



Garmin G5

Electronic Flight Instrument Part 23 AML STC Maintenance Manual Including Instructions for Continued Airworthiness





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RECORD OF REVISIONS

Revision	Revision Date	Description
1	7/22/16	Initial Release
2	03/14/17	Revised to add G5 DG/HSI, supporting equipment and associated functions.
3	10/18/17	Revised to cover changes associated with the addition of the G5/GAD 29B third party autopilot interfaces.

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DEFINITIONS OF WARNINGS, CAUTIONS, AND NOTES



WARNING

Warnings are used to bring to the installer’s immediate attention not only damage to the equipment but personal injury may occur if the instruction is disregarded.



CAUTION

Cautions are used to alert the individual damage to equipment may result if the procedural step is not followed to the letter.



NOTE

Notes are used to expand and explain the preceding step and provide further understanding of the reason for the particular operation.



WARNING

This product, its packaging, and its components contain chemicals known to the State of California to cause cancer, birth defects, or reproductive harm. This notice is being provided in accordance with California's Proposition 65. If you have any questions or would like additional information, please refer to our web site at www.garmin.com/prop65.



WARNING

Perchlorate Material – special handling may apply, See www.dtsc.ca.gov/hazardouswaste/perchlorate.



BATTERY WARNINGS:

If these guidelines are not followed, the lithium-ion battery may experience a shortened life span or may present a risk of damage to the device, fire, chemical burn, electrolyte leak, and/or injury.

Do not leave the battery exposed to a heat source or in a high temperature environment. To help prevent damage, store the battery out of direct sunlight.

For maximum battery longevity, store within a temperature range of 32° to 77°F (from 0° to 25°C).

Do not use a sharp object to remove the battery.

Do not disassemble, puncture, damage, or incinerate the device or battery.

Keep the battery away from children.

Only replace the battery with the approved replacement from Garmin. Using another battery presents a risk of fire or explosion. To purchase a replacement battery, see your Garmin dealer or the Garmin website.

Contact your local waste disposal department to dispose of the device and battery in accordance with applicable local laws and regulations.



CAUTION:

*The display uses a lens with a special coating that may be sensitive to skin oils, waxes, and abrasive cleaners. **CLEANERS CONTAINING AMMONIA WILL HARM THE ANTI-REFLECTIVE COATING.** It is very important to clean the lens using a clean, lint-free cloth and a cleaner that is specified as safe for anti-reflective coatings. Avoid any chemical cleaners or solvents that can damage plastic components.*



CAUTION:

The G5 does not contain any user-serviceable parts. Repairs may only be made by an authorized Garmin service center. Unauthorized repairs or modifications could result in permanent damage to the equipment and void both the warranty and the authority to operate this device under FAA, FCC, and other applicable regulations.



NOTE:

Use of polarized eyewear may cause the display to appear dim or blank.



NOTE

All images used in this document are current at the time of publication but are subject to change and may not be up to date.



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1 INTRODUCTION

1.1 Introduction

This document provides Instructions for Continued Airworthiness (ICA) for the Garmin G5 Electronic Flight Instrument as installed in Part 23 aircraft under STC SA01818WI. This document satisfies the requirements for continued airworthiness as defined by 14 CFR Part 23.1529 and Appendix G. Information in this document is required to maintain the continued airworthiness of the G5.

1.2 Organization

The following outline briefly describes the organization of this manual:

Section 2: System Description

Provides a complete description of the type design change associated with installing the G5. An overview of the system interface is also provided.

Section 3: Control & Operation

Presents basic control and operation information specifically tailored to maintenance practices.

Section 4: Instructions for Continued Airworthiness

Provides maintenance instructions for continued airworthiness of the G5.

Section 5: Troubleshooting

Provides troubleshooting information to aid in diagnosing and resolving potential problems with the G5.

Section 6: Equipment Removal & Installation

Gives instructions for the removal and installation of the G5.

Section 7: Equipment Configuration & Testing

Gives instructions for loading software, configuring, and testing of G5.

Section 8: Return to Service Procedure

Specifies return-to-service procedures to be performed upon completion of maintenance of the G5.

1.3 Acronyms and Abbreviations

The following acronyms are used in this manual:

AML	Approved Model List	GPS	Global Positioning System
CAN	Controller Area Network	HSI	Horizontal Situation Indicator
DG	Directional Gyro	ICA	Instructions for Continued Airworthiness
CFR	Code of Federal Regulations	STC	Supplemental Type Certificate
FAA	Federal Aviation Administration		

1.4 Publications

The following documents are recommended to be available when performing maintenance on the G5.

Table 1-1, Recommended Documents

Part Number	Garmin Document
190-01112-12	<i>Garmin G5 Part 23 AML STC Pilot's Guide</i>
190-01112-10	<i>Garmin G5 Part 23 AML STC Installation Manual</i>



1.5 Revision and Distribution

This document is required for maintaining the continued airworthiness of the aircraft. When this document is revised, every page will be revised to indicate current revision level.

Owner/operators may obtain the latest revision of this document from the Garmin website, www.garmin.com.

2 SYSTEM DESCRIPTION

The G5 System equipment part numbers approved by STC SA01818WI-A are found in Table 1-2 of Garmin document 190-01112-10, *Garmin G5 Part 23 AML STC Installation Manual*.

2.1 G5 Electronic Flight Instrument

2.1.1 G5 Attitude Indicator

The G5 Electronic Flight Instrument configured as an attitude indicator is shown in Figure 2-1. The G5 is an electronic flight instrument display operating as a standalone flight display. It features a bright, sunlight readable, 3.5-inch color display which is sized to fit in a standard 3-1/8-inch instrument cutout. The G5 contains integrated attitude/air data sensors that provides display of attitude and secondary display of air data information.

The G5 Attitude indicator configuration is determined at the time of installation as defined by the AML STC installation data and recorded in APPENDIX A of this document and maintained with the aircraft records.



Figure 2-1 G5 Electronic Flight Instrument (Attitude)

The G5 calculates aircraft attitude using information from its built-in inertial sensors. If the G5 senses that the attitude solution is valid, but not yet within the internal accuracy limits, "ALIGNING" is displayed. The G5 can align itself both while taxiing and during level flight.

The G5 will also use GPS and airspeed data to provide the most accurate attitude information. If none of these additional sources of information are available, attitude calculations will still be valid but accuracy may be slightly affected.



The G5 attitude functions are shown below:

- Pitch
- Roll

The G5 has a Turn Rate Indicator located at the bottom of the PFD Page. Tick marks to the left and right of the displayed heading denote standard turn rates (3 deg/sec). A magenta Turn Rate Trend Vector shows the current turn rate. A standard-rate turn is shown on the indicator by the trend vector stopping at the standard turn rate tick mark.

The G5 displays slip/skid information as indicated by the location of the ball at the lower center portion of the indicator.

The G5 receives a GPS input for attitude aiding via one of the following methods:

- GPS antenna
- GTN 6XX/7XX series navigator
- GNS 4XX(W)/5XX(W) series navigator
- GNS 480 series navigator
- GTX 3x5 transponder

The following functions are provided by the GPS input:

- Ground Track
- Ground Speed (GS)

When the G5 attitude is installed with a G5 HSI, the G5 attitude can also be interfaced to GPS NAV and/or VHF NAV for display of lateral and vertical guidance.

The G5 installation is connected to the aircraft Pitot / Static system which provides the following functions:

- Secondary Airspeed indicator
- Secondary Barometric altimeter
- Secondary Vertical speed
- Secondary Altimeter Barometric Setting
- Secondary Altimeter
- Secondary Altitude Display
- Selected altitude setting, bug and visual altitude alerting
- Secondary Vertical Speed Indicator
- Vspeed references

The GMU 11 magnetometer can be installed as an optional interface for a standalone G5 attitude display. This will allow the display of heading on the attitude display, but does not allow the removal of the existing DG.



2.1.2 G5 DG/HSI Indicator

The G5 Electronic Flight Instrument configured as a DG/HSI, as shown in Figure 2-2. The G5 is an electronic instrument display operating as a standalone flight display. It features a bright, sunlight readable, 3.5-inch color display which is sized to fit in a standard 3-1/8-inch instrument cutout. In this location the G5's primary function is the display of slaved compass, VHF NAV and/or GPS NAV. The G5 also contains integrated attitude/air data sensors that provide reversionary display of attitude and secondary display of air data information.

The G5 DG/HSI configuration is determined at the time of installation as defined by the AML STC installation data and recorded in APPENDIX A of this document and maintained with the aircraft records.



Figure 2-2 G5 Electronic Flight Instrument (DG/HSI)

2.1.3 Battery

The G5 has an external lithium-ion battery that provides up to 4 hours of emergency power. The battery is required for the G5 used as an attitude display, but optional for the G5 used in the DG and HSI position.



Figure 2-3 G5 Battery

2.1.4 Installation Location

The G5 is installed in the pilot's instrument panel in the primary attitude indicator location, in the rate-of-turn indicator location, or in the DG/HSI location. The term "rate-of-turn indicator" refers to either a turn coordinator or turn and bank indicator.

2.2 GMU 11 Magnetometer

The Garmin GMU 11 Magnetometer is a remote mounted device that interfaces with a G5 to provide heading data to the G5 Attitude and/or G5 DG/HSI. The GMU 11 Magnetometer uses magnetic field measurements to create electronically stabilized heading data. The GMU 11 is required when a G5 is installed as a DG/HSI.



Figure 2-4 GMU 11

2.2.1 Installation Location

The GMU 11 installation location is determined at the time of installation as defined by the AML STC installation data and recorded in APPENDIX B of this document and maintained with the aircraft records. Installation is optional for the G5 as an attitude indicator and required for the G5 as a DG/HSI.

2.3 GAD 29/29B

The GAD 29/29B is a remote-mount unit that allows interface to IFR navigators such as the GNS and GTN series. For installations with a G5 DG/HSI or a G5 DG/HSI and G5 attitude the GAD 29/29B will receive ARINC 429 data from the navigator interfaced and transmit that information onto the CAN bus to be consumed by the G5. The GAD 29B adds analog outputs and excitation pass through capability. Installation is optional based on configuration of the system.

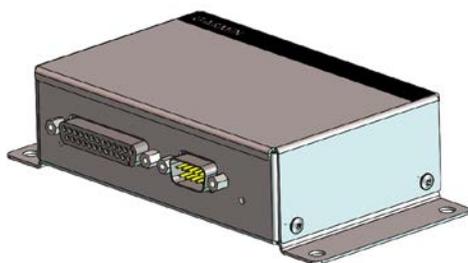


Figure 2-5 GAD 29/29B

2.3.1 Installation Location

The GAD 29/29B installation location is determined at the time of installation as defined by the AML STC installation data and recorded in APPENDIX B of this document and maintained with the aircraft records.



3 BASIC CONTROL & OPERATION

The G5 unit will turn on automatically when power is applied to the avionics bus. The unit will turn off automatically 45 seconds after power is removed. Alternatively, holding the button on the left lower corner of the unit for three seconds will turn the unit off.

The knob on the lower right corner of the unit is used for the following;

G5 Attitude

- adjust the barometric pressure setting.
- Set heading bug[#]
- Set altitude pre-select

[#] Only configurations utilizing a GMU 11

G5 DG/HSI

- Set heading bug
- Selected course *
- Enable/Disable bearing pointer *
- Enter PFD reversion

* Only configurations utilizing VHF NAV or GPS NAV

The backlight level adjusts automatically via a photocell. Temporary adjustments to the backlight level may be made by pressing the power button twice, then turning the knob on the lower right corner of the unit to adjust. When power is cycled to the unit, the backlight level is reset to use the photocell.

The GMU 11 and GAD 29/29B units are remote mounted units that have no independent control or operation. These units are supporting units for the G5 functions and their use is dependent on the configuration of the installation.

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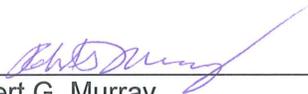
4 INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

4.1 Airworthiness Limitations

The Airworthiness Limitations section is FAA-approved and specifies maintenance required under §§ 43.16 and 91.403 of Title 14 of the Code of Federal Regulations, unless an alternative program has been FAA-approved.

There are no new (or additional) airworthiness limitations associated with this equipment and/or installation.

FAA APPROVED


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

Date

10/18/2017

4.2 Servicing Information

This section addresses servicing information for the G5 Electronic Flight Display, Battery, GMU 11 magnetometer and the GAD 29/29B data bus converter.

4.2.1 G5 Electronic Flight Instrument

The G5 unit maintenance is 'on condition' only. See section 6 for equipment removal and installation. No component-level overhaul is required. Reference Table 4-1 for necessary tests or checks and the specific intervals for the G5.

4.2.2 GMU 11 Magnetometer

The GMU 11 unit maintenance is 'on condition' only. See section 6 for equipment removal and installation. No component-level overhaul is required. Reference Table 4-1 for necessary tests or checks and the specific intervals for the GMU 11.



NOTE

After replacing or servicing electrical components near the GMU 11 magnetometer, the Magnetometer Interference Test (reference Section 7.8) and Magnetometer Calibration Procedure (reference Section 7.5.3) must be performed.

4.2.3 GAD 29/29B Data Bus Converter

The GAD 29/29B unit maintenance is 'on condition' only. See section 6 for equipment removal and installation. No component-level overhaul is required. Reference Table 4-1 for necessary tests or checks and the specific intervals for the GAD 29/29B.



4.2.4 Maintenance Intervals

Table 4-1 shows items installed by this STC which must undergo tests or checks at specific intervals.

Table 4-1, Maintenance Intervals

Item	Description/Procedure	Manual Section No.	Interval
G5 unit	Removal & Installation	6.1	On Condition
	Altimeter System Test	7.7	24 calendar months
G5 battery	Removal & Installation	6.2	On Condition
	Capacity Check	4.2.5	12 calendar months
G5 mounting ring	Removal & Installation	6.3	On Condition
GMU 11 unit	Removal & Installation	6.5	On Condition
GAD 29/29B unit	Removal & Installation	6.6	On Condition

4.2.5 Battery Capacity Check

1. Without power applied to the aircraft, turn on the G5 by pressing the power button in the lower left corner of the unit.
2. Note the remaining battery capacity (%) at the top left corner of the display.
3. After about a minute, the remaining capacity will change from (%) to time (hour:min).
4. If the remaining capacity is less than one hour (1:00), allow the battery to charge until the capacity shows greater than 95% and repeat the check.
5. If the remaining capacity is less than one hour (1:00) after charging, the battery must be replaced.

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5 TROUBLESHOOTING

5.1 G5 Electronic Flight Instrument

5.1.1 General



NOTE

The term 'Red-X' refers to a red "X" that appears on different areas of the display to indicate the failure of that particular function

If a Red-X appears on the display or anywhere in the configuration mode menus, the following troubleshooting steps may be used to help identify the cause.

1. Review the airframe logbook to verify if any G5 or other avionics or electrical maintenance has been performed recently that may have contributed to the failure.
2. Check for loose wire terminals on the circuit breaker connections on the power wire(s) causing intermittent power connections. Also, check for intermittent circuit breakers.
3. Check that all connectors are fully seated, and that the jack screw connectors are fully tightened on both sides of all connectors.
4. Check for a loose wire harness that is able to move around during flight. This condition may cause the wire to pull on or vibrate the connector, making intermittent connections.
5. Ensure that the G5 is mounted securely.
6. Look for any heavy objects that may not be fastened tight to the aircraft structure that could be inducing vibration in the G5's attitude sensors.
7. Look for evidence of water or fluid contamination in the area around the G5.
8. Unplug the connector on the G5 or any affected LRU and check for bent pins.
9. Inspect the wire harness clamp on the rear of all connectors to verify that it is not too tight and smashing/shorting the wires.

5.1.2 Attitude

If the attitude is failed and shows a Red-X condition, follow the troubleshooting steps in the previous section. If this does not resolve the issue, gather answers to the following questions. This information may be helpful to the customer, the avionics dealer, or to Garmin Aviation Product Support in troubleshooting the failure.

- 1) What specifically was the nature of the failure? Was it a Red-X of only GPS track, only pitch/roll, or a combination?
- 2) If there was a Red-X of pitch or roll information, did the unit display an alignment message (which is indicative of a reset), or a failure message (which is indicative of an invalidated output)?
- 3) What exactly was the aircraft doing in the two minutes that preceded the failure (taxing on the ground, flying straight-and-level flight, turning, climbing, etc)? If the problem occurred on the ground, was it within 100 feet of a hangar using GPS repeaters?
- 4) How long did the failure last? Was it brief or sustained? If it was repetitive, about how many times did it happen? Did it happen on more than one day?



- 5) Was the problem correlated with a specific maneuver or a specific geographic area?
- 6) Can the problem be repeated reliably?
- 7) Did the onset of the problem occur shortly after a software upload to the G5?
- 8) Was there a loss of the GPS position lock?

5.1.3 Air Data

If the airspeed and/or altitude is failed and shows a Red-X condition:

- 1) Inspect the pitot/static plumbing integrity.
- 2) Inspect the pitot/static ports and all associated equipment.
- 3) If the problem persists, replace the G5 with a known good unit.

5.1.4 Heading Information (Installations with a GMU 11 Installed)

If a Red-X (steady or intermittent) is displayed in the heading field on the G5, check the following while the aircraft is on the ground:

- 1) When taxiing, heading performance is susceptible to the presence of magnetic anomalies (metal buildings, underground steel culverts, steel grates in the ramp, rebar). Localized sources of interference on the ground may consistently cause a Red-X to be displayed on the heading in the same spot while taxiing, and this is not caused by a failure of the GMU 11 or its calibration.
- 2) Check to see if any new equipment has been installed on the aircraft. If there has been, conduct the magnetic interference test in Section 7.8.1 to see if the new equipment is causing magnetic interference with the GMU 11.
- 3) On the G5 in configuration mode, select the Device Information page, select MAG and verify there is a Green Check by MAG. If there is a Red-X by MAG, proceed to the next step.
- 4) Inspect and verify the CAN Bus wiring between the G5 and GMU 11.
 - a. With power removed, remove a connector from one of the devices that is not located at either of the extreme ends of the CAN bus.
 - b. Using an ohm meter, verify that the resistance between the CAN HI and CAN LO pins on the connector is 60 ohms. This will verify that the CAN backbone is properly terminated at each end (two 120 ohm terminating resistors in parallel).
 - c. A resistance of 120 ohms indicates that one of the two required CAN terminations is missing.
 - d. A resistance of 40 ohms or less indicates that too many terminations are installed.
 - e. Verify that the CAN HI and CAN LO signals are not swapped, shorted together, or open-circuited at any LRU connector.
 - f. Verify that the CAN HI and CAN LO signals are not shorted to ground (this can happen when shielded wire is installed incorrectly).
- 5) If the problem persists, replace the GMU 11 with a known good unit.



5.1.5 VHF Navigation Information (Installations without a GAD 29/29B Installed)

If the VHF navigation information is removed from the G5 HSI display:

- 1) On the G5 in configuration mode, select the RS-232 configuration page, verify there is a Green Check by 'Input Format, Garmin VHF NAV Radio' and 'Output Format, Garmin VHF NAV Radio'. If there is a Red-X by either of these items, proceed to the next step.
- 2) Check the RS-232 wiring connected between the G5 and the VHF Navigator using the instructions in the General section above.
- 3) Verify the VHF Navigator configuration has not changed from the initial installation. Reference APPENDIX A .
- 4) If the problem persists, replace the G5 or VHF Navigator with a known good unit.

5.1.6 VHF Navigation Information (Installations with a GAD 29/29B Installed)

If the VHF navigation information is removed from the G5 HSI display:

- 1) On the G5 in configuration mode, select the Device Information page, select A429 and verify there is a Green Check by A429. If there is a Red-X by A429, proceed to the next step.
- 2) Check the ARINC 429 wiring connected between the G5 and the GAD 29/29B using the instructions in the General section above.
- 3) The GAD 29/29B has an LED on the outer case that indicates the LRUs current status. The status indications are:

Table 5-1, GAD 29/29B Status LED Indications

LED Indication	Description
No Light	No Power
Steady Green	On, but not communicating via CAN Bus
Flashing Green	On and communicating via CAN Bus
Red	Hardware Fault
Alternating Red/Green	CAN bus network error two similar devices are configured with the same unit ID

- 4) If the LED indication is 'No Light', verify the circuit breaker, power and ground wiring between the GAD 29/29B circuit breaker and GAD 29/29B. If proper power is available to the GAD 29/29B, replace the GAD 29/29B with a known good unit.
- 5) If the LED indication is 'Steady Green', inspect and verify the CAN Bus wiring between the G5 and GAD 29/29B.
 - a. With power removed, remove a connector from one of the devices that is not located at either of the extreme ends of the CAN bus.



- b. Using an ohm meter, verify that the resistance between the CAN HI and CAN LO pins on the connector is 60 ohms. This will verify that the CAN backbone is properly terminated at each end (two 120 ohm terminating resistors in parallel).
 - c. A resistance of 120 ohms indicates that one of the two required CAN terminations is missing.
 - d. A resistance of 40 ohms or less indicates that too many terminations are installed.
 - e. Verify that the CAN HI and CAN LO signals are not swapped, shorted together, or open-circuited at any LRU connector.
 - f. Verify that the CAN HI and CAN LO signals are not shorted to ground (this can happen when shielded wire is installed incorrectly).
- 6) If the LED indication is ‘Red’, replace the GAD 29/29B with a known good unit.
 - 7) If the LED indication is ‘Alternating Red/Green’, verify the Unit ID strapping on the G5 units. Reference Section 5.3 wiring interconnects for the appropriate Unit ID strapping.
 - 8) Verify the VHF Navigator configuration has not changed from the initial installation. Reference APPENDIX A .
 - 9) If the problem persists, replace the GAD 29/29B with a known good unit.

5.1.7 GPS Navigation Information (Installations with a GAD 29/29B Installed)

5.1.7.1 GPS VFR Displayed on G5

If the GPS navigation information is removed from the G5 HSI display and GPS VFR is displayed:

- 1) On the G5 in configuration mode, select the Device Information page, select A429 and verify there is a Green Check by A429. If there is a Red-X by A429 proceed to the next step.
- 2) Check the ARINC 429 wiring connected between the G5 and the GAD 29/29B using the instructions in the General section above.
- 3) The GAD 29/29B has an LED on the outer case that indicates the LRUs current status. The status indications are:

Table 5-2, GAD 29/29B Status LED Indications

LED Indication	Description
No Light	No Power
Steady Green	On, but not communicating via CAN Bus
Flashing Green	On and communicating via CAN Bus
Red	Hardware Fault
Alternating Red/Green	CAN bus network error two similar devices are configured with the same unit ID



- 4) If the LED indication is 'No Light' verify the circuit breaker, power and ground wiring between the GAD 29/29B circuit breaker and GAD 29/29B. If proper power is available to the GAD 29/29B replace the GAD 29/29B with a known good unit.
- 5) If the LED indication is Steady Green Inspect and verify the CAN Bus wiring between the G5 and GAD 29/29B
 - a. With power removed, remove a connector from one of the devices that is not located at either of the extreme ends of the CAN bus.
 - b. Using an ohm meter, verify that the resistance between the CAN HI and CAN LO pins on the connector is 60 ohms. This will verify that the CAN backbone is properly terminated at each end (two 120 ohm terminating resistors in parallel).
 - c. A resistance of 120 ohms indicates that one of the two required CAN terminations is missing.
 - d. A resistance of 40 ohms or less indicates that too many terminations are installed.
 - e. Verify that the CAN HI and CAN LO signals are not swapped, shorted together, or open-circuited at any LRU connector.
 - f. Verify that the CAN HI and CAN LO signals are not shorted to ground (this can happen when shielded wire is installed incorrectly).
- 6) If the LED indication is 'Red', replace the GAD 29/29B with a known good unit.
- 7) If the LED indication is 'Alternating Red/Green', verify the Unit ID strapping on the G5 units. Reference Section 5.3 wiring interconnects for the appropriate Unit ID strapping.
- 8) Verify the GPS Navigator configuration has not changed from that set in the initial installation. Reference APPENDIX A .
- 9) If the problem persists, replace the GAD 29/29B with a known good unit.

5.1.8 Loss of third party Autopilot Heading and/or Course Datum (Installations with GAD 29B Installed)

If the third party autopilot loses the capability to couple and track Heading and/or Course Datum:

- 1) Complete troubleshooting as directed and applicable in Section 5.1.4 for loss of Heading Datum, Section 5.1.6 for loss of Course Datum and Section 5.1.7 for loss of GPSS Datum. If these all indicate there is no problem continue to the next step.
- 2) Inspect and verify the ARINC 429 Bus wiring between the GPS Navigator, GAD 29B and autopilot computer.
- 3) Inspect and verify the Analog wiring between the GAD 29B and the autopilot computer.
- 4) Verify the G5 and GPS Navigator configurations has not changed from that set in the initial installation. Reference APPENDIX A .
- 5) Verify the autopilot computer is functioning properly. Reference autopilot manufacturers troubleshooting procedures.
- 6) If the problem persists, replace the GAD 29B with a known good unit.

5.1.9 GPS position information removed (Units with no NAV interface)

If the GPS position information is removed from the G5 Attitude or HSI display (no GPS track or Ground Speed).

- 1) On the G5 in configuration mode, select the RS-232 Configuration page, select Input Format and verify there is a Green Check by MapMX. If there is a Red-X by MapMX, proceed to the next step.
- 2) Check the RS 232 wiring connected between the G5 and the GPS Navigator using the instructions in the General section above.
- 3) Verify the GPS Navigator configuration has not changed from the initial installation. Reference APPENDIX A .
- 4) If the problem persists, replace the G5 with a known good unit.

5.1.10 MicroSD Card

A stuck or sticking microSD™ card in the G5 can sometimes be caused by the card thickness variability (especially if there is more than one label on the card). This is usually caused by the card sticking in the overlay opening, not by the card sticking to the socket inside the unit. Try another card (without a label if possible) to confirm the problem. If the second card sticks, the microSD™ socket board inside the unit may be misaligned with the overlay and the G5 will require repair. Garmin recommends using SanDisk® brand cards.

5.1.11 Data Logging

Data logging on the G5 may be used to help troubleshoot issues. Operational data is gathered from the G5 during flight or on ground and is stored in *.csv log files on the microSD™ card (if installed).

5.1.12 CAN Bus Troubleshooting

If problems are occurring within the CAN bus network, the following steps can help to identify the issue.

Review the status LED on the GAD29/29B. the status LED indications are listed in Table 5-3

Table 5-3 Status LED Indications

LED Indication	Description
No Light	No Power
Steady Green	On but not communicating via CAN bus
Flashing Green	On and communicating via CAN bus
Red	Hardware fault
Alternating Red/Green	CAN bus network error (two identical LRUs are configured with the same unit ID)

- 1) Ensure the CAN bus is daisy-chained between CAN devices around the system, and CAN devices are not connected via a single point or routed through a hub device (Figure 5-1). This can cause unwanted signal reflections and “orphan” some devices on the bus and prevent their communication.

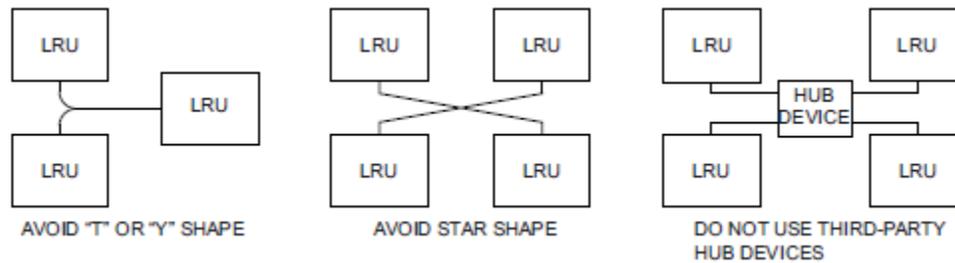


Figure 5-1 Incorrect CAN Wiring Example

- 2) Ensure the CAN bus is terminated in only two locations, and only at the extreme ends of the CAN bus (Figure 5-2).

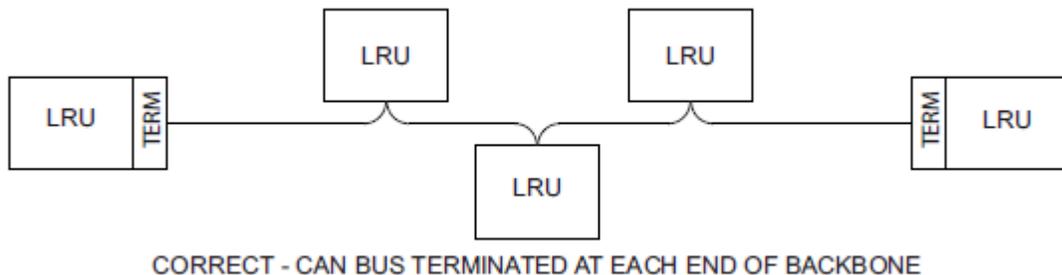


Figure 5-2 Correct CAN Bus Terminator Example

- 3) With power removed, remove the CAN bus connector from one of the devices that is not located at either of the extreme ends of the CAN bus.
 - a. Using an Ohm meter, verify the resistance between the CAN-H and CAN-L pins on the connector is 60 Ω . This will verify the CAN backbone is properly terminated at each end (two 120 Ω terminating resistors in parallel).
 - b. A resistance of 120 Ω indicates one of the two required CAN terminations is missing.
 - c. A resistance of 40 Ω or less indicates too many terminations are installed.
- 4) Verify the CAN-H and CAN-L signals are not swapped, shorted together, or open-circuited at any LRU connector.
- 5) Verify the CAN-H and CAN-L signals are not shorted to ground.
- 6) Highlight each device on the configuration mode Device Information page on the #1 G5 unit and verify the value displayed for Network Error Rate is a steady 0%.
- 7) Power up the #1 G5 unit and one other CAN device at a time and verify the connection quality for each device. Sometimes a device will communicate only when it is the only powered device on the CAN bus if one or more of the above issues is present. Evaluating each CAN device in turn can help narrow down a problem.

5.2 Outline and Installation Drawings

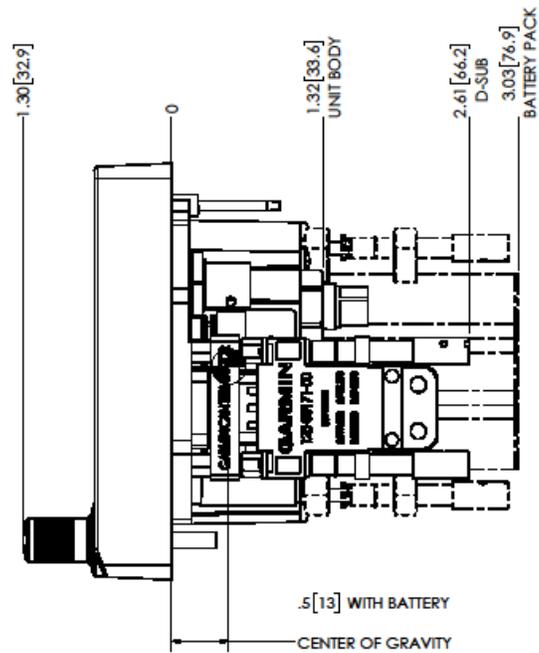


Figure 5-3 G5 Outline Drawing (side view)

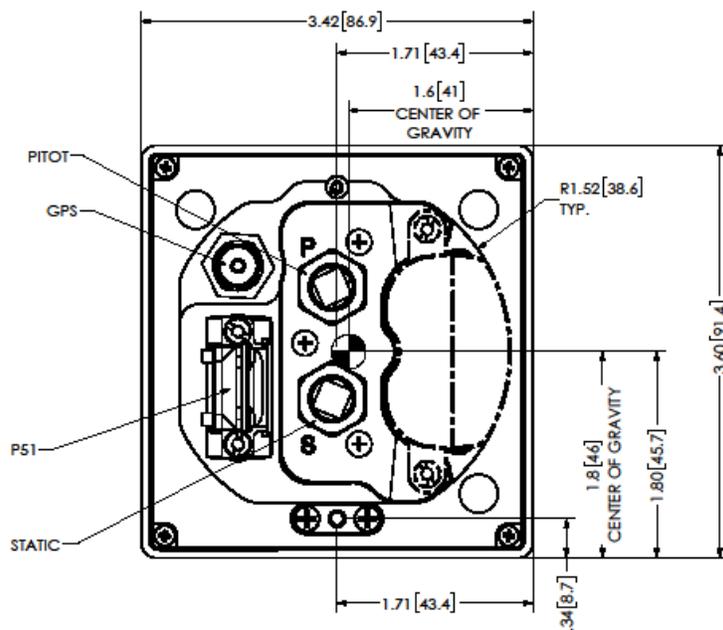


Figure 5-4 G5 Outline Drawing (back view)

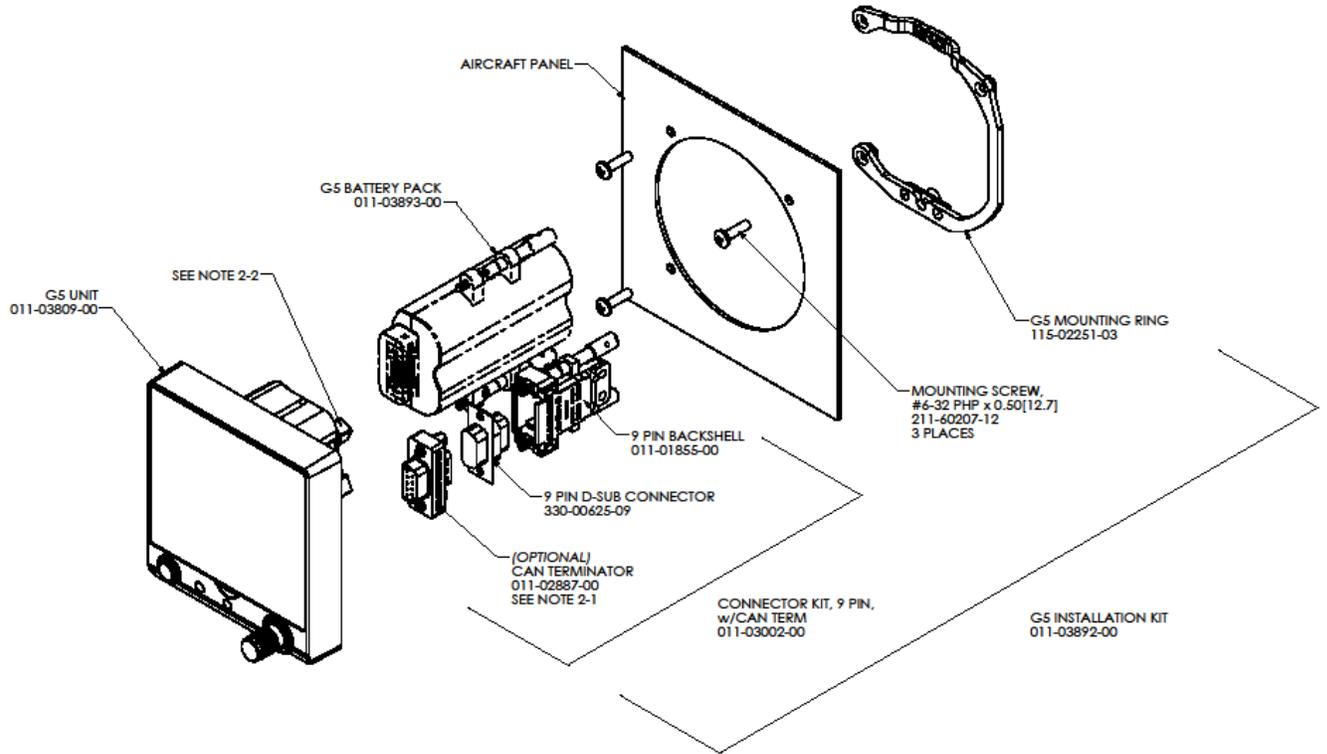


Figure 5-5 G5 Exploded View

5.3 G5 Interconnect Drawings

For G5 system interconnect drawings reference Garmin Document 190-01112-10.

5.3.1 Connector Layout

For G5 system connector layout reference Garmin Document 190-01112-10.

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6 EQUIPMENT REMOVAL & INSTALLATION

This section describes how to remove and install the equipment associated with this STC.

The G5 System equipment part numbers approved by STC SA01818WI-A are found in Table 1-2 of Garmin document 190-01112-10, *Garmin G5 Part 23 AML STC Installation Manual*.

6.1 G5 Unit



CAUTION:

When removing and/or installing the G5, always ensure that aircraft power is off. Unplug any auxiliary power supplies.

Removal

Removal and reinstallation procedure for a standard G5 installation or a G5 recessed into the panel is identical.

1. Insert a hex drive tool through the access hole in the front cover of the G5 as shown in Figure 6-1 loosen the unit from the mounting ring.

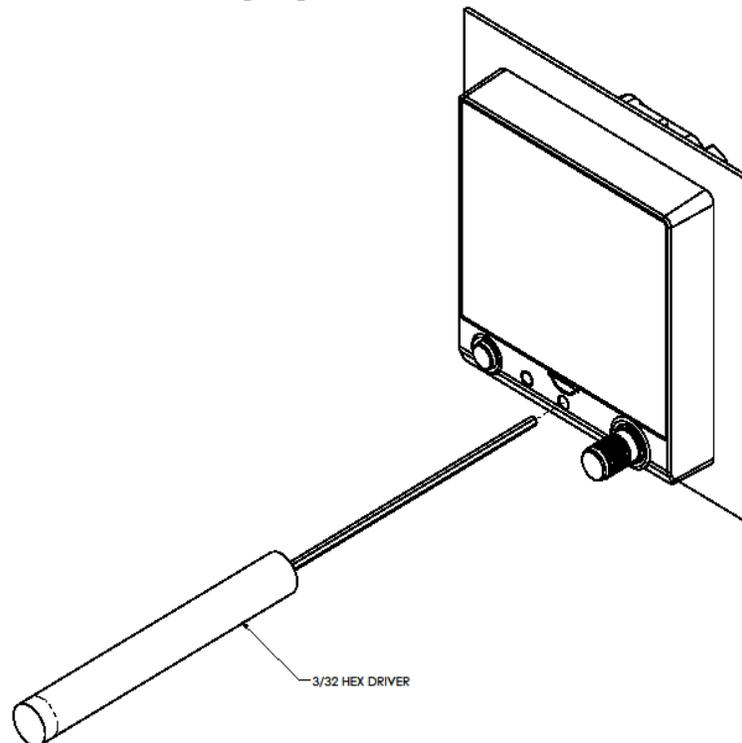


Figure 6-1 G5 Hex Driver

2. Disconnect the pitot and static lines from the G5 unit.
3. Disconnect the electrical connector and GPS coaxial cable connector (if installed) from the G5 unit.
4. Remove the G5 unit.

Reinstallation

1. Inspect the electrical and coaxial connectors and pins for signs of damage. Repair any damage.
2. Reconnect the electrical connector and GPS coaxial connector (if installed) to the G5 unit.
3. Reconnect the pitot and static lines to the G5 unit. The ports are labeled on the unit using the abbreviations “P” and “S” respectively.
4. Insert 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.
5. Insert a hex drive tool through the access hole in the front cover of the G5 as shown in Figure 6-1 and tighten the unit to the instrument panel using 10-12 in-lbs torque.
6. Proceed to Section 7 for configuration and testing.

If a replacement G5 unit is being installed in an instrument panel greater than 0.150 inch thick, the captive mounting screw must be replaced with a longer #6-32 hex socket head screw. To replace the captive mounting 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 6-2. Install a longer #6-32 hex socket head screw and reinstall the screw mount plate. Ensure correct orientation of the screw mount plate before applying 6-8 in-lb. of torque to the #4-40 mount plate screws.

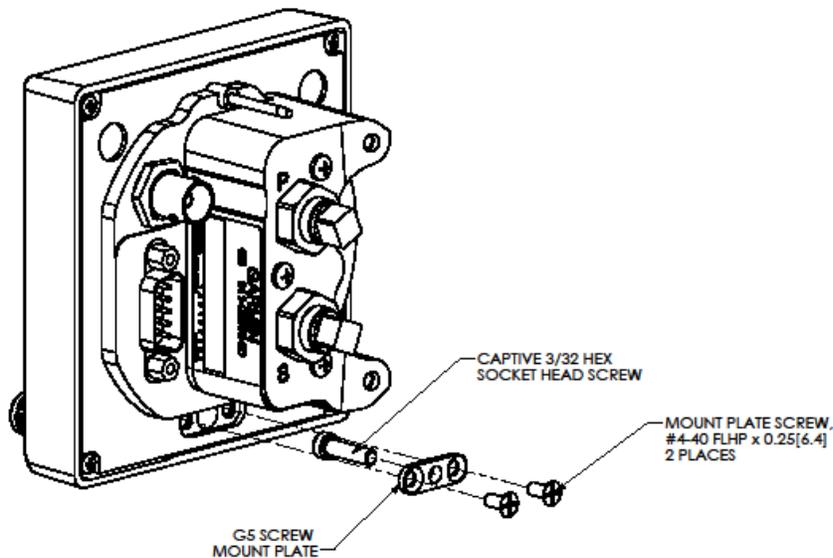


Figure 6-2 G5 Captive Mounting Screw

6.2 G5 Battery

Removal

1. Loosen the G5 unit per Section 6.1. Do not remove the pitot and static lines or the electrical and GPS coaxial cable connectors from the G5 unit if access to the battery can be gained while these items remain connected.
2. Use a screwdriver to loosen the battery jackscrews on the back of the unit (reference Figure 5-5.)
3. Remove the battery from the G5 unit.

Reinstallation

1. Locate the battery on the back of the G5 unit.
2. Use a screwdriver to tighten the battery jackscrews to back of the G5 unit.
3. Reinstall the G5 unit per Section 6.1.

6.3 G5 Mounting Ring Replacement

Removal

1. Loosen the G5 unit per Section 6.1. Do not remove the pitot and static lines or the electrical and GPS coaxial cable connectors from the G5 unit if access to the mounting ring can be gained while these items remain connected.
2. Remove the three #6-32 screws that secure the mounting ring to the instrument panel.
3. Remove the G5 mounting ring.

Reinstallation

1. Locate the new mounting ring, and secure to the instrument panel using the three #6-32 screws.
2. Evenly torque the screws to 10-12 in-lbs.
3. Reinstall the G5 unit per Section 6.1.

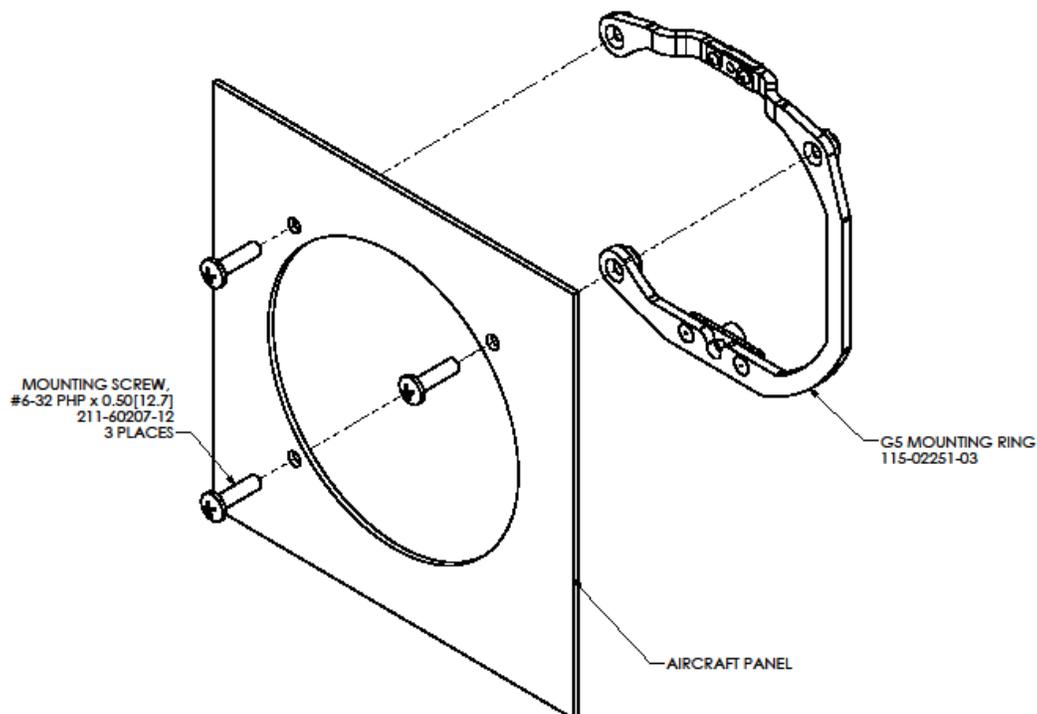


Figure 6-3 G5 Mounting Ring

6.4 GPS Antenna

Refer to the data which installed the GPS antenna for removal and installation of the GPS antenna.

6.5 GMU 11



CAUTION:

When removing and/or installing the GMU11, always ensure that aircraft power is off. Unplug any auxiliary power supplies.

Removal

1. Gain access to the GMU 11. Refer to the location information recorded in APPENDIX B of this document and maintained with the aircraft records.
2. Disconnect the GMU 11 connector.
3. Unscrew the 4 fasteners that hold the GMU 11 to the mounting location.



NOTE

Make sure the hardware removed from the GMU 11 mounting is retained for reinstallation. If hardware needs to be replaced, reference Figure 6-4 for appropriate Hardware part numbers.



NOTE

Be sure to use non-magnetic tools to avoid harming the GMU.

Reinstallation

1. Place the GMU 11 in its mounting location and align its holes with the mounting holes.
2. Insert the 4 mounting screws and secure the GMU 11 in place with washers and nuts. Tighten screws until snug, plus 1/4 turn.
3. Inspect the electrical connector and pins for signs of damage. Repair any damage.
4. Connect the wiring harness to the GMU 11.
5. Conduct the Magnetometer calibration procedure (Section 7.5.3), the Compass Rose Swing (Section 7.6) and the Magnetic interference check (Section 7.8.1).

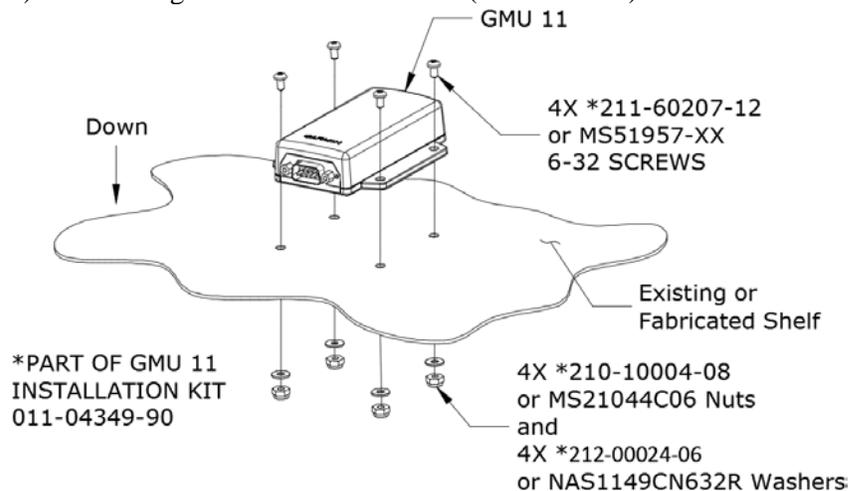


Figure 6-4 GMU 11 Mounting Hardware



6.6 GAD 29/29B



CAUTION:

When removing and/or installing the GAD 29/29B, always ensure that aircraft power is off. Unplug any auxiliary power supplies.

Removal

1. Gain access to the GAD 29/29B. Refer to the location information recorded in APPENDIX B of this document and maintained with the aircraft records.
2. Disconnect the GAD 29/29B connectors.
3. Unscrew the 4 fasteners that hold the GAD 29/29B to the mounting location.

Reinstallation

1. Place the GAD 29/29B in its mounting location and align its holes with the mounting holes.
2. Insert the 4 mounting screws and secure the GAD 29/29B in place.
3. Inspect the electrical connectors and pins for signs of damage. Repair any damage.
4. Connect the wiring harness to the GAD 29/29B.
5. Conduct the system return to service procedure in Section 8

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7 EQUIPMENT CONFIGURATION & TESTING

This section contains instructions for configuration and checkout of the G5(s) and supporting equipment after reinstallation or replacement. The steps which are not applicable to a particular installation may be skipped.

The person performing these procedures must be familiar with the aircraft, have a working knowledge of typical avionics systems, and has experience using the test equipment defined in this section.

7.1 Recommended Test Equipment

The following test equipment is recommended to conduct the procedures in this section:

- Air data test set (pitot/static ramp tester)
- Digital Multi-Meter
- Ground power unit capable of supplying 14/28 Vdc power to the aircraft systems and avionics
- Digital Level or equivalent
- VHF NAV Test Set



NOTE

All test equipment must have current calibration records.

7.2 Pitot Static System Leak Check

If the pitot and/or static system lines were removed from any G5 unit, perform a pitot static system leak check in accordance with the aircraft manufacturer's approved data.



CAUTION

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

7.3 G5 Software

This section contains procedures for loading software to the G5 unit.

7.3.1 Loader Card Creation

To create a software loader card, follow the procedures outlined below.

1. To obtain the latest software version approved for this STC, visit www.Garmin.com and navigate to the Aviation Product/General Aviation/Indicators/G5 page. Do not download software from the Experimental Aircraft web page.
2. Download the self-extracting update file onto your hard drive.
3. Insert a FAT32-formatted microSD™ card with at least 20 MB of free space into your card reader.
4. Open the self-extracting update file and follow the instructions provided by the installer application. You will be prompted to specify the drive letter of the microSD card you wish to use for the update. When the transfer is complete, safely eject the microSD card.

7.3.2 Software Loading Procedure



NOTE

If two G5's are installed, this procedure must be completed on both G5's. If both G5 units software do not match, the G5 will post a "Software Version Mismatch" message on the display. This message will be removed when both units have been loaded with matching software.

1. Power on the G5, then insert the software loader card created in Section 7.3.1 into the microSD™ card slot.
2. If the version of software on the card is newer than the version currently on the unit, a software update pop-up will appear on the screen. Select OK to begin the update.
3. The unit will reboot to the software update screen and the software update will begin automatically. This screen will show the progress of the software update.
4. Ensure power is not removed while the update is being performed.
5. The unit will reboot after the update is complete.
6. The new software version will be displayed while the unit powers on or in the configuration mode menu.

7.4 G5 Configuration Mode

To enter configuration mode, hold down the knob while powering on the G5. Configuration selections are made by rotating and pressing the knob on the face of the G5 as necessary to select the correct configurations.

7.4.1 Configuration Pages Summary

When in configuration mode, the G5 displays the following configurations pages:

- Device Information – used to display device specific information such as the software version and basic indicator configuration.
- Attitude – used to configure Indicator Type, Pitch Display preferences, and User Pitch offset.
- Air Data – used to enable/ disable the G5 Air Data Sensors and configure the Vertical Speed rate.
- Magnetometer – allows configuration of magnetometer and magnetometer positioning.
- Airspeed – allows for configuration of the reference speeds.
- Flight Controls – used to configure the system for autopilot servos if installed.
- Backlight – used to configure backlight configuration parameters.
- Display – used to configure the display format of the G5.
- Battery – used to set backup battery status and power off modes.
- GPS – used to configure the internal GPS receiver.
- Navigation – used to configure the display of navigation information
- Units – This page is used to configure the units type to display altitude, airspeed, ground speed, vertical speed and pressure displays.
- RS-232 – used to configure the RS-232 input and output ports used of the G5.
- ARINC 429 - used to configure the ARINC 429 input and output ports used of the G5.
- Exit Configuration Mode – used to exit configuration mode.

7.4.2 G5 configuration

Before replacing a G5 unit, the technician should obtain the most current G5 configuration settings which are typically kept with the aircraft records (reference APPENDIX A). If the existing configuration setting record is not available, set the configuration to match the values and units indicated in the aircraft’s AFM or other operational information. If any changes are made to the configuration settings, record the new settings in APPENDIX A and keep in the aircraft records for future reference.

7.5 G5 Calibration Procedures

Table 7-1 describes the calibration procedures to be performed for the G5 unit after maintenance is performed.

Table 7-1: Calibration Procedure Summary

Calibration Procedure	Procedure Name	Procedure Description	Requirement
A	Pitch/Roll Offset Compensation	Level aircraft	Procedure A is required if a new G5 unit is installed
C	Air Data Static Pressure Calibration	Altitude calibration	Procedure C is recommended if the G5 altimeter does not match primary altimeter
D	GMU 11 Magnetometer Calibration	Magnetometer Calibration	Procedure D is only required if a GMU 11 was installed and interfaced to either G5.

7.5.1 Calibration Procedure A: Pitch/Roll Offset Compensation



NOTE

If two G5’s are installed, this procedure must be done on both and can be done concurrently.

See Section 7.5.1.1 for example of this calibration procedure.

Using the following procedure, complete these equations.

$$\begin{array}{ccc}
 \begin{array}{c} \text{New Pitch Offset} \\ \text{(From Step 9)} \\ \boxed{} \end{array} & - & \begin{array}{c} \text{A/C Pitch Offset} \\ \text{(From Step 2)} \\ \boxed{} \end{array} = \begin{array}{c} \text{Pitch Calibration} \\ \text{(For Step 10)} \\ \boxed{} \end{array} \\
 \\
 \begin{array}{ccc}
 \begin{array}{c} \text{New Roll Offset} \\ \text{(From Step 9)} \\ \boxed{} \end{array} & - & \begin{array}{c} \text{A/C Roll Offset} \\ \text{(From Step 2)} \\ \boxed{} \end{array} = \begin{array}{c} \text{Roll Calibration} \\ \text{(For Step 10)} \\ \boxed{} \end{array}
 \end{array}$$

1. *Consult the aircraft’s maintenance manual and locate the longitudinal (ROLL) and lateral (PITCH) leveling points.
2. Using a digital level, document the Aircraft Roll and Pitch offsets. (Do not enter, exit, or move the aircraft at this point.) Use a negative number for left wing up or nose up readings. Use a positive number for left wing down or nose down readings.

3. Select the Attitude Configuration Page.
4. Select Calibrate Pitch/Roll.
5. Ensure that aircraft and the unit comply with all on-screen instructions then select Start.
-Disregard item 1, leveling the aircraft is not necessary.
6. A progress screen will then be displayed. There is a 30 second countdown timer for the procedure that resets if the aircraft moves.
7. When the calibration is complete, a successful status message will be displayed along with the new pitch and roll offsets.
8. If the leveling offsets documented from Step 2 were both 0.0, the calibration is complete. If either new offset were other than 0.0, continue to step 9.
9. Document the “New Roll Offset” and “New Pitch Offset” numbers and complete the equation.
10. Press “Done” and adjust the values of the “Roll Calibration” and the “Pitch Calibration” values to the answers from the equations.
11. Exit Configuration Mode.
12. This completes the Attitude Calibration Procedure.

*In flight level cruise attitude is not necessarily the same as the leveling points provided by the manufacturer. Adjustments to the pitch and roll offsets can be made to compensate for the aircraft flight characteristics.

7.5.1.1 Attitude Calibration Example

In Figure 7.1, the aircraft is sitting 5.2° nose up and 1.4° left wing up, (both negative number). Also, the G5 is mounted in the pilot’s panel, which has an 8° forward tilt. After completing the Calibration Procedure in Step 7, the value in the Pitch Calibration field on the G5 is 2.8° and -1.4° in the Roll Calibration field. See Figure 7.2 for the completed equations.

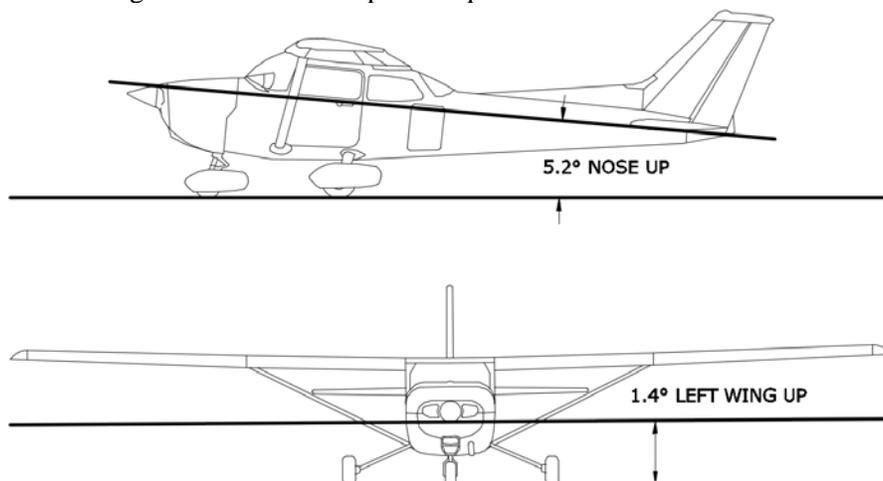


Figure 7.1, Attitude Calibration Example

New Pitch Offset (From Step 9)	-	A/C Pitch Offset (From Step 2)	=	Pitch Calibration (For Step 10)
2.8		-5.2		8.0
New Roll Offset (From Step 9)	-	A/C Roll Offset (From Step 2)	=	Roll Calibration (For Step 10)
-1.4		-1.4		0.0

Figure 7.2, Example of Calibration Equations

7.5.2 Calibration Procedure C: Air Data Static Pressure Calibration



NOTE

If two G5's are installed, this procedure must be done on both and can be done concurrently.

The Air Data configuration page has a selection for static pressure calibration. This procedure is used to perform an altimeter re-calibration. The altitude pressure sensor used in the G5 is very low drift and does not typically require re-calibration.

The static pressure calibration requires the use of a pressure control system (test set) with an altitude accuracy of at least ± 5 ft. at sea level and ± 20 ft. at 30,000 ft. It is necessary to re-calibrate to sea level (0 ft.), 10,000 ft., 20,000 ft., and optionally to 30,000 ft. The operator is allowed to finish the calibration at the end of the 20,000 ft. calibration if the aircraft operational ceiling is below 20,000 ft.



CAUTION

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

1. Select the Air Data configuration page.
2. Select Calibrate Static Pressure.
3. Ensure all on-screen instructions have been complied with, then press Start.
4. At each calibration point the display will present a screen indicating the pressure altitude to set. Once the altitude is set, select Ready to calibrate this pressure.
5. During the calibration at each pressure, the pressure must be held constant for 30 seconds for the calibration step to be successful. The calibration may be cancelled at any point should the test setup require adjustment before repeating. A progress screen will be displayed showing the status of the test.
6. Select Done when the static pressure calibration is successfully completed.

7.5.3 CALIBRATION PROCEDURE D: GMU 11 Magnetometer Calibration



NOTE

All selections made in configuration mode in this section are made on the G5 ID strapped as #1. In a single G5 installation, Unit ID #1 is always the single G5 unit. In a Dual G5 installation, Unit ID #1 is the G5 in the Attitude or Turn Coordinator position.



CAUTION

This magnetometer calibration procedure should be carried out on a compass rose to guarantee measurements free of environmental magnetic disturbances. If a compass rose is not available a sight compass can be used. Attempting to carry out this procedure on a typical ramp area may not yield a successful calibration. The accuracy of the heading display on the G5 cannot be guaranteed if this calibration is not performed on a magnetically clean and level surface.



NOTE

A magnetometer calibration failure is indicated by a “Magnetometer not Calibrated” message on the G5 on power up. If necessary, move the aircraft to a different location and attempt the magnetic calibration again.

1. Start the aircraft engine in accordance with the aircraft AFM or POH.
2. After aircraft engine startup, taxi the aircraft to a properly calibrated compass rose.
3. At the compass rose, align the aircraft to a heading of magnetic north (+/- 10°).
4. Restart the G5 in configuration mode.
5. Go to the “Magnetometer” page Group on the G5 unit.
6. Select the “Calibrate Magnetometer...” page.
7. The G5 will display instructions. Follow the on-screen instructions and select “Next” to cycle through each page of instructions.
8. On the final page, select “Start” to begin the calibration.
9. The G5 display advises the operator when to turn the aircraft, when to stop, and when to turn again.
10. Upon instruction to turn, taxi the aircraft in a right turn. After approximately 25° to 30° of turn from the last heading, the G5 display advises the operator when to stop the aircraft.



NOTE

If smooth accurate turns are not made, the G5 may incorrectly interpret a station and instruct to “Hold current position...” prior to or after completion of the heading change. If this scenario is encountered, it is best for the operator to temporarily ignore the “Hold current position...” command and instead use compass rose references to complete the heading change. Dwelling at these 30° increments for the time recommended by the G5 should result in successful calibration.

11. The G5 instructs the operator to dwell at multiple headings around a complete circle.
12. Repeat the turn-and-stop process until the G5 advises that a successful calibration is complete and “Calibration: Success” is displayed on the G5.
13. Select “Done” on the G5 to conclude this procedure
14. Exit configuration mode.
15. Continue to Section 7.6.



7.6 Compass Rose Swing

After the Magnetic Calibration Procedure is successfully completed, a compass swing must be performed to verify the GMU 11 heading accuracy. If each heading displayed on the G5 (or G5 #1 and G5 #2) is within $\pm 10^\circ$ of the actual heading no further adjustments are necessary.

1. With the G5 (or G5 #1 and G5 #2 for a dual G5 installation) in normal mode, all of the aircraft and avionics systems powered and operating normally, position the aircraft on a known compass rose at a heading 360° (North), or select a level and magnetically clean location and use a sight compass to position the aircraft to a heading of 360° (North).
2. Record the heading displayed on the G5 (or G5 #1 and G5 #2 for a dual G5 installation) in Table 7-2. Also record the heading displayed on the standby compass (these values can be used to complete the standby compass calibration card).
3. Repeat step 2 for each of the headings listed in Table 7-2.
4. Calculate the heading errors by subtracting the displayed (B) value from the actual (A) value for each of the headings in Table 7-2.

Table 7-2: Heading Verification

Heading (A)	Displayed G5 Heading (B)	Heading Error (A-B)	Stby Compass Heading
360° (North)			
30°			
60°			
90° (East)			
120°			
150°			
180° (South)			
210°			
240°			
270° (West)			
300°			
330°			

5. If all calculated heading errors for the G5 are $\pm 6^\circ$ from the surveyed heading, the installation is acceptable and no further action is required. Proceed to Section 8.
6. If a Heading Error (A-B) is greater than $\pm 6^\circ$, calculate the average error by adding all errors and dividing by 12. This is the angle by which the GMU 11 must be physically rotated to correct the installation or before changing the physical location, perform a Magnetometer Interference Check in Section 7.8.1 to verify interference is not causing the error.
7. If necessary, modify the installation to rotate the GMU 11 by the amount calculated in the previous step. When looking down at the GMU 11, rotate clockwise for positive values, and counterclockwise for negative values.

After physically correcting the GMU 11 installation, repeat the procedures in Section 7.8.1 and Section 7.5.3 and this section.

7.7 Altimeter System Test

If the G5 unit is replaced, in aircraft that are IFR certified, perform an altimeter system test of the G5 in accordance with 14 CFR Part 43 Appendix E.

7.8 GMU 11

If the GMU 11 is removed and reinstalled or removed and replaced, the procedure in 7.5.3 must be conducted.

7.8.1 Magnetometer Interference Check

This check is to be used as necessary to help troubleshoot GMU 11 discrepancies that may be related to interference or when a GMU 11 is moved and the new mounting location needs to be verified for acceptable interference levels.

With the G5 in configuration mode, initiate the magnetometer interference test procedure by performing the following steps:



NOTE

All selections made in configuration mode in this section are made on the G5 ID strapped as #1. In a single G5 installation, Unit ID #1 is always the single G5 unit. In a Dual G5 installation, Unit ID #1 is the G5 in the Attitude or Turn Coordinator position.

1. Select the “Magnetometer” page group on the G5 #1
2. Select the “Interference Test...” page.
3. Follow the instructions on each page displayed on the G5. Select “Next” to cycle through the pages and “Back” to go to the previous page.



NOTE

The last page instructs the operator to prepare a detailed test sequence list with precise start and stop times for exercising all electronic devices. Only the electronic devices that are likely to affect the operation of the GMU 11 magnetometer need be included in the test sequence. The list of relevant electronic devices varies from aircraft to aircraft. An example survey sequence form is located in APPENDIX D .

4. Select “Start” to begin the test procedure.
5. The operator should carry out the actions called for in the prepared test sequence.



NOTE

It is important that all actions are carried out in the order and at the precise elapsed time as specified in the prepared test sequence.



6. After the “Begin test sequence” appears, wait approximately five seconds and perform each of the actions listed in the test sequence table. Refer to APPENDIX D for an example of a test sequence.
7. When the test sequence is completed, wait approximately five seconds and then select “Done” to complete the test.

The G5 informs the operator if the installation has passed or failed the magnetometer interference test. The results displayed indicate the worst case percentage of limit and the time at which it occurred. If the test passes, no further action is required.

If the test fails, the installation should be considered unreliable until the source of magnetic interference is identified and remedied. The magnetometer interference test must be repeated until passed. When the magnetometer interference test fails, record the magnetometer maximum deviation value and its corresponding timestamp. Compare the corresponding timestamp with the prepared test sequence to identify which action produced the problem.

Two common reasons for a failed magnetometer interference test are:

1. New equipment is installed in close proximity to the GMU 11 magnetometer.
2. An existing or new electronic device has become grounded through the aircraft structure instead of via the proper ground wire in a twisted shielded pair, especially if the ground return path through the aircraft structure passes near the GMU 11.

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8 SYSTEM RETURN TO SERVICE PROCEDURE

After all G5 configuration and testing is completed per Section 7, complete the following steps:

1. Position the aircraft to allow a GPS signal to be received.
2. Apply power to the aircraft and aircraft systems and allow the aircraft systems to initialize.
3. If new software was updated, verify the correct software part number is displayed. To verify the latest software version approved for this STC, visit www.Garmin.com and navigate to the Aviation Product/General Aviation/Indicators/G5 page.
4. On the G5 Attitude display, verify the following;
 - No Red-X's displayed
 - Attitude display
 - Heading display (if interfaced to a GMU 11) Ground Track display (if not interfaced to a GMU 11)
 - Airspeed Tape (Digital read out will be dashes)
 - Altitude Tape (Digital readout should be reasonable to field elevation)
 - Ground speed field
 - Slip skid display
 - Current track bug
 - Barometric Pressure setting field
5. On the G5 HSI display, verify the following;
 - No Red-X's displayed
 - Heading/ Ground Track display
 - Heading Display - if interfaced to a GMU 11, indicated by white numbers indicating magnetic heading.
 - Ground Track display (if not interfaced to a GMU 11, indicated by magenta numbers indicating GPS ground track.
 - Ground speed field (configurations without a GPS input will not display Ground Speed)
 - Current track bug (configurations without a GPS input will not display Current Track bug)
 - Rotating compass rose.

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APPENDIX A G5 AND GPS/VHF NAVIGATOR CONFIGURATION DOCUMENTATION

Appendix A contains a G5 configuration recording sheet in the case of a dual G5 installation a configuration sheet should be completed for each G5 installed. The document will be completed during the initial installation and maintained with the aircraft records.

A.1 G5 ELECTRONIC FLIGHT INSTRUMENT

Date:	Aircraft Make/Model:	Aircraft Reg #/Serial #:
G5 Part #:	G5 Serial #:	G5 software version:
CONFIGURATION PAGE	CONFIGURATION OPTION	CONFIGURATION SETTING
Device Information	Installation Type	Standalone Instrument
	Diagnostics/Data Log	Enabled
Attitude Configuration	Indicator Type	Normal
	Pitch Display	Normal
	User Pitch Offset	Disabled
	Automatic Declutter	
Air Data	Air Data Sensors	Enabled
	Vertical Speed Indicator	
Airspeed <small>Note: Configure Units prior to setting airspeeds</small>	VNE	
	VNO	
	VSO	
	VS1	
	VFE	
	VA	
	VX	
	VY	
	VG	
	VR	
	VMC	
Magnetometer	Magnetometer	
	Orientation	
Flight Controls	Analog Autopilot Interface	
Backlight	Current Mode	Automatic
	Default Mode	Automatic
	Minimum Photocell Input	Default
	Minimum Display Brightness	Default
	Maximum Photocell Input	Default
	Maximum Display Brightness	Default
Display	Filter Time Constant	Default
	HSI Page	
Battery	Power Up Page	
	Show Battery Status	When Using Battery
GPS	Automatic Power Off	On Ground Only
	Internal GPS Receiver	
	GPS Data Fields	



Date:	Aircraft Make/Model:	Aircraft Reg #/Serial #:
G5 Part #:	G5 Serial #:	G5 software version:
CONFIGURATION PAGE	CONFIGURATION OPTION	CONFIGURATION SETTING
Navigation	Navigation Data	
Units	Altitude	
	Distance	
	Airspeed	
	Ground Speed	
	Ground Track	Magnetic
	Vertical Speed	
	Pressure	
	Data Field Units Display	Alternate
RS-232	Input Format	
	Output Format	
ARINC 429	Output 1	
	Output 2	
	Input 1	
	Input 2	
	Input 3	
	Input 4	

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A.2 GTN 6XX/7XX CONFIGURATION (IF USED)

Config Page	Config Option	Configuration Setting
ARINC 429	ARINC 429 In (x) (x represents any available ARINC 429 Port)	Speed = Data =
	ARINC 429 In (x) (x represents any available ARINC 429 Port)	Speed = Data =
	ARINC 429 Out (x) (x represents any available ARINC 429 Port)	Speed = Data =
RS-232	RS-232 (x) (x represents any available RS-232 Port)	Input = Output =
Main Indicator (Analog) Configuration	CDI Key	
	Selected Course for GPS	
	Selected Course for VLOC	
	V-Flag State	
VOR/LOC/GS Configuration	Nav Radio	
	ARINC 429 Configuration	Tx Speed = SDI =
Main System	Heading Source Input	Not Connected This selection is made only if the GTN being interfaced to has no other Heading input.
	Altitude Source Input	Connected This selection is made only if the GTN being interfaced to has no other Altitude input.

A.3 GNS 4XX(W) / 5XX(W) CONFIGURATION (IF USED)

Config Page	Config Option	Configuration Setting
MAIN ARINC 429 CONFIG Page	IN (x) (x represents any available ARINC 429 Port)	Speed = Data =
	IN (x) (x represents any available ARINC 429 Port)	Speed = Data =
	OUT	Speed = Data =
	VNAV	
MAIN RS232 CONFIG Page	RS-232 (x) (x represents any available RS-232 Channel)	Input = Output =
MAIN CDI/OBS CONFIG Page		Press Menu and then select "IGNORE SEL CRS FOR VLOC?" Menu will display "ALLOW SEL COURSE FOR VLOC?" when set properly.
VOR/LOC/GS ARINC 429 CONFIG Page	SPEED	RX = TX =
	SDI	



A.4 GNS 480 CONFIGURATION (IF USED)

Config Page	Config Option	Configuration Setting
GND Maint Serial Setup	CH (x) (x represents any available Serial Channel)	Output =
GND Maint ARINC 429 Setup	CH In (2) (or any available 429 Port)	SEL = SPEED = SDI =
	CH Out (1) (or any available 429 Port)	SEL = SPEED = SDI =
	CH Out (2) (or any available 429 Port)	SEL = SPEED = SDI =
GND Maint Resolver Interface Setup	Resolver	
GND Maint Miscellaneous Setup	CDI Select	

A.5 GNC 255 CONFIGURATION (IF USED)

Config Page	Config Option	Configuration Setting
Sys Configuration	RS 232 Serial Port	
Attitude Configuration	CDI Indicator	

A.6 SL30 CONFIGURATION (IF USED)

Config Page	Config Option	Configuration Setting
Sys Configuration	RS 232 Serial Port	
Attitude Configuration	Indicator Type	



APPENDIX B EQUIPMENT LOCATIONS

Appendix B contains a documentation sheet for recording LRU's included in the installation and its location on the aircraft. The document will be completed during the initial installation and maintained with the aircraft records.

B.1 Equipment Locations

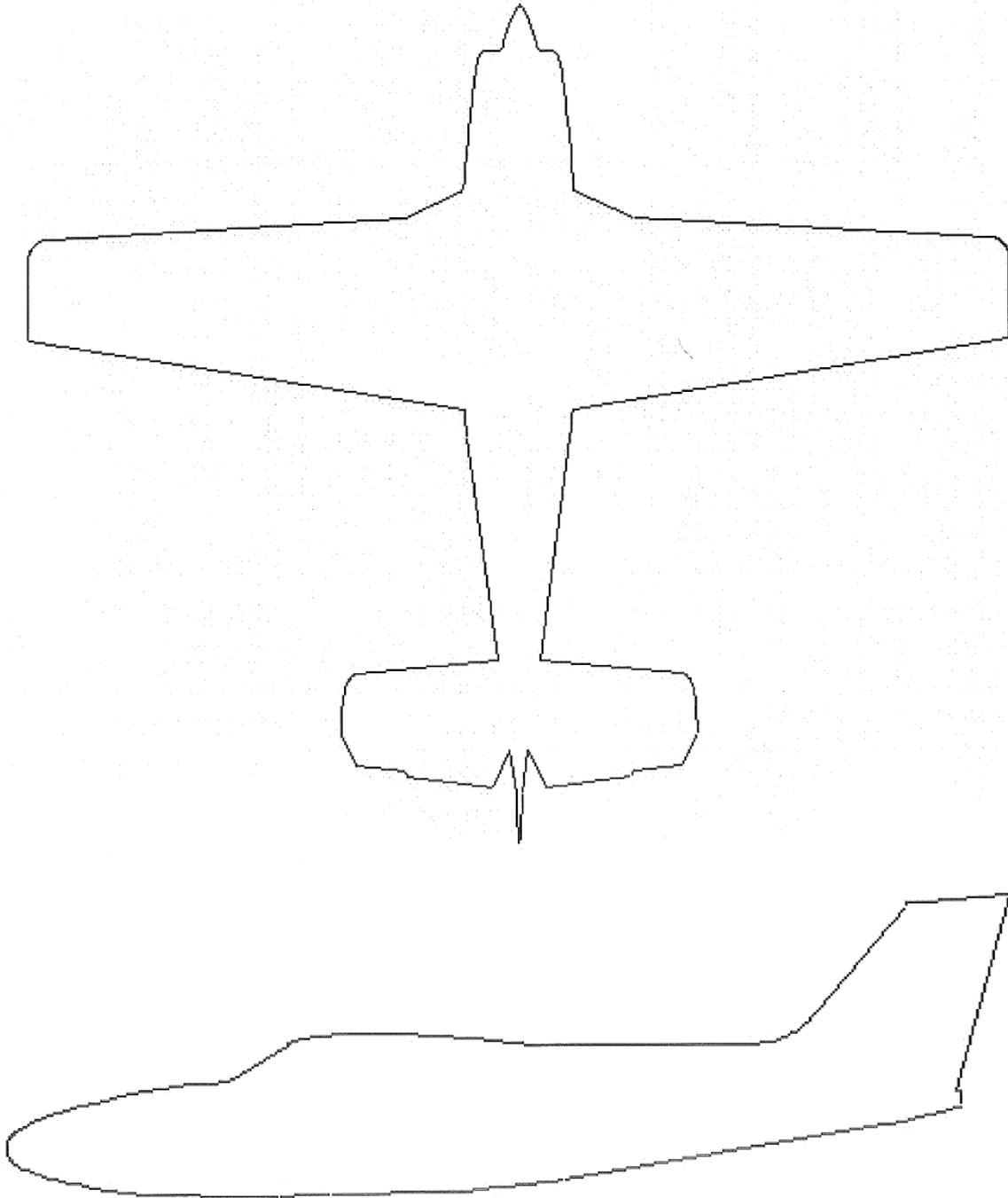
Date:	Aircraft Make/Model:	Aircraft Reg #/Serial #:
LRU	LRU included in this installation?	Description of Location
G5 #1		
G5 #2		
GMU 11		
GAD 29/29B		

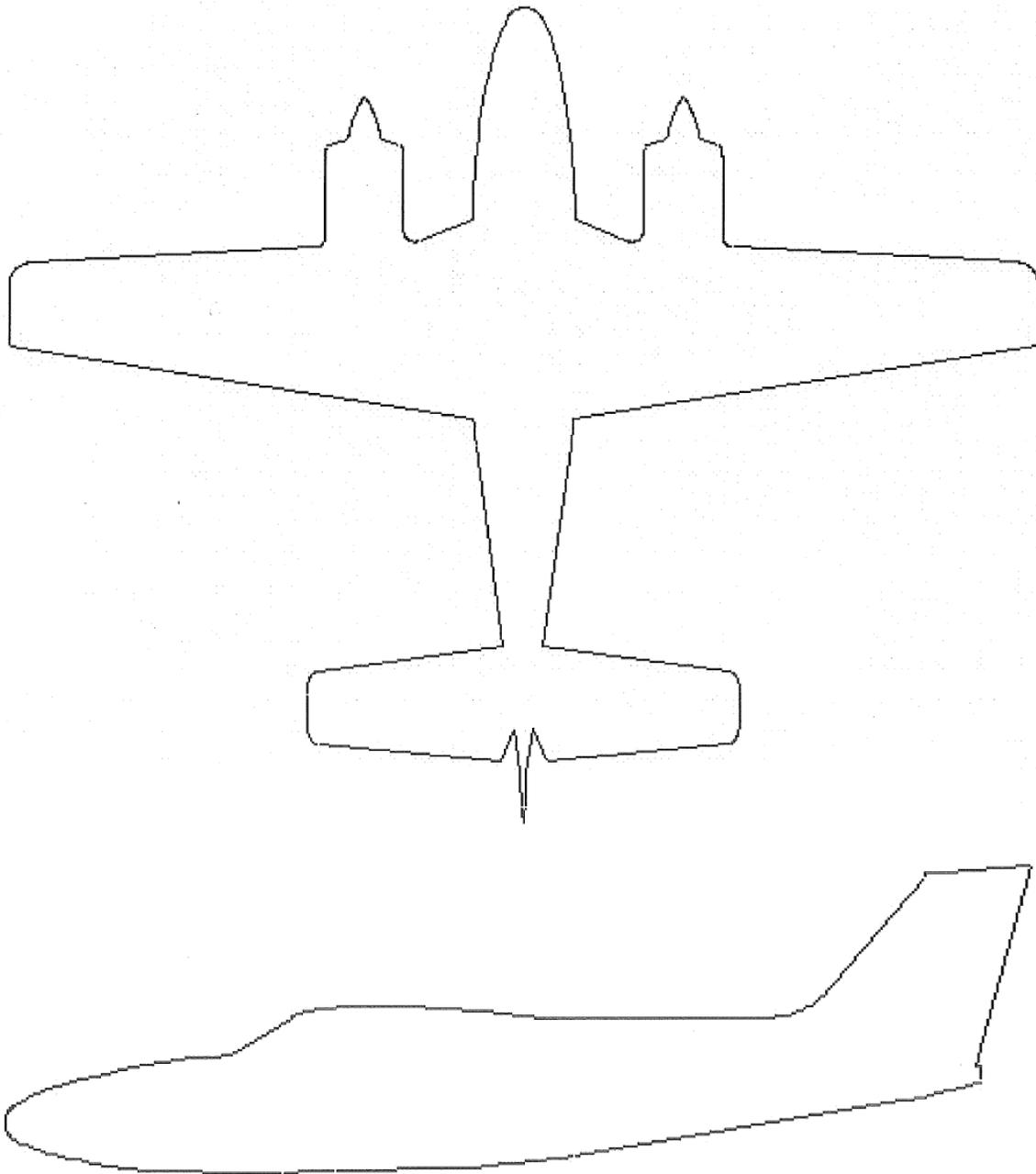
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APPENDIX C WIRE ROUTING

Appendix C contains a generic aircraft drawing to be used for documenting the wire routing for the installation of the G5, GMU 11 and GAD 29/29B. The drawing will be completed during the initial installation and maintained with the aircraft records.

C.1 Wire Routing Single Engine







APPENDIX D EXAMPLE MAGNOTOMETER INTERFERENCE SURVEY SEQUENCE

Example Survey Sequence

A/C Reg.:		Survey data file name:
Elapsed Time (sec)	Elapsed Time (min:sec)	Action
0	0:00	Test begins (calibration period – no activity permitted)
20	0:20	Calibration period ends
30	0:30	Aileron full right
40	0:40	Aileron full left
50	0:50	Aileron level
60	1:00	Rudder full right
70	1:10	Rudder full left
80	1:20	Rudder neutral
90	1:30	Elevators full up
100	1:40	Elevators full down
110	1:50	Elevators neutral
120	2:00	Flaps down
140	2:20	Flaps up
160	2:40	Landing gear up
180	3:00	Landing gear down
190	3:10	Speed brake up
200	3:20	Speed brake down
210	3:30	Navigation lights on
220	3:40	Navigation lights off
230	3:50	Landing lights on
240	4:00	Landing lights off
250	4:10	Taxi lights on
260	4:20	Taxi lights off
270	4:30	Air conditioning on
280	4:40	Air conditioning off
290	4:50	Landing lights and taxi lights on
300	5:00	Landing lights and taxi lights off
310	5:10	Strobes on
320	5:20	Strobes off
330	5:30	Recognition lights on
340	5:40	Recognition lights off
350	5:50	Turn on all wingtip lights simultaneously
360	6:00	Turn off all wingtip lights simultaneously
370	6:10	Beacon on
380	6:20	Beacon off
390	6:30	Autopilot engaged in a pitch and roll mode (to engage servo clutches)
400	6:40	Autopilot disengaged
410	6:50	Pitot heat on
420	7:00	Pitot heat off
430	7:10	End of test