GARMIN®

GA 35
GA 36
GA 37
Antenna Installation Instructions

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Revision	Revision Date	Description
A	7/30/2007	Initial Release
B	3/18/08	Remove TSO-C129a
C	8/21/09	Clerical changes, updated reference AC 43.13-2A to AC 43.13-2B, and clarified mounting location criteria.
D	1/13/11	Add black and olive green options. Update for SA02018SE-D.
E	3/6/13	Updated document for clerical changes. Removed all TSO, STC and Warranty information.
F	7/25/14	Detailed mounting hardware changes for GA 35.

CURRENT REVISION DESCRIPTION

Revision	Page Numbers	Section Number	Description of Change
F	2-6	2.4	Rewrote step 5 of antenna installation.
	2-6	2.4	Added table of hardware and torque specifications.
	2-6	2.4	Added caution pertaining to hardware use on GA 35 antennas.
	A-1	Appendix A	Added caution about hardware use for GA 35 antennas.
	A-2	Appendix A	Added note about hardware use for GA 36 antennas.
	A-3	Appendix A	Added note about hardware use for GA 37 antennas.

DOCUMENT PAGINATION

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Appendix A	A-1 through A-4

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1 General Description

Careful planning and consideration of the following guidelines will help to achieve the desired performance and reliability from the GA 35, GA 36, and GA 37 antennas.

1.1 Introduction

This document provides installation instructions for the GA 35, GA 36, and GA 37 antennas. It is intended for use by persons certified by the Federal Aviation Administration (FAA) to install avionics equipment. These instructions apply to the GA 35, GA 36, and GA 37 antennas listed in the following table. Refer to the applicable Aero Antenna installation drawing listed in Table 1-1 for technical specifications for the antenna being installed.

Table 1-1. Antenna Part Numbers

Item	Description	Garmin Part Number	Aero Antenna Part Number	Footprint	Color	Aero Antenna Installation Dwg. No.
GA 35	GPS/WAAS	013-00235-00	AT575-93GW-TNCF-000-RG-27-NM	Teardrop	White	AT575-93G
		013-00235-01	AT575-93GB-TNCF-000-RG-27-NM		Black	
		013-00235-02	AT575-93GO-TNCF-000-RG-27-NM		Olive Green	
GA 36	GPS/WAAS	013-00244-00	AT575-126GW-TNCF-000-RG-27-NM	ARINC743	White	AT575-126G
		013-00244-01	AT575-126GB-TNCF-000-RG-27-NM		Black	
		013-00244-02	AT575-126GO-TNCF-000-RG-27-NM		Olive Green	
GA 37	GPS/WAAS + SiriusXM	013-00245-00	AT2300-126GW-TNCF-000-RG-27-NM	ARINC743	White	AT2300-126G
		013-00245-01	AT2300-126GB-TNCF-000-RG-27-NM		Black	
		013-00245-02	AT2300-126GO-TNCF-000-RG-27-NM		Olive Green	

These instructions do not include installation instructions for the antenna coax cable or troubleshooting information. Refer to the receiving equipment installation manual for antenna coax installation considerations and troubleshooting information.

1.2 Equipment Description

The GA 35, GA 36, and GA 37 antennas include GPS/WAAS antennas and GPS/WAAS with SiriusXM combination antenna. The coax cable interface to the receiving equipment provides both power to the antenna preamp from the receiving equipment and signal back to the receiving equipment. For receiving equipment compatibility, refer to the receiving equipment installation manual.

1.3 Environmental Qualifications

It is the responsibility of the installing agency to obtain the latest revisions of the GA 35, GA 36, and GA 37 Environmental Qualifications. The Environmental Categories are available on the Aero Antenna Drawing. To obtain a copy of these drawings, see the 'Dealer Resource Center' portion of the Garmin website, www.garmin.com.

Table 1-2. Part Numbers/Drawing Numbers

Item	Garmin Part Number	Aero Antenna Environmental Qualification Drawing Number
GA 35	013-00235-00	TSO575-126G
	013-00235-01	
	013-00235-02	
GA 36	013-00244-00	TSO575-126G
	013-00244-01	
	013-00244-02	
GA 37	013-00245-00	TSO2300-126
	013-00245-01	
	013-00245-02	

1.4 Certification

Refer to the Aero Antenna drawings specified in Table 1-1 for TSO information

2 Installation

2.1 Introduction

This section provides equipment and hardware information for installing the desired antenna. Installation of any antenna should follow the aircraft TC or STC requirements. For technical information on a specific antenna, refer to the respective drawings as listed in Table 1-1.

2.1.1 Antenna Mounting Location

When choosing a location for the antenna, the coax routing distance from the existing or planned location of the receiver to the proposed antenna location should be considered. The receiver installation manual should include information that can be used to check whether the planned coax routing distance will support intended receiver signal gain and loss requirements.

2.1.2 Placement of Antenna for Lightning Protection

Antennas should be installed in an aircraft lightning zone that matches their qualifications. The DO-160 Section 23 qualifications of the antennas support installation in Lightning Zones 1C, 2A or 3. This typically places the antenna at least 51.2 inches (1.3 meters) aft of the aircraft nose. The exact distances are provided by the lightning zones identified for each aircraft. Antennas should not be installed in fuel bay areas where the fasteners or antenna stud penetrate the wet or dry fuel bay.

2.1.3 GPS/WAAS Antennas

The GPS antenna is a key element in the overall system performance and integrity for a GPS/WAAS navigation system. The mounting location, geometry, and surroundings of the antenna can affect the system performance and/or availability. The following guidance provides information to aid the installer in ensuring that the most optimum location is selected for the installation of the GPS antenna. The installation guidelines presented here meet the intent of AC 20-138A section 16. The greater the variance from these guidelines, the greater the chance of decreased antenna performance. Approach procedures with vertical guidance are the most sensitive to these effects. LNAV only approaches, terminal operations, and enroute operations may also be affected. Because meeting all of these installations guidelines may not be possible on all aircraft, these guidelines are listed in order of importance to achieve optimum performance. Items 3a, 3b, and 3c below are of equal importance and their significance may depend on the aircraft installation. The installer should use their best judgment to balance the installation guidelines. Figure 2-1 shows the recommended placement of antennas.

1. Mount the antenna as close to level as possible with respect to the normal cruise flight attitude of the aircraft. If the normal flight attitude is not known, substitute with the waterline, which is typically referenced as level while performing a weight and balance check.
2. The GPS antenna should be mounted in a location to minimize the effects of airframe shadowing during typical maneuvers. Typically mounting farther away from the tail section reduces signal blockage seen by the GPS antenna.

3a. The GPS antenna should be mounted no closer than two feet from any VHF COM antenna or any other antenna which may emit harmonic interference at the L1 frequency of 1575.42 MHz. An aircraft EMC check (reference VHF COM interference check in Post Installation Checkout procedures for the GPS receiver installation) can verify the degradation of GPS in the presence of interference signals. If an EMC check reveals unacceptable interference, insert a GPS notch filter in line with the offending VHF COM or the (re-radiating) ELT transmitter.

NOTE

This check can only be performed if a GPS receiver exists on the aircraft or one is being installed.

NOTE

When mounting a combination antenna, the recommended distance of two feet or more is not applicable to the distance between the antenna elements in a combination antenna (ex. GPS and SiriusXM) provided the combination antenna is TSO authorized and has been tested to meet Garmin's minimum performance standards.

3b. The GPS antenna should be mounted no closer than two feet from any antennas emitting more than 25 watts of power. An aircraft EMC check can verify the degradation of GPS in the presence of interference signals.

3c. To achieve the best possible low-elevation antenna gain (by minimizing pattern degradation due to shadowing and near-field interaction), the GPS antenna shall be mounted with clearance from other antennas, including passive antennas such as another GPS antenna or SiriusXM antenna. When practical, installers should use 12 inch center-to-center spacing between antennas. If 12 inch spacing is not practical use a maximum center-to-center spacing from adjacent antennas, but never less than 9 inch center-to-center spacing. Spacing less than 9 inches center-to-center results in unacceptable GPS/WAAS antenna pattern degradation.

4. To limit degradation by windscreen effects, avoid mounting the antenna closer than 3 inches from the windscreen.

NOTE

Antennas on certain airplanes with a maximum speed over 250 KIAS should be installed at least 24 inches aft of the windscreen, unless another location has been certified.

5. For multiple GPS installations, the antennas should not be mounted in a straight line from the front to the rear of the fuselage to prevent a lightning strike from damaging both antennas. Also varying the mounting location will help minimize any aircraft shading by the wings or tail section (in a particular azimuth, when one antenna is blocked the other antenna may have a clear view).

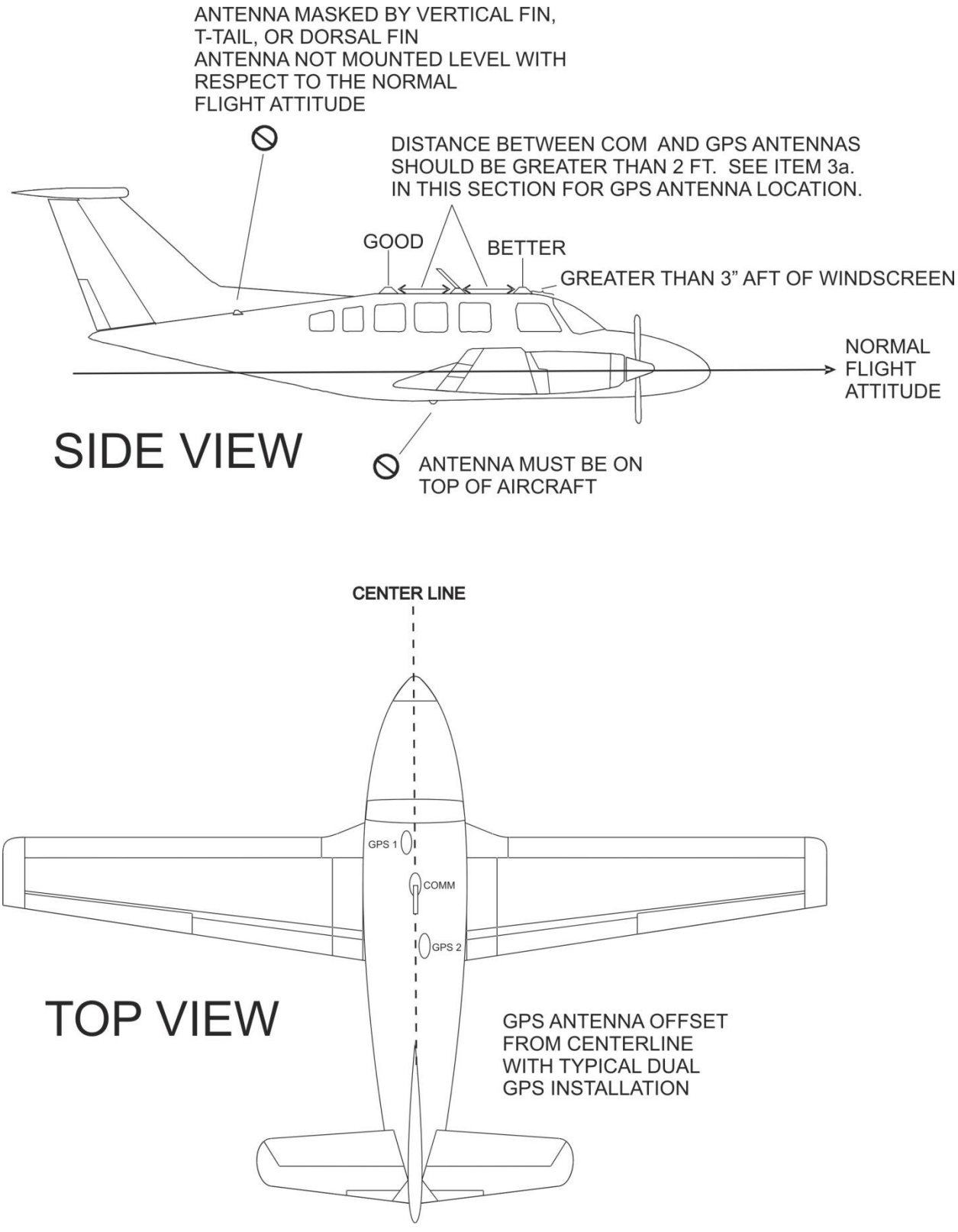


Figure 2-1. GPS Antenna Installation Considerations

2.1.4 SiriusXM® Antennas

For the GA 37 combination GPS and SiriusXM antennas, follow mounting location considerations for both GPS/WAAS antennas and for SiriusXM Radio Antennas.

The SiriusXM antenna should be mounted on top of the aircraft for greatest satellite visibility. For best performance, select a location with an unobstructed view of the sky above the aircraft when in level flight (see Figure 2-1). Location of communication antennas too close to the SiriusXM antenna may not only degrade the transmission through reflection, but can also absorb and re-radiate the transmission causing a condition similar to having two COM antennas located in close proximity to each other.

The antenna should be mounted (edge to edge) no closer than 1.25 inches from any passive (receive only) antenna such as another GPS or SiriusXM antenna, five inches from a VHF active antenna such as VHF COM transmitting antennas or ACARS, five inches from an active radar altimeter (4 GHz), and 12 inches from a UHF/Microwave transmitting antennas such as a transponder, DME, active TCAS, UAT, SATCOM, or Flitephone.

Maintain about three feet from heater, ignition, autopilot, and other control surface actuators and motors. Maintain about five feet from fluorescent lamps, related ballast, air conditioners, blowers, strobe lights and power supplies.

2.2 Antenna Doubler

The installation of an antenna doubler is essential to maintain structural integrity of the antenna installation. Some aircraft may have existing provisions for an antenna, such as a doubler (permanently attached to the skin) or backing plate (removable). If the aircraft is not equipped with antenna mounting provisions, refer to AC 43.13-2( ) for guidance on manufacturing and installing doublers. Note that design features of the aircraft, such as pressurization, may require FAA approved installation design and substantiating data.

Antenna doublers are available from Garmin if installing the antenna using AML STC SA02018SE-D. Refer to the 'Dealer Resource Center' portion of the Garmin website, www.garmin.com, to obtain a copy of STC SA02018SE-D.

2.3 Antenna Grounding

Antenna grounding is necessary for optimum antenna performance. The antenna performance is also dependent on the size of the ground plane. The aircraft skin provides the appropriate ground plane in metallic aircraft for antenna performance and lightning protection. Additional guidance is provided below.

2.3.1 Ground Plane

For optimum antenna performance, a metallic ground plane or skin sized at least 7.5 inches beyond the perimeter of the antenna is recommended. If ground plane is added to the aircraft, round its edges to be as circular as practical for best performance.

2.3.2 Electrical Bonding

It is important that the antenna baseplate is electrically bonded to the aircraft ground plane. Refer to SAE ARP 1870 section 5 when surface preparation is required to achieve electrical bond. The electrical bond should achieve direct current (DC) resistance less than or equal to 2.5 milliohms to structure local to where the equipment is mounted. Measure the electrical bonding resistance using a calibrated milliohm meter. An equivalent OEM procedure may also be substituted.

Typically it is not necessary to remove paint under the footprint of the antenna on the metal skin of the aircraft to achieve a good electrical bond. The painted surface prevents corrosion and should be left intact if possible. If paint removal is necessary for bonding, be careful to avoid excessive chipping or cracking beyond the antenna baseplate, to prevent corrosion. The resistance of 2.5 milliohms can usually be achieved through the antenna mounting screws which attach to the antenna doubler.

To measure the antenna bonding resistance, perform the following steps:

1. Disconnect coaxial cable(s) from the antenna connector(s).
2. Measure the resistance between the antenna connector body and a nearby exposed portion of conductive aircraft structure (e.g. a nearby exposed rivet on fuselage stringer).
3. The measured resistance should be equal to or less than 2.5 milliohms.

2.4 Antenna Installation

Refer to the aircraft manufacturer's specifications and AC 43.13-2B, Chapter 3 for appropriate guidance on antenna installation.

1. Refer to Appendix A for the appropriate mounting cutout. Drill or punch the mounting holes as necessary.
2. Install a doubler plate to reinforce the aircraft skin, as necessary.
3. Secure the O-ring in the O-ring groove on the underside of the antenna.
4. Place antenna over mounting holes, using the fours screw holes to align the antenna. Insert the supplied four screws.
5. Washers and locking nuts (not provided, may be part of doubler plate) are required to secure the antenna Using the supplied screws or equivalent, torque should be evenly applied across all mounting screws to avoid deformation of the mounting area. Do not over tighten screws.

Antenna	Mounting Screws	Torque Specifications
GA 35	MS24693-C 8-32 Stainless Steel	12 – 15 inch-pounds
GA 36 GA 37	MS24694-C 10-32 Stainless Steel	20 – 25 inch pounds

CAUTION

GA 35 serial numbers below 110000 required screws with 80 degree countersink angle and most aviation fasteners (AN509) are NOT compatible. Serial numbers 110000 and higher, AN509 hardware is compatible. Antennas installed with incompatible hardware or screws that have been over tightened will void antenna warranty.

6. Ensure that the antenna is electrically bonded as described in Section 2.3.2.
7. Seal the antenna to the fuselage using a good quality electrical grade sealant. Run a bead of the sealant along the edge of the antenna where it meets the exterior aircraft skin. Use caution to ensure that the antenna connectors are not contaminated with sealant.

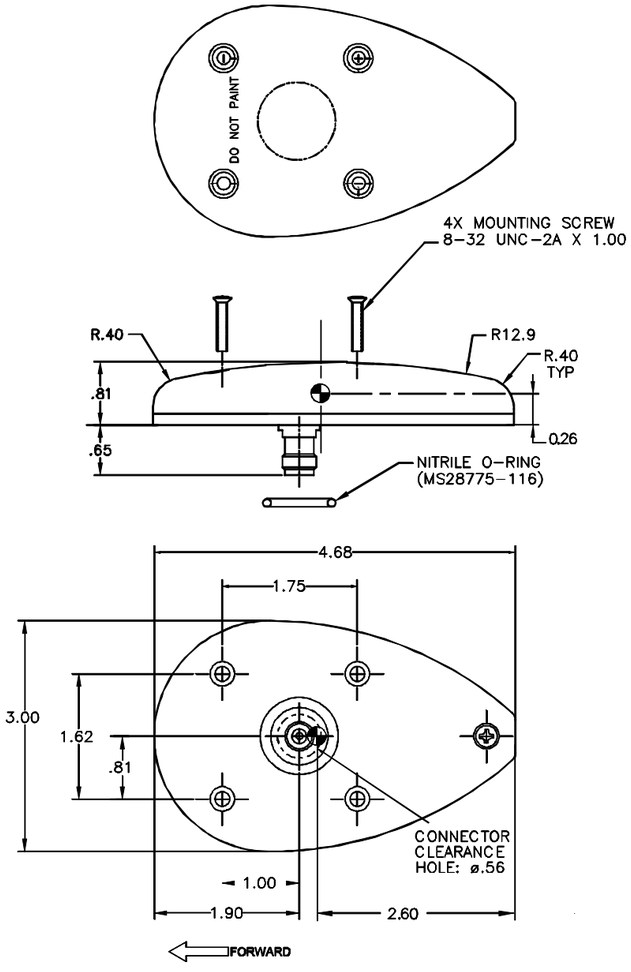
CAUTION

Do not use construction grade RTV sealant or sealants containing acetic acid. These sealants may damage the electrical connections to the antenna. Use of these type sealants may void the antenna warranty.

2.5 Installation Approval

Installation of any antenna should follow the aircraft TC or STC requirements.

Appendix A INSTALLATION DRAWINGS



CAUTION

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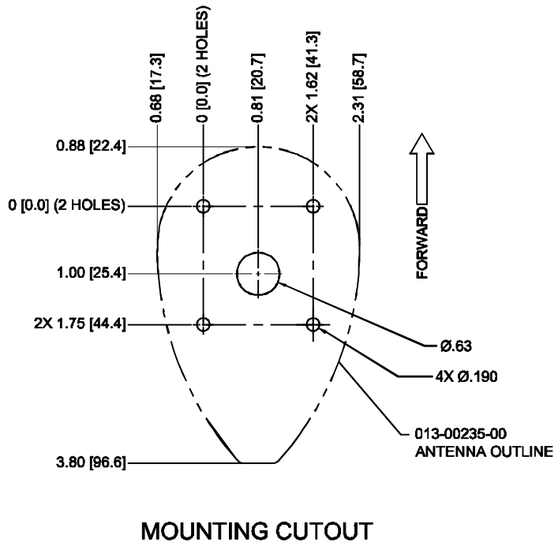


MOUNTING CUTOUT

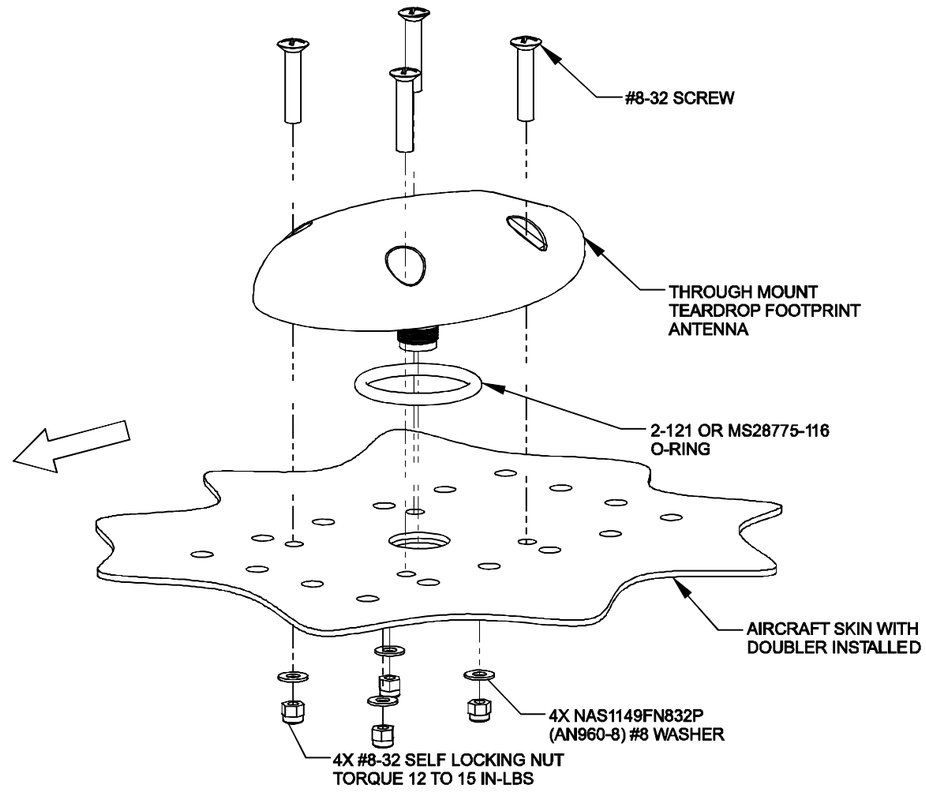
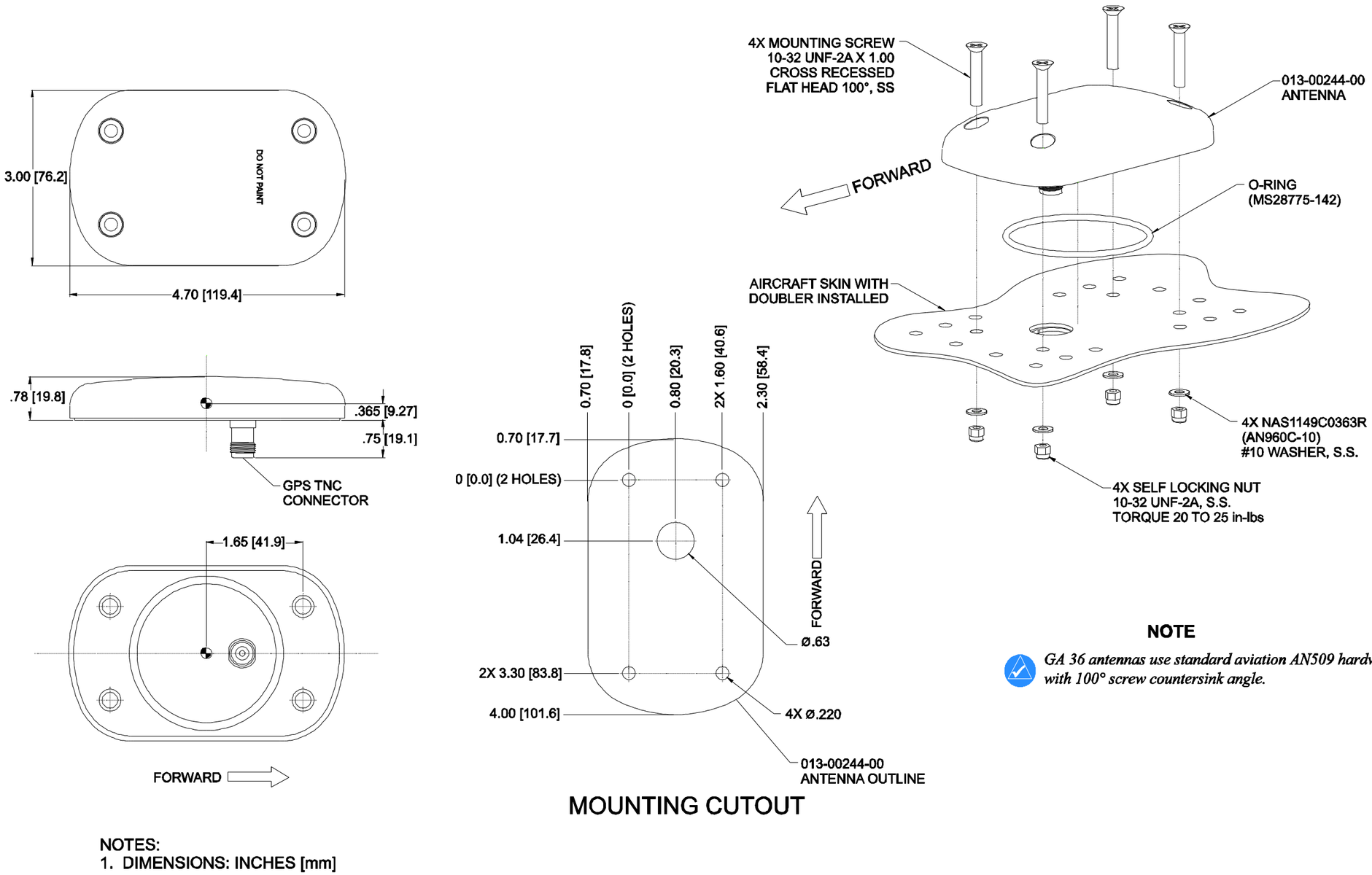


Figure A-1. GA 35 Antenna Installation Drawing



MOUNTING CUTOUT

NOTE

GA 36 antennas use standard aviation AN509 hardware with 100° screw countersink angle.

NOTES:
1. DIMENSIONS: INCHES [mm]

Figure A-2. GA 36 Antenna Installation Drawing

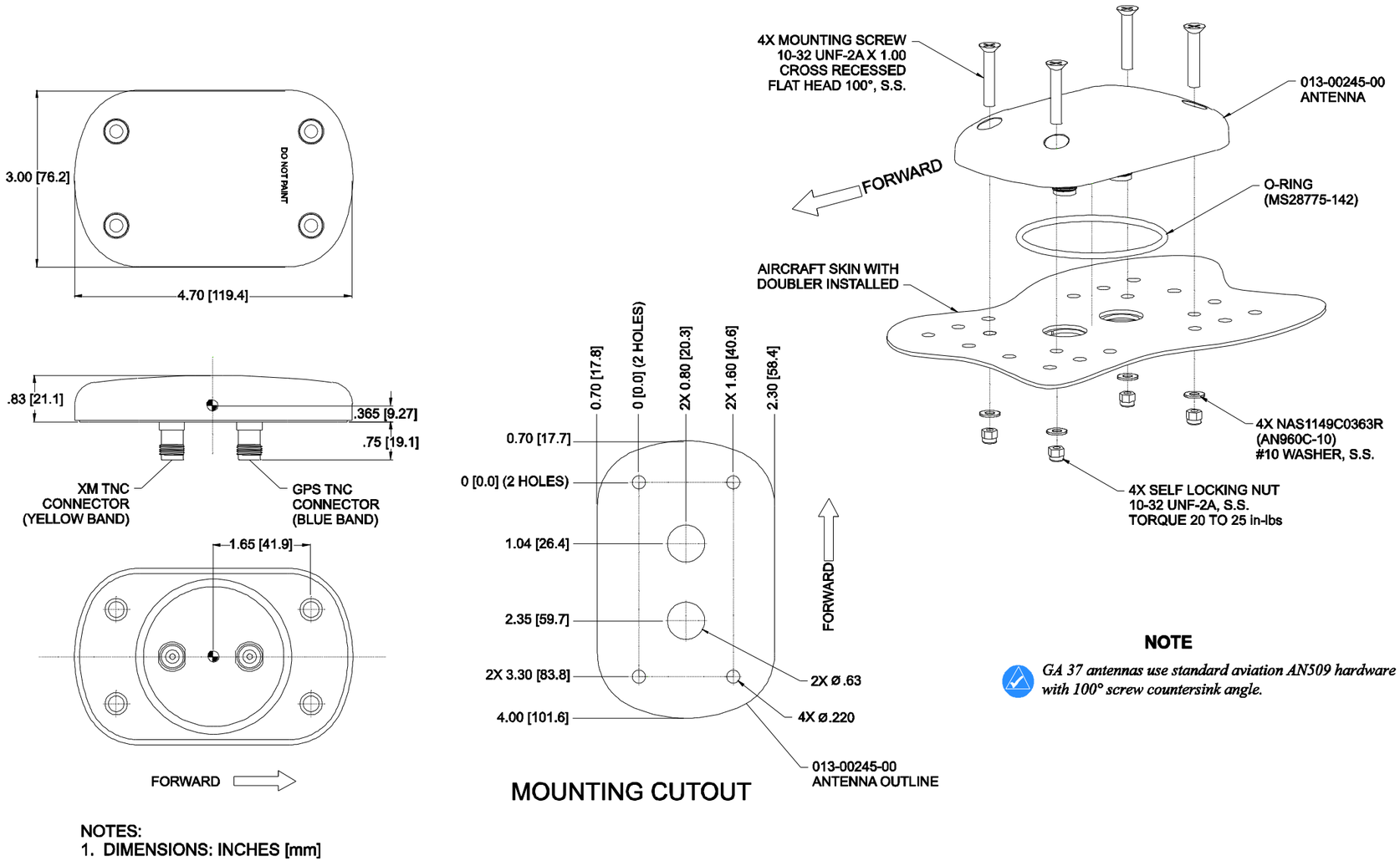


Figure A-3. GA 37 Antenna Installation Drawing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