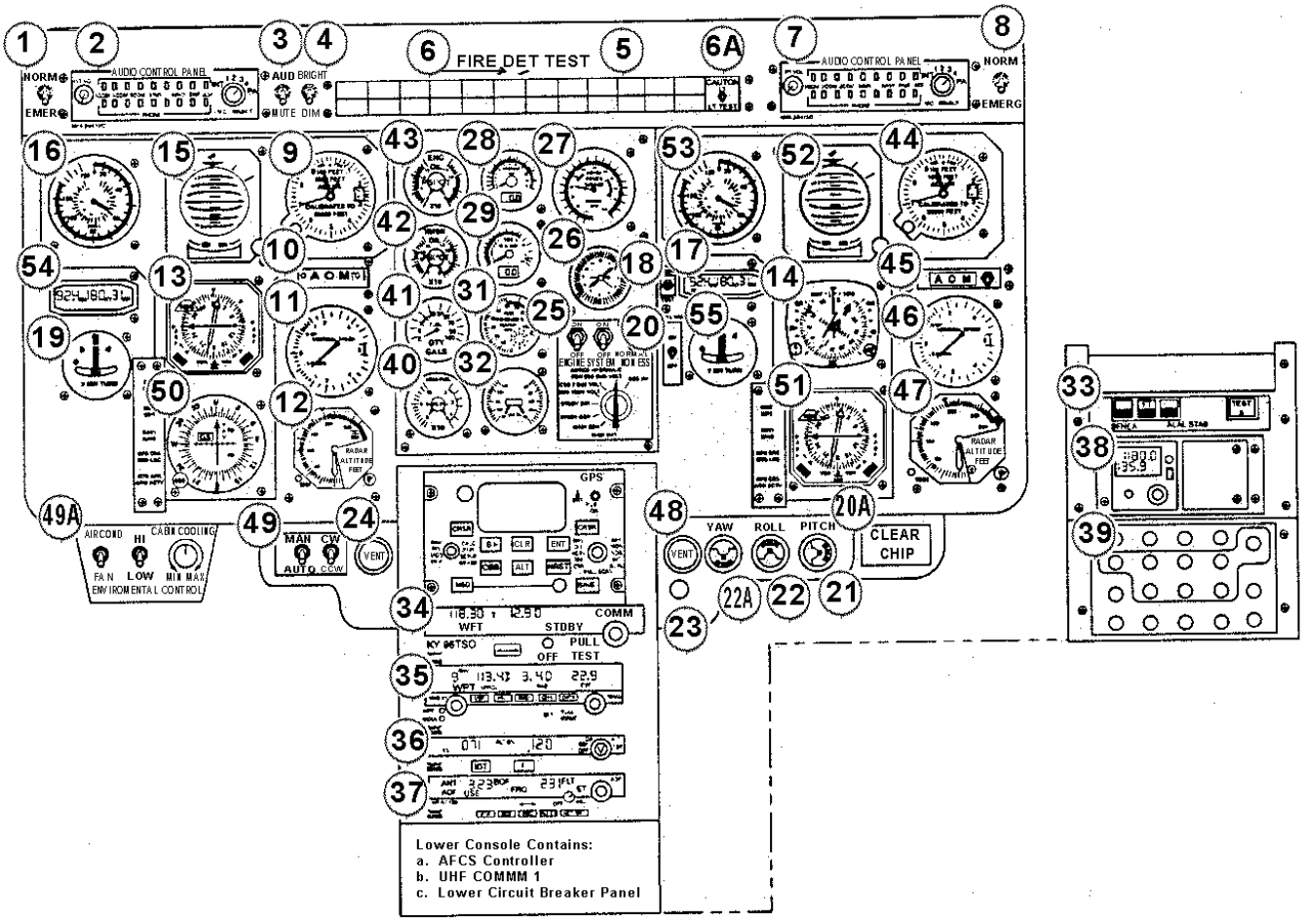


Figure 31-11. TH-57C Instrument Panel (Sheet 1 of 2)

1. Audio NORM/EMER switch
2. Audio control panel
3. Audio mute switch
4. Caution panel BRIGHT/DIM switch
5. Caution/warning panel
6. Fire detector test button
6A. Caution/warning panel test switch
7. Audio control panel
8. Audio NORM/EMERG switch
9. Altimeter
10. Marker beacon panel
11. Instantaneous vertical speed indicator (IVSI)
12. Radar altimeter
13. Radio magnetic indicator (RMI)
14. Horizontal situation indicator (HSI)
15. Attitude indicator
16. Airspeed indicator
17. DME master indicator
18. TACAN test switch
19. Turn and slip indicator
20. Fuel valve switch
20A. Clear chip indicator switch
21. Pitch actuator position indicator
22. Roll actuator position indicator
22A. Yaw actuator position indicator
23. Alternate static source knob
24. Ventknob
25. Voltmeter panel and miscellaneous switches
26. Clock
27. Dual tachometer
28. Torquemeter
29. Turbine outlet temperature indicator (TOT)
30. TOT overtemperature light test button
31. Gas producer tachometer
32. Voltmeter
33. AFCS controller
34. VHF COMM 2
35. NAV 1
36. Transponder(XPDR)
37. ADF
38. UHF COMM 1
39. Pedestal circuit breaker panel and miscellaneous switches
40. Fuel pressure indicator/loadmeter
41. Fuel quantity indicator
42. Transmission oil temperature and pressure indicator
43. Engine oil temperature and pressure indicator
44. Altimeter
45. Marker beacon light adapter
46. Instantaneous vertical speed indicator (IVSI)
47. Radar altimeter
48. Vent knob
49. Compass slaving adapter
49A. Environmental control panel
50. Course deviation indicator (COI)
51. Radio magnetic indicator (RMI)
52. Attitude indicator
53. Airspeed indicator
54. DME slave indicator
55. Turn and slip indicator

Figure 31-11. TH-57C Instrument Panel (Sheet 2 of 2)

Table 31-5. DC VOLTMETER		
INDICATION OF TROUBLE	**PROBABLE CAUSE**	**CORRECTIVE ACTION**
No reading or erratic reading.	Defective generator.	Replace generator.
	Open or short circuit in loadmeter.	Replace voltmeter.
	Dirty or worn mechanism in voltmeter.	Replace voltmeter.
	Voltage regulator faulty.	Replace voltage regulator.
	Defective wiring.	Repair wiring.

31-55. REMOVAL - DC VOLTMETER

1. Ensure electrical power is OFF.
2. Disconnect electrical leads from back of DC voltmeter.
3. Protect electrical lead with tape.
4. Remove mounting screws. Remove DC voltmeter.

31-56. INSPECTION - DC VOLTMETER

1. Inspect DC voltmeter for loose or cracked glass.
2. Inspect markings for legibility.

31-57. INSTALLATION - DC VOLTMETER

DO NOT OVER TIGHTEN SCREWS. EXCESSIVE TORQUE MAY DEFORM DC VOLTMETER CASE.

1. Position DC voltmeter in panel. Install mounting screws.
2. Remove tape and connect electrical leads.
3. Check operation of DC voltmeter.