

# N228HS

## 2003 Cessna T206H

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# FAA Form

# 337s

**MSN: T20608419**



**RidgeAire**  
WORLDWIDE  
aviation specialists

*Prepared by the worldwide aviation specialists at RidgeAire, Inc.*

For



U.S. Department of Transportation Federal Aviation Administration

# MAJOR REPAIR AND ALTERATION (Airframe, Powerplant, Propeller, or Appliance)

Form Approved OMB No. 2120-0020 11/30/2007 Electronic Tracking Number

For FAA Use Only

INSTRUCTIONS: Print or type all entries. See Title 14 CFR §43.9, Part 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. §44701). Failure to report can result in a civil penalty for each such violation. (49 U.S.C. §46301(a))

1. Aircraft	Nationality and Registration Mark <b>N228HS</b>	Serial No. <b>T20608419</b>	
	Make <b>CESSNA</b>	Model <b>T206 H</b>	Series
2. Owner	Name (As shown on registration certificate) <b>ELLIOTT TAMARA</b>	Address (As shown on registration certificate) <b>52 WATERFORD CT NACGDOCHES, TX 75965-8709 USA</b>	

### 3. For FAA Use Only

4. Type		5. Unit Identification			
Repair	Alteration	Unit	Make	Model	Serial No.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	AIRFRAME	_____	(As described in Item 1 above)	_____
<input type="checkbox"/>	<input type="checkbox"/>	POWERPLANT			
<input type="checkbox"/>	<input type="checkbox"/>	PROPELLER			
<input type="checkbox"/>	<input type="checkbox"/>	APPLIANCE	Type		
			Manufacturer		

### 6. Conformity Statement

A. Agency's Name and Address		B. Kind of Agency	
<b>HARTSELL AVIONICS INC. 325 CORPORATE ROAD LONGVIEW, TEXAS 75603 USA</b>		<input type="checkbox"/> U. S. Certificated Mechanic	<input type="checkbox"/> Manufacturer
		<input type="checkbox"/> Foreign Certificated Mechanic	C. Certificate No.
		<input checked="" type="checkbox"/> Certificated Repair Station	H9TR858J
		<input type="checkbox"/> Certificated Maintenance Organization	

D. I certify that the repair and/or alteration made to the unit(s) identified in item 5 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U. S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

Extended range fuel per 14 CFR Part 43 App. B <input type="checkbox"/>	Signature/Date of Authorized Individual 	<b>DAVID HARTSELL</b> 08-February-2021
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### 7. Approval for Return to Service

Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is  Approved  Rejected

	FAA Flt. Standards Inspector		Manufacturer		Maintenance Organization		Persons Approved by Canadian Department of Transport
BY	FAA Designee	<input checked="" type="checkbox"/>	Repair Station		Inspection Authorization		Other (Specify)

Certificate or Designation No. <b>H9TR858J</b>	Signature/Date of Authorized Individual 	<b>DAVID HARTSELL</b> 08-February-2021
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## NOTICE

*Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.*

### 8. Description of Work Accomplished

*(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)*

N228HS

Feb-08-2021

Nationality and Registration Mark

Date

A. REMOVE AUTOPILOT, #2 NAV COM, ENGINE AND FLIGHT INSTRUMENTS.

B. THE FOLLOWING EQUIPMENT WAS INSTALLED USING MIL 22759 AND MIL 27500 WIRE.

C. EQUIPMENT INSTALLED I.A.W. :

- a. A.C. 43.13-1B CHAP. 4 sec 4,6,7 sec 1-5 and 7 and 11,10,11 exc sec 2 and 18 thru 20,12 sec 1 and 2.
- b. A.C. 43.13-2B CHAP. 1,2,3,13

D. ALTERATIONS AS FOLLOWS:

- a. INSTALLED G500TXI SYSTEMS IAW STC# SA02571SE  
THE G500TXI FMS#190-01717-B2 REV 1 OR LATER APPROVED REV. MUST BE ON BOARD AND AVILIBLE TO THE FLIGHT CREW WHEN USING THE G600TXI
- b | INSTALL GTN 650XI AND GMA 35C IAW STC# SA02019SE-D
- c. INSTALL GARMIN GFC500 AUTOPILOT IAW STC# SA01866WI
- d. INSTALL GARMIN GI275 NDCATOR FOR EIS IAW STC#SA02658SE THE STC APPROVED FMS P#190-02246-12 REV 1 OR LATER APPROVED REV MUST BE ON BOARD AND AVAILABLE TO THE FLIGHT CREW WHEN USING THE GI 275.

E. STC APPROVED ICA's GIVEN TO AIRCRAFT OWNER. AFMS 'S FOR THE GARMIN G5 P#190-01112-13 R6 ,GFC 500A/P DWG#190-02291-25 R4,

GTN 650XI P#190-01007-C2 OR LATER REV.MUST BE ON BOARD AND IMMEDIATELY AVAILABLE TO THE FLIGHT CREW WHEN USING THE RESPECTIVE EQUIPMENT.

F. ELECTRIC LOAD DOES NOT EXCEED 80% OF SYSTEM CAP.

G. EQUIP LIST AND WIGHT AND BALLANCE UPDATED.

-----END-----

ADDITIONAL SHEETS ARE ATTACHED



U S Department of  
Transportation  
Federal Aviation  
Administration

## MAJOR REPAIR AND ALTERATION (Airframe, Powerplant, Propeller, or Appliance)

Form Approved  
OMB No. 2120-0020

For FAA Use Only

Office Identification

INSTRUCTIONS: Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. 1421). Failure to report can result in a civil penalty not to exceed \$1,000 for each such violation (Section 901 Federal Aviation Act 1958)

<b>1. Aircraft</b>	Make <b>Cessna</b>	Model <b>T206H</b>
	Serial No. <b>T20608419</b>	Nationality and Registration Mark <b>USA N228HS</b>
<b>2. Owner</b>	Name (As shown on registration certificate) <b>Tamara Elliott</b>	Address (As shown on registration certificate) <b>52 Waterford Ct. Nacogdoches, TX 75965-8709</b>

**3. For FAA Use Only**

4. Unit Identification				5. Type	
Unit	Make	Model	Serial No.	Repair	Alteration
AIRFRAME	~~~~~(As described in item 1 above)~~~~~			<input type="checkbox"/>	<input checked="" type="checkbox"/>
POWERPLANT				<input type="checkbox"/>	<input type="checkbox"/>
PROPELLER				<input type="checkbox"/>	<input type="checkbox"/>
APPLIANCE	Type			<input type="checkbox"/>	<input type="checkbox"/>
	Manufacturer			<input type="checkbox"/>	<input type="checkbox"/>

**6. Conformity Statement**

<b>A. Agency's Name and Address</b> Avionics 1 <sup>st</sup> , Inc 5676 Apollo Dr LB39 Dallas, TX 75237	<b>B. Kind of Agency</b> <input type="checkbox"/> U.S. Certified Mechanic <input type="checkbox"/> Foreign Certified Mechanic <input checked="" type="checkbox"/> Certified Repair Station <input type="checkbox"/> Manufacturer	<b>C. Certificate No.</b> CRS # 8A1R718B
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D. I certify that the repair and/or alteration made to the unit(s) identified in item 4 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

<b>Date</b> May 15, 2019	<b>Signature of Authorized Individual</b> <div style="text-align: right;">             Dennis F. Sorber         </div>
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**7. Approval for Return to Service**

Pursuant to the authority given persons specified below, the unit identified in item 4 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is  APPROVED  REJECTED

<b>BY</b>	<input type="checkbox"/> FAA Fit Standards Inspector	<input type="checkbox"/> Manufacturer	<input type="checkbox"/> Inspection Authorization	Other (Specify)
	<input type="checkbox"/> FAA Designee	<input checked="" type="checkbox"/> Repair Station	<input type="checkbox"/> Person Approved by Transport Canada Airworthiness Group	

<b>Date of Approval or Rejection</b> May 15, 2019	<b>Certificate or Designation No.</b> CRS # 8A1R718B	<b>Signature of Authorized Individual</b> <div style="text-align: right;">             Dennis F. Sorber         </div>
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## NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

### 8. Description of Work Accomplished

(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

N228HS      Cessna T206H      S/N T20608419      WO# 190503-3      Tach: 3161.4

#### Removed Equipment:

- 1.) Bendix/King KMT-112 Flux Gate P/N 071-1052-00 at F.S. 37
- 2.) Bendix/King KA51B Slaving Accessory P/N 071-1242-01
- 3.) Bendix/King HSI P/N 066-3046-07 at F.S. 12
- 4.) Bendix/King KG-102A Remote Directional Gyro P/N 060-0015-00 at F.S. 155
- 5.) Vacuum Pump P/N AA3216CW at F.S. -5
- 6.) Vacuum Pump P/N RAP215LC at F.S. -5

#### Installed Equipment:

- 1.) Garmin GMU-11 Magnetometer P/N 011-04349-01 at F.S. 37
- 2.) Garmin GAD-29B Analog Converter P/N 011-03236-11 at F.S. 12
- 3.) Dual Garmin G-5 Display unit P/N 011-03809-00 at F.S. 14

Installed Dual Garmin G-5 Electronic Flight Display systems including Electronic HSI and Attitude Indicator in accordance with Garmin STC # SA01818WI dated October 18, 2017 with reference to the Garmin G-5 Part 23 AML STC Installation Manual P/N 190-01112-10 Rev. 18 dated April 2019.

All affected systems were operationally checked with no discrepancies noted. System checks were completed IAW Manufacturers installation instructions.

Instructions for Continued Airworthiness for the G-5s are contained within Document #190-01112-11, Rev. 5, dated July 2018 approved via STC # SA01818WI was inserted into the aircraft records.

Ground checks were completed on May 15, 2019 IAW Garmin G-5 Installation Manual P/N 190-01112-10, Rev. 18, dated April 2019, with all checks being satisfactory.

An Electrical Load Analysis was performed in accordance with AC 43.13-1B, Chapter 11, Paragraph 11-36.

FAA Approved Flight Manual Supplement for the Garmin G-5 Document #190-01112-13, Rev. 5, dated December 2017 were inserted into Aircraft Flight Manual and is required to be onboard and available to the pilot for operation of this system.

Weight and Balance Data and Equipment List was updated and entered into the Aircraft Flight Manual

-----END-----

Additional Sheets Are Attached



United States of America  
Department of Transportation  
Federal Aviation Administration

# Supplemental Type Certificate

Number: SA01818WI

This certificate issued to: Garmin International, Inc.  
1200 East 151st Street  
Olathe, KS 66062

certifies that the change in the type design for the following product with the limitations and conditions therefore as specified hereon meets the airworthiness requirements of Part 23\* of the Federal Aviation Regulations.

Original Product – Type Certificate Number:

Multiple - AML STC

Make:

Model:

See Approved Model List (AML) SA01818WI for approved aircraft models and applicable airworthiness regulations

Description of Type Design Change:

Installation of Garmin G5 Electronic Flight Instrument

Data Required:

- (1) Garmin Master Drawing List (MDL) 005-01112-01, Revision 1, dated July 22, 2016
  - (2) Garmin G5 STC Maintenance Manual including ICA 190-01112-11, Revision 1, dated July 22, 2016
  - (3) Garmin G5 Airplane Flight Manual Supplement 190-01112-13, Revision 1, dated July 22, 2016
- Later FAA-approved revisions to the data listed above are incorporated without amendment to this certificate

Limitations and Conditions:

- (1) Compatibility of this design change with previously approved modifications must be determined by the installer.
  - (2) The installation of the G5 requires the retention of the mechanical airspeed indicator, altimeter, and vertical speed indicator. If the G5 is installed as the primary attitude, it requires retention of the existing rate of turn indicator. If installed in place of the rate of turn indicator, it requires retention of the existing primary attitude indicator.
- (continued on Sheet 3)

*This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, and revoked or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.*

Date of Application: May 5, 2016

Date Reissued:

Date of Issuance: July 22, 2016

Date Amended:

By Direction of the Administrator

Signature

Robert G. Murray  
ODA STC Unit Administrator  
ODA-240087-CE

Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both. This certificate may be transferred or made available to third persons by licensing agreements in accordance with 14 CFR 21.47. Possession of this Supplemental Type Certificate (STC) document by persons other than the STC holder does not constitute rights to the design data nor to alter an aircraft, aircraft engine, or propeller. The STC's supporting documentation (drawings, instructions, specifications, flight manual supplements, etc.) is the property of the STC holder. An STC holder who allows a person to use the STC to alter an aircraft, aircraft engine, or propeller must provide that person with written permission acceptable to the FAA. (Ref. 14 CFR 21.120).



United States of America  
Department of Transportation  
Federal Aviation Administration  
*Supplemental Type Certificate*

INSTRUCTIONS: The transfer endorsement below may be used to notify the appropriate FAA Aircraft Certification Office of the transfer of this Supplemental Type Certificate. The FAA will reissue the certificate in the name of the transferee and forward it to him.

*Transfer Endorsement*

*Transfer the ownership of Supplemental Type Certificate Number:*

To (Name and address of transferee)

From (Name and address of grantor)

Extent of Authority (if licensing agreement):

*Date of transfer:*

*Signature of grantor:* \_\_\_\_\_

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Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both. This certificate may be transferred or made available to third persons by licensing agreements in accordance with 14 CFR 21.47. Possession of this Supplemental Type Certificate (STC) document by persons other than the STC holder does not constitute rights to the design data nor to alter an aircraft, aircraft engine, or propeller. The STC's supporting documentation (drawings, instructions, specifications, flight manual supplements, etc.) is the property of the STC holder. An STC holder who allows a person to use the STC to alter an aircraft, aircraft engine, or propeller must provide that person with written permission acceptable to the FAA. (Ref. 14 CFR 21.120).

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United States of America  
Department of Transportation  
Federal Aviation Administration

# Supplemental Type Certificate

(Continuation Sheet)

Number: SA01818WI

### Limitations and Conditions (Cont.)

- (3) Aircraft modified by this STC must be operated in accordance with the Airplane Flight Manual Supplement (AFMS) identified above.
- (4) Aircraft modified by this STC must be maintained in accordance with the Instructions for Continued Airworthiness (ICA) identified above.
- (5) If the holder agrees to permit another person to use this certificate to alter the product, the holder must give the other person written evidence of that permission.

### \*Certification Basis

Based on 14 CFR 21.115 and 21.101, and the FAA policy for significant changes in FAA Order 8110.48, the certification basis for this change is as follows:

- a. The certification basis for parts not changed or not affected by this change remains unchanged from the original approval.
- b. The certification basis for parts changed or affected by this change is:

Section	Amdt.
23.301(a)	23-48
23.303	Orig.
23.305(a)(b)	23-45
23.307(a)	Orig.
23.561(a)(b)(3)(e)	23-48
23.601	Orig.
23.603	23-23
23.605(a)	23-23
23.607(b)	23-48
23.613(a)(b)	23-45
23.771(a)	23-14
23.773(a)(2)	23-45
23.777(a)(b)	23-33
23.1301	23-20
23.1303(a)(b)(f)	23-49
23.1307	23-49
23.1309(a)(b)(c)(d)(e)	23-49
23.1311(a)(1)(2)(3)(6)(7)(b)	23-49
23.1321(c)(d)(e)	23-49
23.1322	23-43

Continued on Page 4

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Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both. This certificate may be transferred or made available to third persons by licensing agreements in accordance with 14 CFR 21.47. Possession of this Supplemental Type Certificate (STC) document by persons other than the STC holder does not constitute rights to the design data nor to alter an aircraft, aircraft engine, or propeller. The STC's supporting documentation (drawings, instructions, specifications, flight manual supplements, etc.) is the property of the STC holder. An STC holder who allows a person to use the STC to alter an aircraft, aircraft engine, or propeller must provide that person with written permission acceptable to the FAA. (Ref. 14 CFR 21.120).

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United States of America  
Department of Transportation  
Federal Aviation Administration

# Supplemental Type Certificate

(Continuation Sheet)

Number: SA01818WI

Certification Basis continued:

Section	Amdt.
23.1323(a)(b)(c)	23-49
23.1325(a)(b)	23-49
23.1331(a)(b)(1)(c)	23-43
23.1351(a)	23-49
23.1353(h)	23-49
23.1357(a)(b)(c)(d)	23-43
23.1359	23-49
23.1365(a)(b)(d)(e)	23-49
23.1381(a)(b)	Original
23.1431(a)(b)	23-49
23.1529	23-26
23.1541	23-21
23.1543(b)	Original
23.1545(a)(b)(c)	23-23
23.1555(a)(b)	23-21
23.1581(a)(b)(d)(f)	23-45
23.1585(a)	23-45

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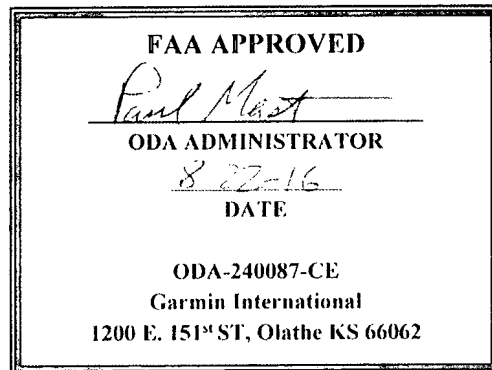
Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both. This certificate may be transferred or made available to third persons by licensing agreements in accordance with 14 CFR 21.47. Possession of this Supplemental Type Certificate (STC) document by persons other than the STC holder does not constitute rights to the design data nor to alter an aircraft, aircraft engine, or propeller. The STC's supporting documentation (drawings, instructions, specifications, flight manual supplements, etc.) is the property of the STC holder. An STC holder who allows a person to use the STC to alter an aircraft, aircraft engine, or propeller must provide that person with written permission acceptable to the FAA. (Ref. 14 CFR 21.120).

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**FAA Approved Model List (AML)**

**STC Number SA01818WI**

**Installation of Garmin G5 Electronic Instrument System**



Issued Date: July 22, 2016

Revised Date: August 22, 2016

(See Revision History for full list of revisions)

**FAA Approved Model List (AML) STC Number SA01818WI**

**AML Revision Log**

<b>Date</b>	<b>Description</b>
July 22, 2016	Original
Aug 22, 2016	Add models under the following TCDS: 1A2, 1A4, 1A6, A34CE, A-767

**FAA Approved Model List (AML) STC SA01818WI**

Aircraft Make (TCDS Holder) [common name or previous make]	Aircraft Model (alias)	Type Certificate Number	TC Cert. Basis*	MDL 005-01112-01 Rev.**	AML Rev. Date	Limitations
<b>Aermacchi S.p.A</b> (Aermacchi S.p.A) [Siai Marchetti]	F.260, F.260B, F.260C, F.260D, F.260E, F.260F	A10EU	CAR 3	1	July 22, 2016	
<b>Aermacchi S.p.A</b> (Aermacchi S.p.A) [Siai Marchetti]	S.205-18/F, S.205-18/R, S.205-20/F, S.205-20/R, S.205-22/R, S.208, S.208A	A9EU	FAR 23	1	July 22, 2016	
<b>Aero Commander</b> (Dynac Aerospace Corp) [Voltaire]	10, 10A, 100, 100A, 100-180	1A21	CAR 3	1	July 22, 2016	
<b>Aeromere</b> (Aeromere S.A.) [Falco]	Falco F.8.L	7A11	CAR 3/10	1	July 22, 2016	
<b>Aeronautica Macchi Aerfer</b> (Aeronautica Macchi S.p.A. & Aerfer-Industrie Aerospaziali Meridionali S.p.A.)	AM-3	A19EU	FAR 23	1	July 22, 2016	
<b>Alexandria Aircraft</b> (Alexandria Aircraft, LLC) [Bellanca]	17-30, 17-31, 17-31TC	1A3	CAR 3	1	July 22, 2016	
<b>Alexandria Aircraft</b> (Alexandria Aircraft LLC) [Bellanca]	17-30A, 17-31A, 17-31ATC	A18CE	FAR 23	1	July 22, 2016	
<b>American Champion</b> (American Champion Aircraft Corporation)	7ECA, 7GCAA, 7GCBC, 7KCAB	A-759	CAR 4a	1	July 22, 2016	
<b>American Champion</b> (American Champion Aircraft Corporation)	8KCAB, 8GCBC	A21CE	FAR 23	1	July 22, 2016	
<b>Aviat Aircraft, Inc.</b> (Aviat Aircraft, Inc.) [Sky International]	A-1, A-1A, A-1B, A-1C-180, A-1C-200	A22NM	FAR 23	1	July 22, 2016	
<b>Beechcraft</b> (Beechcraft Corporation) [Hawker Beechcraft Corporation]	D17S (Army UC-43, UC-43B, Navy GB-1, GB-2), SD17S	A-649	Aero 7A	1	July 22, 2016	
<b>Beechcraft</b> (Beechcraft Corporation) [Hawker Beechcraft Corporation]	G17S	TC 779	Aero 7A	1	July 22, 2016	
<b>Beechcraft</b> (Beechcraft Corporation) [Hawker Beechcraft Corporation]	19A, B19, M19A, 23, A23, A23A, A23-19, A23-24, B23, C23, A24, A24R, B24R, C24R	A1CE	CAR 3	1	July 22, 2016	
<b>Beechcraft</b> (Beechcraft Corporation) [Hawker Beechcraft Corporation]	35-33, 35-A33, 35-B33, 35-C33, 35-C33A, E33, E33A, E33C, F33, F33A, F33C, G33, H35, J35, K35, M35, N35, P35, S35, V35, V35A, V35B, 36, A36, A36TC, B36TC	3A15	CAR 3	1	July 22, 2016	
<b>Beechcraft</b> (Beechcraft Corporation) [Hawker Beechcraft Corporation]	35, A35, B35, C35, D35, E35, F35, G35	A-777	CAR 3	1	July 22, 2016	
<b>Beechcraft</b> (Beechcraft Corporation) [Hawker Beechcraft Corporation]	45 (YT-34), A45 (T-34A, B-45), D45 (T-34B)	5A3	CAR 3	1	July 22, 2016	

**FAA Approved Model List (AML) STC SA01818WI**

<b>Aircraft Make (TCDS Holder) [common name or previous make]</b>	<b>Aircraft Model (alias)</b>	<b>Type Certificate Number</b>	<b>TC Cert. Basis*</b>	<b>MDL 005-01112-01 Rev.**</b>	<b>AML Rev. Date</b>	<b>Limitations</b>
<b>Beechcraft</b> (Beechcraft Corporation) [Hawker Beechcraft Corporation]	D55, D55A, E55, E55A, 56TC, A56TC, 58, 58A, 95, B95, B95A, D95A, E95, 95-55, 95-A55, 95-B55, 95-B55A, 95-B55B (T-42), 95-C55, 95-C55A	3A16	CAR 3	1	July 22, 2016	
<b>Beechcraft</b> (Beechcraft Corporation) [Hawker Beechcraft Corporation]	76	A29CE	FAR 23	1	July 22, 2016	
<b>Beechcraft Corporation</b> (Beechcraft Corporation) [Beech Aircraft Company; Raytheon Aircraft Company; Hawker Beechcraft Corporation]	77	A30CE	FAR 23	1	July 22, 2016	
<b>Boeing</b> (The Boeing Company) [Rockwell International]	BC-1A, AT-6 (SNJ-2), AT-6A (SNJ-3), AT-6B, AT-6C (SNJ-4), AT-6D (SNJ-5), AT-6F (SNJ-6), SNJ-7, T-6G	A-2-575	CAR 4a	1	July 22, 2016	
<b>Cessna</b> (Cessna Aircraft Company)	T-50 (Army AT-17, and UC-78 series, and Navy JRC-1)	A-722	CAR 4a	1	July 22, 2016	
<b>Cessna</b> (Cessna Aircraft Company)	Cessna FR172K	A18EU	CAR 3	1	July 22, 2016	
<b>Cessna</b> (Cessna Aircraft Company)	F172D, F172E, F172F, F172G, F172H, F172K, F172L, F172M, F172N, F172P, FP172D	A4EU	CAR 3 CAR 10	1	July 22, 2016	
<b>Cessna</b> (Cessna Aircraft Company)	F177RG	A26EU	FAR 23	1	July 22, 2016	
<b>Cessna</b> (Cessna Aircraft Company)	F182P, F182Q, FR182	A42EU	CAR 3 FAR 23	1	July 22, 2016	
<b>Cessna</b> (Cessna Aircraft Company)	F337E, FT337E, F337F, FT337F, F337G, FT337GP, F337H, FT337HP	A23EU	FAR 23	1	July 22, 2016	
<b>Commander</b> (Commander Aircraft Corporation) [CPAC, Inc.]	112, 112TC, 112B, 112TCA, 114, 114A, 114B, 114TC	A12SO	FAR 23	1	July 22, 2016	
<b>Diamond</b> (Diamond Aircraft Industries, Inc.)	DA20-A1, DA20-C1	TA4CH	FAR 23	1	July 22, 2016	
<b>EADS-PZL "Warszawa-Okecie"</b> (EADS-PZL "Warszawa-Okecie" S.A.)	PZL-104 WILGA 80, PZL-104M WILGA 2000, PZL-104MA WILGA 2000	A55EU	FAR 23	1	July 22, 2016	
<b>EADS-PZL "Warszawa-Okecie"</b> (EADS-PZL "Warszawa-Okecie" S.A.)	PZL-KOLIBER 150A, PZL-KOLIBER 160A	A69EU	FAR 23	1	July 22, 2016	
<b>Found Aircraft Canada, Inc.</b> (Found Aircraft Canada, Inc.)	FBA-2C, FBA-2C1 (Bush Hawk), FBA-2C2 (Bush Hawk XP)	A7EA	CAR 3 FAR 23	1	July 22, 2016	
<b>Found Brothers</b> (Found Brothers Aviation Limited)	FBA Centennial "100"	A13EA	CAR 3	1	July 22, 2016	
<b>Helio</b> (Helio Aircraft, LLC)	H-250, H-295 (USAF U-10D), HT-295, H-391 (USAF YL-24), H-391B, H-395 (USAF L-28A or U-10B), H-395A,	1A8	CAR 3	1	July 22, 2016	

**FAA Approved Model List (AML) STC SA01818WI**

Aircraft Make (TCDS Holder) [common name or previous make]	Aircraft Model (alias)	Type Certificate Number	TC Cert. Basis*	MDL 005-01112-01 Rev.**	AML Rev. Date	Limitations
Howard (Howard Aircraft Foundation)	DGA-15P (Army UC-70, Navy GH-1, GH-2, GH-3, NH-1), DGA-15J (Army UC-70B), DGA-15W	A-717	CAR 4a	1	July 22, 2016	
Interceptor (Interceptor Aircraft Inc) [Prop-Jets, Inc.; Meyers]	200, 200A, 200B, 200C, 200D, 400	3A18	CAR 3	1	July 22, 2016	
JGS (JGS Properties, LLC) [Quartz Mountain Aerospace; Luscombe Aircraft]	11E	A-804	CAR 3	1	July 22, 2016	
Lovaux Ltd (FLS Aerospace (Lovaux) Ltd.)	OA7 Optica Series 300	A64EU	FAR 23	1	July 22, 2016	
Maule (Maule Aerospace Technology, Inc.)	Bee Dee M-4, M-4, M-4C, M-4S, M-4T, M-4-180C, M-4-180S, M-4-180T, M-4-180V, M-4-210, M-4-210C, M-4-210S, M-4-210T, M-4-220, M-4-220C, M-4-220S, M-4-220T, M-5-180C, M-5-200, M-5-210C, M-5-210TC, M-5-220C, M-5-235C, M-6-180, M-6-235, M-7-235, MX-7-235, MX-7-180, MX-7-420, MXT-7-180, MT-7-235, M-8-235, MX-7-160, MXT-7-160, MX-7-180A, MXT-7-180A, MX-7-180B, M-7-235B, M-7-235A, M-7-235C, MX-7-180C, M-7-260, MT-7-260, M-7-260C, M-7-420AC, MX-7-160C, MX-7-180AC, M-7-420A, , M-9-235	3A23	CAR 3	1	July 22, 2016	
MICCO Aircraft Co., Inc. (MICCO Aircraft Company, Inc.) [Meyers]	MAC-125C, MAC-145, MAC-145A, MAC-145B	3A1	CAR 4a FAR 23	1	July 22, 2016	
Mooney (Mooney International Corporation) [Mooney Aviation Company, Inc.; Mooney Airplane Co.; Mooney Aircraft Corporation; Aerostar Aircraft Corp]	M20, M20A, M20B, M20C, M20D, M20E, M20F, M20G, M20J, M20K, M20L, M20M, M20R, M20S	2A3	CAR 3	1	July 22, 2016	
Mooney (Mooney Aircraft Corporation)	M22	A6SW	CAR 3	1	July 22, 2016	
Moravan (Moravan National Corporation)	ZLIN 526L	A30EU	FAR 23	1	July 22, 2016	
Nardi (Nardi S.A.) [Siai Marchetti]	FN-333	7A5	CAR 3/10	1	July 22, 2016	
Navion (Sierra Hotel Aero, Inc.)	Navion (L-17A), Navion A (L-17B, L-17C), Navion B, Navion D, Navion E, Navion F, Navion G, Navion H	A-782	CAR 3	1	July 22, 2016	
Piaggio (Piaggio & C.)	P.136-L, P.136-LI	A-813	CAR 3/10	1	July 22, 2016	(3)
Piper Aircraft, Inc. (Piper Aircraft, Inc.)	PA-18 "125" (Army L-21A), PA-18S "125", PA-18AS "125", PA-18 "135" (Army L-21B), PA-18A "135", PA-18S "135", PA-18AS "135", PA-18 "150", PA-18A "150", PA-18S "150", PA-18AS "150", PA-19 (Army L-18C), PA-19S	1A2	CAR 3	1	July 22, 2016	
	PA-18, PA-18S, PA-18A			1	Aug 22, 2016	

**FAA Approved Model List (AML) STC SA01818WI**

Aircraft Make (TCDS Holder) [common name or previous make]	Aircraft Model (alias)	Type Certificate Number	TC Cert. Basis*	MDL 005-01112-01 Rev.**	AML Rev. Date	Limitations
Piper Aircraft, Inc. (Piper Aircraft, Inc.)	PA-20, PA-20S, PA-20 "115", PA-20 "135", PA-20S "135"	1A4	CAR 3	1	Aug 22, 2016	
Piper Aircraft, Inc. (Piper Aircraft, Inc.)	PA-22, PA-22-108, PA-22-135, PA-22S-135, PA-22-150, PA-22S-150, PA-22-160, PA-22S-160	1A6	CAR 3	1	Aug 22, 2016	
Piper Aircraft, Inc. (Piper Aircraft, Inc.)	PA-23, PA-23-160, PA-23-235, PA-23-250, PA-E23-250	1A10	CAR 3	1	July 22, 2016	
Piper Aircraft, Inc. (Piper Aircraft, Inc.)	PA-24, PA-24-250, PA-24-260, PA-24-400	1A15	CAR 3	1	July 22, 2016	
Piper Aircraft, Inc. (Piper Aircraft, Inc.)	PA-28-140, PA-28-150, PA-28-151, PA-28-160, PA-28-161, PA-28-180, PA-28-235, PA-28S-160, PA-28R-180, PA-28S-180, PA-28-181, PA-28R-200, PA-28R-201, PA-28R-201T, PA-28RT-201, PA-28RT-201T, PA-28-201T, PA-28-236	2A13	CAR 3	1	July 22, 2016	
Piper Aircraft, Inc. (Piper Aircraft, Inc.)	PA-38-112	A18SO	FAR 23	1	July 22, 2016	
Piper Aircraft, Inc. (Piper Aircraft, Inc.)	PA-44-180, PA-44-180T	A19SO	FAR 23	1	July 22, 2016	(1)(2) (3)
Piper Aircraft, Inc. (Piper Aircraft, Inc.)	PA-30, PA-39, PA-40	A1EA	CAR 3	1	July 22, 2016	
Piper Aircraft, Inc. (Piper Aircraft, Inc.)	PA-32-260, PA-32-300, PA-32S-300, PA-32R-300, PA-32RT-300, PA-32RT-300T, PA-32R-301(SP), PA-32R-301(HP), PA-32R-301T, PA-32-301, PA-32-301T, PA-32-301FT, PA32-301XTC	A3SO	CAR 3	1	July 22, 2016	
Piper Aircraft, Inc. (Piper Aircraft, Inc.)	PA-34-200, PA-34-200T, PA-34-220T	A7SO	CAR 3	1	July 22, 2016	
Polskie Zaklady Lotnicze Spolka zo.o (Polskie Zaklady Lotnicze Spolka zo.o) [PZL MIELEC]	PZL M26 01	A44CE	FAR 23	1	July 22, 2016	
SOCATA Morane Saulnier Rallye (SOCATA) [SOCATA - Groupe Aerospatiale]	Rallye 100S, Rallye 150ST, Rallye 150T, Rallye 235E, Rallye 235C, MS 880B, MS 885, MS 894A, MS 893A, MS 892A-150, MS 892E-150, MS 893E, MS 894E	7A14	CAR 3	1	July 22, 2016	
SOCATA (SOCATA) [SOCATA - Groupe Aerospatiale]	TB 9, TB 10, TB 20, TB 21, TB 200	A51EU	FAR 23	1	July 22, 2016	
SOCATA, S.A. (SOCATA S.A.) [Grumman]	GA-7 (Cougar)	A17SO	FAR 23	1	July 22, 2016	
STOL (Sky Enterprises, Inc.) [Republic Sea-Bee]	RC-3	A-769	CAR 3	1	July 22, 2016	
STOL (STOL Aircraft Corporation) [Republic Twin-Bee]	UC-1	A6EA	CAR 3	1	July 22, 2016	
Textron Aviation Inc. (Textron Aviation Inc.) [Cessna Aircraft Company]	150, 150A, 150B, 150C, 150D, 150E, 150F, 150G, 150H, 150J, 150K, A150K, 150L, A150L, 150M, A150M, 152, A152	3A19	CAR 3	1	July 22, 2016	

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Aircraft Make (TCDS Holder) [common name or previous make]	Aircraft Model (alias)	Type Certificate Number	TC Cert. Basis*	MDL 005-01112-01 Rev.**	AML Rev. Date	Limitations
Textron Aviation Inc. (Textron Aviation Inc.) [Cessna Aircraft Company]	170, 170A, 170B	A-799	CAR 3	1	July 22, 2016	
Textron Aviation Inc. (Textron Aviation Inc.) [Cessna Aircraft Company]	172, 172A, 172B, 172C, 172D, 172E, 172F (USAF T-41A), 172G, 172H (USAF T-41A), 172I, 172K, 172L, 172M, 172N, 172P, 172Q, 172R, 172S	3A12	CAR 3 FAR 23	1	July 22, 2016	(3)
Textron Aviation Inc. (Textron Aviation Inc.) [Cessna Aircraft Company]	175, 175B, P172D, R172E (USAF T-41B), (USAF T-41C or D), R172F (USAF T-41D), R172G (USAF T-41C or D), R172H (USAF T-41D), R172J, 172RG, R172K	3A17	CAR 3	1	July 22, 2016	
Textron Aviation Inc. (Textron Aviation Inc.) [Cessna Aircraft Company]	177, 177A, 177B	A13CE	FAR 23	1	July 22, 2016	
Textron Aviation Inc. (Textron Aviation Inc.) [Cessna Aircraft Company]	177RG	A20CE	FAR 23	1	July 22, 2016	
Textron Aviation Inc. (Textron Aviation Inc.) [Cessna Aircraft Company]	180, 180A, 180B, 180C, 180D, 180E, 180F, 180G, 180H, 180J, 180K	5A6	CAR 3	1	July 22, 2016	
Textron Aviation Inc. (Textron Aviation Inc.) [Cessna Aircraft Company]	182, 182A, 182B, 182C, 182D, 182E, 182F, 182G, 182H, 182J, 182K, 182L, 182M, 182N, 182P, 182Q, 182R, 182S, 182T, R182, T182, TR182, T182T	3A13	CAR 3 FAR 23	1	July 22, 2016	(3)
Textron Aviation Inc. (Textron Aviation Inc.) [Cessna Aircraft Company]	185, 185A, 185B, 185C, 185D, 185E, A185E, A185F	3A24	CAR 3	1	July 22, 2016	
Textron Aviation Inc. (Textron Aviation Inc.) [Cessna Aircraft Company]	190, 195 (LC-126A,B,C), 195A, 195B	A-790	CAR 3	1	July 22, 2016	
Textron Aviation Inc. (Textron Aviation Inc.) [Cessna Aircraft Company]	206, P206, P206A, P206B, P206C, P206D, P206E, TP206A, TP206B, TP206C, TP206D, TP206E, U206, U206A, U206B, U206C, U206D, U206E, U206F, U206G, TU206A, TU206B, TU206C, TU206D, TU206E, TU206F, TU206G, 206H, T206H	A4CE	CAR 3 FAR 23	1	July 22, 2016	(3)
Textron Aviation Inc. (Textron Aviation Inc.) [Cessna Aircraft Company]	210, 210A, 210B, 210C, 210D, 210E, 210F, T210F, 210G, T210G, 210H, T210H, 210J, T210J, 210K, T210K, 210L, T210L, 210M, T210M, 210N, T210N, 210R, T210R, 210-5 (205), 210-5A (205A)	3A21	CAR 3	1	July 22, 2016	
Textron Aviation Inc. (Textron Aviation Inc.) [Cessna Aircraft Company]	T303	A34CE	FAR 23	1	Aug 22, 2016	
Textron Aviation Inc. (Textron Aviation Inc.) [Cessna Aircraft Company]	310, 310A (USAF U-3A), 310B, 310C, 310D, 310E (USAF U-3B), 310F, 310G, 310H, E310H, 310I, 310J, 310J-1, E310J, 310K, 310L, 310N, 310P, T310P, 310Q, T310Q, 310R, T310R	3A10	CAR 3	1	July 22, 2016	
Textron Aviation Inc. (Textron Aviation Inc.) [Cessna Aircraft Company]	320, 320A, 320B, 320C, 320D, 320E, 320F, 320-1, 335	3A25	CAR 3	1	July 22, 2016	



**FAA Approved Model List (AML) STC SA01818W1**

Aircraft Make (TCDS Holder) [common name or previous make]	Aircraft Model (alias)	Type Certificate Number	TC Cert. Basis*	MDL 005-01112-01 Rev.**	AML Rev. Date	Limitations
Textron Aviation Inc. (Textron Aviation Inc.) [Cessna Aircraft Company]	336	A2CE	CAR 3	1	July 22, 2016	
Textron Aviation Inc. (Textron Aviation Inc.) [Cessna Aircraft Company]	337, 337A (USAF 02B), 337B, T337B, 337C, 337E, T337E, T337C, 337D, T337D, 337F, T337F, 337G, T337G, 337H, T337H, T337H-SP	A6CE	CAR 3 FAR 23	1	July 22, 2016	
Trident (Viking Air, Ltd.)	TR-1	A19EA	FAR 23	1	July 22, 2016	
True Flight Holdings LLC (True Flight Holdings LLC) [American General]	AA-1, AA-1A, AA-1B, AA-1C	A11EA	FAR 23	1	July 22, 2016	
True Flight Holdings LLC (True Flight Holdings LLC) [American General]	AA-5, AA-5A, AA-5B, AG-5B	A16EA	FAR 23	1	July 22, 2016	
Univair (Univair Corporation) [Stinson]	108, 108-1, 108-2, 108-3, 108-5	A-767	CAR 3	1	Aug 22, 2016	
WACO (The WACO Aircraft Company)	YMF	ATC 542	Aero 7A	1	July 22, 2016	
Zenair (Zenair Ltd.)	CH2000	TA5CH	FAR 23	1	July 22, 2016	
ZLIN Aircraft a.s. (ZLIN Aircraft a.s.) [Moravan a.s.]	Z-242L, Z-143L	A76EU	FAR 23	1	July 22, 2016	

[\* TC Certification Basis - See Type Certificate Data Sheet applicable to aircraft for complete certification basis.]

[\*\* Later FAA-approved revisions of the Master Drawing List may be used.]

**Limitations:**

- (1) Excluding aircraft equipped with Avidyne Integra
- (2) Excluding aircraft equipped with Garmin G500
- (3) Excluding aircraft equipped with Garmin G1000

\*\*\*\*\*END\*\*\*\*\*



## 4 INSTALLATION PROCEDURES

### 4.1 Mechanical Installation

#### 4.1.1 Special Tools Required

##### **Laser Square**

For GMU 11 magnetometer installations it is recommended (but optional) to use a laser square with a line accuracy of  $\pm 3/32$  inches end-to-end, at 15 feet perpendicular distance (or better). A Stanley Laser Level Square 77-188 S2 meets the line accuracy requirement.

##### **Digital Level**

It is recommended to use a digital level when installing GMU 11 magnetometer.

##### **Protractor Tool**

A protractor tool may be required to measure the angle offset during the magnetometer installation.

##### **Plumb Bob**

A plumb bob may be required for leveling and installing the magnetometer unit.

##### **Aircraft Jack Set**

A set of aircraft jacks may be required for stabilizing the aircraft after it is leveled.

#### 4.1.2 G5 Mounting Requirements



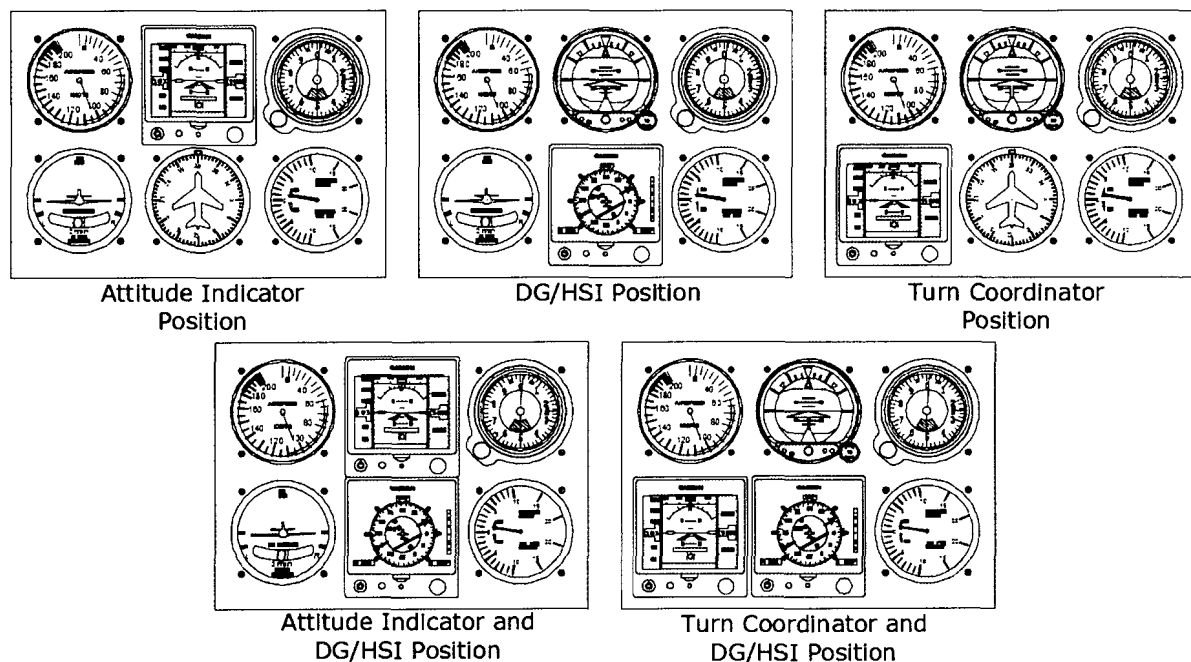
##### **NOTE**

*It is important that the G5 is installed perpendicular to the aircraft's longitudinal axis (display bezel parallel to the wing spar carry thru) and as close to level in the roll axis as possible. Small roll offsets and pitch offsets, up to 15°, can be corrected for during calibration.*

In addition to the installation limitations in Section 2.1, consider the following when selecting a mounting location for the G5:

- Protect the mounting location for the G5 from rapid thermal transients, in particular large heat loads from nearby high-power equipment.
- Do not install the G5 within 1 inch of magnetically mounted antennas, speaker magnets, or other strongly magnetic items.
- If installing dual G5s above and below each other, a minimum spacing of 3.6 inches center to center is required, see Section 4.1.2.4 for more information.
- Two Adapter Plates must be used if installing the G5 in an instrument hole with any cutout for instruments knobs. See Figure 4-10 and Figure 4-12 for more information.

One or two G5s may be installed. See Figure 4-1 for typical installation configurations in an IFR approved aircraft.



**Figure 4-1 Typical G5 Installations for IFR Approved Aircraft**

A G5 can be installed in an instrument panel that does not have an existing attitude indicator or DG/HSI. In these cases, the G5 must be located on the Pilot's instrument panel, and centered as nearly as practicable about the vertical plane of the pilot's forward vision. If the G5 is installed as an;

- Attitude indicator, it must be located as close to the top center position of the pilot's instrument panel as practical.
- DG/HSI, it shall be located adjacent to and directly below the instrument in the top center position when possible.

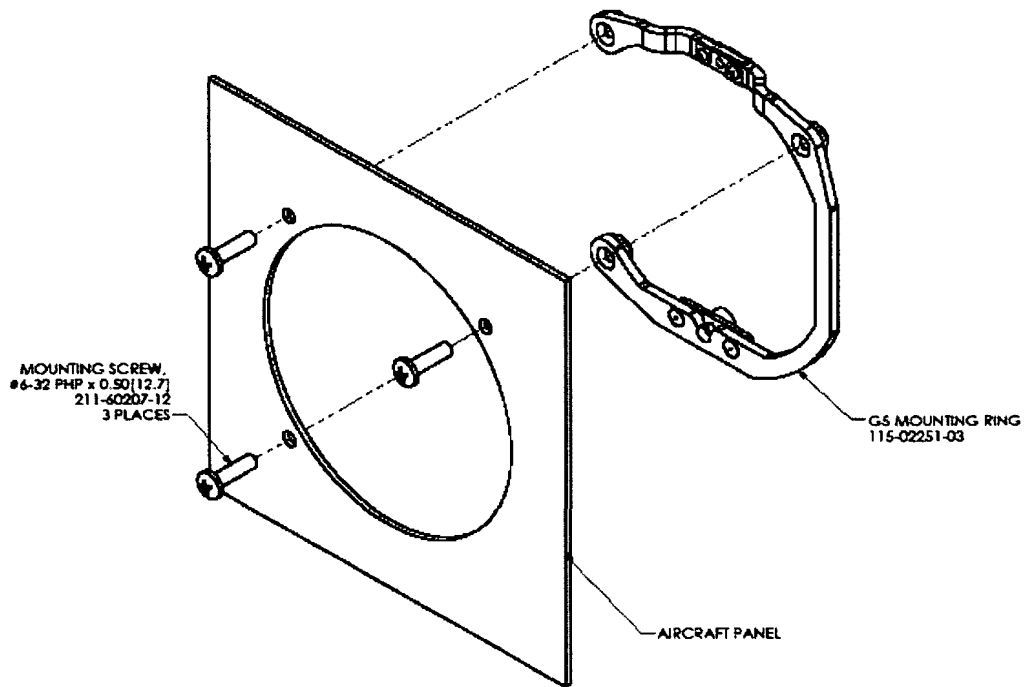
#### 4.1.2.1 Mounting Ring Installation

The G5 Mounting Ring (115-02251-03) can be used as a template when marking the panel for cutout. For complete cutout dimensions see Figure 6-11.

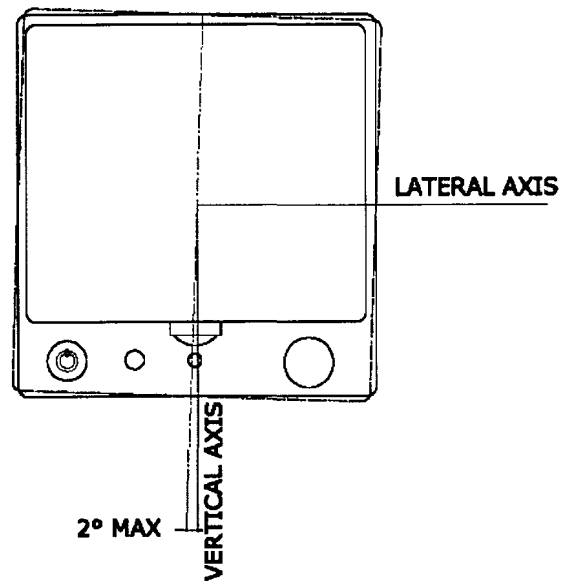
Secure the mounting ring to the aircraft panel using the supplied #6-32 pan head Phillips mounting screws. Evenly torque the mounting screws to 10-12 in-lbs.

- The G5 must be leveled to within 15.0° in the longitudinal axis (Pitch). (Reference Figure 4-4 )
- The G5 must be leveled to within 2.0° in the lateral axis (Roll). (Reference Figure 4-3 )
- Mount the G5 with the connector aligned to within 1.0° of the vertical axis (Yaw) of the aircraft (display bezel parallel to the wing spar carry thru). (Reference Figure 4-5 )

An aircraft leveling and offset calibration procedure must additionally be carried out prior to flight.



**Figure 4-2 G5 Mounting Ring**



**Figure 4-3 Maximum Misalignment of the G5 in the Lateral Axis**

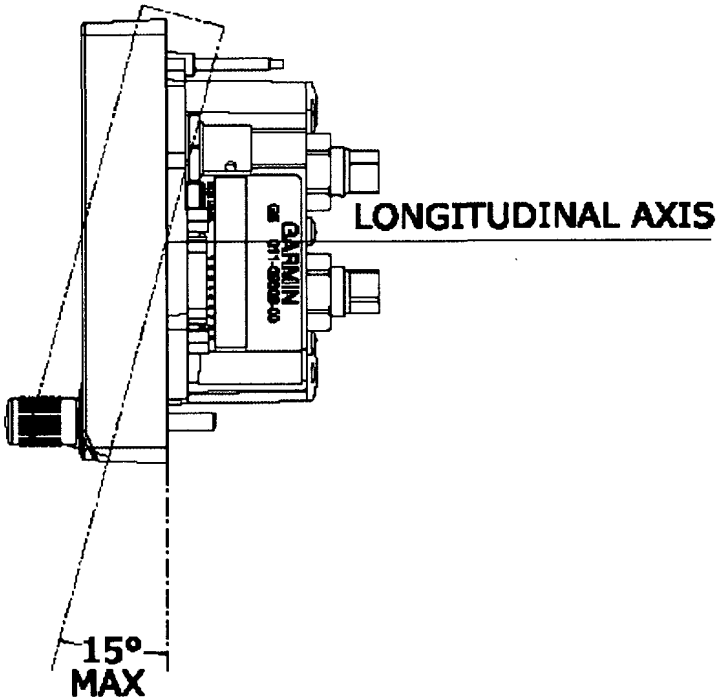


Figure 4-4 Maximum Misalignment of the G5 in the Longitudinal Axis

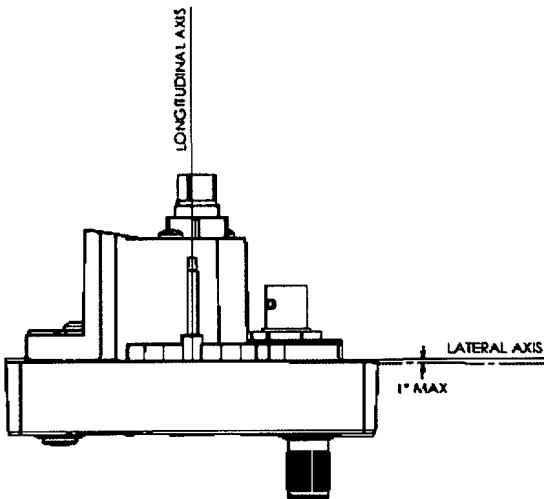


Figure 4-5 Maximum Misalignment of the G5 in the Vertical Axis



### 4.1.2.2 G5 Installation

The G5 is installed by inserting the alignment pin located at the top of the unit into the mating hole in the mounting ring, pushing the unit flush with the instrument panel, and fastening the captive 3/32" hex socket head screw to the mounting ring as shown in Figure 4-6. To fasten the captive screw to the mounting ring, insert a 3/32" hex drive tool through the access hole in the front cover of the G5 as shown in Figure 4-7. Torque the captive mounting screw to 10-12 in-lbs.

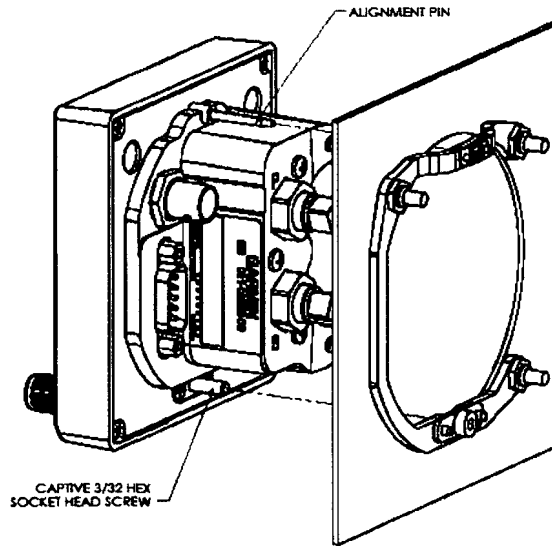


Figure 4-6 G5 Alignment Pin

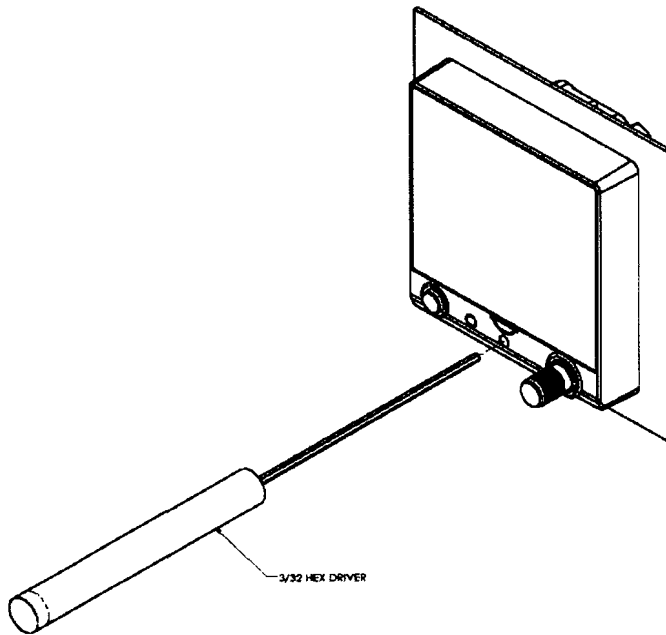


Figure 4-7 G5 Hex Driver Insertion



### 4.1.2.3 Optional #6-32 Captive Mounting Screw

The captive 3/32" hex socket head screw can be used for panel thicknesses up to 0.150". For installations with a panel thickness greater than 0.150", the captive mounting screw can be replaced with a standard #6-32 hex socket head screw (MS16995). To replace the screw, remove the two #4-40 flat head Phillips mount plate screws, the G5 screw mount plate, and the captive screw as shown in Figure 4-8. Reverse this process to install the longer #6-32 hex socket head screw. Ensure correct orientation of the screw mount plate before applying 6-8 in-lb. of torque to the #4-40 mount plate screws.

NOTE: Standard #6-32 hex socket head screws use a 7/64" hex drive feature. The access hole in the G5 bezel is large enough to accommodate this increase in hex tool size.

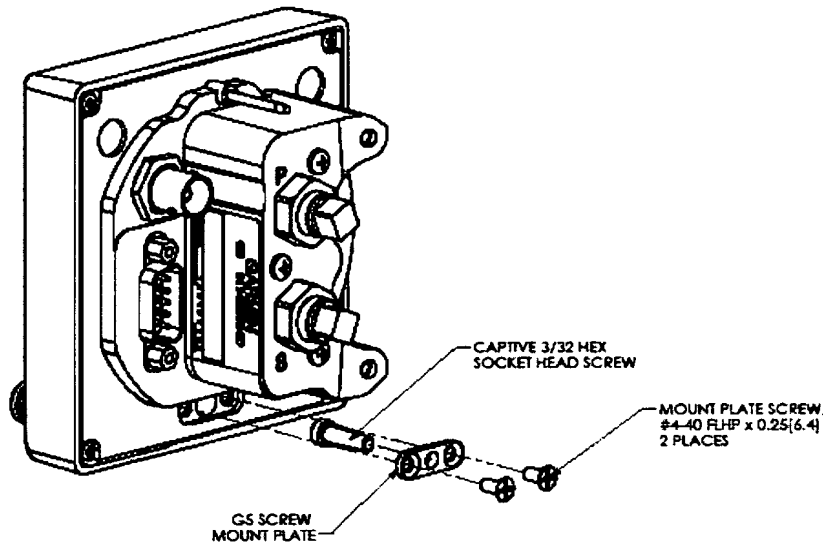


Figure 4-8 G5 Captive Mounting Screw Replacement

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#### 4.1.2.4 Dual G5 Installations Requiring Instrument Panel Modification

The minimum vertical distance needed between two G5 units is 3.6 inches center to center. Some instrument panels may require modification of existing holes to gain the needed 3.6 inch spacing.

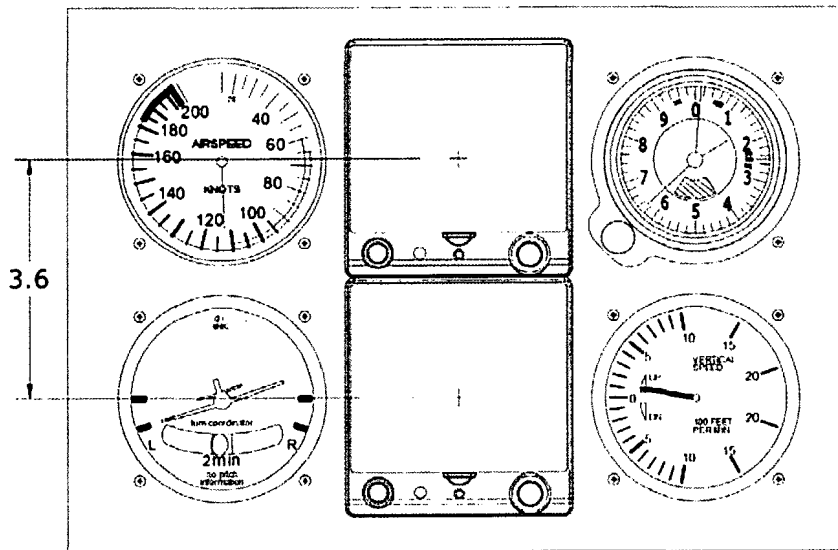


Figure 4-9 Required Vertical Spacing Between G5 Units

The panel may be modified by enlarging one hole or both, up to a maximum of 0.25 inch per instrument hole. The proposed positions must be such that neither G5 unit is obscured by the glareshield, control yoke or other object.

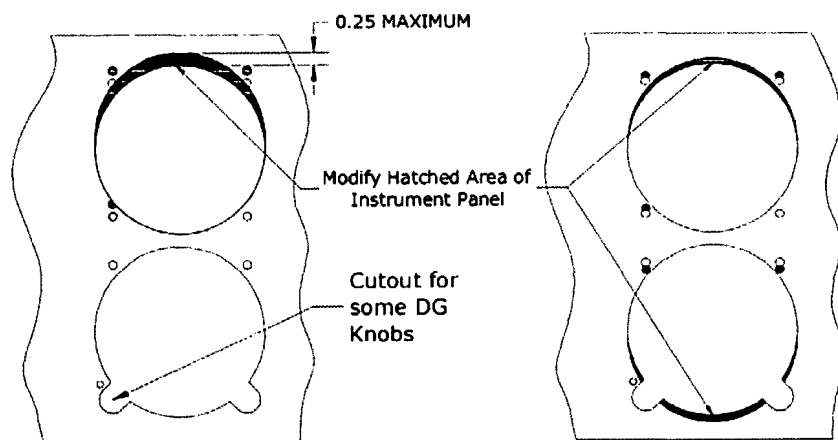


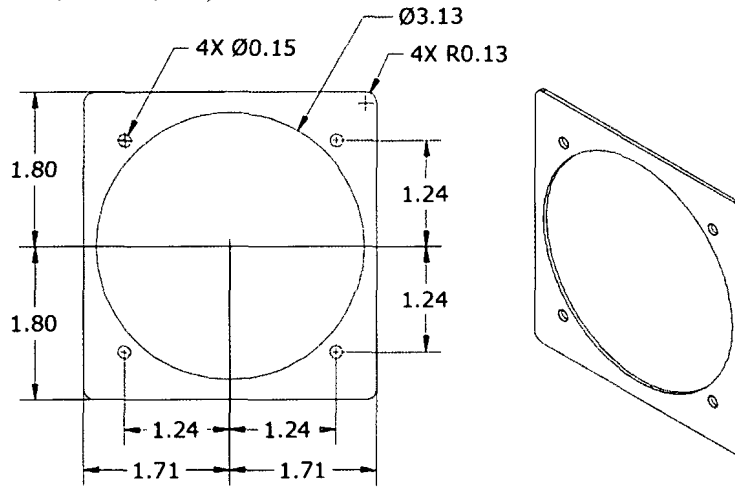
Figure 4-10 Instrument Panel Modification



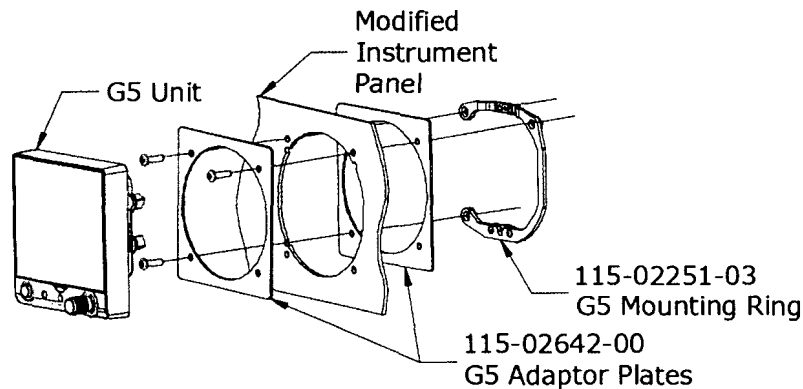
The G5 Adapter Plate, (115-02642-00) is shown in Figure 4-11. Each installation of a G5 in a DG/HSI will include 2 adapter plates. Two G5 adapter plates must be installed as shown in Figure 4-12 when

- any instrument panel modification has taken place
- G5 is installed in an instrument hole with cutouts for instrument knobs

The G5 adapter plate is fabricated from 0.050 thick 2024-T3 aluminum per the dimensions shown in Figure 4-11. Apply a finish coat of paint to adaptor plates as desired prior to final installation. These may be field fabricated if needed and must have some type of corrosion protection (primer, alodine, etc.).



**Figure 4-11 G5 Adapter Plate**



**Figure 4-12 G5 Adapter Plate Assembly**



#### 4.1.2.5 Cutting a New Instrument Hole for G5 Installation

For G5 installations in aircraft approved for VFR-only operation, there may be the need to cut a new instrument hole.

If it is desired to mount the G5 recessed, refer to Section 4.1.2.6 for instructions and limitations.

In order to satisfy the structural requirements when cutting a new instrument hole in the existing panel, the following conditions must be met:

- 1) Modification of the instrument panel must be in accordance with AC 43.13-2B, Chapter 2.
- 2) The instrument panel must be a minimum of 0.040 inches thick.
- 3) The dimensions and limitations of the hole must be as shown in Figure 4-13.
- 4) The new location must satisfy the alignment requirements shown in Figure 4-3, Figure 4-4, and Figure 4-5.
- 5) There must be at least 0.25 inches between the main instrument hole or the screw holes and any adjacent holes or the edges of the panel.
- 6) The instrument panel must be structurally capable of supporting the weight of the installed units.
- 7) The location of the hole must allow for sufficient clearance for the G5 electrical and pneumatic connections, see Figure 4-14.
- 8) The location must be free from rapid thermal transients, in particular, large heat loads from electrical loads.
- 9) Do not mount the G5 within 1 inch of magnetically mounted antennas, speaker magnets, or other strongly magnetic items.

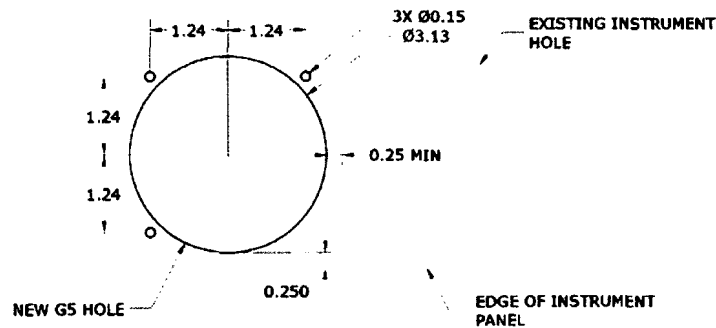


Figure 4-13, G5 Instrument Hole Dimensions

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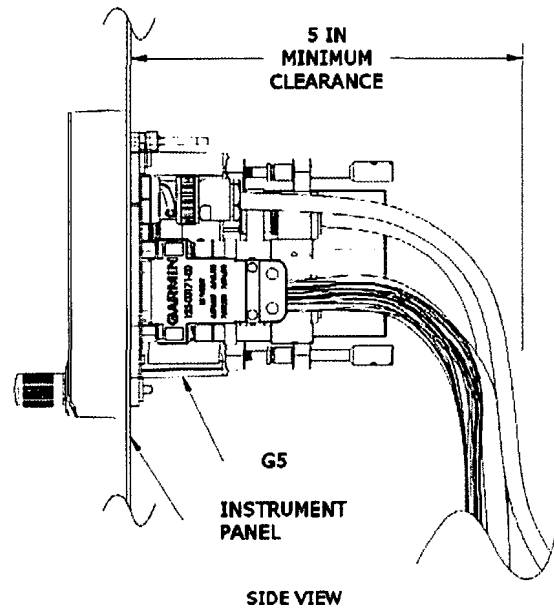


Figure 4-14, Clearance for Connections

### 4.1.2.6 G5 Recessed Mount Option

The G5 unit may be recessed into the instrument panel which positions the display flush with the instrument panel. A full understanding of this modification is required before starting. A recessed adapter plate and modification of the instrument panel will be needed. Some instrument panels may not be capable of supporting this modification. See section 4.1.2.6.5 for suggested adapter plate modification procedure.

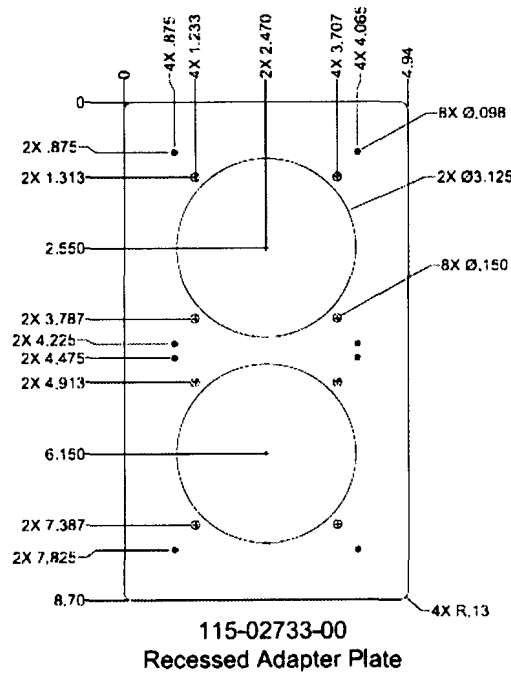
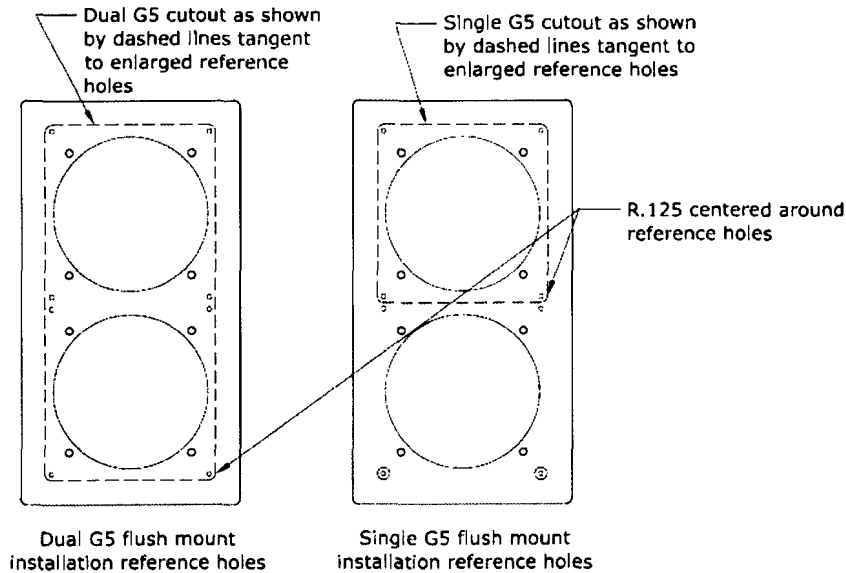


Figure 4-15 Recessed Adapter Plate



Recessed Adapter Plate, 115-02733-00, is required when a G5 unit is recessed in the panel. The plate can be ordered from Garmin, or field fabricated. If field fabricated, it must be 0.090 thick 2024-T3 aluminum per Figure 4-15 and must have some type of corrosion protection (primer, alodine, etc.). The Recessed Adapter Plate includes reference holes and can be used as a template for creating the recessed cutout.

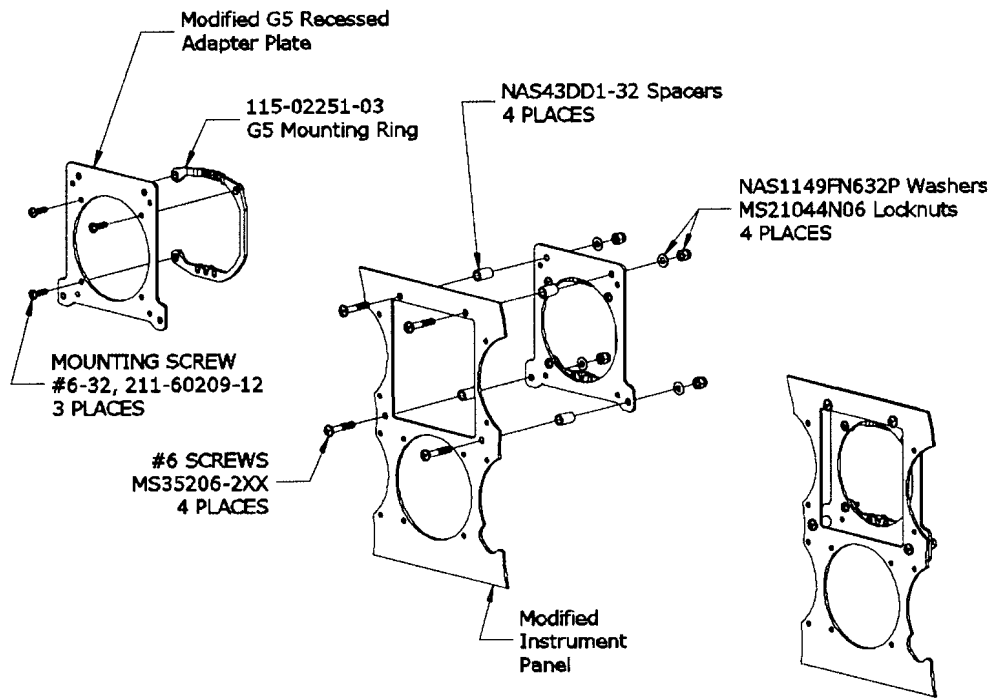


**Figure 4-16 Recessed Adapter Plate Template Reference Holes**

#### 4.1.2.6.1 Recess Mounting Single G5

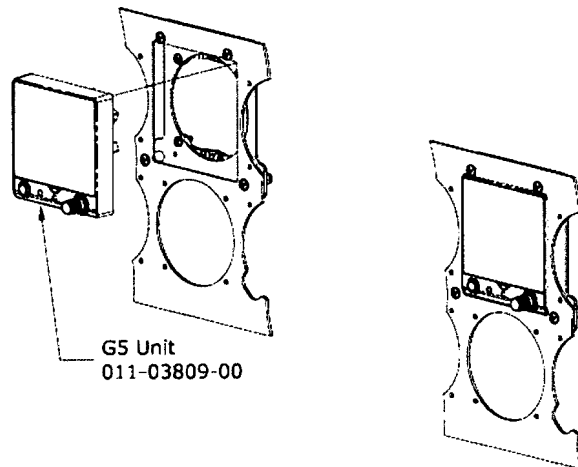
Install a single recessed G5 as illustrated by Figure 4-17 and Figure 4-18. A G5 installation in the attitude position is shown, but the same instructions can be used when installing a G5 in the DG or turn coordinator positions. Modify 115-02733-00 adapter for single G5 installation per Figure 4-16. A minimum of four No. 6 MS35206-2XX screws must be used to secure the modified mounting adapter plate in place. Maintain 1.5D edge distance minimum.

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**Figure 4-17 Single G5 Recessed Adapter Plate Installation**

Install G5 unit per section 4.1.2.2.



**Figure 4-18 Single G5 Recessed Installation**



#### 4.1.2.6.2 Recess Mounting Dual G5 Vertically

Install dual recessed G5s as illustrated by Figure 4-19 and Figure 4-20. A minimum of six No. 6 MS35206-2XX screws must be used to secure the modified mounting adapter plate in place. Maintain 1.5D edge distance minimum.

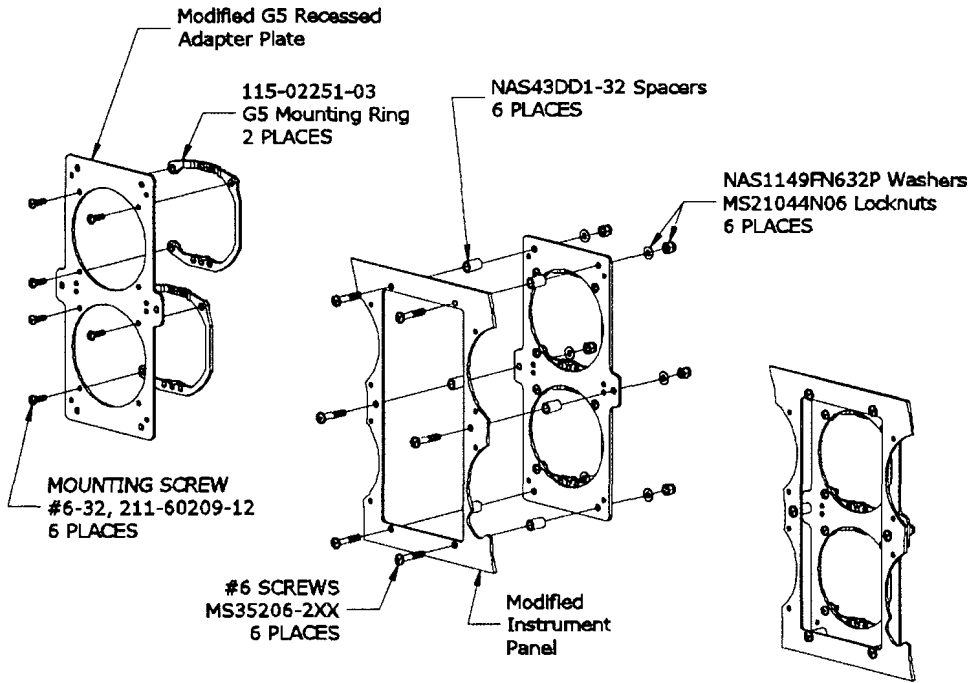


Figure 4-19 Dual Vertical G5 Recessed Adapter Plate Installation

Install G5 units per section 4.1.2.2.

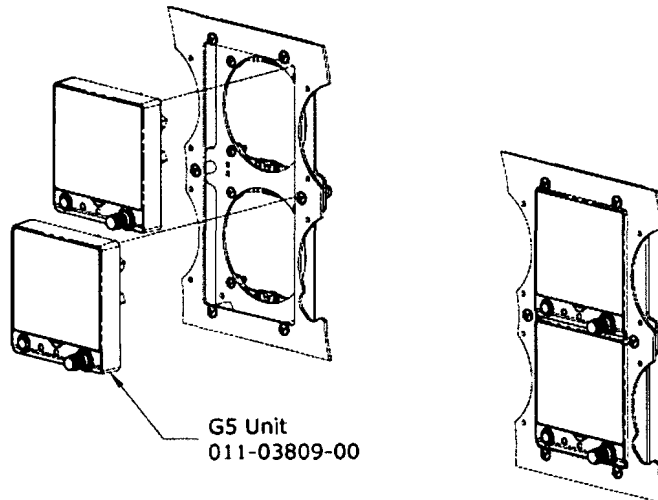
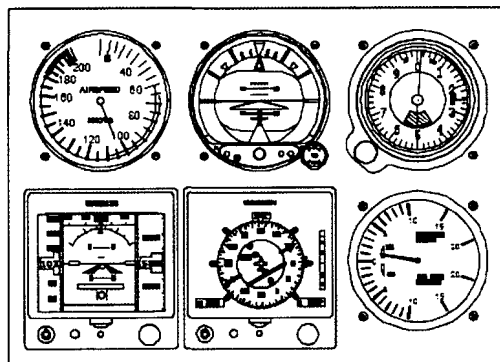


Figure 4-20 Dual Vertical G5 Recessed Installation



### 4.1.2.6.3 Recess Mounting Dual G5 Horizontally

In an installation where the G5 Attitude indicator is in the Turn Coordinator position and a G5 DG/HSI is installed as well (ref Figure 4-21), the dual G5s may be installed recessed horizontally in a similar manner to the dual vertical recessed installation. A horizontal recessed adapter plate will need to be field fabricated in order to fit the existing installation. This plate must be fabricated of 0.090 thick 2024-T3 aluminum and must have some type of corrosion protection (primer, alodine, etc.). A minimum of six No. 6, MS35206-2XX screws must be used to secure the modified mounting adapter plate in place. Maintain 1.5D edge distance minimum.



Turn Coordinator and DG/HSI Position

Figure 4-21 Dual Horizontal G5 Recessed Installation

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## 4.1.2.6.4 Instrument Panel Modification Limitations

The modification required for recess mounting a G5, whether it is single, dual vertical or dual horizontal must meet the following conditions:

- 1) The mounting location must satisfy the alignment requirements shown in Figure 4-3, Figure 4-4, Figure 4-5.
- 2) The proposed location must allow for sufficient clearance for the G5 unit and connections as shown in Figure 4-14.
- 3) The hole must meet the limitations and minimums as shown in Figure 4-22.
- 4) The modification must be completed in accordance with AC 43.13-2B, Chapter 2.

Any modification of subsequent structure or parts other than the instrument panel as defined in these instructions are beyond the scope of this manual. Additional data from the aircraft manufacturer or other FAA approved data would be required for these situations.

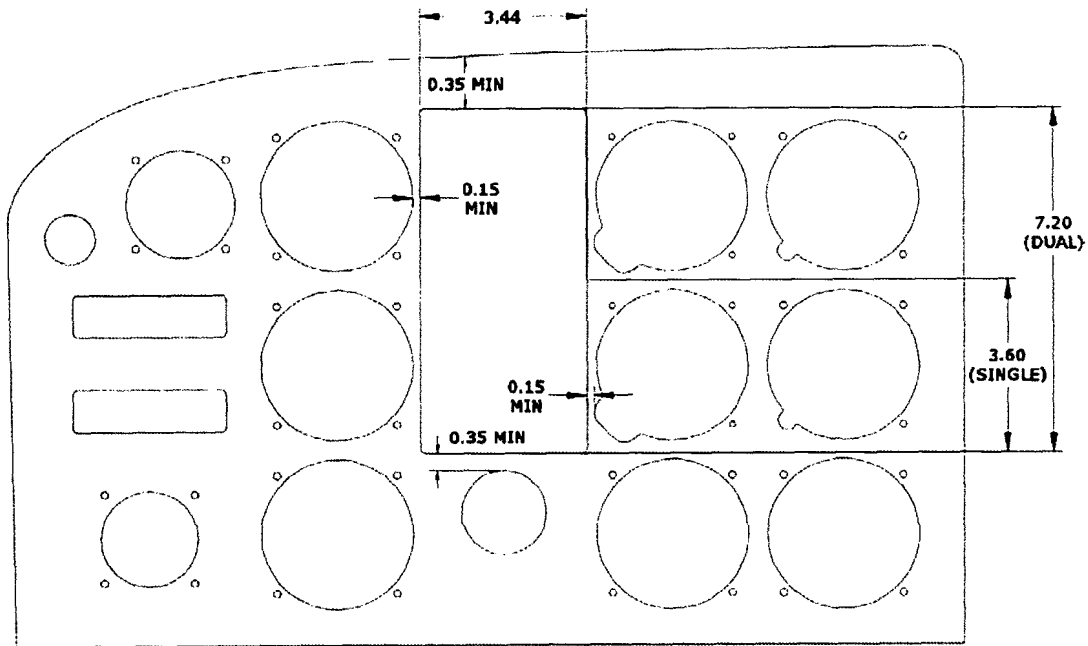
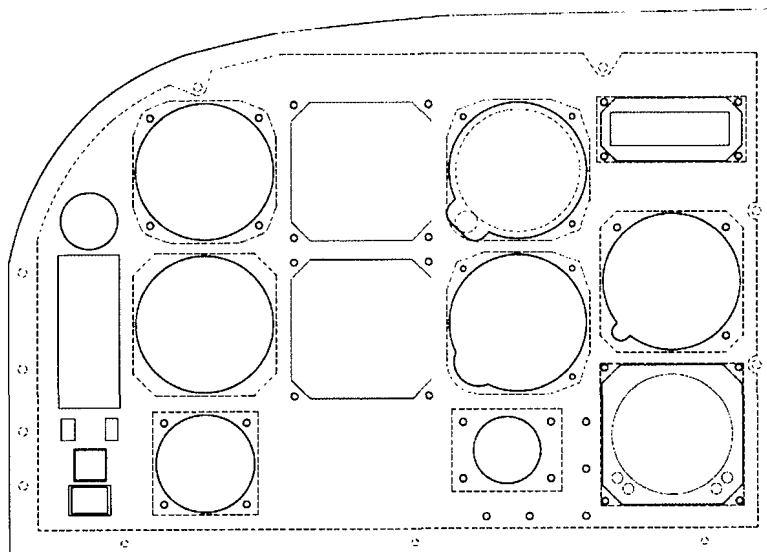


Figure 4-22, Instrument Panel Limitations

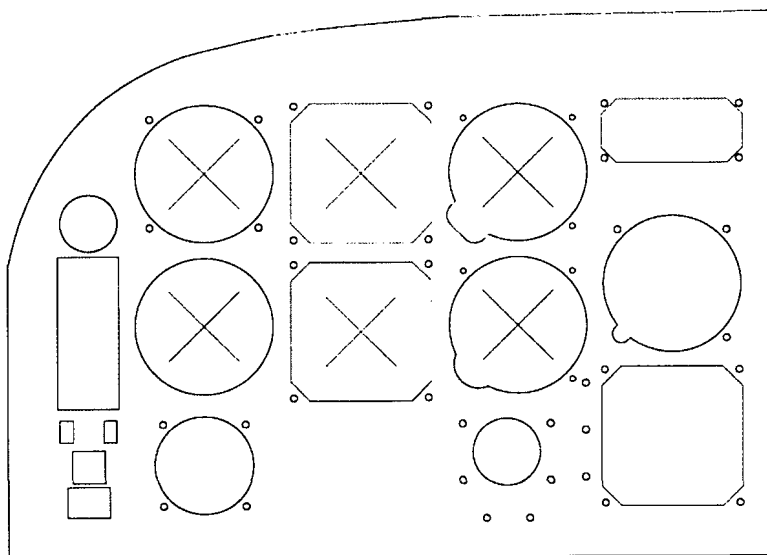
## 4.1.2.6.5 Modifying Recess Mount Adapter Plate

This section illustrates a suggested procedure for modifying the G5 Recessed Adapter Plate and instrument panel. Dual vertical G5 installation shown; dual horizontal and single installation procedure is similar.



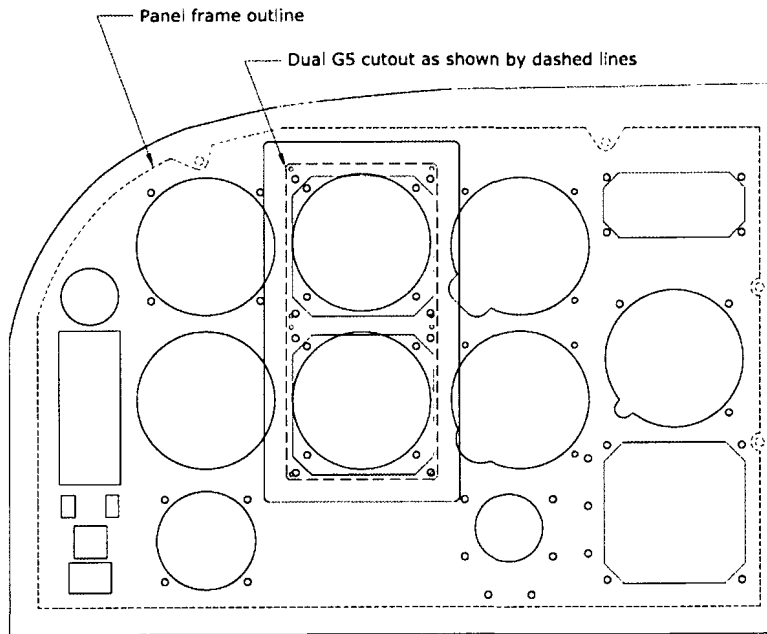


**Figure 4-23 Instrument Panel; View looking forward**



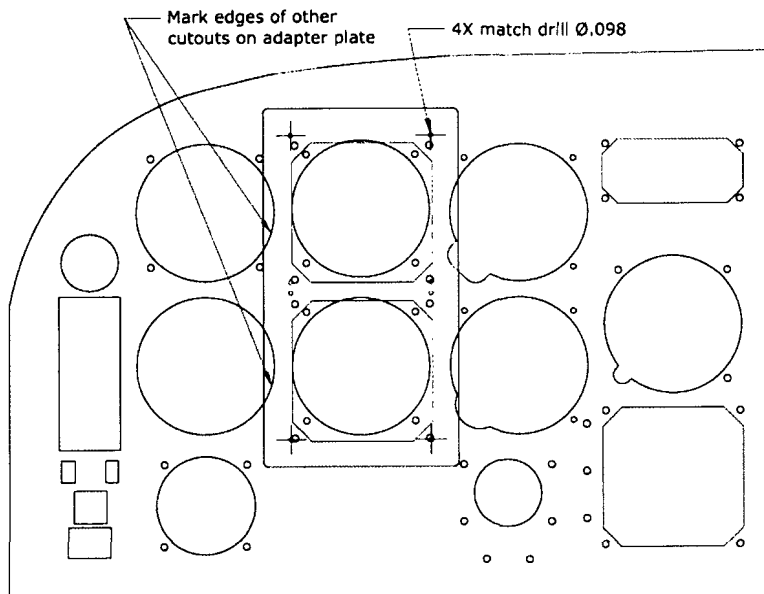
**Figure 4-24 Instrument Panel view with instruments removed**

Temporarily remove instruments adjacent to proposed G5 location and/or as needed.



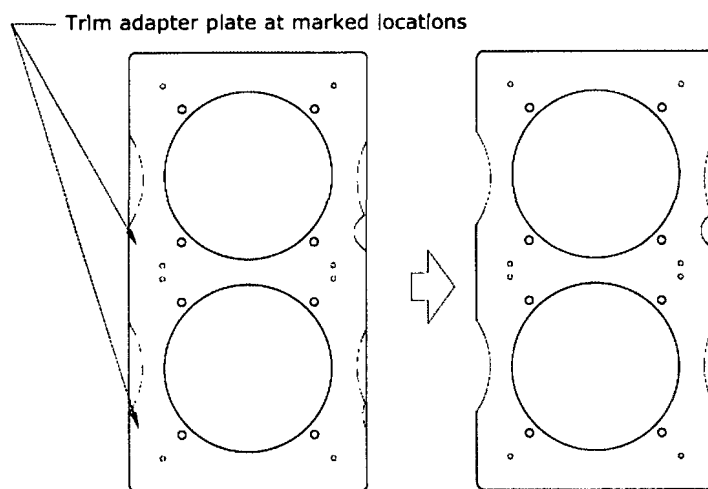
**Figure 4-25 Recessed Adapter Plate located on panel**

Place 115-02733-00, Recessed Adapter Plate, at desired location, keeping in mind distance to instrument panel frame and other instruments.

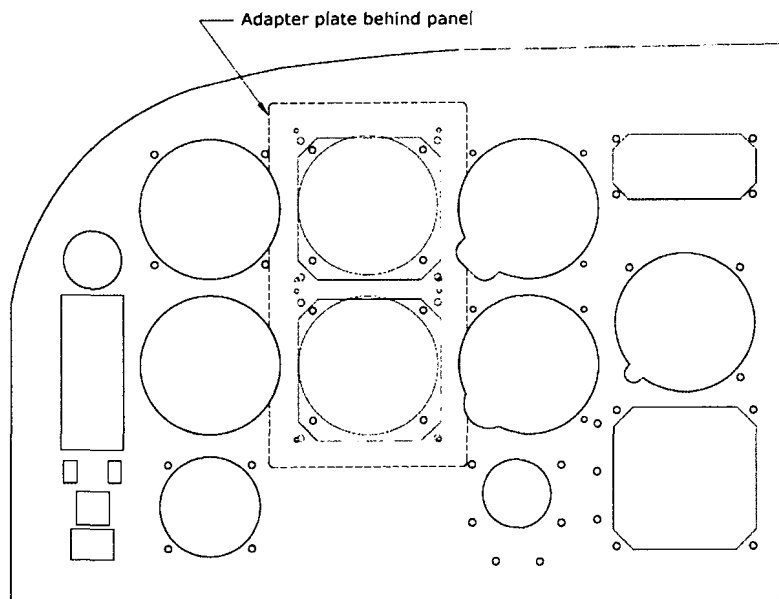


**Figure 4-26 Match drilling through panel, using adapter plate as template**

When ready, mark adapter plate and match drill instrument panel 4x, .098 diameter through adapter plate reference holes

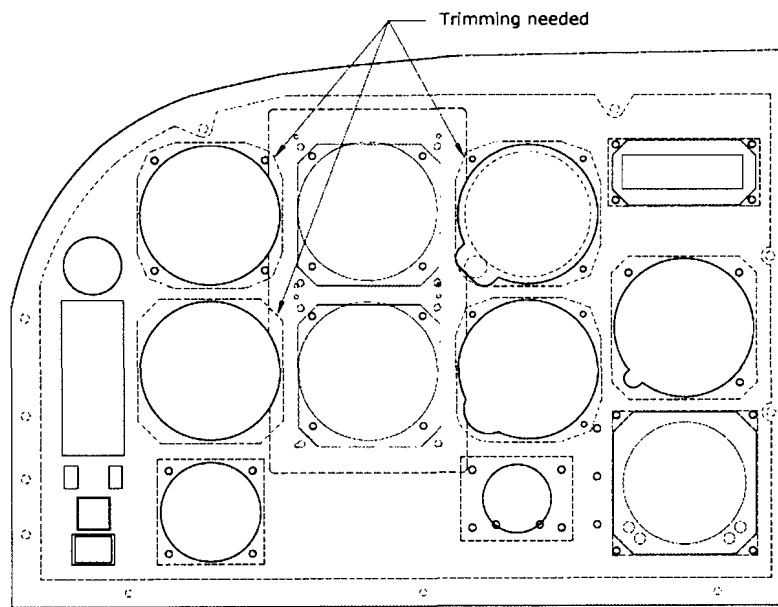


**Figure 4-27 Preliminary trimming of adapter plate**



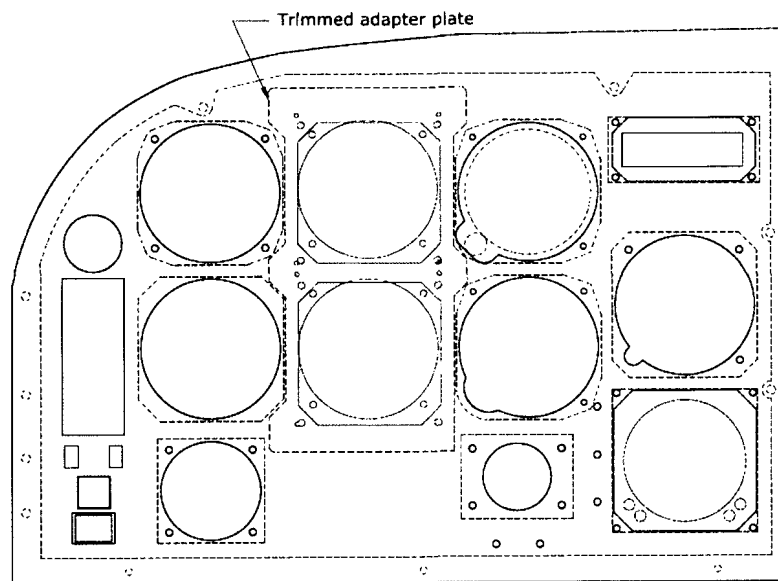
**Figure 4-28 Adapter plate located on far side of instrument panel**

Use reference holes from adapter plate to align adapter plate behind panel.



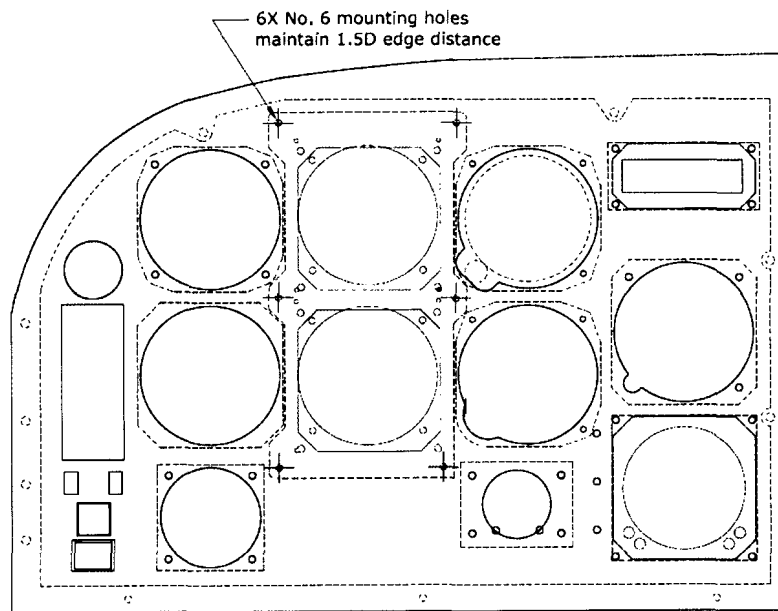
**Figure 4-29 Additional trimming of adapter plate required**

Mark adapter plate where trimming is needed in order to avoid interference with any adjacent instrument or other item.



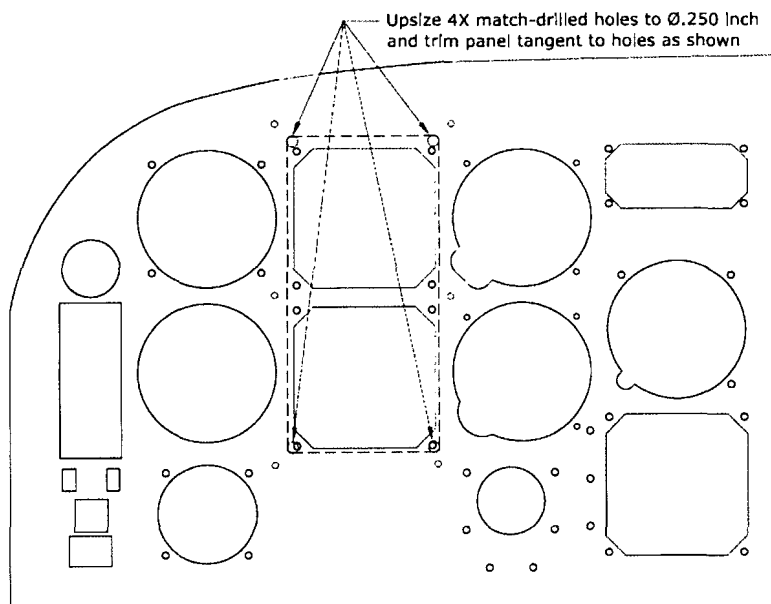
**Figure 4-30 Trimmed adapter plate**

Trim adapter plate as needed; remove only enough material to allow adapter plate to fit without interference.

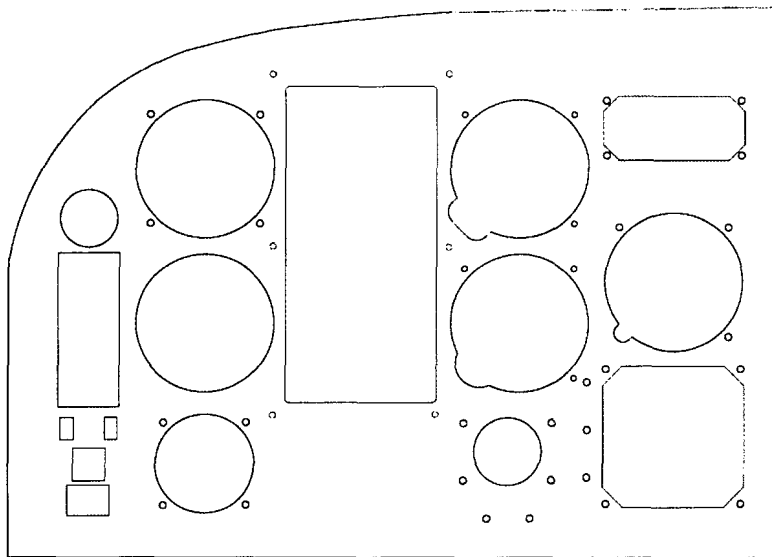


**Figure 4-31 Adapter plate mounting holes**

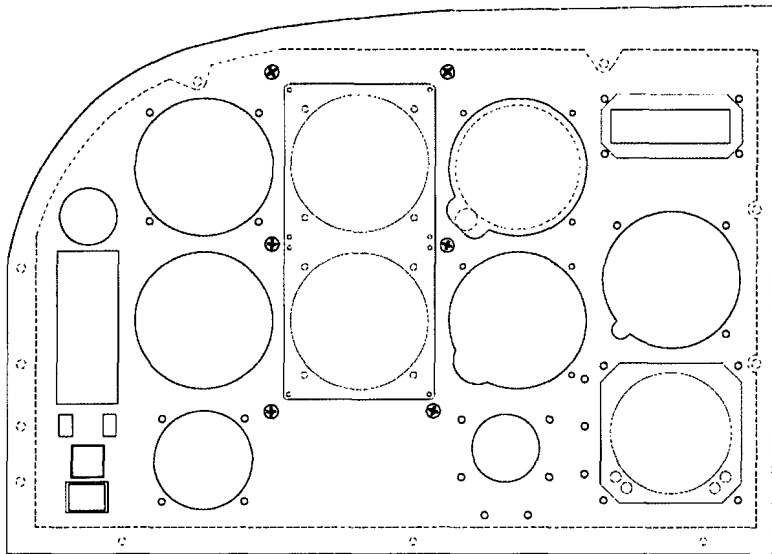
Drill 6 mounting holes through both adapter plate and panel; maintain minimum 1.5D edge distance for No. 6 hardware.



**Figure 4-32 Dual G5 panel cutout, using match drilled holes for reference**

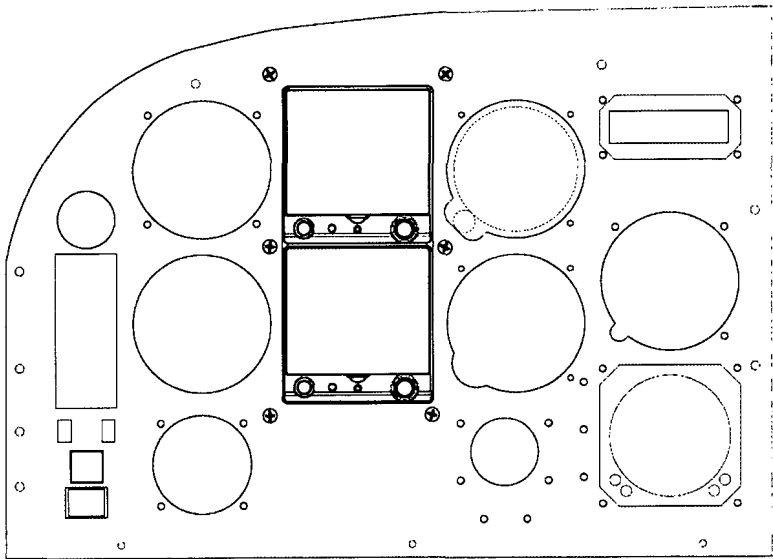


**Figure 4-33 Instrument panel after cutout for dual vertical G5 units**



**Figure 4-34 Adapter plate installed**

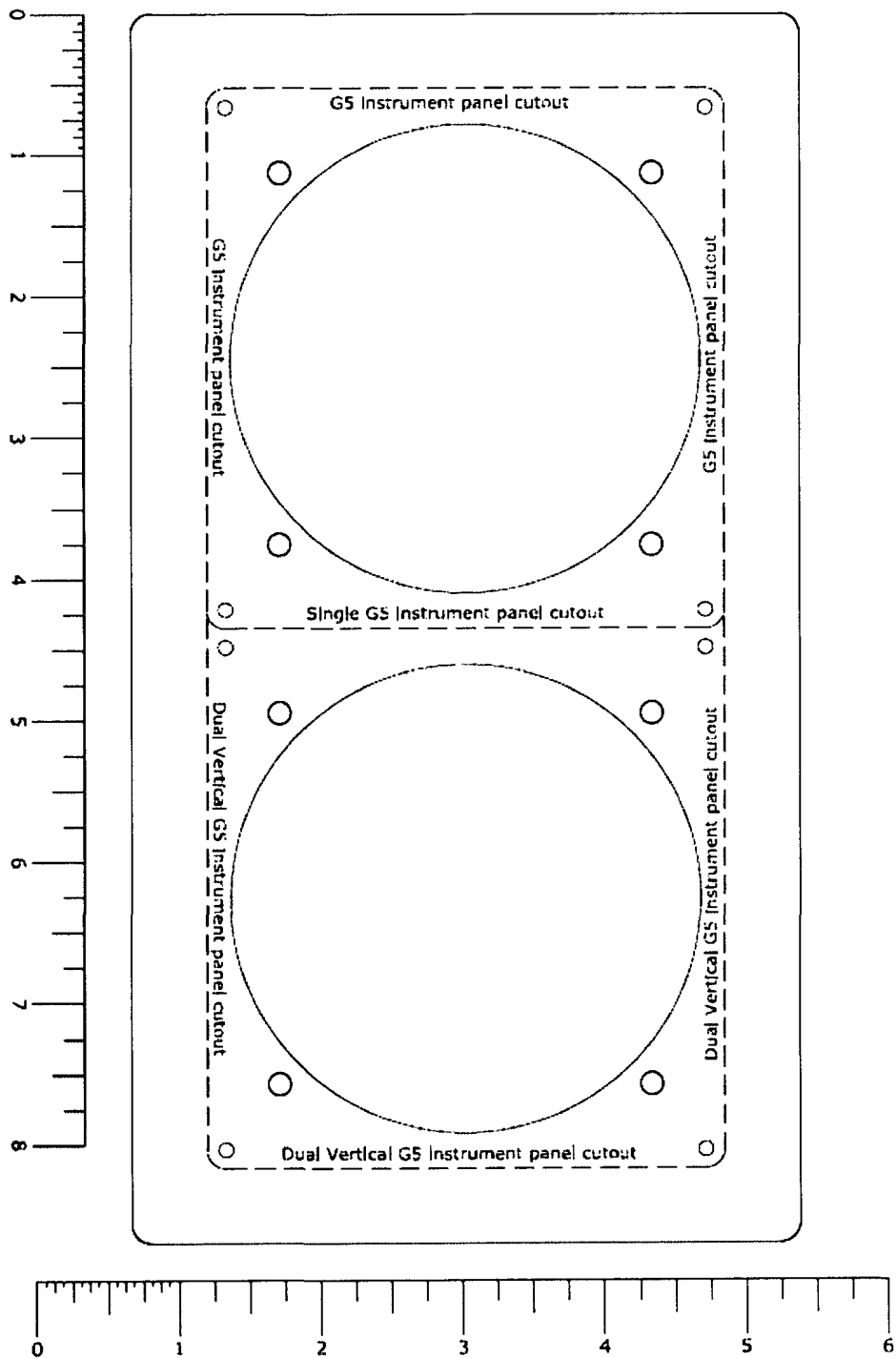
Deburr and finish instrument panel and adapter plate as needed, then install adapter plate per Section 4.1.2.6.1 or 4.1.2.6.2.



**Figure 4-35 Dual vertical G5 units installed**

Install G5 units per Section 4.1.2.2.

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**Figure 4-36 G5 flush mount adapter plate printable template**

The figure above may be photocopied and scaled as needed to match the full size part. This paper copy may be used along with the instructions on Section 4.1.2.6.5 to verify the proposed installation of the G5 units will meet the installation requirements.





### 4.1.3 GMU 11 Magnetometer Mounting Requirements

The GMU 11 is an extremely sensitive magnetic sensor, more sensitive to magnetic disturbances than a flux gate magnetometer. For this reason, when choosing a location, distance from possible magnetic disturbances is critical to a successful installation.

Consider the following items when choosing a mounting location:

- Maintain as much distance as possible from electric motors, ferromagnetic materials, electrical devices drawing more than 100 mA and electrical conductors
- Ensure that any electrical conductor near the GMU 11 is shielded
- The GMU 11 must not be mounted on an access panel
- Mounting of the GMU 11 in the wing is preferred. Some aircraft cannot mount the GMU 11 in the wing, reference APPENDIX E for a consolidated list of aircraft with this restriction.



#### CAUTION

*After a location has been selected and a GMU 11 mounting method chosen, a location survey must be performed at that location prior to fabricating or assembling any parts for the GMU 11 mounting. It is possible that the location will fail the survey and the installation will require a new location, with different installation requirements. See Section 4.1.3.1 for Magnetic Interference Survey instructions.*



#### CAUTION

*Failure to meet these specifications may result in a failed magnetometer calibration.*

For the installation of the GMU 11 level the aircraft in both the longitudinal and lateral axes. Refer to the aircraft's maintenance manual for leveling instructions. It is preferred that the aircraft is placed on jacks while leveled to avoid inadvertently placing the aircraft in a non-level position when entering, exiting or working the aircraft.

The GMU 11 should be mounted to a surface known to have sufficient structural integrity to withstand additional inertial forces imposed by the 0.26-pound unit.

In order to satisfy the structural mounting requirements for the GMU 11, the following conditions must be met:

- 1) The mounting location must satisfy the alignment requirements shown in Figure 4-37 and Figure 4-38
- 2) The mounting structure, existing or new, must be electrically bonded to the airframe per Section 4.5.
- 3) Any supporting structure must be rigidly connected to the aircraft primary structure through strong structural members capable of supporting substantial loads.
- 4) Mounting platform shall not span greater than 12" in width or length without direct attachment to primary structure. If mounting platform does span greater than 12", add necessary stringers, doublers, bulkhead flange reinforcements, etc., to provide adequate support. Existing honeycomb core sandwich panels with aluminum face sheets are adequate and do not require additional reinforcement.
- 5) A minimum of 3" between the connector end of the GMU 11 and any object must be maintained to ensure clearance for connector and wire harness.
- 6) If a support bracket or shelf needs to be fabricated, it should be fabricated and attached to the aircraft structure in accordance with the methods outlined in AC43.13-2B Chapter 1 and 2, AC43.13-1B Chapter 4, and the following requirements:



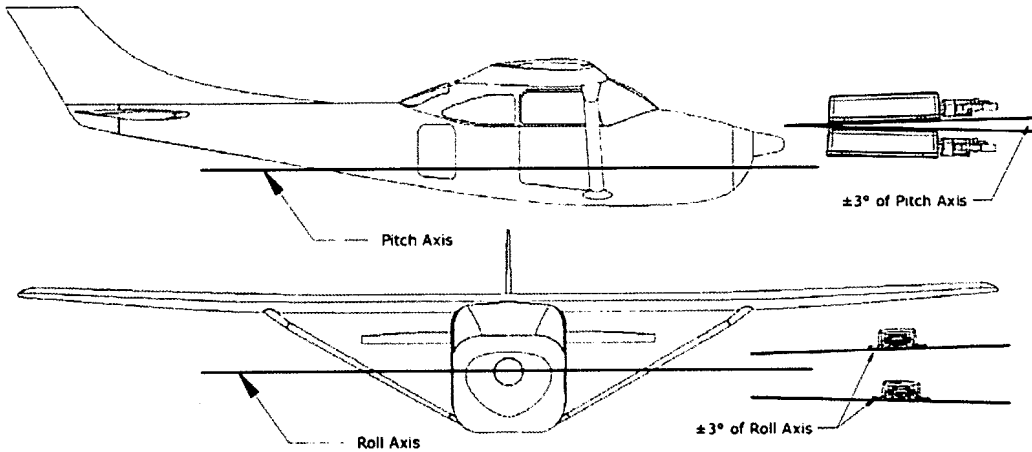
- a) Material shall be 2024-T3 aluminum alloy sheet per AMS-QQ-A-250/4 or Clad 2024-T3 aluminum alloy sheet per AMS-QQ-A-250/5.
- b) Material shall be minimum 0.032 inch thick.
- c) Material shall have some type of corrosion protection (primer, alodine, etc.)
- d) It shall be attached to primary aircraft structure with a minimum of 4 non-magnetic fasteners or rivets from Table 4-1.

**Table 4-1 GMU 11 Supporting Hardware**

Hardware	Minimum Specifications
<b>Rivets</b>	MS20470AD3-X (3/32 Diameter, Length A/R)
<b>Screws</b>	MS51957-XX (#6-32, Stainless Steel, Length A/R)
<b>Washers</b>	NAS1149CN632R (#6-32, Stainless Steel)
<b>Nuts</b>	MS21044C06 (#6-32, Stainless Steel)

In general, wing mounting of the GMU 11 magnetometer is preferred. Fuselage mounting is permitted, but NOT within two feet of the cabin area because of numerous potential disturbances that can interfere with accurate operation. The GMU 11 must be mounted in a serviceable location in the aircraft (e.g., accessible through an access panel).

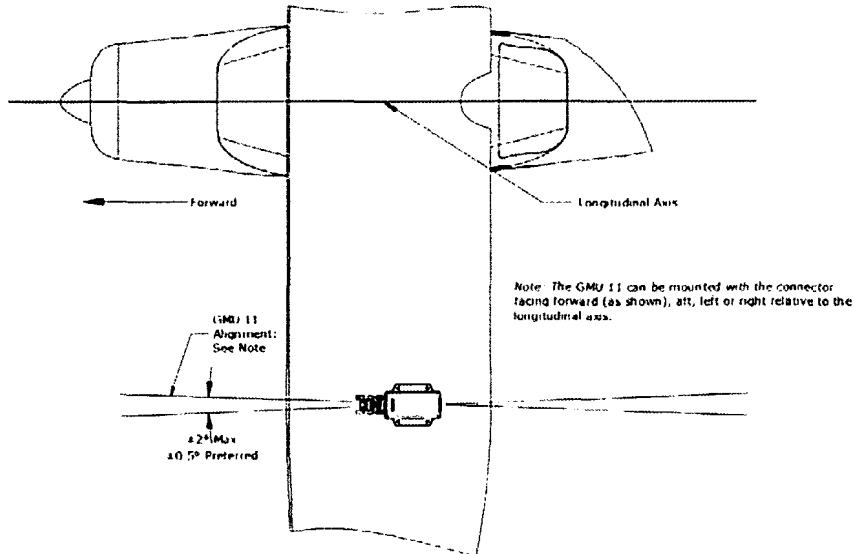
The GMU 11 must be oriented with the mounting flanges facing down to within 3.0° of the aircraft pitch and roll axis as show in Figure 4-37.



**Figure 4-37 GMU 11 Pitch and Roll Requirements**

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Lateral orientation can be such that the connector faces forward, aft, left or right, but must be within 2° of the longitudinal axis of the aircraft, see Figure 4-38.



**Figure 4-38 GMU 11 Heading Alignment Requirements**

#### 4.1.3.1 Magnetic Interference Survey

1. Temporarily place the GMU 11 in the proposed mounting location maintaining orientation as described in Figure 4-37 and Figure 4-38.
2. Secure in place using tape if needed. Do not use clamps or other devices that are ferrous or magnetic.
3. Run the magnetic interference survey in accordance with APPENDIX C. If the survey passes, the location is considered reliable for the installation of the GMU 11.

If the test fails, the location should be considered unreliable until the source of the magnetic interference is identified, remedied and the location is retested and passes the test. If the magnetic interference cannot be remedied, another location should be chosen and tested.

*This area intentionally blank*



### 4.1.3.2 GMU 11 Mounting



#### CAUTION

Care should be taken when tightening the mounting screws of the GMU 11. Excessive tightening may damage the mounting flange or break the screws. Fasteners should be tightened until snug, plus one-quarter turn.

*GMU should not be mounted in a composite wing.*

*It may be mounted in a wing constructed of metal so long as any hardware used to attach the GMU or its bracket do not penetrate the fuel tank. For installation in a composite wing tip, of a metal wing, see APPENDIX D.*

Using the hardware called out in Figure 4-39, mount the GMU 11, and replace any magnetic fasteners within 1.5 feet with nonmagnetic equivalents (e.g. replace zinc-plated steel screws used to mount wing covers or wing tips with nonmagnetic stainless steel screws).

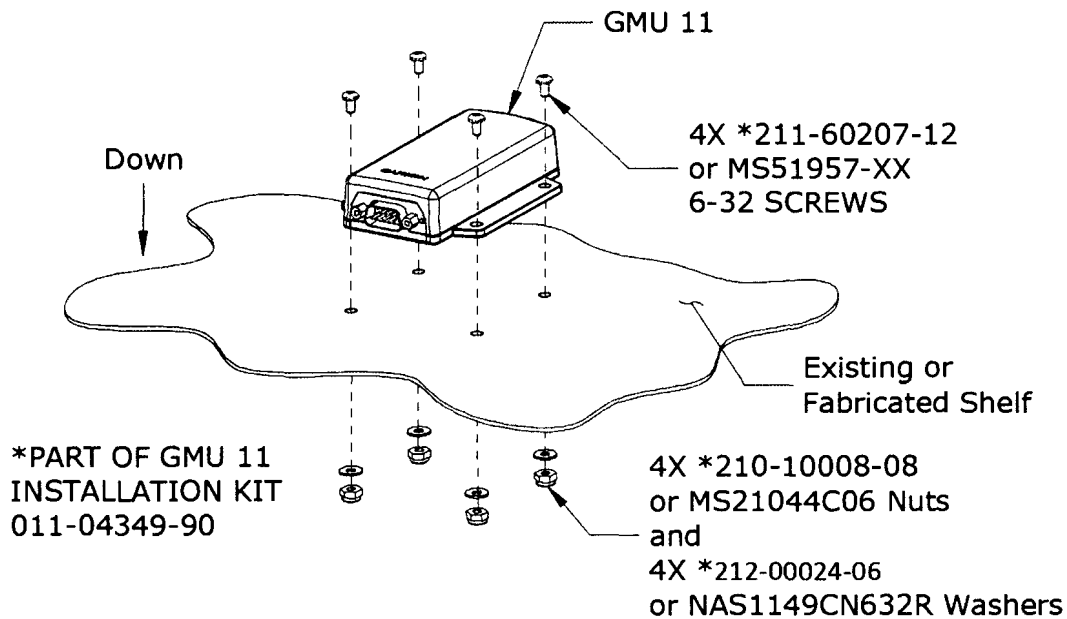


Figure 4-39 GMU 11 Mounting Hardware



#### 4.1.4 GAD 29/29B Mounting Requirements

The GAD 29/29B should be mounted to a surface known to have sufficient structural integrity to withstand additional inertial forces imposed by the 0.63-pound unit.

In order to satisfy the structural mounting requirements for the GAD 29/29B, the following conditions must be met:

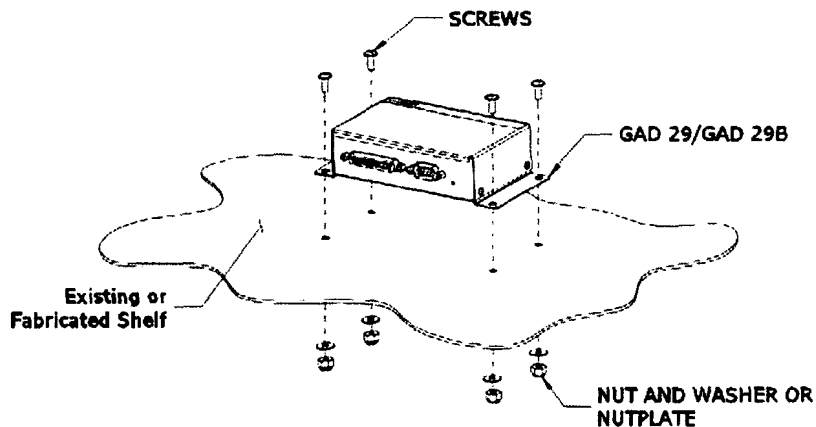
- 1) The mounting structure, existing or new, must be electrically bonded to the airframe per Section 4.5.
- 2) Any supporting structure must be rigidly connected to the aircraft primary structure through strong structural members capable of supporting substantial loads.
- 3) Mounting platform shall not span greater than 12" in width or length without direct attachment to primary structure. If mounting platform does span greater than 12", add necessary stringers, doublers, bulkhead flange reinforcements, etc., to provide adequate support. Existing honeycomb core sandwich panels with aluminum face sheets are adequate and do not require additional reinforcement.
- 4) A minimum of 3" between the connector end of the GAD 29/29B and any object must be maintained to ensure clearance for connectors and wire harness.
- 5) If a support bracket or shelf needs to be fabricated, it should be fabricated and attached to the aircraft structure in accordance with the methods outlined in AC43.13-2B Chapter 1 and 2, AC43.13-1B Chapter 4, and the following requirements:
  - a) Material shall be 2024-T3 aluminum alloy sheet per AMS-QQ-A-250/4 or Clad 2024-T3 aluminum alloy sheet per AMS-QQ-A-250/5.
  - b) Material shall be minimum 0.040 inch thick.
  - c) Material shall have some type of corrosion protection (primer, alodine, etc.)

It shall be attached to primary aircraft structure with a minimum of 4 fasteners or rivets listed in Table 4-2.

**Table 4-2 GAD 29/29B Supporting Hardware**

<b>Hardware</b>	<b>Minimum Specifications</b>
<b>Rivets</b>	MS20470AD3-X (3/32 Diameter, Length A/R)
<b>Screws</b>	MS35206-XXX (#6-32, Length A/R)
<b>Washers</b>	NAS1149FN632P
<b>Nuts</b>	MS21042L06

Using the hardware called out in Figure 4-40, mount the GAD 29/29B to the chosen mounting location. Recommended torque of fasteners is 20-25 in-lbs.



### Hardware Specifications

SCREWS	ANS25832R0X (8-32 LENGTH A/R)			
WASHERS	NAS1149FN816P	OR	#8 NUTPLATES	STANDARD PART; ANY MS (MILITARY SPECIFICATION) PART NUMBER
NUTS	MS21044ND8		RIVETS	MS20426AD3-X

Figure 4-40 GAD 29/29B Mounting Hardware

#### 4.1.4.1 GAD 29B Transformer Mounting Instructions

Reference Section 3.4.10 for GAD 29B transformer mounting.

#### 4.1.5 Pneumatic Connections

The G5 Attitude indicator and G5 DG/HSI use pitot and static pressure for the secondary display of altitude and airspeed. The installer must install the necessary hoses and fittings to interface to the existing aircraft pitot and static pressure source. Below are guidelines to use for this installation.

The G5 has two ports that are connected to the aircraft's pitot and static pressure sources. The ports are labeled on the unit using the abbreviations "P" and "S" respectively (Figure 6-9). The pressure ports have 1/8-27 ANPT female threads. The mating fitting must have 1/8-27 ANPT male threads.

Determine the hose/connection material that best interfaces with the existing aircraft installation. Reference the appropriate aircraft parts manual to determine the current part numbers associated with the aircraft installation of hose and connections used in the pitot/static system.

Use appropriate tubing and fittings to connect the pitot and static lines to the unit. Avoid sharp bends in the tubing and route hoses clear of aircraft control cables. The G5 must not be at the low point of the pneumatic plumbing lines to avoid moisture or debris collecting at or near the unit. Ensure that no deformations of the airframe surface have been made that would affect the relationship between static air pressure and true ambient static air pressure for any flight condition. Refer to 14 CFR Part 43, Appendix E and AC43.13-1B, Chapter 12, Section 4 for approved practices while installing hoses and connections. If this static source had an alternate static source selector switch, it must be retained.



For aircraft equipped with a single pitot-static system, the G5 must be connected to the pitot-static system used by the pilot's instruments. For aircraft equipped with a dual pitot-static system, the G5 must be connected to the pitot-static system that is independent from the pilot's instruments.



**CAUTION**

*To avoid damaging the G5 pressure sensors, both the pitot and static ports must be connected to the test set.*



**CAUTION**

*Verify sealant/tape is not present inside the plumbing upon assembly. Use care to avoid getting fluids or particles inside the pneumatic lines or G5 ports.*



#### 4.1.6 Glare Shield Mounted GPS Antenna Mounting Requirements

The GPS antenna (P/N 011-04036-00) is designed for installation on top of an existing instrument panel glareshield. The selected location must offer good visibility of the sky through the windshield.

Installation of the GPS antenna cannot obstruct or limit the pilot's vision (even though the antenna has a low profile). The optimal antenna position is horizontal, or as close to horizontal as practical given the shape of the glareshield.

Fastener holes for screw-mounted antenna installation, as depicted in Figure 4-42, must not penetrate through the ventilation or defrost channels built into the glareshield, if present. If the glareshield is part of the instrument panel structure, fastener holes may only be drilled if provisioned by the aircraft maintenance manual or structural repair manual.

A TNC/BNC Adaptor (P/N 330-01754-00) is required to connect the GPS antenna to the G5.

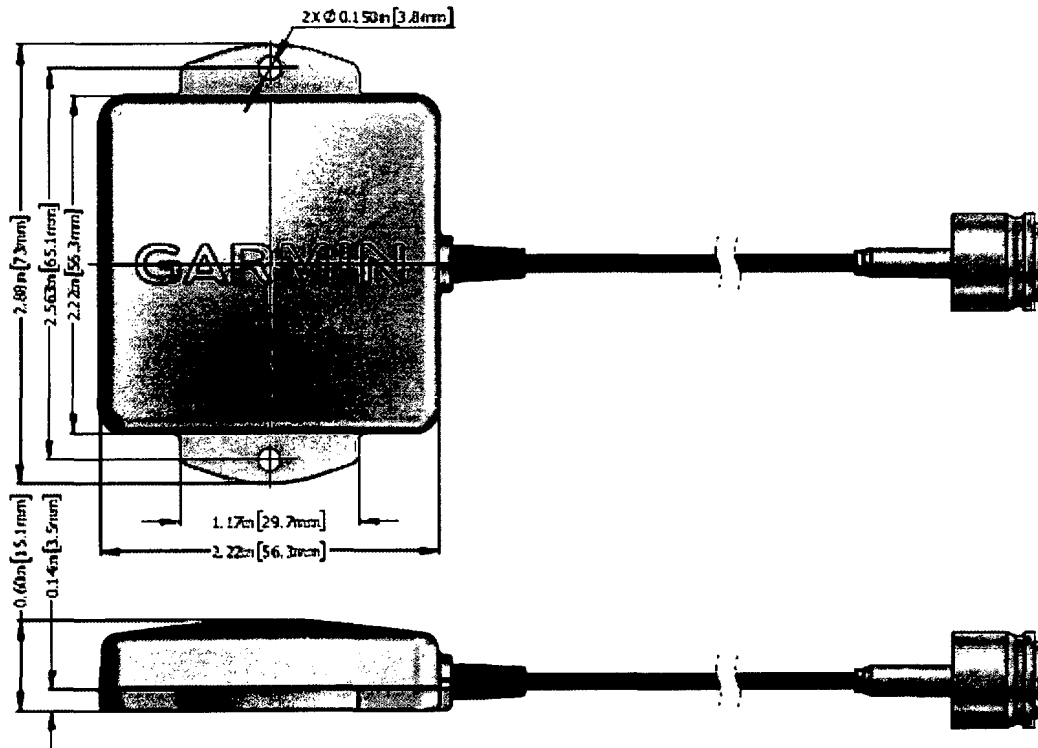
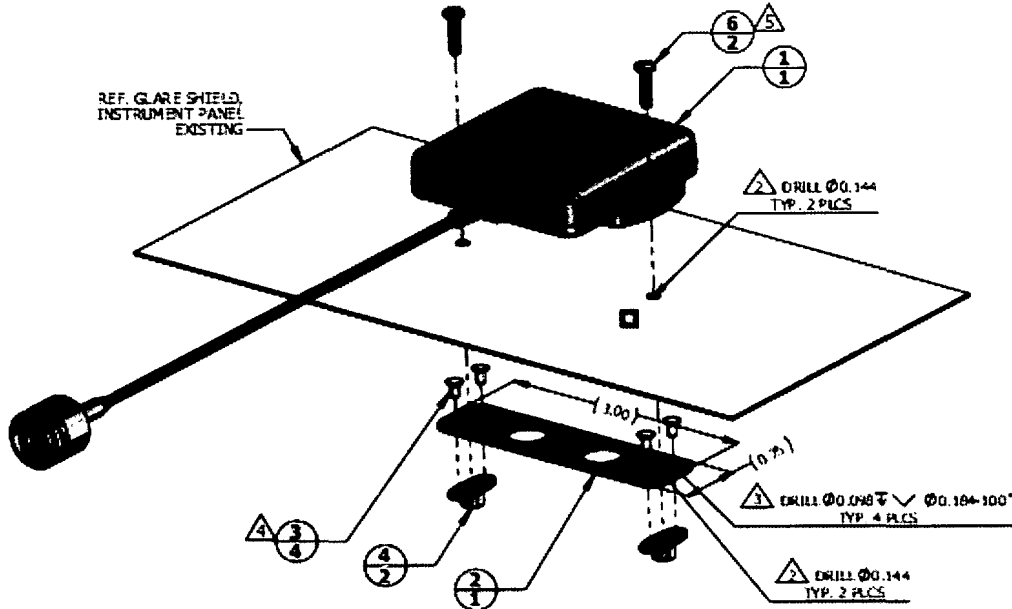


Figure 4-41 – Glare Shield Mounted GPS Antenna Dimensions

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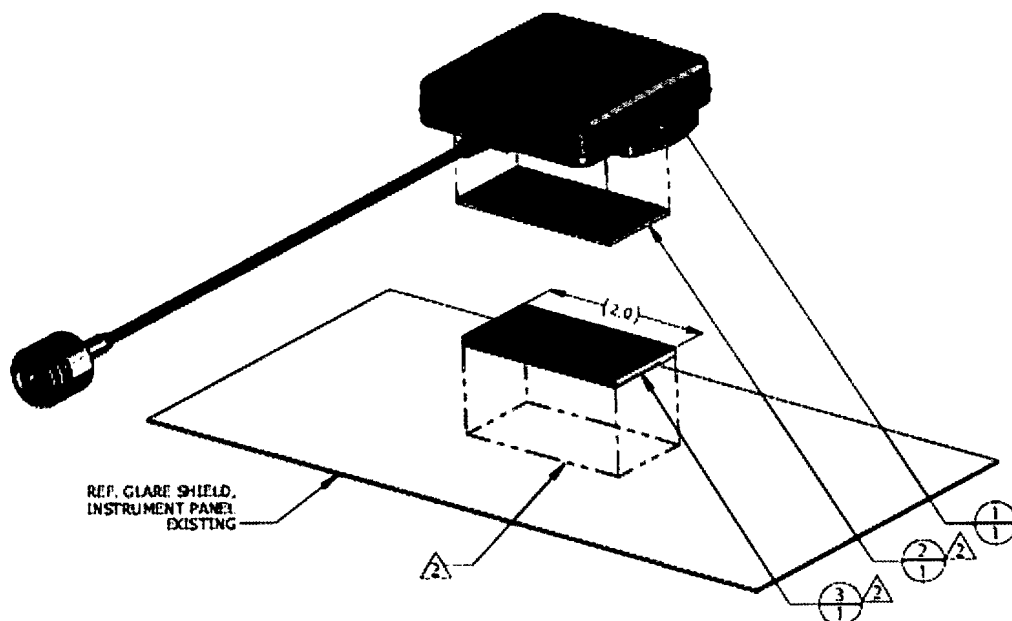


QTY	ITEM	PART NUMBER	DESCRIPTION
2	6	MS35206-229	SCREW, MACHINE PAN HEAD, CROSS RECESSED, CAD PLATED .1380-32 UNC-2A, 0.438 IN LONG
2	4	MS35214-26	SCREW, MACHINE PAN-HEAD, CROSS RECESSED, BLACK OXIDE FINISH .1380-32 UNC-2A, 0.438 IN LONG
2	4	MS21069-06	NUT, SELF-LOCKING, PLATE, TWO-LUG, REDUCED RIVET SPACING, LOW HEIGHT, STEEL .138-32 UNJC-3B
4	3	MS20426AD3-3	RIVET, SOLID, COUNTERSUNK 100 DEG, PRECISION HEAD, 3/32 IN OD, 3/16 IN LONG
1	2	PLATE DETAIL	SHEET, 6061-T6 AL, 0.040 INCH THICK PER AMS 4025, AMS 4027, AMS-QQ-A-290/11
1	1	011-04036-00	BACKUP GPS ANTENNA, GDU 70X

**NOTES**

- 1 DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.
- 2 FASTENER HOLES ARE LOCATED TO MATCH BACKUP GPS ANTENNA ITEM 1.
- 3 FASTENER HOLES ARE LOCATED TO MATCH NUTPLATE ITEM 4.
- 4 RIVETS ARE INSTALLED PER MIL-R-47196 (NASM47196) RIVET, BULK TYPE, PREPARATION FOR AND INSTALLATION OR PER MIL-STD-403 PREPARATION FOR AND INSTALLATION OF RIVETS AND SCREWS, ROCKET MISSILE, AND AIRFRAME STRUCTURES.
- 5 USE FASTENER WITH BLACK OXIDE FINISH IF ANTENNA LOCATION IS SUCH THAT FASTENERS ARE VISIBLE TO THE PILOT OR COPILOT AND MIGHT BECOME A SOURCE OF ACCIDENTAL GLARE. TORQUE .1380-32 UNC 2A SCREWS HAND TIGHT.

**Figure 4-42 – Glare Shield Mounted GPS Antenna (Screw-mounted Installation Example)**



1	3	A-A-55126	FASTENER TAPE, SYNTHETIC, ADHESIVE BACKED, A-A-55126 CLASS 1/2, TYPE 1, LOOP 1.0 INCH WIDE
	2		FASTENER TAPE, SYNTHETIC, ADHESIVE BACKED, A-A-55126 CLASS 1/2, TYPE 1, HOOK 1.0 INCH WIDE
1	1	011-04036-00	BACKUP GPS ANTENNA, GDU 70X
QTY	ITEM	PART NUMBER	DESCRIPTION

**NOTES**

- 1. DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.
- 2. PEEL OFF ADHESIVE PROTECTING FILM AND PRESS THE FASTENER TAPE IN TO BOND. SURFACES MUST BE CLEAN AND FREE FROM OIL OR OTHER CONTAMINANTS. LOOP FASTENER IS BONDED TO GLARE SHIELD AND HOOK FASTENER IS BONDED TO ANTENNA. TAPE FASTENER MUST BE 2.0 INCHES OR LONGER.
- 3. GPS ANTENNA KIT, GARMIN PART NO. 010-12444-00 INCLUDES DUAL LOCK FASTENER, GARMIN PART NO. 252-00433-00 WHICH CAN BE USED INSTEAD OF A-A-55126 FASTENER TAPE.

Figure 4-43 – Glare Shield Mounted GPS Antenna (Hook & Loop Installation Example)

## 4.2 Electrical Installation

### 4.2.1 Special Tools

Crimp tools and positioners are required to ensure consistent, reliable crimp contact connections for the D-sub connectors. The following crimp tools are recommended:

Table 4-3: Contact Crimp Tooling

Manufacturer	Crimp Tool P/N	Positioner P/N	Insertion/Extraction Tool P/N
MIL-Spec	M22520/2-01	M22520/2-08	M81969/1-02
Daniels	AFM8	K13-1	



## 4.2.2 Power Distribution

The circuit protection device for the G5 and GAD 29/29B must be a push-pull manually resettable circuit breaker or identically rated circuit protection device approved by the aircraft type certificate. See Section 3.2.1 for required circuit breaker part numbers. Use the following guidance for which electrical bus the G5 needs to be connected (Note: some aircraft manufacturers may label the battery bus as “essential bus” or “main bus”):

- G5 installed as attitude indicator or DG, connect to battery bus
- G5 installed as HSI, connect to the avionics bus

## 4.2.3 Wiring Harness Assembly

Allow adequate space for installation of the wiring harness and connectors. Construct the wiring harness in accordance with the information contained in this and the following sections. Mark wire in accordance with AC 43.13-1B Chapter 11 Section 16. Strip and insert the wire into the contact and crimp with the recommended (or equivalent) crimping tools. Insert the contacts into the connector as specified by the interconnect diagrams in Section 5. Verify the contacts are properly engaged into the connector by gently tugging on the wire. Mark harness connectors in accordance with AC 43.13 Chapter 11 Section 17. Route and secure the wiring harness away from sources of electrical interference.

The tables below lists the parts required to complete the assembly of the G5, GMU 11 and GAD 29/29B wiring harness connectors. Some of the parts required for this installation are included in the connector kit, and some are to be provided by the installer. See the notes below the tables for parts that are included in the connector kit. The Garmin connector backshell gives the installer the ability to easily terminate shield grounds at the connector backshell as shown in and Figure 4-45. Numbers referenced in Figure 4-44 and Figure 4-45 correspond to items listed in Table 4-4, Table 4-5, and Table 4-6.

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**Table 4-4: G5 (1P51, 2P51) and GMU11 (P111) Connector Parts**

Item	Description	Part Number	Notes
1	Shield Termination, Solder Style, Insulated, Heat-Shrinkable, Environment Resistant (X = size)	AS83519/1-X (SAE-AS83519)	1
2	Contact, Socket, MIL Crimp, Size 20	M39029/63-368, or	
		336-00022-02	2
3	Insulation Tape, Electrical, Self-Adhering, Unsupported Silicone Rubber	A-A-59163 (MIL-I-46852C)	
4	Terminal, Lug, Crimp Style, Copper, Insulated, Ring Tongue, Bell Mouthed, Type II, Class I	MS25036-149	
5	Connector, Plug, D-Sub, MIL Crimp Socket	330-00625-09	2
6	Backshell, Jackscrew, 9/15 Pin	125-00171-00	2
7	Clamp, Backshell, Jackscrew, 9/15 Pin	115-01078-00	2
8	Screw, 4-40x.375, PHP, SS/P, w/Nylon	211-60234-10	2
9	Cover, Backshell, Jackscrew, 9/15 Pin	115-01079-00	2
10	Screw, 4-40x.187, FLHP100, SS/P, w/Nylon	211-63234-06	2
11	Screw, PHP, 8-32 x 0.312", Cad-Plated Steel, or Screw, PHP, 8-32 x 0.312", Stainless	MS35206-242, or MS51957-42	
12	Split Washer, #8 (0.045" compressed thickness), Cad-plated Steel, or Split Washer, #8 (0.045" compressed thickness), Stainless	MS35338-42, or	
		MS35338-137	
13	Flat washer, Cad-plated Steel, #8, 0.032" thick, $\square$ 0.174" ID, 0.375" OD, or Flat Washer, Stainless, #8, 0.032" thick, 0.174" ID, $\square$ 0.375" OD	NAS1149FN832P, or	
		NAS1149CN832R	
14	Flat Braid, 1/16"	AA59569F36T0062	1

Notes:

1. AS83519/1-X and braid are the preferred method for shield termination. Alternately, AS83519/2-X with pre-installed shield drain may be used.
2. Garmin Part Number. Included in kit p/n 011-03002-00.

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Table 4-5: GAD 29/29B 9-pin (P291) Connector Parts

Item	Description	Part Number	Notes
1	Shield Termination, Solder Style, Insulated, Heat-Shrinkable, Environment Resistant (X = size)	AS83519/1-X (SAE-AS83519)	1
2	Contact, Socket, MIL Crimp, Size 20	M39029/63-368, or	
		336-00022-02	2
3	Insulation Tape, Electrical, Self-Adhering, Unsupported Silicone Rubber	A-A-59163 (MIL-I-46852C)	
4	Terminal, Lug, Crimp Style, Copper, Insulated, Ring Tongue, Bell Mouthed, Type II, Class I	MS25036-149	
5	Connector, Plug, D-Sub, MIL Crimp Socket	330-00625-09	2
6	Backshell, Jackscrew, 9/15 Pin	125-00171-00	2
7	Clamp, Backshell, Jackscrew, 9/15 Pin	115-01078-00	2
8	Screw, 4-40x.375, PHP, SS/P, w/Nylon	211-60234-10	2
9	Cover, Backshell, Jackscrew, 9/15 Pin	115-01079-00	2
10	Screw, 4-40x.187, FLHP100, SS/P, w/Nylon	211-63234-06	2
11	Screw, PHP, 8-32 x 0.312", Cad-Plated Steel, or Screw, PHP, 8-32 x 0.312", Stainless	MS35206-242, or MS51957-42	
12	Split Washer, #8 (0.045" compressed thickness), Cad-plated Steel, or Split Washer, #8 (0.045" compressed thickness), Stainless	MS35338-42, or	
		MS35338-137	
13	Flat washer, Cad-plated Steel, #8, 0.032" thick, $\square$ 0.174" ID, 0.375" OD, or Flat Washer, Stainless, #8, 0.032" thick, 0.174" ID, $\square$ 0.375" OD	NAS1149FN832P, or	
		NAS1149CN832R	
14	Flat Braid, 1/16"	AA59569F36T0062	1

Notes:

1. AS83519/1-X and braid are the preferred method for shield termination. Alternately, AS83519/2-X with pre-installed shield drain may be used.
2. Garmin Part Number. Included in kit p/n 011-03271-00.

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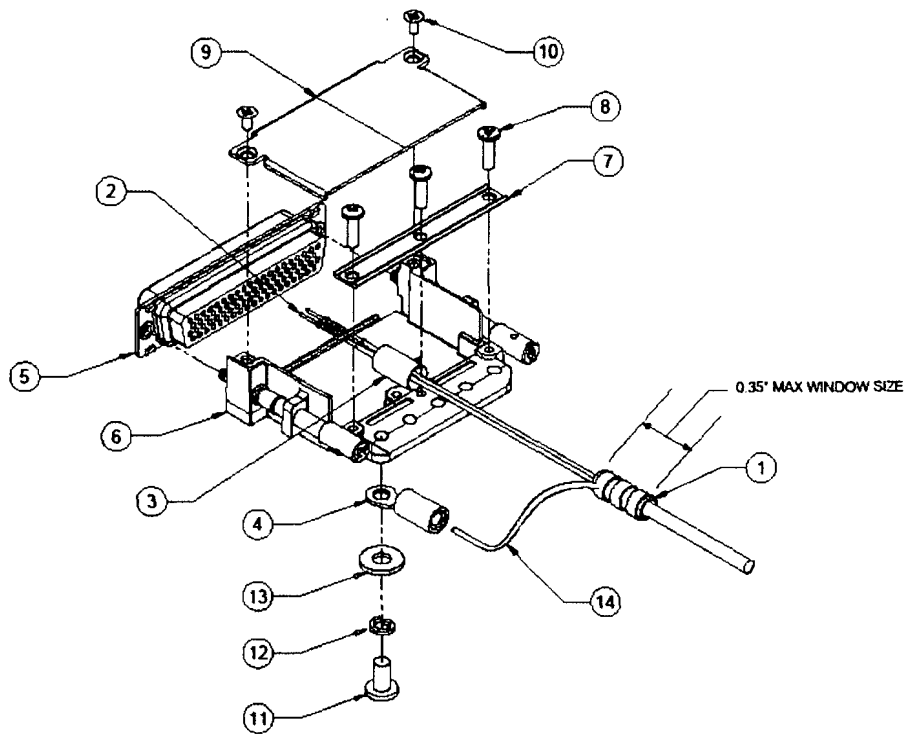
Table 4-6: GAD 29/29B 25-pin (P292) Connector Parts

Item	Description	Part Number	Notes
1	Shield Termination, Solder Style, Insulated, Heat-Shrinkable, Environment Resistant (X = size)	AS83519/1-X (SAE-AS83519)	1
2	Contact, Pin, MIL Crimp, Size 20	M39029/64-369, or 336-00024-00	2
3	Insulation Tape, Electrical, Self-Adhering, Unsupported Silicone Rubber	A-A-59163 (MIL-I-46852C)	
4	Terminal, Lug, Crimp Style, Copper, Insulated, Ring Tongue, Bell Mouthed, Type II, Class I	MS25036-149	
5	Connector, Plug, D-Sub, MIL Crimp Socket	330-00624-25	2
6	Backshell, Jackscrew, 25/44 Pin	125-00173-00	2
7	Clamp, Backshell, Jackscrew, 25/44 Pin	115-01078-02	2
8	Screw, 4-40x.375, PHP, SS/P, w/Nylon	211-60234-10	2
9	Cover, Backshell, Jackscrew, 25/44 Pin	115-01079-02	2
10	Screw, 4-40x.187, FLHP100, SS/P, w/Nylon	211-63234-06	2
11	Screw, PHP, 8-32 x 0.312", Cad-Plated Steel, or Screw, PHP, 8-32 x 0.312", Stainless	MS35206-242, or MS51957-42	
12	Split Washer, #8 (0.045" compressed thickness), Cad-plated Steel, or Split Washer, #8 (0.045" compressed thickness), Stainless	MS35338-42, or MS35338-137	
13	Flat washer, Cad-plated Steel, #8, 0.032" thick, $\square$ D.174" ID, 0.375" OD, or Flat Washer, Stainless, #8, 0.032" thick, 0.174" ID, $\square$ D.375" OD	NAS1149FN832P, or NAS1149CN832R	
14	Flat Braid, 1/16"	AA59569F36T0062	1

Notes:

1. AS83519/1-X and braid are the preferred method for shield termination. Alternately, AS83519/2-X with pre-installed shield drain may be used.
2. Garmin Part Number. Included in kit p/n 011-03271-00.

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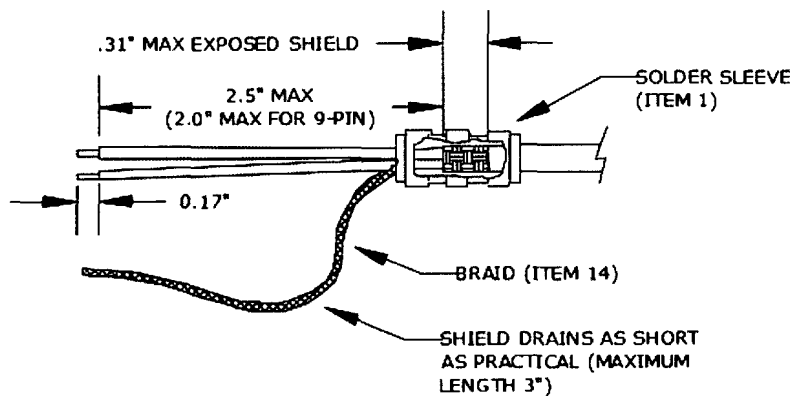
**Figure 4-44 Wiring Harness Connector Assembly**

NOTE: 78 pin D-sub connector shown, 9 pin and 25 pin D-sub connector similar.

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## SHIELDED CABLE PREPARATION (PREFERRED METHOD)



## SHIELDED CABLE PREPARATION (ALTERNATE METHOD)

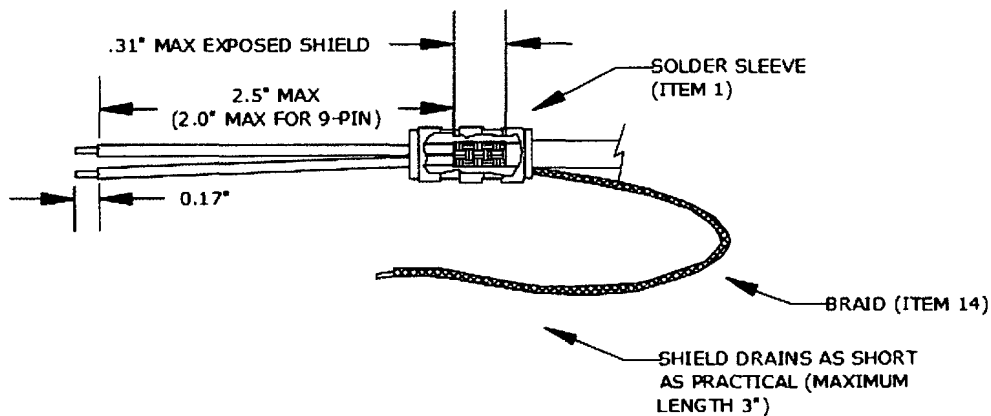


Figure 4-45 Shield Termination Methods

With the exception of CAN bus shield termination methods shown in section 3.4.11, prepare all of the shielded wires using one of the shield termination methods shown in Figure 4-45. Keep the shield drains as short as practical (3" max total length). See Table 4-4, Table 4-5, and Table 4-6 regarding numbers in parentheses in the following procedure.

1. Strip 2.5 inches (maximum) (2.0 inches maximum for 9-pin connectors) of the jacket to expose the shield braid.
2. Remove the exposed braid.
3. Carefully score the jacket 1/4 to 5/16 inches and remove the jacket to leave the braid exposed.
4. Slide a shield terminator (1) onto the exposed shield braid and insert shield braid drain (14) into shield terminator. Secure the shield terminator and braid drain to the shield using a heat gun approved for use with solder sleeves.





5. Strip the signal wires approximately 0.17 inches.
6. Crimp socket contacts (2) on to the signal wires.
7. Crimp ring terminals (4) on to the shield drain wires.
8. Repeat steps 1 through 7 as needed for the remaining shielded wires.
9. Insert the signal wire socket contacts into the appropriate locations in the D-sub connector (5).
10. Attach the shield drain ring terminals to the connector backshell shield block using the supplied screws and washers (11)(12)(13).
11. Wrap the wiring harness with silicone fusion tape (3) at the point where the strain relief clamp (7) and connector backshell (6) will contact the wiring harness.
12. Attach the strain relief clamp (7) to the connector backshell (6) using the supplied screws (8).



### CAUTION

*Placing the concave side of the strain relief clamp across the wiring harness will damage the wiring harness.*



### NOTE

*Only two ring terminals should be attached to each screw on the connector backshell shield ground. It is preferred that only two wires be terminated in each ring terminal. This will necessitate the use of a ring terminal, #8, insulated, 14-16 AWG (MS25036-153). If only a single wire is left or if only a single wire is needed for this connector a ring terminal, #8, insulated, 18-22 AWG (MS25036-149) can be used. If more wires exist for the connector than two per ring terminal, it is permissible to terminate three wires per ring terminal.*

13. Install the connector backshell cover (9) using the supplied screws (10).

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### 4.3 Weight and Balance

Weight and balance computations are required after the installation of the G5. Table 4-7 lists the weights associated with the G5 Electronic Flight Instrument. Refer to AC 43.13-1B, Chapter 10, for the weight and balance procedure covering the addition of equipment to the aircraft.

**Table 4-7: LRU Weights**

Item	Weight
G5 with Battery, connector and mounting ring	.98 lbs
GMU 11	.26 lbs
GAD 29	.63 lbs
GAD 29B	.65 lbs
Glare Shield Mounted GPS Antenna	.20 lbs

### 4.4 Electrical Load Analysis

If the current draw of the G5 unit(s), GMU 11 or GAD 29/29B is less than the removed equipment, then the aircraft's electrical load capacity can be shown to be adequate by analysis. If it is determined the modification results in an increase in electrical load, then it must be verified the electrical generation and reserve battery capacity remain adequate to support electrical loads essential to safe flight and landing of the aircraft.

#### 4.4.1 Aircraft with Existing Electrical Load Analysis

If there is an existing electrical load analysis for the aircraft, it must be updated to reflect the modification. It must show the electrical system has adequate capacity to supply power to the modified systems in all expected conditions. Refer to the aircraft manufacturer's documentation for guidance on revising and maintaining the electrical load analysis.

#### 4.4.2 Aircraft without Existing Electrical Load Analysis

Prior to undertaking a complete electrical load analysis, the net change to the electrical load resulting from the G5 installation should be determined. See Table 4-8 for a sample calculation. The results of this analysis will be used to determine how to proceed further.

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#### 4.4.2.1 Electrical Load is Reduced Following Modification

If calculations show the overall load on the electrical system is reduced as shown in the following example, no further analysis is required. This assumes the electrical system was within all limits prior to the G5, GMU 11 and GAD 29/29B installation. Record the new electrical load calculations.

**Table 4-8: Sample Net Electrical Load Change Calculation**

Items removed from aircraft:	Electrical Load (Amps) <sup>1</sup>
<b>SUBTOTAL</b>	

Items added to aircraft		
G5	14 V (typical) <sup>(1)</sup>	.200 A
	28 V (typical) <sup>(1)</sup>	.100 A
GMU11	14 V (typical) <sup>(1)</sup>	.100 A
	28 V (typical) <sup>(1)</sup>	.100 A
GAD 29/29B	14 V (typical) <sup>(1)</sup>	.200 A
	28 V (typical) <sup>(1)</sup>	.100 A
<b>SUBTOTAL</b>		

**NET CHANGE IN BUS LOAD**  
 (NEW BUS LOAD – OLD BUS LOAD) \_\_\_\_\_

Notes:

- (1) Use 14 V or 28 V typical current draw depending on aircraft system when performing this calculation.



#### 4.4.2.2 Electrical Load is Increased Following Modification

If it is determined the electrical load has increased an appreciable amount, a complete electrical load analysis must be performed to show the capacity of the electrical system is sufficient for the additional electrical load. For guidance on performing an electrical load analysis, refer to ASTM F 2490-05, Standard Guide for Aircraft Electrical Load and Power Source Capacity Analysis. Alternatively, the loads under various operating conditions may be measured, as described in Section 4.4.2.3.

#### 4.4.2.3 Performing an Electrical Load Analysis by Measurement

This section describes how to perform an electrical load analysis for a single alternator-single battery electrical system. These procedures may be modified accordingly for aircraft with multiple batteries or alternators, and it must be shown the maximum electrical demand does not typically exceed 80% of the electrical system capacity.

In this section the following definitions are used:

**normal operation:** the primary electrical power generating system is operating normally.

**emergency operation:** the primary electrical power generating system is inoperative and a back-up electrical power generating system is being used. This typically requires load shedding of non-essential equipment to provide adequate electrical power to essential required equipment for safe flight and landing of the airplane.

Either an in-circuit or clamp-on ammeter can be used for current measurement. The instrument used must be calibrated and must be capable of reading current to the nearest 0.5 A, or better.

1. Record the continuous load rating for the alternator and battery.
2. Compile a list of electrical loads on the aircraft (generally, this is just a list of circuit breakers and circuit breaker switches).
3. Identify whether each load is *continuous* (e.g. GPS) or *intermittent* (e.g. stall warning horn, landing gear).
4. Using the worst-case flight condition, identify whether each load is used in a particular phase of flight for *normal* operation. If some loads are mutually exclusive and will not be turned on simultaneously (e.g. pitot heat and air conditioning), use only those loads for the worst-case condition.
5. Identify whether each load is used in a particular phase of flight for emergency operation. As a minimum, these systems generally include:
  - COM Radio #1
  - NAV Radio #1
  - Transponder and associated altitude source
  - Audio Panel
  - Stall Warning System (if applicable)
  - Pitot Heat

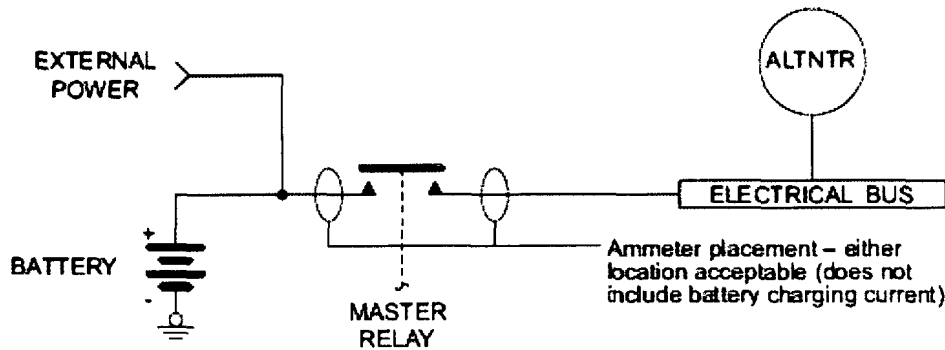
# GARMIN<sup>®</sup>

- Landing Light (switched on during landing only)
  - Instrument Panel Dimming
6. Insert/attach the ammeter in the line from the external power source to the master relay circuit as shown in Figure 4-46. This will eliminate errors due to the charging current drawn by the battery.



## CAUTION

*To avoid damage to equipment, ensure the ammeter is capable of handling the expected load.*



**Figure 4-46 Ammeter Placement for Current Measurements**

7. Ensure all circuit breakers are closed.
8. Apply external power to the aircraft. The voltage of the power source should be set to the nominal alternator voltage (usually 13.8 VDC or 27.5 VDC).
9. Turn on the battery master switch.



## NOTE

*Intermittent electrical loads are not measured. It is assumed if additional current is required beyond what the alternator can supply, this short-duration demand will be provided by the battery.*

10. Set the lighting as described below. These settings will be used for every current measurement which follows:
- Set instrument panel and flood lights to maximum brightness.
  - Set displays with a backlight to 50% brightness
11. Using the tabulation completed above, switch on all *continuous* electrical loads used for the taxiing phase and record the current measured by the ammeter (measurement (a) in Figure 4-47). The autopilot circuit breaker (if installed) should be closed, but the autopilot should not be engaged.



## WARNING

*Pitot heat should be switched on only long enough to take the current measurement and then switched off to avoid injury to personnel or damage to the Pitot tube.*

12. Using the tabulation completed above, switch on all continuous electrical loads used for the **normal** takeoff/landing phase and record the current measured by the ammeter. Measurements must be taken with the landing lights ON and OFF (measurements (b1) and (b2) in Figure 4-47).
13. Engage the autopilot (if installed).
14. Using the tabulation completed above, switch on all continuous electrical loads which are used for the **normal** cruise phase and record the current measured by the ammeter (measurement (c) in Figure 4-47).
15. Using the tabulation completed above, switch on all continuous electrical loads used for the **emergency** cruise phase and record the current measured by the ammeter.
16. Using the tabulation completed above, switch on all continuous electrical loads used for the emergency landing phase and record the current measured by the ammeter.
17. Using the values measured and recorded, complete the ELA using the blank form in Figure 4-47 and Figure 4-48.
18. Verify the maximum electrical load does not exceed 80% of the electrical system capacity. See example in Figure 4-49 and Figure 4-50.



## NOTE

*Electrical loads in excess of 80% but not greater than 95% of electrical system capacity are permitted during the takeoff/landing phase of flight when landing light(s) are switched on.*

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**AIRPLANE ELECTRICAL LOAD TABULATION FORM**

Date: \_\_\_\_\_ Tail Number: \_\_\_\_\_ Phase(s) of flight during which circuit/system is used

Circuit/System	Circuit Breaker Number	Operating Time	Normal Operation			Emergency Operation	
			Taxiing	TD/ Land	Cruise	Cruise	Land
			10 min	10 min	60 min		10 min

Figure 4-47 Blank Electrical Load Tabulation Form, Sheet 1 of 2



**AIRPLANE ELECTRICAL LOAD TABULATION FORM (CONTINUED)**

Date: \_\_\_\_\_ Tail Number: \_\_\_\_\_ Phase(s) of flight during which circuit/system is used

Circuit/System	Circuit Breaker Number	Operating Time	Normal Operation			Emergency Operation	
			Taxiing 10 min	TDR and 10 min	Cruise 60 min	Cruise	Land 10 min
_____	_____	_____					
_____	_____	_____					
_____	_____	_____					
_____	_____	_____					
_____	_____	_____					
_____	_____	_____					
_____	_____	_____					
_____	_____	_____					
_____	_____	_____					
Total current used (amps):			(a)	Ldg Lr ON (a,b)	(c)	(d)	(e)
+ Alternator rating (amps):				Ldg Lr OFF (a,b)			
x 100% = Percent of alternator capacity used:			(a) % ( $\leq 60\%$ )	Ldg Lr ON ( $\leq 65\%$ )	(c) % ( $\leq 80\%$ )	N/A	N/A
				Ldg Lr OFF ( $\leq 60\%$ )			
Pass/Fail:			_____	_____	_____		

Notes:

Figure 4-48 Blank Electrical Load Tabulation Form, Sheet 2 of 2





**ELECTRICAL LOAD TABULATION FORM**

Date: 02/14/14 Tail Number: NXXXX

Phase(s) of flight during which circuit/system is used

Circuit/System	Circuit Breaker Number	Operating Time	Normal Operation			Emergency Operation	
			Taxiing 10 min	TD/Land 10 min	Cruise 60 min	Cruise	Land 10 min
ALTERNATOR FIELD		Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ANNUNCIATOR PANEL		Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
VACUUM WARNING		Intermittent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GEAR WARNING		Intermittent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GEAR ACTUATOR		Intermittent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CLUSTER GAUGE		Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
IGNITION		Intermittent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PFD		Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
TURN COORDINATOR		Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GEAR RELAY		Intermittent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ADC		Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PANEL LIGHTS		Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
GLARESHIELD LIGHTS		Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
AHRS		Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
FLAP ACTUATOR		Intermittent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COM 1		Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
GPS/NAV 1		Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
COM 2		Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GPS/NAV 2		Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AUTOPILOT [1]		Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AUDIO PANEL		Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
RADIO BLOWER		Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ADF		Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TRANSPONDER		Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
GDL 69		Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GTS 8X5		Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
JPI ENGINE MONITOR		Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
BOSE HEADSETS		Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
ALTITUDE ENCODER		Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
STROBE LIGHT		Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
NAV LIGHTS		Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
RECOGNITION LIGHTS		Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
LANDING LIGHT		Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
PITOT HEAT		Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
BOOST PUMP		Continuous	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Figure 4-49 Sample Completed Electrical Load Tabulation Form, Sheet 1 of 2



**ELECTRICAL LOAD TABULATION FORM (CONTINUED)**

Date: 02/14/14 Tail Number: NXXXX

Circuit/System	Circuit Breaker Number	Operating Time	Phase(s) of flight during which circuit/system is used				
			Normal Operation			Emergency Operation	
			Takeoff 10 min	TO/Land 10 min	Cruise 60 min	Cruise	Land 10 min
_____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Total current used (amps):			47.5 (a)	60 Ldg 1 ON (b1) 44.7 Ldg 1 OFF (b2)	43.5 (c)	34.0 (d)	48.1 (e)
+ Alternator rating (amps): <u>70</u>							
x 100% = Percent of alternator capacity used:			68 % (100%)	88 % Ldg 1 ON (100%) 64 % Ldg 1 OFF (100%)	62 % (100%)	N/A	N/A
Pass/Fail:			PASS	PASS	PASS		

Notes:

Figure 4-50 Sample Completed Electrical Load Tabulation Form, Sheet 2 of 2

## 4.5 Electrical Bonding

The GAD 29/29B is the only LRU installed by this STC that requires chassis bonding. Sections 4.5, 4.5.1, 4.5.2, 4.5.3 present data on acceptable methods of electrical bonding for the GAD 29/29B. For G5 and GMU11 bonding strap requirements and associated installations, refer to section 4.5.4 and 4.5.5.

GAD29/29B electrical bonding can be achieved with mounting hardware (rivets, bolts, nuts, washers, etc.). A reliable electrical bond relies on mated surfaces to be clean of any primer/grease/dirt. When bolts are used to secure racks/brackets/etc. and are relied upon for electrical bond, in lieu of the mating surfaces of the racks/brackets/etc. then the area under the head of the bolt/screw or washer must be free of primer and a burnished area should be prepared that is at least 0.125 inches wider than the head of the bolt or the washer (if used) under the head. If primer or film was removed to achieve this then any exposed area still visible after the bond is completed must be refinished with the original finish or other suitable film (e.g. primer) or coating, ref ARP1870. If the bolt is secured with washer and nut then a similar burnish area as described above shall occur between the washer and the mounting structure, see Figure 4-51. Rivets used to mechanically attach brackets/shelves/etc. provide an inherent electrical bond through the rivets and require no additional bond preparation. Similarly riveted nut plates do not need any special bonding preparation and can be relied upon to provide electrical bond between the fastener and the nut plate. The top or bottom side of the Garmin racks or equipment flanges do not need any special bond preparations, see Figure 4-52. Additional details on how to accomplish electrical bonding can also be found in SAE ARP1870 section 5.

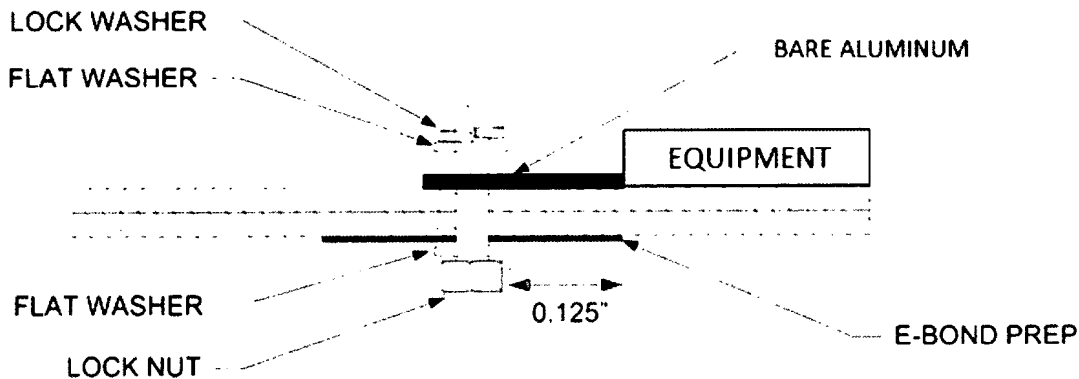


Figure 4-51 – Nut and washer electrical bonding

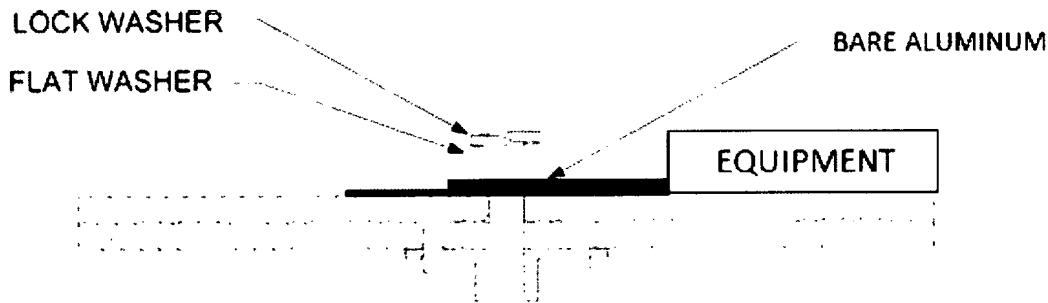


Figure 4-52 – Nut plate electrical bonding



When equipment is mounted to honeycomb shelves, the face sheets must be metal. The honeycomb material between the face sheets is not conductive and therefore care must be taken to make sure proper bonding of the equipment has taken place. The top and bottom faces sheets must be grounded to each other and one of the face sheets must be grounded to the airframe.

The instrument panel must be of metal construction so that remotely mounted units have a metal ground reference back to the other G5 interfacing equipment mounted on the instrument panel. For metal aircraft the latter is achieved inherently through the metallic aircraft structure. For composite aircraft a ground plane (or reference) may need to be created to achieve a comparable ground. This procedure is described in Section 4.5.2.

All LRU bonding measurements must be made with the connector(s) disconnected from the LRU.

#### 4.5.1 Metal Aircraft

The GAD 29/29B and the support brackets require a resistance value of 2.5 milliohms or less between individual mating surfaces. For general steps on how to prepare aluminum surfaces for electrical bonding refer to Section 4.5.3.

If the instrument panel is attached by vibration mounts, verify that the mounts are grounded to the metallic airframe structure by means of a bonding jumper. Ensure that the installed bonding jumper meets the following specifications.

1. The braid is a 7/16" or wider tubular braid (part number QQB575R30T437, 24,120 circular mils) or a 3/4" or wider flat braid (part number QQB575F36T781, 20,800 circular mils).
2. The braid contains a terminal lug (mil-spec MS20659-130) at each end.
3. The strap length is as short as possible, not exceeding 6 inches.

Ensure that each terminal lug is secured to its respective mating surface with one #10 steel bolt and one flat washer (part number AN970-3). Lugs and washers should be center-aligned and flush on all outside edges. These components should be in full contact with the mating surface.

#### 4.5.2 Nonmetallic Aircraft

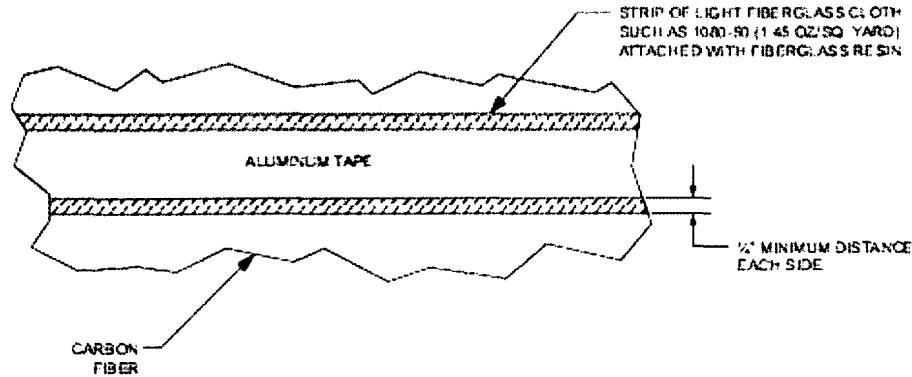


##### NOTE

*Carbon reinforced composite (with or without mesh) or fiberglass with mesh is considered to be conductive. Wood, Kevlar and fiberglass without mesh is considered to be non-conductive.*

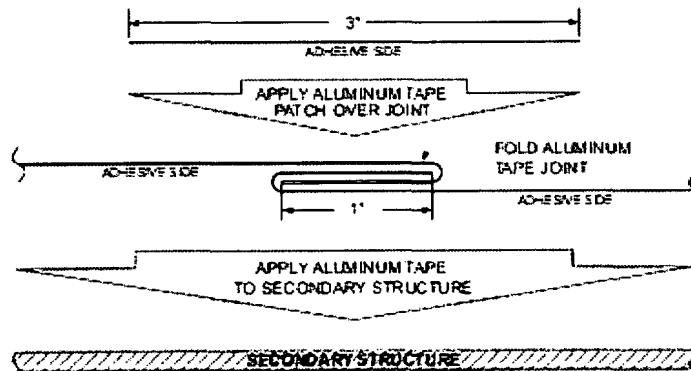
If the equipment is mounted in the metallic instrument panel then the bonding should be accomplished like that for metal aircraft (Section 4.5.1). For composite areas of the aircraft the GAD 29/29B must be electrically bonded to the metallic instrument panel either directly through the unit remote install/mounting rack or with heavy-duty dead soft aluminum tape such as 3M Heavy Duty Aluminum Foil Tape 438. The following guidance should be used for locating and bonding the LRU:

1. Identify a location for the LRU which is close to the instrument panel or the grounding structure for the instrument panel.
2. Identify a route between the LRU location and the instrument panel ground that will accommodate a strip of aluminum tape with a width of at least four inches and a length-to-width ratio of 7:1.
3. If the tape will come in contact with carbon composite material, the tape must be electrically isolated from the carbon composite material to prevent corrosion due to dissimilar materials. Secure a thin layer of fiberglass cloth to the carbon fiber with fiberglass resin as shown in Figure 4-53.



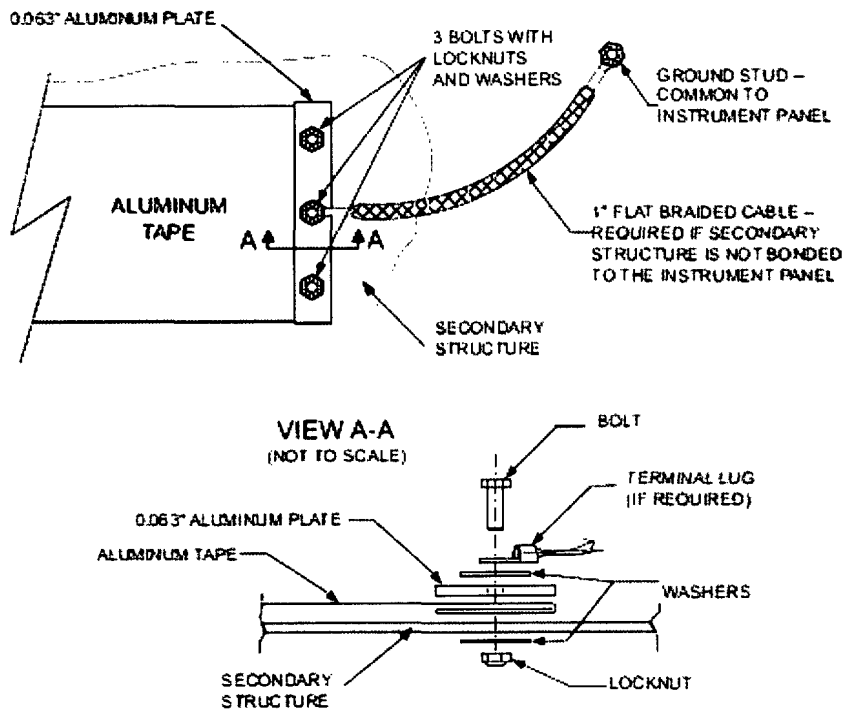
**Figure 4-53 Fiberglass Insulation for Carbon Fiber Material**

4. Identify a grounding location. The ground must be a bare metal surface on the instrument panel or grounding structure for the instrument panel. If it is impractical to reach a grounding location with aluminum tape then:
  - a. The tape shall meet a 5:1 length to width ratio.
  - b. The bond strap shall be one inch wide and no longer than five inches.
5. Prepare the aluminum surface at the ground location outlined in Section 4.5.3 or identify a ground stud to which the braid can be attached. Any new ground stud shall also be prepared for electrical bonding.
6. Route the tape between the LRU mount and the grounding location for the instrument panel. If needed to maintain the 7:1 length-to-width ratio, the tape can be overlapped in more than one strip.
7. If two pieces of tape need to be joined end-to-end, they can be joined as illustrated in Figure 4-54.

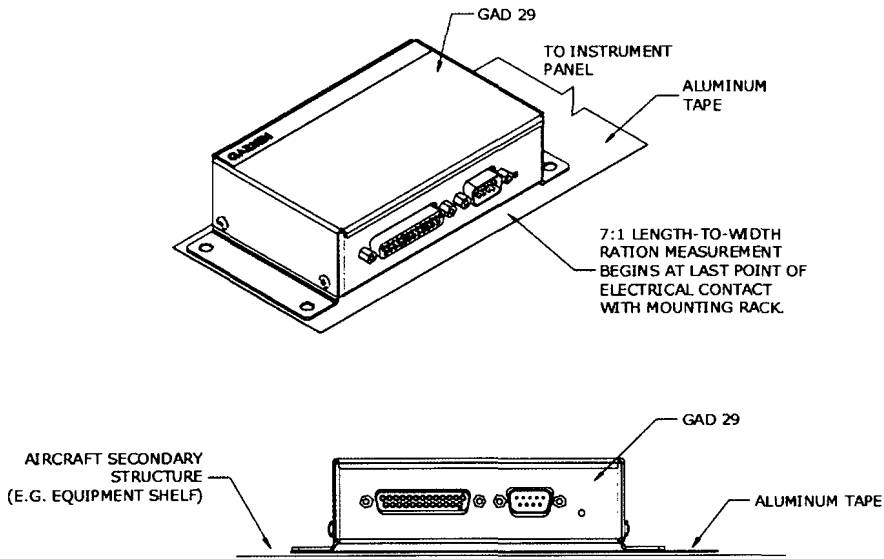


**Figure 4-54 Aluminum Tape Joint**

8. Fold the end of the tape over twice for added thickness at the prepared grounding location. Refer to Figure 4-55. Apply 3" wide tape over the seam as shown.
9. The tape shall not have any tears in the joint or along the length of the tape as tears will degrade the bonding performance.
10. Electrical bond preparation for all aluminum-to-aluminum interfaces per SAE ARP1870 section 5.1 and 5.5.
11. If a bonding strap will be used to reach the grounding location, secure the end of the tape to the secondary composite surface as shown in Figure 4-55. Note that the procedure for installing mounting bolts applies only to secondary aircraft structures, not to primary structure or structural load-carrying members. The tape shall meet 5:1 length to width ratio if a bonding strap is used. The bonding strap shall be one inch wide and no longer than five inches. Refer to Figure 4-55.
12. Terminate both ends of the bonding strap with MS20659-130 terminal lugs.
13. Install AN960C10 washer between the terminal lug and the mating metal surface and secure with a #10 steel bolt. Ensure that the lug and washer are centered and in full contact with the mating surface with no overhang when secured.
14. Secure the end of the tape in place using a 0.063" piece of aluminum using three bolts and nuts. Refer to Figure 4-55.
15. Secure the aluminum tape to the GAD 29/29B or mounting rack as shown in Figure 4-56.
16. Verify that the resistance between tape and the local grounding location does not exceed 2.5 mΩ.



**Figure 4-55 Aluminum Tape Ground Termination**



**Figure 4-56 GAD 29/29B Aluminum Tape Installation**

### 4.5.3 Aluminum Surface Preparation

In order to prepare the aluminum surface for proper bonding, the following general steps should be followed. For a detailed procedure, reference SAE ARP1870, Sections 5.1 and 5.5.

1. Clean grounding location with solvent.
2. Remove non-conductive films or coatings from the grounding location. When area is cleaned around fastener heads or washers the area cleaned should be 0.125 inches wider than the foot print of the washer or the bolt head.
3. Apply a chemical conversion coat such as Alodine 1200 to the bare metal.
4. Once the chemical conversion coat is dry, clean the area.
5. Install bonding aluminum tape or equipment at grounding location.
6. After the bond is complete, if any films or coatings were removed from the surface, reapply a suitable film or coating to the surrounding area.

### 4.5.4 Bonding strap for G5 and GMU11

A bonding strap is required for the G5 and GMU11, use the following guidance to create a bond strap. The bonding strap must be **less than 10 inches in length** and must be connected from the backshell to a #10 ground stud. Below is a list of approved metal braids with their accompanying terminal rings that can be used to create these bonding straps.

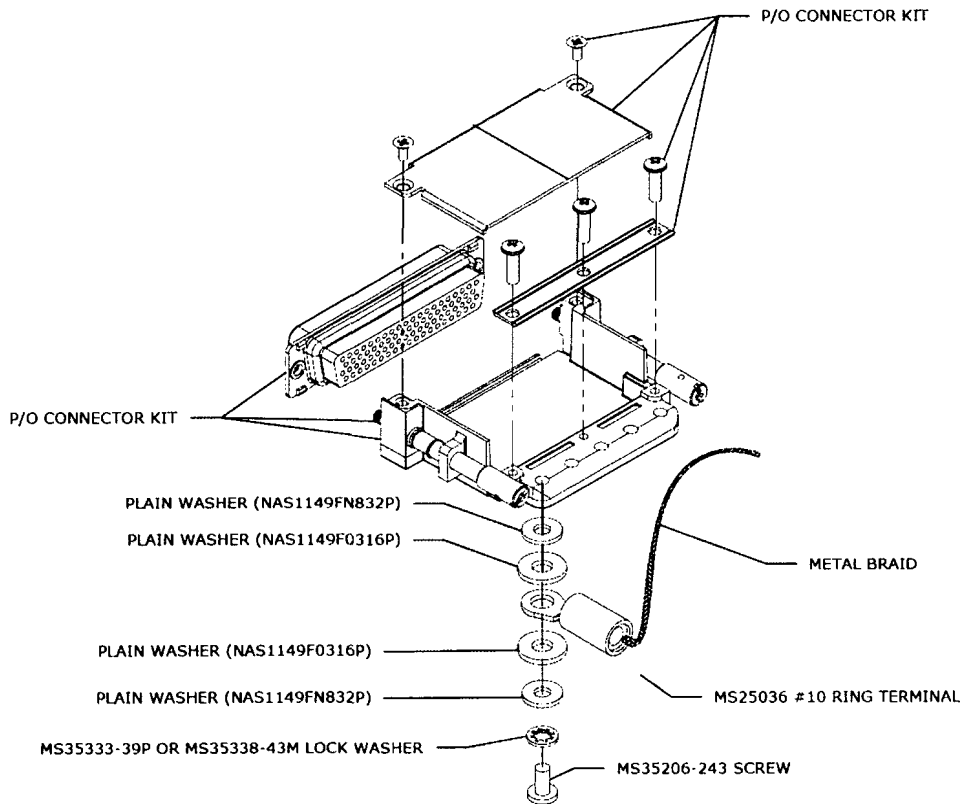
**Table 4-9: Bonding Strap Potential Part Numbers**

Bonding strap part numbers			
Braid Part Number	Ring Terminal Part Number	Braid Part Number	Ring Terminal Part Number
QQB575*36*375	MS25036-112 (#10) or MS25036-156 (#8)	AA59569*36*0375	MS25036-112 (#10) or MS25036-156 (#8)
QQB575*34*375	MS25036-112 (#10) or MS25036-156 (#8)	AA59569*34*0375	MS25036-112 (#10) or MS25036-156 (#8)

QQB575*32*375	MS25036-112 (#10) or MS25036-156 (#8)	AA59569*32*0375	MS25036-112 (#10) or MS25036-156 (#8)
QQB575*30*375	MS25036-115	AA59569*30*0375	MS25036-115
QQB575*30*473	MS25036-115	AA59569*36*0500	MS25036-115
QQB575*36*500	MS25036-115	AA59569*34*0500	MS25036-115
QQB575*34*500	MS25036-115	AA59569*32*0500	MS25036-115
QQB575*32*500	MS25036-115	AA59569*32*0500	MS25036-119
QQB575*30*500	MS25036-119		

Create the bonding strap using the following instructions:

1. Cut an appropriate length of a metal braid listed in the table (maximum 10 inches)
2. Terminate both ends with the stated MS25036 terminal
3. Find a location on structure to create or re-use an existing ground stud that is size #10 for connection to this bonding strap from the LRU backshell.
4. If creating a new ground stud, create a #10 ground stud in accordance with the instructions stated in this section. Hole to be  $\varnothing 0.201$ .
5. If using a #8 ring terminal for connection to the backshell, reference Figure 4-44 for hardware buildup using ring terminal bonding strap part numbers listed in Table 4-9.
6. If using a #10 ring terminal for connection to the backshell, use the following method to connect the #10 terminal to the LRU backshell, create the following hardware buildup as shown below in Figure 4-57:



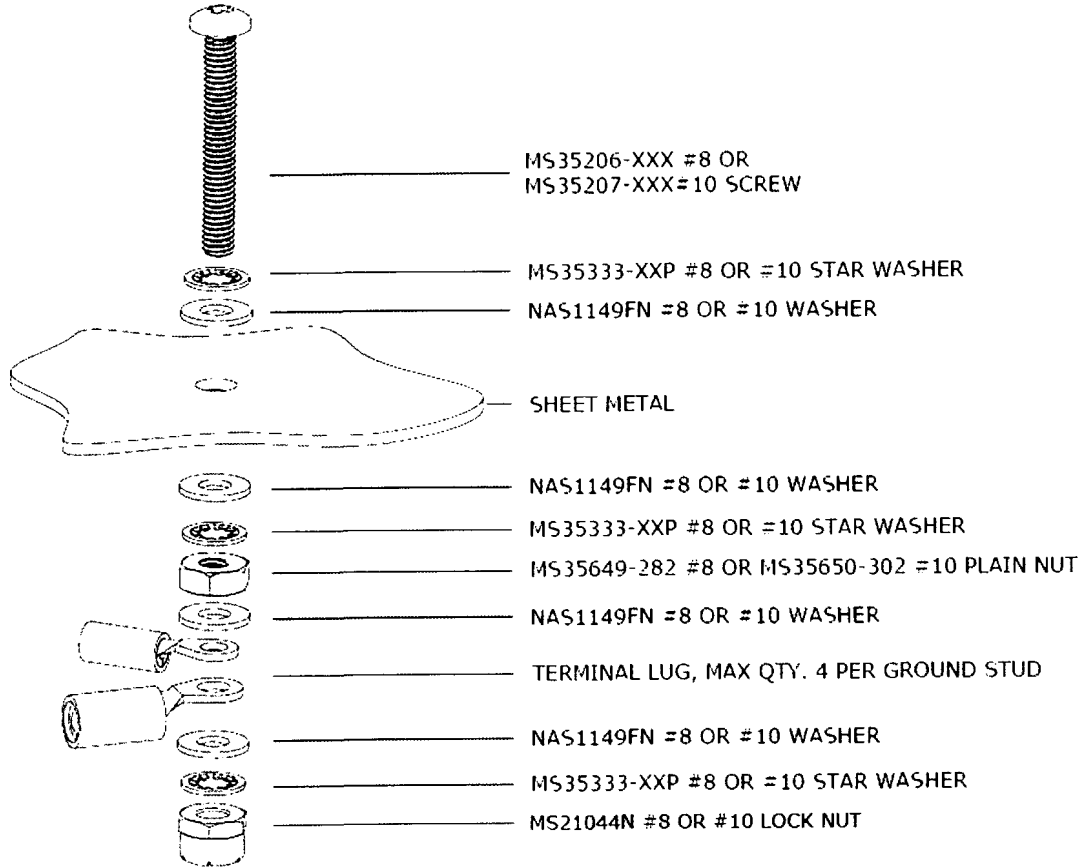
**Figure 4-57 - #10 terminal installation on Garmin backshell**

7. Torque hardware buildup to 11-17 in-lb.



### 4.5.5 Ground stud build up

New ground studs for equipment grounding may be required for the G5 installation. See Figure 4-58 for the parts required and the buildup sequence for ground stud installation. Clean and prepare one side of the sheet metal surface in accordance with section 4.5.



**Figure 4-58 - Pan Head Screw Ground Stud Buildup**

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FAA Approved  
AIRPLANE FLIGHT MANUAL SUPPLEMENT  
or  
SUPPLEMENTAL AIRPLANE FLIGHT MANUAL  
for the  
GARMIN G5 ELECTRONIC FLIGHT INSTRUMENT  
as installed in

T206H

Make and Model Airplane

Registration Number: N228HS Serial Number: T20608419

This document serves as an Airplane Flight Manual Supplement or as a Supplemental Airplane Flight Manual when the aircraft is equipped in accordance with Supplemental Type Certificate SA01818WI for the installation and operation of the Garmin G5 Electronic Flight Instrument. This document must be carried in the airplane at all times.

The information contained herein supplements or supersedes the information made available to the operator by the aircraft manufacturer in the form of clearly stated placards or markings, or in the form of an FAA approved Airplane Flight Manual, only in those areas listed herein. For limitations, procedures and performance information not contained in this document, consult the basic placards or markings, or the basic FAA approved Airplane Flight Manual.

FAA APPROVED BY: [Signature]

Robert Murray  
ODA STC Unit Administrator  
GARMIN International, Inc  
ODA-240087-CE

DATE: 11/12/13

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**GARMIN G5 ELECTRONIC FLIGHT INSTRUMENT**

REV NO.	PAGE NO(S)	DESCRIPTION	DATE OF APPROVAL	FAA APPROVED
1	ALL	Original Issue	7/22/2016	Robert Murray ODA STC Unit Administrator
2	ALL	Added information regarding G5 DG/HSI.	4/28/2017	Robert Murray ODA STC Unit Administrator
3	ALL	Added interface to 3 <sup>rd</sup> party autopilots.	10/18/2017	Robert Murray ODA STC Unit Administrator
4	ALL	Added note to General section.	10/26/17	Paul Mast ODA STC Unit Administrator
5	ALL	Reformatted document. Updated system messages interface. Added DG/HSI reversion description.	See Cover	See Cover

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## SECTION 1 – GENERAL

The G5 Electronic Flight Instrument can display the following information to the pilot depending on the installation and location of the G5 instrument.

- Primary attitude
- Primary slip and turn rate information
- Primary heading
- Secondary airspeed
- Secondary altimeter
- Secondary ground track

When installed in place of the attitude indicator, the primary function of the G5 is to provide attitude information to the pilot. When installed in place of the rate of turn indicator, the primary function of the G5 is to provide turn rate and slip ball information to the pilot. When installed in place of the directional gyro, the primary function of the G5 is to provide directional information to the pilot.

### NOTE:

The pilot is reminded to perform appropriate flight and navigation instrument cross checks for the type of operation being conducted.

In case of a loss of aircraft electrical power, a backup battery (optional when installed as a DG/HSI) sustains the G5 Electronic Flight Instrument for up to four hours.

An optional GAD 29B may be installed to provide course and heading datum to an autopilot based on the data selected for display on the HSI.



## Abbreviations and Terminology

The following glossary is applicable within the airplane flight manual supplement

<b>ADI</b>	Attitude Direction Indicator
<b>AFMS</b>	Airplane Flight Manual Supplement
<b>ATT</b>	Attitude
<b>CDI</b>	Course Deviation Indicator
<b>DG</b>	Directional Gyro
<b>DR</b>	Dead Reckoning
<b>FAA</b>	Federal Aviation Administration
<b>GPS</b>	Global Positioning System
<b>GPSS</b>	GPS Roll Steering
<b>HDG</b>	Heading
<b>HSI</b>	Horizontal Situation Indicator
<b>ILS</b>	Instrument Landing System
<b>LOC</b>	Localizer (no glideslope available)
<b>LOI</b>	Loss of Integrity
<b>VFR</b>	Visual Flight Rules
<b>VHF</b>	Very High Frequency
<b>VOR</b>	VHF Omni-directional Range

## SECTION 2 – LIMITATIONS

### System Software Requirements

The G5 must utilize the following or later FAA approved software versions for this AFMS revision to be applicable:

Component	Software Version
G5 Electronic Flight Instrument	5.00

### Use of Secondary Instruments

The original type design approved instruments for airspeed, altitude and vertical speed remain the primary indications for these parameters.

If the G5 Electronic Flight Instrument is installed in place of the rate of turn indicator, the original type design approved instrument for attitude remains in the primary indication for attitude.

If the G5 Electronic Flight Instrument is installed in place of the directional gyro, the original type design approved instruments for attitude remains the primary indication for attitude.

**NOTE:**

For aircraft approved for VFR-only operations, the G5 Electronic Flight Instrument may be installed as an attitude indicator and rate of turn indicator.

### Kinds of Operations

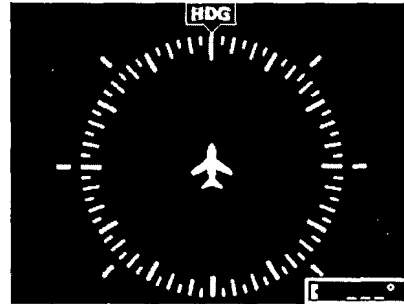
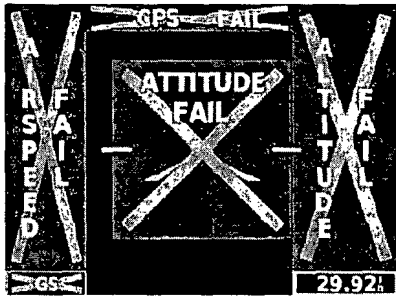
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## SECTION 3 – EMERGENCY PROCEDURES

### G5 Failure Indications

If a G5 function fails, a large red 'X' is typically displayed over the instrument(s) or data experiencing the failure. Upon G5 power-up, certain instruments remain invalid as equipment begins to initialize. All instruments should be operational within one minute of power-up. If any instrument remains flagged and it is not likely an installation related problem, the G5 should be serviced by a Garmin-authorized repair facility.



#### Attitude Failure

Attitude failure is indicated by removal of the sky/ground presentation, a red X, and a yellow "ATTITUDE FAIL" on the display.

Rate-of-turn and slip information will not be available.

1. Use standby instruments.
2. Seek VFR conditions or land as soon as practical.

#### Heading Failure, Loss of Magnetometer Data, or Magnetic Field Error

A heading failure, loss of magnetometer data, or magnetic field error is indicated by removal of the digital heading readout, a red X, and a yellow "HDG" on the display.

1. Use standby magnetic compass.

#### NOTE:

If the G5 DG/HSI has a valid GPS signal the G5 DG/HSI instrument will display the GPS track information in magenta.

## GPS Failure

If GPS navigation receivers and/or navigation information are not available or invalid, the G5 will display Dead Reckoning mode (DR) or Loss of Integrity mode (LOI) on the HSI in the lower left corner.

*If Alternate Navigation Sources (ILS, LOC, VOR) Are Available:*

1. Use alternate navigation source.

*If No Alternate Navigation Sources Are Available:*

*If DR is Displayed on HSI:*

1. Use the amber CDI for course information.
2. Fly toward known visual conditions.

*If LOI is Displayed on HSI:*

1. Fly toward known visual conditions.

For aircraft equipped with a GAD 29B interfaced to an autopilot, GPSS will be displayed in amber text when GPSS emulation has been selected from the G5 menu.

1. Deselect GPSS from the G5 menu and select a different autopilot mode.

## Attitude Aligning

During system initialization, the G5 displays the message 'ALIGNING' over the attitude indicator. The G5 will typically display valid attitude within the first minute of power-up. The G5 can also align itself while taxiing and during level flight.

If the "ALIGNING" indication occurs during flight and attitude remains displayed, the attitude display is acceptable for use for flight in instrument conditions. The message will clear when the attitude solution is within the systems internal accuracy tolerances. It is recommended to maintain wings level to reduce the time for the system to align.

## Attitude Aligning / Keep Wings Level

If the "ALIGNING KEEP WINGS LEVEL" indication occurs during flight, the G5 has detected an invalid attitude solution and will not display any attitude information.

1. Use standby instruments to maintain wings level flight. The system will display attitude when internal accuracy tolerances have been met.
2. If attitude does not return, seek VFR conditions or land as soon as practical.

## Loss of Electrical Power to the G5 Display

In the event of a loss of aircraft electrical power to the G5 attitude display, the indicator will continue to function on its internal battery. If an internal battery is installed on the optional G5 HSI, the indicator will continue to function on the internal battery if aircraft power is lost. Internal battery endurance is indicated on the G5 display in hours and minutes. The charging symbol will be removed and the internal battery will not be charged.

In the event the G5 attitude display powers down, the optional G5 HSI will automatically revert to displaying attitude information. It will not revert back to the DG/HSI format if the G5 attitude unit regains power. The DG/HSI presentation may be selected from the G5 menu on the G5 DG/HSI unit after reversion to the attitude display.

## Loss of Electrical Power to the GAD 29B (If Installed)

In the event of a loss of aircraft electrical power to the optional GAD 29B, the heading and course datum will be unavailable to the autopilot and the autopilot may deviate from the intended path or may disconnect. GPS flight plan course information may be displayed on the HSI and VFR will be displayed in amber text on the HSI. GPSS will be displayed in amber text, if GPSS mode is selected.



1. Deselect GPSS from the G5 menu and select a different autopilot mode.
2. Lateral GPS course guidance may only be used in VFR conditions.

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## SECTION 4 – NORMAL PROCEDURES

### G5 Power Button and Knob

The G5 display will power on with the application of aircraft power. The G5 power button is used to turn the display on and off. Press and hold the power button to turn the display off.

The knob performs the following functions:

<b>Press</b>	Press to access the Menu. From the Menu, press to select the desired menu item. <i>Press to accept the displayed value when editing numeric data or selecting from a list.</i> Press to sync the heading or track bug for the HSI.
<b>Turn</b>	From the Menu, turn the Knob to move the cursor to the desired menu item. For the ADI, rotate to adjust the baro setting on the secondary altitude display. For the HSI, rotate to adjust the heading or track bug. Turn to select the desired value when editing numeric data or selecting from a list.

### Backlight Intensity Adjustment

The power up state of the G5 backlight is in Auto adjustment mode.

To adjust the backlighting:

**To select Manual mode from Auto mode:**

1. While the unit is turned on, press the Power button.
2. Turn the knob to manually adjust the backlight intensity.
3. Press the knob to close the backlight page.

**To select Auto mode from Manual mode:**

1. While the unit is turned on, press the Power button.
2. Press the Power button again to select Auto.
3. Press the knob to close the backlight page.

### Prior to Flight in Instrument Meteorological Conditions

1. Press the Power button on the G5 attitude indicator.
2. Verify the battery status indicator is green on the G5 attitude indicator.



## Autopilot Operations with the G5 HSI

The G5 and optional GAD 29B offer various integration capabilities dependent upon the type of autopilot installed in a particular aircraft.

The G5 Electronic Flight Instrument installation in this aircraft provides the following autopilot functions (appropriate boxes will be checked):

- This installation does not interface with the autopilot (basic wing leveling autopilot or no autopilot is installed in the aircraft).
  - A GAD 29B Adapter is installed in this aircraft.
    - Course / NAV Selection coupling to the autopilot.
    - Heading Bug coupling capability to the autopilot.
    - Roll Steering (GPSS) emulated via heading mode.
- OR
- Roll Steering capable autopilot (GPSS menu function for emulation not applicable).

### Course / NAV Selection Coupling to the Autopilot (If Configured)

When operating the autopilot in NAV mode, the deviation information from the installed navigation sources (i.e. GPS or NAV) is switched via the navigation source. The NAV source displayed on the HSI is the NAV source the autopilot is following. Many autopilots also use the course datum to determine the best intercept angles when operating in NAV mode.

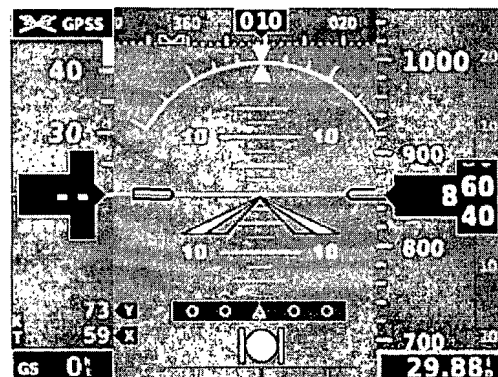
### Heading Bug Coupling Capability to the Autopilot (If Configured)

When operating the autopilot in HDG mode, the difference between the HDG bug location on the HSI and the actual aircraft heading creates an error signal which the autopilot will minimize by turning in the direction of the bug. If the bug is turned more than 180 degrees, the autopilot may turn the airplane in the opposite direction of the desired turn.

### Roll Steering (GPSS) Emulated via HDG Mode (If Configured)

For autopilots that do not support digital GPSS signals, GPSS functionality may be emulated by operating the autopilot in HDG mode and selecting GPSS from the G5 menu. If the autopilot is already designed to receive roll steering information, the data is transmitted digitally from the navigator to the autopilot.

When GPSS is selected on the G5 menu, the heading bug on the HSI changes to a hollow outline and a crossed-out heading bug appears on the G5 HSI display indicating that the autopilot is not coupled to the heading bug. The bug is still controllable and may still be used for reference.



When GPSS is selected on the G5, GPSS turn commands are converted into a heading error signal to the autopilot. When the autopilot is operated in HDG mode, the autopilot will fly the turn commands from the GPS

navigator. If the GPSS data is invalid (for example, if there is no active GPS leg) or the selected HSI source on the G5 HSI is not GPS, the annunciated GPSS text will be yellow and a zero turn command will be sent to the autopilot.

*This page intentionally left blank.*

## SECTION 5 – PERFORMANCE

No change.

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## SECTION 6 – WEIGHT AND BALANCE

See current weight and balance data.

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## SECTION 7 – SYSTEM DESCRIPTION

Refer to Garmin G5 Electronic Flight Instrument Pilot's Guide for Certified Aircraft, part number 190-01112-12 Rev A (or later approved revisions), for a description of the G5 electronic flight instrument. This reference material is not required to be on board the aircraft but does contain a more in depth description of all the functions and capabilities of the G5.


The ATT circuit breaker supplies power to the G5 instrument for normal power operation and to charge the internal battery.

The DG circuit breaker supplies power to the G5 instrument for normal power operation when configured as a DG, and to charge the internal battery (if installed).

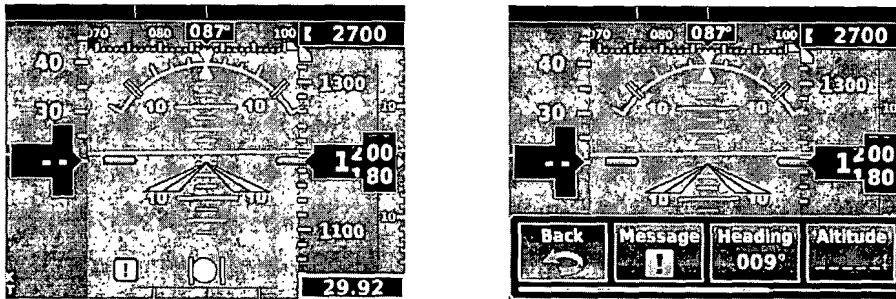
The HSI circuit breaker supplies power to the G5 instrument for normal power operation when configured as an HSI, and to charge the internal battery (if installed).

The GAD circuit breaker supplies power to the optional GAD 29 adapter for normal power operation.

### System Messages

The G5 has the capability to display system messages to the crew along the bottom of the display. A system message is indicated through a white  indication on the G5.

Messages can be displayed by pressing the G5 knob, and selecting the Message menu item.



(For Reference Only)



The following table shows the meaning of each message. System messages are displayed in white text.

<b>Message</b>	<b>Meaning</b>
<b>External Power Lost</b>	Aircraft power has been removed from the G5.
<b>Critical battery fault! Powering off</b>	Battery has critical fault condition and the unit is about to power off to avoid damage to the battery.
<b>Battery fault</b>	Battery has a fault condition – unit needs service.
<b>Battery charger fault</b>	Battery charger has a fault condition – unit needs service.
<b>Low battery</b>	Battery charge level is low.
<b>Hardware fault</b>	Unit has a hardware fault – unit needs service.
<b>Power supply fault</b>	Unit power supply fault detected – unit needs service.
<b>Unit temperature limit exceeded</b>	Unit is too hot or too cold.
<b>Network address conflict</b>	Another G5 with the same address is detected on the network (most commonly a wiring error on one of the units).
<b>Communication error</b>	General communication error (most commonly appears in conjunction with <i>Network Address Conflict</i> message).
<b>Factory calibration data invalid</b>	Unit calibration data not valid – unit needs service.
<b>Magnetic field model database out of date</b>	Internal magnetic field database is out of date - software update required.
<b>Magnetometer Hardware fault</b>	The magnetometer has detected a fault – unit needs service. Heading data may not be available.
<b>Using external GPS data</b>	GPS data from another network LRU is being used. The unit's internal GPS receiver is enabled, but unable to establish a GPS fix.
<b>Not receiving RS-232 data</b>	The G5 is not receiving RS-232 data from the GPS navigator – system needs service.
<b>Not receiving ARINC 429 data</b>	The G5 is not receiving ARINC 429 data from the navigation source – system needs service.
<b>GPS receiver fault</b>	The G5 on-board GPS receiver has a fault.
<b>ARINC 429 interface configuration error</b>	The G5 ARINC 429 port is receiving information from an incorrect source – system needs service.
<b>Software version mismatch</b>	The G5 attitude indicator and the G5 HSI units have different software. Cross fill of baro, heading and altitude bugs is disabled.

These messages remain while the condition persists.



U S Department of  
Transportation  
Federal Aviation  
Administration

## MAJOR REPAIR AND ALTERATION (Airframe, Powerplant, Propeller, or Appliance)

Form Approved  
OMB No. 2120-0020  
11/30/2007

Electronic Tracking Number

For FAA Use Only

INSTRUCTIONS: Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. 1421). Failure to report can result in a civil penalty not to exceed \$1,000 for each such violation (Section 901 Federal Aviation Act 1958)

<b>1. Aircraft</b>	Nationality and Registration Mark <b>USA / N228HS</b>	Serial No. <b>T20608419</b>	
	Make <b>Cessna</b>	Model <b>T206H</b>	Series
<b>2. Owner</b>	Name (As shown on registration certificate) <b>ELLIOTT TAMARA</b>	Address (As shown on registration certificate) Address <b>52 WATERFORD CT</b> City <b>NACOGDOCHES</b> State <b>TEXAS</b> Zip <b>75965-8709</b> Country <b>USA</b>	

**3. For FAA Use Only**

4. Type		5. Unit Identification			
Repair	Alteration	Unit	Make	Model	Serial Number
<input type="checkbox"/>	<input checked="" type="checkbox"/>	AIRFRAME	_____	(As described in Item 1 above)	_____
<input type="checkbox"/>	<input type="checkbox"/>	POWERPLANT			
<input type="checkbox"/>	<input type="checkbox"/>	PROPELLER			
<input type="checkbox"/>	<input type="checkbox"/>	APPLIANCE	Type		
			Manufacturer		

**6. Conformity Statement**

A. Agency's Name and Address	B. Kind of Agency	
Name <b>J.A. Air Center</b>	<input type="checkbox"/> U.S. Certificated Mechanic	<input type="checkbox"/> Manufacturer
Address <b>43W730 US RT 30</b>	<input type="checkbox"/> Foreign Certificated Mechanic	C. Certificate No.
City <b>Sugar Grove</b> State <b>IL</b>	<input checked="" type="checkbox"/> Certificated Repair Station	<b>NF2R029L</b>
Zip <b>60554</b> Country <b>USA</b>	<input type="checkbox"/> Certificated Maintenance Organization	

D. I certify that the repair and/or alteration made to the unit(s) identified in item 5 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

Extended range fuel per 14 CFR Part 43 App. B <input type="checkbox"/>	Signature/Date of Authorized Individual <b>2/25/2019</b>
--	---

**7. Approval for Return to Service**

Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is  APPROVED  REJECTED

BY	FAA Fit Standards Inspector		Manufacturer	Maintenance Organization	Person Approved by Canadian Department of Transport
	FAA Designee	<b>X</b>	Repair Station	Inspection Authorization	Other (Specify)

Certificate or Designation No. <b>NF2R029L</b>	Signature/Date of Authorized Individual <b>2/25/2019</b>
---	---

**NOTICE**

*Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.*

**8. Description of Work Accomplished**

*(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)*

USA / N228HS

25/FEB/2019

Nationality and Registration Mark

Date

Removed:

Honeywell KT76C Mode C Transponder, P/N 066-01156-0101, S/N 16295; Comant CI-105 Transponder Antenna, S/N N/A; Mid-Continent Relay Unit, P/N MD41-24P(28K), S/N F23415; T.C.I. Altitude Encoder, P/N IA-R5232C-R, S/N 2141.

INSTALLED:

Garmin GTX-345R ADS-B transponder P/N 011-03303-00 in the tail at F.S. 154.50 in accordance with STC SA01714WI, Garmin's STC Master Drawing List GTX 33X and GTX 3X5 ADS-B AML STC document No. 005-00734-04, Revision 11, dated March 19, 2018; Garmin's GTX 3XX Part 23 AML STC Installation Manual document No. 190-00734-10, Revision 10, dated March 14, 2018; Garmin's GTX 33X and GTX 3X5 ADS-B AML STC Equipment List Drawing No. 005-00734-05, Revision 14, dated March 14, 2018; Cessna Model 206 Series 1998 and on, Maintenance Manual document No. 206HMM, Revision 20, Dated September 1, 2016; Cessna Model 206H/T206H Wiring Manual Document No.206HWC, Revision 10, Dated October 1, 2016, and AC43.13-1B, Change 1; AC43.13-1B, Change 1, Chapters 11 and 12, and AC43.13-2B, Chapters 2 & 3.

Installed Comant CI-105 ADS-B Antenna in the location of the removed transponder antenna at F.S. 133.20.

The Garmin GTX 33X and GTX 3X5 Transponder FAA Approved Airplane Flight Manual Supplement Document No. 190-00734-15, Revision 3, dated December 21, 2017 or later FAA-approved revision has been provided with the aircraft paperwork.

Instructions for Continued Airworthiness

Reference Garmin GTX 33X and GTX 3X5 ADS-B Maintenance Manual Document No. 190-00734-11, Revision 6, dated December 7, 2017 or later revision.

This transponder was tested in accordance with 14 CFR Part 43 Appendix F with IFR, ATC-601-2 Test Set, for compliance with 14 CFR 91.413 this date.

This equipment has been ground checked and there were no adverse effects with any other aircraft system.

The weight & balance data, equipment list and airframe logbooks were revised to reflect this installation. Reference J.A. Air Center's Weight & Balance and Supplemental Equipment List for all part numbers, serial numbers, and equipment installed, or removed, and locations.

-----END-----

Additional Sheets Are Attached



U.S. Department of  
Transportation  
Federal Aviation  
Administration

## MAJOR REPAIR AND ALTERATION (Airframe, Powerplant, Propeller, or Appliance)

Form Approved  
OMB No 2120-0020  
11/30/2007

Electronic Tracking Number

For FAA Use Only

INSTRUCTIONS: Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. 1421). Failure to report can result in a civil penalty not to exceed \$1,000 for each such violation (Section 901 Federal Aviation Act 1958)

<b>1. Aircraft</b>	Nationality and Registration Mark <b>USA / N228HS</b>	Serial No. <b>T20608419</b>	
	Make <b>Cessna</b>	Model <b>T206H</b>	Series
<b>2. Owner</b>	Name (As shown on registration certificate) <b>ELLIOTT TAMARA</b>	Address (As shown on registration certificate) Address <b>52 WATERFORD CT</b> City <b>NACOGDOCHES</b> State <b>TEXAS</b> Zip <b>75965-8709</b> Country <b>USA</b>	

**3. For FAA Use Only**

4. Type		5. Unit Identification			
Repair	Alteration	Unit	Make	Model	Serial Number
<input type="checkbox"/>	<input checked="" type="checkbox"/>	AIRFRAME	_____	(As described in Item 1 above)	
<input type="checkbox"/>	<input type="checkbox"/>	POWERPLANT			
<input type="checkbox"/>	<input type="checkbox"/>	PROPELLER			
<input type="checkbox"/>	<input type="checkbox"/>	APPLIANCE	Type		
			Manufacturer		

**6. Conformity Statement**

<b>A. Agency's Name and Address</b>		<b>B. Kind of Agency</b>	
Name <b>J.A. Air Center</b>		<input type="checkbox"/> U.S. Certificated Mechanic	<input type="checkbox"/> Manufacturer
Address <b>43W730 US RT 30</b>		<input type="checkbox"/> Foreign Certificated Mechanic	C. Certificate No.
City <b>Sugar Grove</b> State <b>IL</b>		<input checked="" type="checkbox"/> Certificated Repair Station	<b>NF2R029L</b>
Zip <b>60554</b> Country <b>USA</b>		<input type="checkbox"/> Certificated Maintenance Organization	

D. I certify that the repair and/or alteration made to the unit(s) identified in item 5 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

Extended range fuel per 14 CFR Part 43 App. B <input type="checkbox"/>	Signature/Date of Authorized Individual <b>3/7/2019</b>
--	--

**7. Approval for Return to Service**

Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is  APPROVED  REJECTED

<b>BY</b>	FAA Fit Standards Inspector	Manufacturer	Maintenance Organization	Person Approved by Canadian Department of Transport
	FAA Designee	<input checked="" type="checkbox"/> Repair Station	Inspection Authorization	Other (Specify)

Certificate or Designation No. <b>NF2R029L</b>	Signature/Date of Authorized Individual <b>3/7/2019</b>
---	--

**NOTICE**

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

**8. Description of Work Accomplished**

(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

USA / N228HS

7/MAR/2019

Nationality and Registration Mark

Date

**Removed:**

Honeywell KMD540 MFD, P/N 066-04035-0301, S/N 5136; Honeywell KLN94 GPS Receiver, P/N 069-01034-0102, S/N 20483; Honeywell KA92 GPS Antenna, P/N 071-01553-0200, S/N 48754; Honeywell KX155A Nav/Com Receiver, P/N 069-01032-0101, S/N 25706.

**Installed:**

Garmin GTN-750 Navigation System, P/N 010-00820-50 in accordance with Garmin STC# SA02019SE-D, the FAA approved Master Drawing List, document No. 005-00533-C0, Revision 18, dated December 13, 2017, or later FAA approved revision, the Garmin GTN 6XX/7XX Part 23 AML STC Installation Manual, document No. 190-01007-A3, Revision 11, dated October 19, 2017; Cessna Model 206 Series 1998 and on, Maintenance Manual document No. 206HMM, Revision 20, Dated September 1, 2016; Cessna Model 206H/T206H Wiring Manual Document No.206HWC, Revision 10, Dated October 1, 2016, and AC43.13-1B, Change 1, Chapters 11 and 12, and AC43.13-2B, Chapters 2 & 3.

Installed one (1) Garmin GPS/WAAS Antennas, Model GA35, P/N 013-00235-00, located in the existing location of the removed Honeywell GPS antenna at F.S. 39.0.

Installed Garmin FAA approved Airplane Flight Manual Supplement document No. 190-01007-A2, Revision 7, dated November 2, 2017 in the Pilots Operating Handbook.

For Instructions for Continued Airworthiness reference Garmin System Maintenance Manual GTN 6XX/7XX Part 23 AML STC, document No. 190-01007-A1, Revision 11, dated August 22, 2018 or later approved revision.

This equipment has been ground checked and there were no adverse effects with any other aircraft system.

The weight & balance data, equipment list and airframe logbooks were revised to reflect this installation. Reference J.A. Air Center's Weight & Balance and Supplemental Equipment List for all part numbers, serial numbers, and equipment installed, or removed, and locations.

-----END-----

Additional Sheets Are Attached



U.S. Department of  
Transportation  
Federal Aviation  
Administration

## MAJOR REPAIR AND ALTERATION (Airframe, Powerplant, Propeller, or Appliance)

Form Approved  
OMB No. 2120-0020  
11/30/2007

Electronic Tracking Number

For FAA Use Only

INSTRUCTIONS: Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. 1421). Failure to report can result in a civil penalty not to exceed \$1,000 for each such violation (Section 901 Federal Aviation Act 1958)

<b>1. Aircraft</b>	Nationality and Registration Mark <b>USA / N228HS</b>	Serial No. <b>T20608419</b>	
	Make <b>Cessna</b>	Model <b>T206H</b>	Series
<b>2. Owner</b>	Name (As shown on registration certificate) <b>ELLIOTT TAMARA</b>	Address (As shown on registration certificate) Address <b>52 WATERFORD CT</b> City <b>NACOGDOCHES</b> State <b>TEXAS</b> Zip <b>75965-8709</b> Country <b>USA</b>	

**3. For FAA Use Only**

4. Type		5. Unit Identification			
Repair	Alteration	Unit	Make	Model	Serial Number
<input type="checkbox"/>	<input checked="" type="checkbox"/>	AIRFRAME	_____	(As described in Item 1 above)	_____
<input type="checkbox"/>	<input type="checkbox"/>	POWERPLANT			
<input type="checkbox"/>	<input type="checkbox"/>	PROPELLER			
<input type="checkbox"/>	<input type="checkbox"/>	APPLIANCE	Type		
			Manufacturer		

**6. Conformity Statement**

<b>A. Agency's Name and Address</b> Name <b>J.A. Air Center</b> Address <b>43W730 US RT 30</b> City <b>Sugar Grove</b> State <b>IL</b> Zip <b>60554</b> Country <b>USA</b>	<b>B. Kind of Agency</b> <input type="checkbox"/> U.S. Certificated Mechanic <input type="checkbox"/> Foreign Certificated Mechanic <input checked="" type="checkbox"/> Certificated Repair Station <input type="checkbox"/> Certificated Maintenance Organization <input type="checkbox"/> Manufacturer <b>C. Certificate No.</b> <b>NF2R029L</b>
--	---

D. I certify that the repair and/or alteration made to the unit(s) identified in item 5 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

Extended range fuel per 14 CFR Part 43 App. B <input type="checkbox"/>	Signature/Date of Authorized Individual <b>3/8/2019</b>
--	--

**7. Approval for Return to Service**

Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is  APPROVED  REJECTED

<b>BY</b>	FAA Fit Standards Inspector		Manufacturer	Maintenance Organization	Person Approved by Canadian Department of Transport
	FAA Designee	<input checked="" type="checkbox"/>	Repair Station	Inspection Authorization	Other (Specify)

Certificate or Designation No. <b>NF2R029L</b>	Signature/Date of Authorized Individual <b>3/8/2019</b>
---	--

**NOTICE**

*Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.*

**8. Description of Work Accomplished**

*(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)*

USA / N228HS

25/FEB/2019

Nationality and Registration Mark

Date

**REMOVED:**

Honeywell KDR510 Data Receiver P/N 064-01088-0101, S/N 2031.

**INSTALLED:**

Installed Garmin GDL-69 XM Data Link Receiver P/N 011-00986-00 at F.S. 147.50 in accordance with STC SA01487SE-D; the Garmin Supplemental Type Certificate Master Data List, P/N 005-C0217-00, Revision A, Dated December 20, 2004, or later FAA approved revision, and the Cessna Model 206 Series 1998 and on, Maintenance Manual document No. 206HMM, Revision 20, Dated September 1, 2016; Cessna Model 206H/T206H Wiring Manual Document No.206HWC, Revision 10, Dated October 1, 2016; AC43.13-1B, Change 1, Chapters 10, 11, 12, and AC43.13-2A Chapters 1, 2, 3.

The Garmin GDL-69 uses a 5 amp circuit breaker labeled "Datalink" and located in the avionics buss.

Information is being displayed on both the Garmin GTN750.

Installed a Garmin GA-56 Datalink antenna P/N 011-01034-00 at Fuselage Station F.S. 149.00.

For Instructions for Continued Airworthiness reference Garmin GDL-69 XM Satellite Radio Instructions for Continued Airworthiness Document Number 190-00355-00, Revision A, or later FAA approved revision.

This equipment has been ground checked and there were no adverse effects with any other aircraft system.

The weight & balance data, equipment list and airframe logbooks were revised to reflect this installation. Reference J.A. Air Center's Weight & Balance and Supplemental Equipment List for all part numbers, serial numbers, and equipment installed, or removed, and locations.

-----END-----

Additional Sheets Are Attached



US Department  
of Transportation  
Federal Aviation  
Administration

## MAJOR REPAIR AND ALTERATION (Airframe, Powerplant, Propeller, or Appliance)

Form Approved  
OMB No. 2120-0020  
2/28/2011

Electronic Tracking Number

For FAA Use Only

INSTRUCTIONS: Print or type all entries. See Title 14 CFR §43.9, Part 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. §44701). Failure to report can result in a civil penalty for each such violation. (49 U.S.C. §46301(a))

<b>1. Aircraft</b>	Nationality and Registration Mark <b>N228HS</b>	Serial No. <b>T20608419</b>	
	Make <b>Cessna</b>	Model <b>T206H</b>	Series
<b>2. Owner</b>	Name (As shown on registration certificate) <b>ELLIOTT TAMARA</b>		Address (As shown on registration certificate)
			Address <b>52 WATERFORD CT</b>
			City <b>NACOGDOCHES</b> State <b>TX</b>
			Zip <b>759658709</b> Country <b>United States</b>

### 3. For FAA Use Only

4. Type		5. Unit Identification			
Repair	Alteration	Unit	Make	Model	Serial No.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	AIRFRAME	_____	(As described in Item 1 above)	_____
<input type="checkbox"/>	<input type="checkbox"/>	POWERPLANT			
<input type="checkbox"/>	<input type="checkbox"/>	PROPELLER			
<input type="checkbox"/>	<input type="checkbox"/>	APPLIANCE	Type		
			Manufacturer		

### 6. Conformity Statement

<b>A. Agency's Name and Address</b>		<b>B. Kind of Agency</b>	
Name <b>Kenneth Hale</b>		<input checked="" type="checkbox"/> U. S. Certificated Mechanic	<input type="checkbox"/> Manufacturer
Address <b>165 County Road 2221</b>		<input type="checkbox"/> Foreign Certificated Mechanic	
City <b>Nacogdoches</b> State <b>TX</b>		<input type="checkbox"/> Certificated Repair Station	
Zip <b>75965</b> Country <b>United States of America</b>		<input type="checkbox"/> Certificated Maintenance Organization	
<b>C. Certificate No.</b> <b>4190268</b>			

D. I certify that the repair and/or alteration made to the unit(s) identified in item 5 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

Extended range fuel per 14 CFR Part 43 App. B <input type="checkbox"/>	Signature/Date of Authorized Individual <b>Kenneth Hale 01/07/2019</b>
--	---

### 7. Approval for Return to Service

Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is  Approved  Rejected

BY	FAA Fit. Standards Inspector	Manufacturer	Maintenance Organization	Persons Approved by Canadian Department of Transport
	FAA Designee	Repair Station	<input checked="" type="checkbox"/> Inspection Authorization	Other (Specify)

Certificate or Designation No. <b>3440359</b>	Signature/Date of Authorized Individual <b>Charles Crossman 01/07/2019</b>
--	---



**NOTICE**

*Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.*

**8. Description of Work Accomplished**

*(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)*

N228HS

07 JAN 2019

Nationality and Registration Mark

Date

Installed Flight Boss Ltd. STC No. SA02415CH IAW Document Number FBL-06-04004 REV. A dated 11/30/07. Installed rudder pedal extension on LH (Pilots) rudder pedals IAW STC. No appreciable change in Weight and balance, no revision necessary. See document FBL-06-04005 most current revision for list of ICA's. Checked Operation and clearance of pedals and extensions, no defects noted.

Additional Sheets Are Attached



US Department  
of Transportation  
Federal Aviation  
Administration

## MAJOR REPAIR AND ALTERATION (Airframe, Powerplant, Propeller, or Appliance)

Form Approved  
OMB No. 2120-0020  
2/28/2011

Electronic Tracking Number

For FAA Use Only

INSTRUCTIONS: Print or type all entries. See Title 14 CFR §43.9, Part 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. §44701). Failure to report can result in a civil penalty for each such violation. (49 U.S.C. §46301(a))

<b>1. Aircraft</b>	Nationality and Registration Mark <b>N228HS</b>	Serial No. <b>T20608419</b>		
	Make <b>Cessna</b>	Model <b>T206H</b>	Series	
<b>2. Owner</b>	Name (As shown on registration certificate) <b>ELLIOTT TAMARA</b>		Address (As shown on registration certificate)	
			Address <b>52 WATERFORD CT</b>	
			City <b>NACOGDOCHES</b>	State <b>TX</b>
			Zip <b>759658709</b>	Country <b>United States</b>

**3. For FAA Use Only**

4. Type		5. Unit Identification			
Repair	Alteration	Unit	Make	Model	Serial No.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	AIRFRAME	_____	(As described in Item 1 above)	_____
<input type="checkbox"/>	<input type="checkbox"/>	POWERPLANT			
<input type="checkbox"/>	<input type="checkbox"/>	PROPELLER			
<input type="checkbox"/>	<input type="checkbox"/>	APPLIANCE	Type		
			Manufacturer		

**6. Conformity Statement**

A. Agency's Name and Address		B. Kind of Agency	
Name <b>Thomas Hunter</b>	Address <b>3563 FM 1857 S.</b> City <b>Rusk</b> State <b>TX</b> Zip <b>75785</b> Country _____	<input checked="" type="checkbox"/> U. S. Certificated Mechanic	Manufacturer
		<input type="checkbox"/> Foreign Certificated Mechanic	C. Certificate No.
		<input type="checkbox"/> Certificated Repair Station	<b>3554698 A &amp; P</b>
		<input type="checkbox"/> Certificated Maintenance Organization	

D. I certify that the repair and/or alteration made to the unit(s) identified in item 5 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

Extended range fuel per 14 CFR Part 43 App. B <input type="checkbox"/>	Signature/Date of Authorized Individual <b>Thomas Hunter</b> <b>09/27/2018</b>	
--	---	--

**7. Approval for Return to Service**

Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is  Approved  Rejected

<b>BY</b>	FAA Fit. Standards Inspector	Manufacturer	Maintenance Organization	Persons Approved by Canadian Department of Transport
	FAA Designee	Repair Station	<input checked="" type="checkbox"/> Inspection Authorization	Other (Specify)

Certificate or Designation No. <b>3440359 I/A</b>	Signature/Date of Authorized Individual <b>Charles Crossman</b> <b>09/27/2018</b>	
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**NOTICE**

*Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.*

**8. Description of Work Accomplished**

*(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)*

N228HS

27 Sep 2018

Nationality and Registration Mark

Date

Installed Airwolf remote oil filter kit PN AFC-K007 IAW STC SA00024NY and installation instructions AFC-K007 F-11 dated 11/11/2010. Teflon hoses PN 124F002-8CR0184 and PN 124F002-8CR0172 fabricated by Aviall Hose Shop in Dallas, TX and installed IAW Airwolf installation instructions previously noted. Operation and leak check performed, no leaks or defects noted. Weight and balance change negligible.

Additional Sheets Are Attached



U.S. Department of Transportation  
Federal Aviation Administration

## MAJOR REPAIR AND ALTERATION (Airframe, Powerplant, Propeller, or Appliance)

Form Approved  
OMB No. 2120-0020  
11/30/2007

Electronic Tracking Number

For FAA Use Only

INSTRUCTIONS: Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. 1421). Failure to report can result in a civil penalty not to exceed \$1,000 for each such violation (Section 901 Federal Aviation Act 1958).

<b>1. Aircraft</b>	Nationality and Registration Mark <b>N228HS</b>	Serial No. <b>T20608419</b>	
	Make <b>Cessna</b>	Model <b>T206H</b>	Series <b>206</b>
<b>2. Owner</b>	Name (As shown on registration certificate) <b>Van Bortel Aircraft, Inc.</b>		Address (As shown on registration certificate) <b>4912 S. Collins</b>
			City <b>Arlington</b> State <b>TX</b> Zip <b>76018</b> Country <b>USA</b>

**3. For FAA Use Only**

4. Type		5. Unit Identification			
Repair	Alteration	Unit	Make	Model	Serial Number
<input type="checkbox"/>	<input type="checkbox"/>	AIRFRAME	_____	(As described in Item 1 above)	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	POWERPLANT	Lycoming Engines	TIO-540-AJ1A	L-11447-61A
<input type="checkbox"/>	<input type="checkbox"/>	PROPELLER			
<input type="checkbox"/>	<input type="checkbox"/>	APPLIANCE	Type		
			Manufacturer		

**6. Conformity Statement**

A. Agency's Name and Address	B. Kind of Agency	
Name <b>Van Bortel Aircraft, Inc.</b>	<input type="checkbox"/> U.S. Certificated Mechanic	<input type="checkbox"/> Manufacturer
Address <b>4912 S. Collins</b>	<input type="checkbox"/> Foreign Certificated Mechanic	C. Certificate No.
City <b>Arlington</b> State <b>TX</b>	<input checked="" type="checkbox"/> Certificated Repair Station	<b>VNFR171L</b>
Zip <b>76018</b> Country <b>USA</b>	<input type="checkbox"/> Certificated Maintenance Organization	<b>Limited Airframe, Limited Powerplant</b>

D. I certify that the repair and/or alteration made to the unit(s) identified in item 5 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

Extended range fuel per 14 CFR Part 43 App. B <input type="checkbox"/>	Signature/Date of Authorized Individual <b>John Hoffman</b>
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**7. Approval for Return to Service**

Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is  APPROVED  REJECTED

BY	FAA Fit Standards Inspector	Manufacturer	Maintenance Organization	Person Approved by Canadian Department of Transport
	FAA Designee	<input checked="" type="checkbox"/> Repair Station	Inspection Authorization	Other (Specify)

Certificate or Designation No. <b>VNFR171L</b>	Signature/Date of Authorized Individual <b>John Hoffman</b>
---	--

**NOTICE**

*Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.*

**8. Description of Work Accomplished**

*(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)*

N228HS

10/30/07

Nationality and Registration Mark

Date

1. Removed Lycoming fuel nozzles P/N: LW-18855. Installed General Aviation Modifications, Inc. turboGAMIjector kit No. GLVT20 S/N: 17079 in accordance with STC SE09445SC and turboGAMIjector Installation Procedure, No. IP-98-002 (Rev. D), dated August 11, 1998. No change in weight and balance.

-----END-----

Additional Sheets Are Attached



U.S. Department of  
Transportation  
Federal Aviation  
Administration

## MAJOR REPAIR AND ALTERATION (Airframe, Powerplant, Propeller, or Appliance)

Form Approved  
OMB No. 2120-0020  
11/30/2007

Electronic Tracking Number

For FAA Use Only

INSTRUCTIONS: Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. 1421). Failure to report can result in a civil penalty not to exceed \$1,000 for each such violation (Section 901.Federal Aviation Act 1958)

<b>1. Aircraft</b>	Nationality and Registration Mark <b>N228HS</b>	Serial No. <b>T20608419</b>	
	Make <b>Cessna</b>	Model <b>T206H</b>	Series <b>206</b>

<b>2. Owner</b>	Name (As shown on registration certificate) <b>Van Bortel Aircraft, Inc.</b>		Address (As shown on registration certificate)		
			Address <b>4912 S. Collins</b>		
			City <b>Arlington</b>	State <b>TX</b>	
			Zip <b>76018</b>	Country <b>USA</b>	

**3. For FAA Use Only**

4. Type		5. Unit Identification			
Repair	Alteration	Unit	Make	Model	Serial Number
<input type="checkbox"/>	<input checked="" type="checkbox"/>	AIRFRAME	_____	(As described in Item 1 above)	
<input type="checkbox"/>	<input type="checkbox"/>	POWERPLANT			
<input type="checkbox"/>	<input type="checkbox"/>	PROPELLER			
<input type="checkbox"/>	<input type="checkbox"/>	APPLIANCE	Type		
			Manufacturer		

**6. Conformity Statement**

A. Agency's Name and Address		B. Kind of Agency	
Name <b>Van Bortel Aircraft, Inc.</b>		<input type="checkbox"/> U.S. Certificated Mechanic	<input type="checkbox"/> Manufacturer
Address <b>4912 S. Collins</b>		<input type="checkbox"/> Foreign Certificated Mechanic	C. Certificate No.
City <b>Arlington</b>	State <b>TX</b>	<input checked="" type="checkbox"/> Certificated Repair Station	<b>VNFR171L</b>
Zip <b>76018</b>	Country <b>USA</b>	<input type="checkbox"/> Certificated Maintenance Organization	<b>Limited Airframe, Limited Powerplant</b>

D. I certify that the repair and/or alteration made to the unit(s) identified in item 5 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

Extended range fuel per 14 CFR Part 43 App. B <input type="checkbox"/>	Signature/Date of Authorized Individual <b>John Hoffman</b>
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**7. Approval for Return to Service**

Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is  APPROVED  REJECTED

<b>BY</b>	FAA Flt Standards Inspector	<input type="checkbox"/>	Manufacturer	Maintenance Organization	Person Approved by Canadian Department of Transport
	FAA Designee	<input checked="" type="checkbox"/>	Repair Station	Inspection Authorization	Other (Specify)

Certificate or Designation No. <b>VNFR171L</b>	Signature/Date of Authorized Individual <b>John Hoffman</b>
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## NOTICE

*Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.*

### 8. Description of Work Accomplished

*(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)*

N228HS

10/30/07

Nationality and Registration Mark

Date

1. Installed Flint Aero, Inc. 14.9 gallon usable fuel containing wing tips in accordance with STC SA4366WE and FAA sealed Flint Aero, Inc. Master Drawing List MDL FA3330, no revision, dated June 18, 1981 or later FAA approved revisions.
2. Installed J. P. Instruments temperature monitoring system model EDM-700 in accordance with STC SA2586NM and FAA approved J. P. Instruments Drawing List Report No. 100, dated December 19, 1996, or later FAA approved revisions.
3. Weight and balance revised and entered in aircraft records.

-----END-----

Additional Sheets Are Attached



U.S. Department  
of Transportation  
Federal Aviation  
Administration

## MAJOR REPAIR AND ALTERATION (Airframe, Powerplant, Propeller, or Appliance)

Form Approved  
OMB No. 2120-0020

**For FAA Use Only**

Office Identification

**50-F500-15**

INSTRUCTIONS: Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This is required by law (49 U.S.C. 1421). Failure to report can result in a civil penalty not to exceed \$ 1000 for each such violation (Section 901 Federal Aviation Act of 1958).

<b>1. Aircraft</b>	Make <b>CESSNA</b>	Model <b>T206H</b>
	Serial No. <b>T20608419</b>	Nationality and Registration Mark <b>USA N21467</b>
<b>2. Owner</b>	Name (As shown on registration certificate) <b>CESSNA AIRCRAFT COMPANY</b>	Address (As shown on registration certificate) <b>PO BOX 7704 WICHITA, KS 67277-7704 USA</b>

**3. For FAA Use Only**

4. Unit Identification				5. Type	
Unit	Make	Model	Serial No.	Repair	Alteration
<b>AIRFRAME</b>	<b>(As described in Item 1 above)</b>				<b>X</b>
<b>POWERPLANT</b>					
<b>PROPELLER</b>					
<b>APPLIANCE</b>	Type				
	Manufacturer				

**6. Conformity Statement**

A. Agency's Name and Address	B. Kind of Agency	C. Certificate No.
<b>ORLANDO AIRCRAFT SERVICES 601 HUMPHRIES AVE. ORLANDO, FL 32803</b>	<input type="checkbox"/> U. S. Certified Mechanic	<b>TP4R552M</b>
	<input type="checkbox"/> Foreign Certified Mechanic	
	<input checked="" type="checkbox"/> Certified Repair Station	
	<input type="checkbox"/> Manufacturer	

D. I certify that the repair and/or alteration made to the unit(s) identified in item 4 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U. S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

Date <b>08-December-2003</b>	Signature of Authorized Individual <b>SAMUEL LEO FOSTER III</b>
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**7. Approval for Return to Service**

Pursuant to the authority given persons specified below, the unit identified in item 4 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is  APPROVED  REJECTED

BY	FAA Fit. Standards Inspector		Manufacturer	Inspection Authorization	Other (Specify)
	FAA Designee	<input checked="" type="checkbox"/>	Repair Station	Person Approved by Transport Canada Airworthiness Group	
Date of Approval or Rejection <b>08-December-2003</b>		Certificate or Designation No. <b>TP4R552M</b>		Signature of Authorized Individual <b>SAMUEL LEO FOSTER III</b>	

34333



## NOTICE

*Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record.  
An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.*

**8. DESCRIPTION OF WORK ACCOMPLISHED** (If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

**Dec-08-2003 USA N21467**

Installed Bendix/King KMH-880 Multi-Hazard Awareness System I.A.W. STC SA01075W1-D.

-----END-----

ADDITIONAL SHEETS ARE ATTACHED



U.S. Department of Transportation  
Federal Aviation Administration

## MAJOR REPAIR AND ALTERATION (Airframe, Powerplant, Propeller, or Appliance)

Form Approved  
OMB No. 2120-0020

For FAA Use Only

Office Identification

*ABO-ESN-15*

INSTRUCTIONS: Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. 1421). Failure to report can result in a civil penalty not to exceed \$1,000 for each such violation (Section 901 Federal Aviation Act of 1958).

<b>1. Aircraft</b>	Make CESSNA	Model T206H
	Serial No. T20608419	Nationality and Registration Mark N21467
<b>2. Owner</b>	Name (As shown on registration certificate) Cessna Aircraft Company	Address (As shown on registration certificate) One Cessna Boulevard Independence KS 67301

### 3. For FAA Use Only

### 4. Unit Identification

### 5. Type

Unit	Make	Model	Serial No.	Repair	Alteration
AIRFRAME	(As described in item 1 above)				X
POWERPLANT					
PROPELLER					
APPLIANCE	Type				
	Manufacturer				

### 6. Conformity Statement

A. Agency's Name and Address	B. Kind of Agency	C. Certificate No.
Andy Vaughn 834 Marlene Drive, Ocoee, Fl. 34761.	<input checked="" type="checkbox"/> U.S. Certificated Mechanic	AP414351143
	<input type="checkbox"/> Foreign Certificated Mechanic	
	<input type="checkbox"/> Certificated Repair Station	
	<input type="checkbox"/> Manufacturer	

D. I certify that the repair and/or alteration made to the unit(s) identified in item 4 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

Date  
12/19/2003

Signature of Authorized Individual

*Andrew C Vaughn*

### 7. Approval for Return To Service

Pursuant to the authority given persons specified below, the unit identified in item 4 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is  APPROVED  REJECTED

BY	FAA Fl. Standards Inspector	Manufacturer	<input checked="" type="checkbox"/>	Inspection Authorization	Other (Specify)
	FAA Designee	Repair Station		Person Approved by Transport Canada Airworthiness Group	
Date of Approval or Rejection		Certificate or Designation No.		Signature of Authorized Individual	
12/19/2003		IA414351143		<i>Andrew C Vaughn</i>	

**NOTICE**

*Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.*

**8. Description of Work Accomplished**

*(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)*

Installed engine driven vapor cycle air conditioning system in accordance with Master Document List, Report Number: DL-26-0100, Revision: C, dated: June 02, 2003. Revised Weight and Balance, and Airplane Flight Manual with Document No.: CR-26-9, dated June 20, 2003. (STC# SA10144SC).

Instructions For Continued Airworthiness are contained in the Maintenance Manual, Document Number CR-26-10, Rev A, dated August 27, 2002.

\*\*\*\*\* NOTHING FOLLOWS \*\*\*\*\*

Additional Sheets Are Attached

# Supplemental Type Certificate

*Number* SA10144SC

*This Certificate issued to* Keith Products, L.P.  
4554 Claire Chennault  
Addison, Texas 75001

*certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part 3 of the Civil Air Regulations.*

*Original Product Type Certificate Number :* A4CE

*Make :* Cessna

*Model :* 206H ; T206H

*Description of Type Design Change:* Installation of an engine driven vapor cycle air conditioning system in accordance with Master Document List, Report Number: DL-26-0100, Revision: C, dated: June 02, 2003, or later FAA approved revision. FAA approved Aircraft Flight Manual Supplement, Document No.: CR-26-9, dated June 20, 2003, or later FAA approved revision is required.

*Limitations and Conditions :* Instructions for Continued Airworthiness are contained in the Maintenance Manual, Document Number CR-26-10, Revision A, dated August 27, 2002. Compatibility of this design change with previously approved modifications must be determined by the installer. If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission.

*This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.*

*Date of application :* June 18, 2002

*Date reissued :*

*Date of issuance :* June 20, 2003

*Date amended :*



*By direction of the Administrator*

*John Hagen*  
(Signature)

S. Frances Cox  
Manager, Special Certification Office  
Southwest Region

(Title)