



GA 35

GA 36

GA 37

**Antenna
Installation
Instructions**

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NOTE

Throughout this document references made to the GA 3X shall equally apply to the antennas list in ~~Table 1-1~~ ~~Table 1-1~~ except where specifically noted.

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GA 3X Antenna Installation Instructions

1. General Description

Careful planning and consideration of the following guidelines are required to achieve the desired performance and reliability from the GA 3X Series antennas.

1.1 Introduction

This manual describes the installation of the GA 3X Series antennas. It is intended for use by persons certified by the Federal Aviation Administration (FAA) to install avionics equipment. This installation manual applies to the GA 3X antennas listed in the following table.

Table 1-1. Antenna Part Numbers

Item	Description	Garmin Part Number	Aero Antenna Part Number	Footprint	Aero Antenna Installation Dwg. No.
GA 35	GPS/WAAS	013-00235-00	AT575-93GW-TNCF-000-RG-27-NM	Teardrop	AT575-93G
GA 36	GPS/WAAS	013-00244-00	AT575-126GW-TNCF-000-RG-27-NM	ARINC 743	AT575-126G
GA 37	GPS/WAAS + XM	013-00245-00	AT2300-126GW-TNCF-000-RG-27-NM	ARINC 743	AT2300-126G

This manual does not include installation of 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 3X Series antennas includes GPS/WAAS antennas and GPS/WAAS with XM 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 Technical Specifications

1.3.1 Antenna Weight

Table 1-2. Antenna Weight

Item	Weight
GA 35	0.47 lbs (0.21 kg)
GA 36	0.47 lbs (0.21 kg)
GA 37	0.50 lbs (0.23 kg)

1.3.2 GPS/WAAS Electrical Specifications (GA 35, GA 36 and GA 37)

Table 1-3. GPS/WAAS Electrical Specifications

Characteristics	Specifications
Frequency Range	1575 ± 10 MHz
Gain	27 ± 0.5 dB @ +25°C nominal and ± 2.0 dB over temperature with respect to nominal
Noise Figure	2.5 dB max over temperature
Nominal Output Impedance	50 ohms
Supply Voltage	4.5 VDC ± 0.5 VDC
Supply Current	60 mA max
Output Connector	TNCF

1.3.3 XM Electrical Specifications (GA 37 Only)

Table 1-4. XM Antenna Specifications

Characteristics	Specifications
Frequency Range	2332.5 to 2345 MHz
Gain	24 ± 2 dB
Noise Figure	1.5 dB max
Nominal Output Impedance	50 ohms
Supply Voltage	4.5 VDC ± 0.5 VDC
Supply Current	55 mA
Output Connector	TNCF

1.3.4 Environmental Specifications

It is the responsibility of the installing agency to obtain the latest revisions of the GA 3X Environmental Qualifications. The Environmental Categories are available on the Aero Antenna Drawing. To obtain a copy of these drawings, see the 'Dealers Only' portion of the Garmin website, www.garmin.com.

Table 1-5. Part Numbers/Drawing Numbers

Item	Garmin Part Number	Aero Antenna Environmental Qualification Drawing Number
GA 35	013-00235-00	TSO575-93G
GA 36	013-00244-00	TSO575-93G
GA 37	013-00245-00	TSO2300-126G

1.4 Certification

1.4.1 GA 35

The GA 35 is compliant with TSO C144.

1.4.2 GA 36

The GA 36 is compliant with TSO C144.

1.4.3 GA 37

The GPS/WAAS function of the GA 37 is compliant to TSO C144. The XM function of the GA 37 is compatible with the Garmin GDL 69 and GDL 69A.

1.5 Limited Warranty

This Garmin product is warranted to be free from defects in materials or workmanship for one year from the date of purchase. Within this period, Garmin will at its sole option, repair or replace any components that fail in normal use. Such repairs or replacement will be made at no charge to the customer for parts or labor, provided that the customer shall be responsible for any transportation cost. This warranty does not cover failures due to abuse, misuse, accident or unauthorized alteration or repairs.

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2. Installation

2.1 Introduction

One method of installing the GA 3X antennas is to follow Garmin GA Antenna AML STC SA01695SE for installations not penetrating a pressure vessel for those aircraft that are included on the STC approved model list. If installing antenna per Garmin GA Antenna AML STC SA01695SE, follow instructions contained in STC Antenna Installation Manual 190-00569-00.

CAUTION

Antenna installations on pressurized cabin aircraft require FAA approved installation design and engineering substantiation data whenever such antenna installations incorporate alteration (penetration) of the cabin pressure vessel by connector holes and/or mounting arrangements. For needed engineering support pertaining to the design and approval of such pressurized aircraft antenna installations, it is recommended that the installer proceed according to any of the following listed alternatives:

1. Obtain approved antenna installation design data from the aircraft manufacturer.
2. Obtain an FAA approved STC pertaining to and valid for the antenna installation.
3. Contact the FAA Aircraft Certification Office in the appropriate Region and request identification of FAA Designated Engineering Representatives (DERs) who are authorized to prepare and approve the required antenna installation engineering data.
4. Obtain FAA Advisory Circular AC-183C and identify a DER from the roster of individuals in it.
5. Contact an aviation industry organization such as the Aircraft Electronics Association for assistance.

2.2 Antenna Mounting Location

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 availability. 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.

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 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) 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: 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 COM, GPS and XM) 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 minimize the effects of shadowing at 5° elevation angles, the GPS antenna should be mounted no closer than 6 inches (edge to edge) from other antennas, including passive antennas such as another GPS antenna or XM antenna.
4. To maintain a constant gain pattern and limit degradation by the windscreen, avoid mounting the antenna closer than 3 inches from the windscreen.
5. For multiple GPS installations, the antennas should not be mounted in a straight line from the front to the rear of the fuselage. 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](#) shows the recommended placement of antennas.

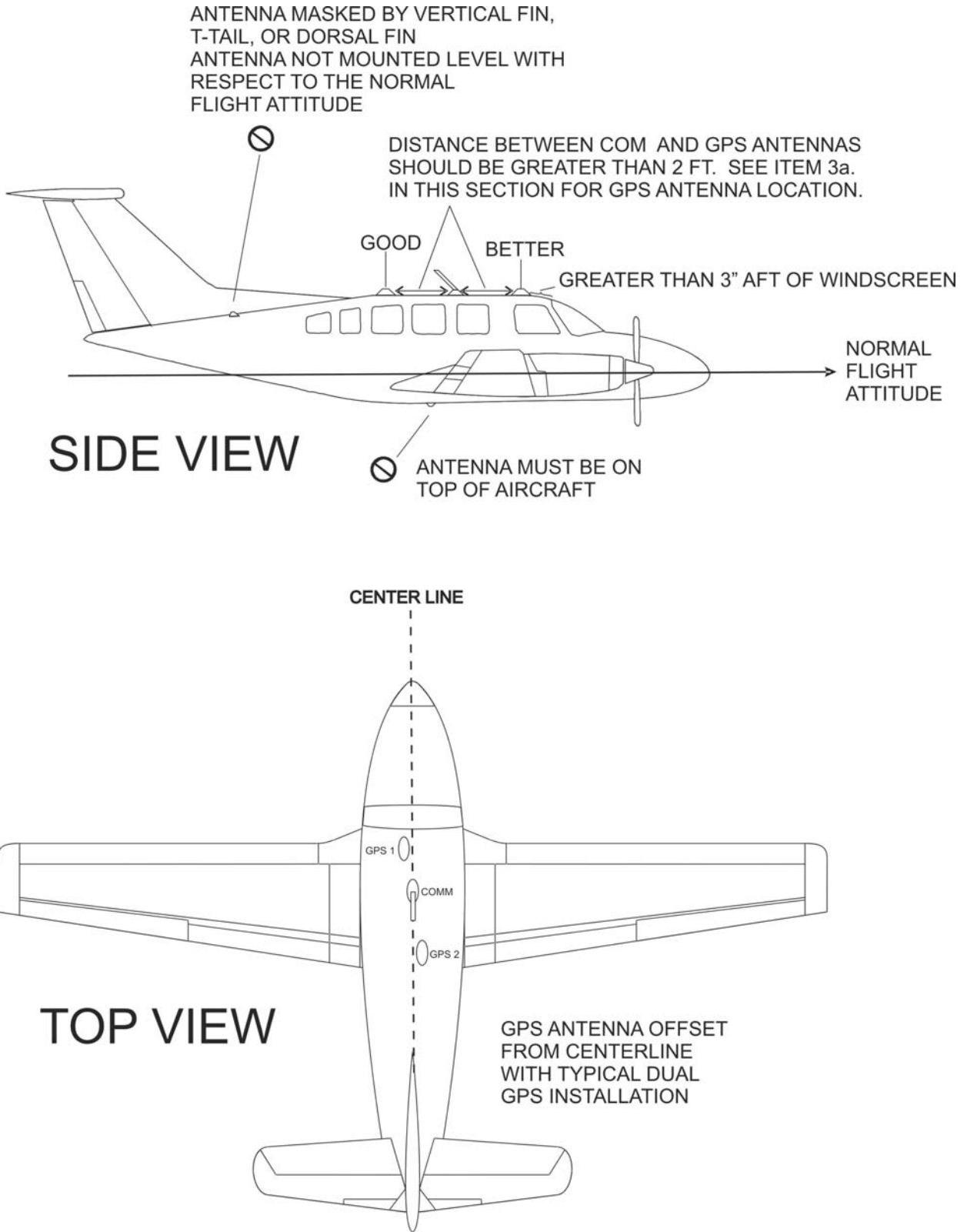


Figure 2-1. GPS Antenna Installation Considerations

2.3 Antenna Doubler

If installing the antenna onto existing provisions a doubler may not be required. If installing the antenna using AML STC SA01695SE as the basis for approval, one of the following antenna doublers may be used:

- Antenna doubler P/N 115-00846-00, for the GA 36 and GA 37 antennas. This doubler contains nut plates (qty. 4) for the antenna mounting screws.
- Antenna doubler P/N 115-00846-10, for the GA 35 antenna. This doubler does not contain nut plates.

The above doublers may be purchased from Garmin or doublers may be fabricated in accordance with the Antenna STC Installation Manual 190-00569-00.

2.4 Antenna Grounding

The antenna is grounded through the mounting hardware. The mounting hardware (washers and nuts) and doubler plate should make contact with an unpainted surface ensuring proper antenna grounding.

It is very important to have good conductivity between the coaxial shield and the ground plane. This is ensured when all the fasteners properly ground the antenna base to the skin of the aircraft.

2.5 Antenna Installation

If installing antenna per Garmin GA Antenna AML STC SA01695SE, follow instructions contained in STC Antenna Installation Manual 190-00569-00.

If not installing per Garmin GA Antenna AML STC SA01695SE, develop installation data for field approval including the following steps. Refer to the aircraft manufacturer's specifications and AC 43.13-2A, Chapter 3 for appropriate guidance on antenna installation.

1. Refer to Appendix A for the appropriate mounting cutout. Drill or punch the holes required.
2. Install a doubler plate to reinforce the aircraft skin, as required.
3. Secure the O-ring in the O-ring groove on the underside of the antenna.
4. Place antenna over mounting holes, using the four 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. Torque the four supplied #8-32 stainless steel screws 12-15 in-lbs for GA 35, or #10-32 stainless steel screws 20-25 in-lbs for GA 36 and GA 37. Torque should be evenly applied across all mounting screws to avoid deformation of the mounting area.
6. Insure that the antenna base and aircraft skin are in continuous contact with the O-ring.
7. Seal the antenna and gasket 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.

2.6 Installation Approval

2.6.1 GA 35, GA 36, and GA 37

The conditions and tests required for TSO approval of the GA 3X antennas are minimum performance standards. It is the responsibility of those desiring to install the antenna either on or within a specific type or class of aircraft to determine the aircraft installation standards are within the TSO standards. One method of installing the GA 3X antennas is per GA Antenna AML STC SA01695SE. For other methods, the GA 3X antennas may be installed only if further evaluation by the applicant documents an acceptable installation and is approved by the administrator. For antenna TSO compliance, see Section 1.4.

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3. Continued Airworthiness

Maintenance of the GA 3X antenna is “on-condition” only. Periodic maintenance of the GA 3X antenna is not required.

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APPENDIX A INSTALLATION DRAWINGS

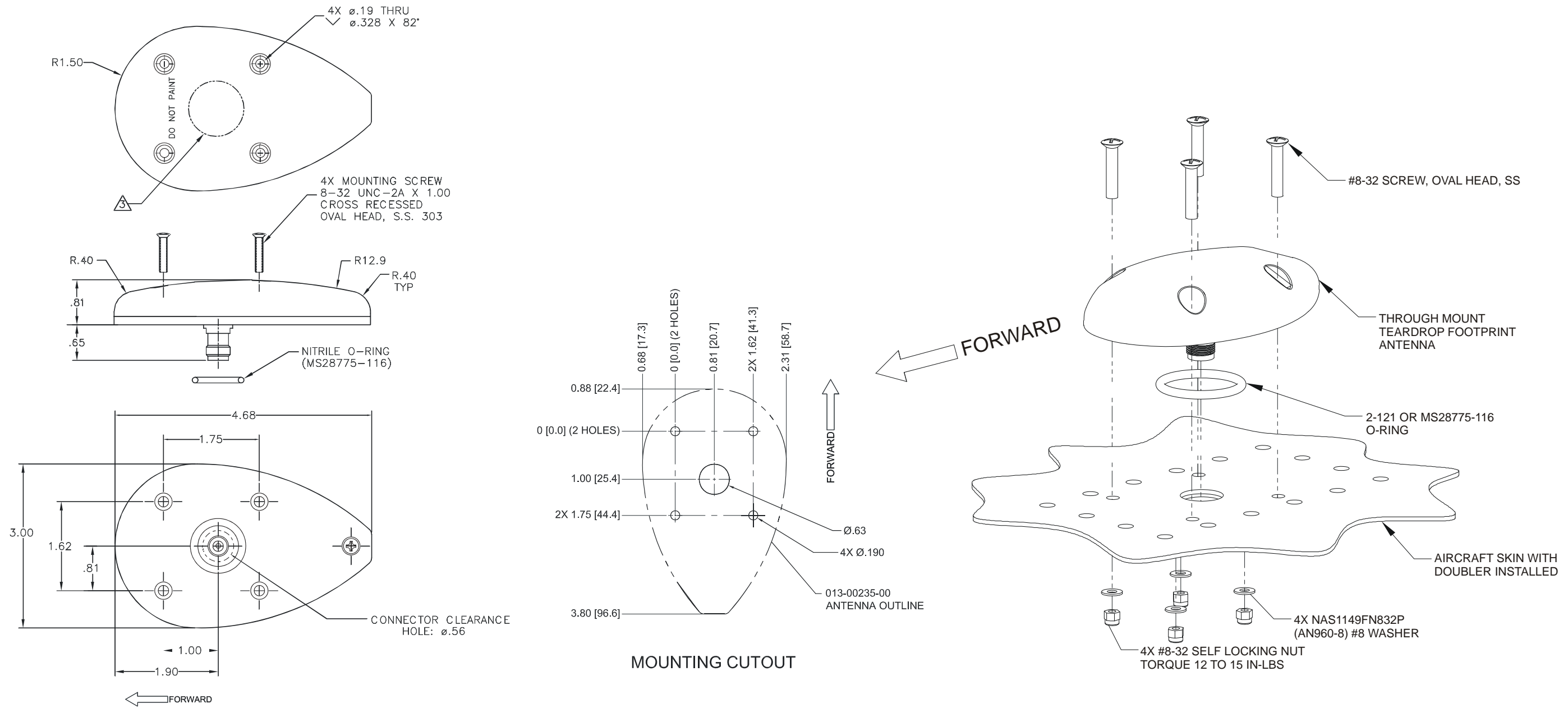
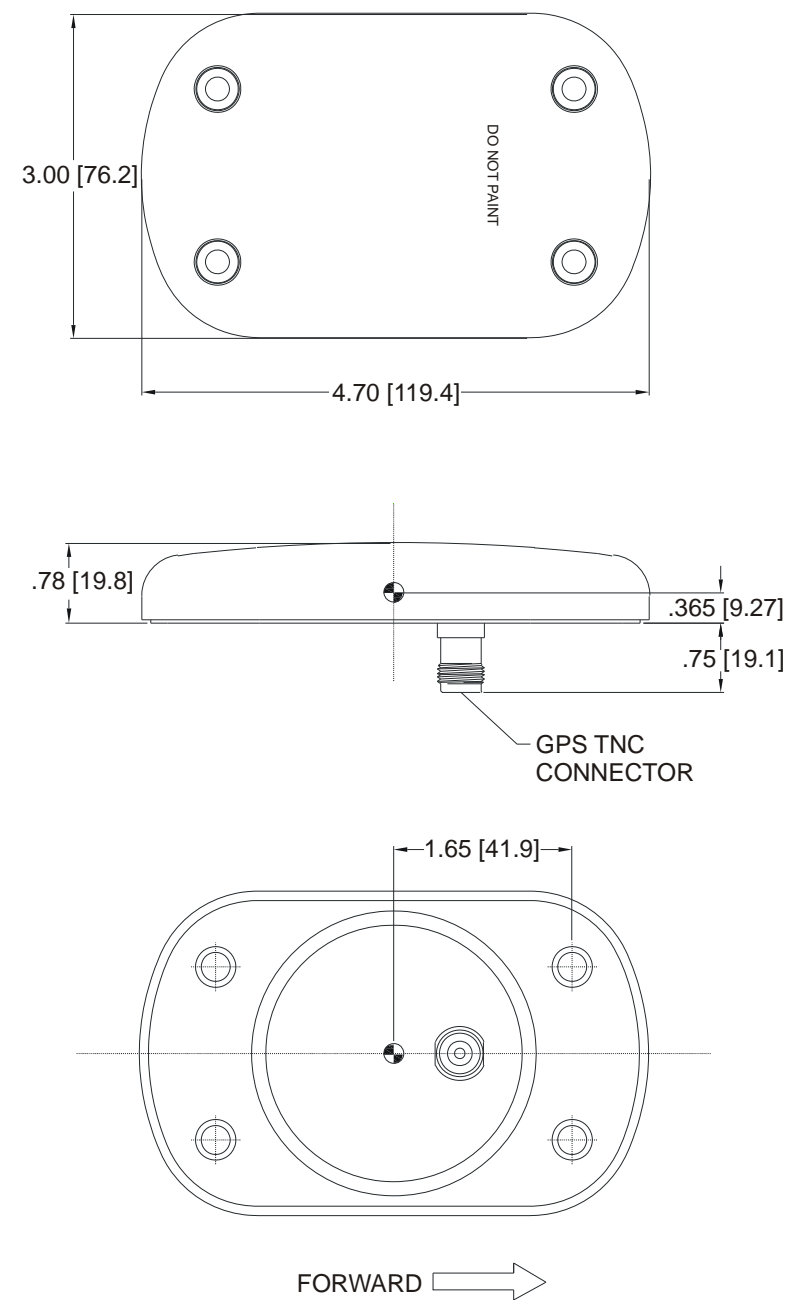


Figure A-1. GA 35 Antenna Installation Drawing



NOTES:
1. DIMENSIONS: INCHES [mm]

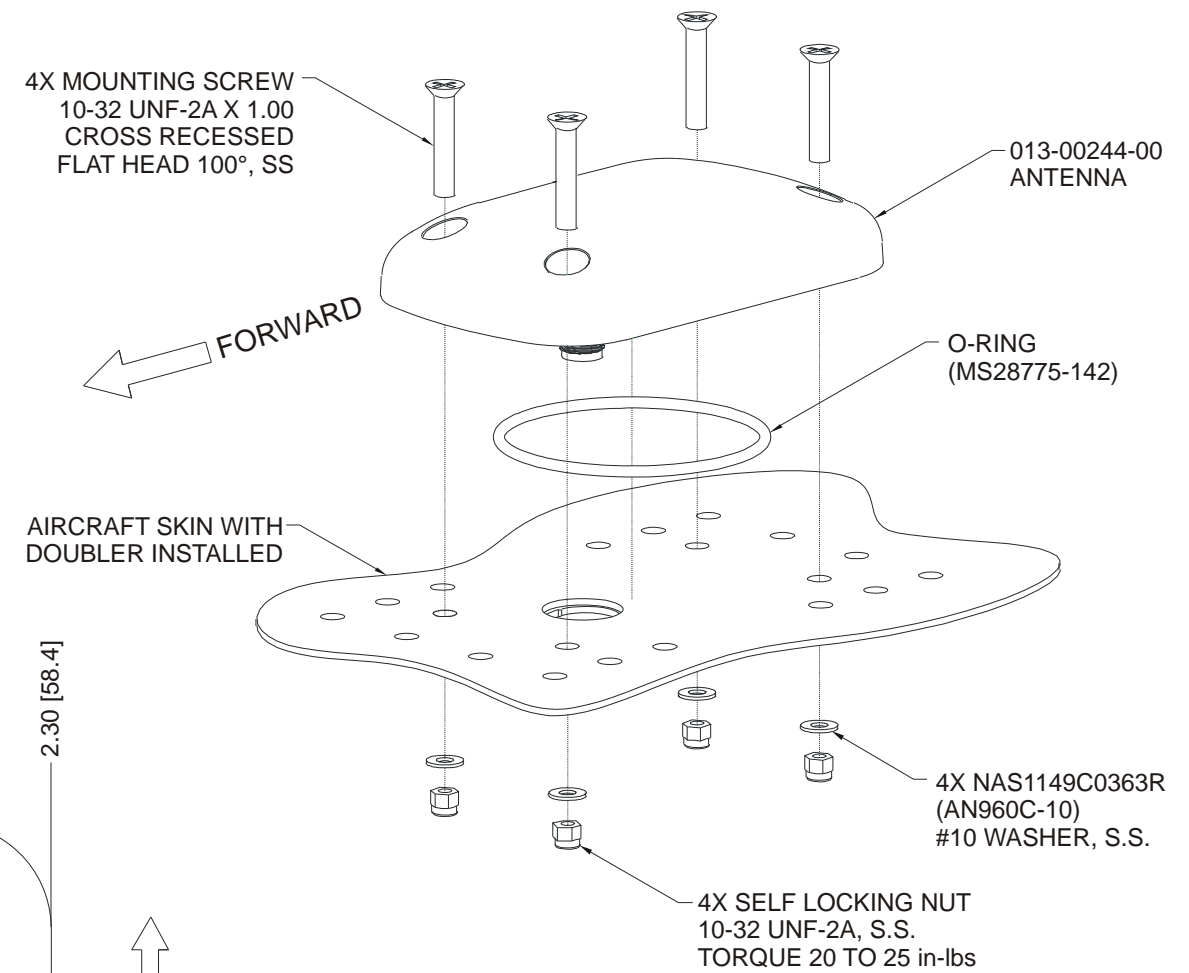
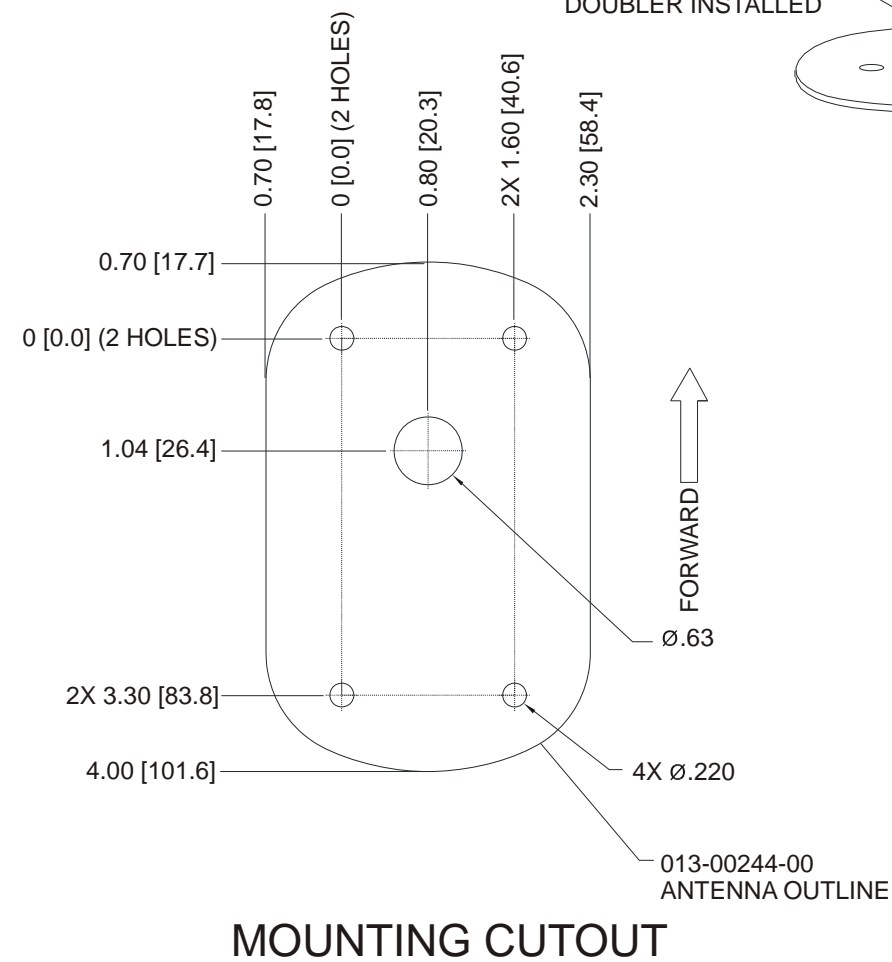
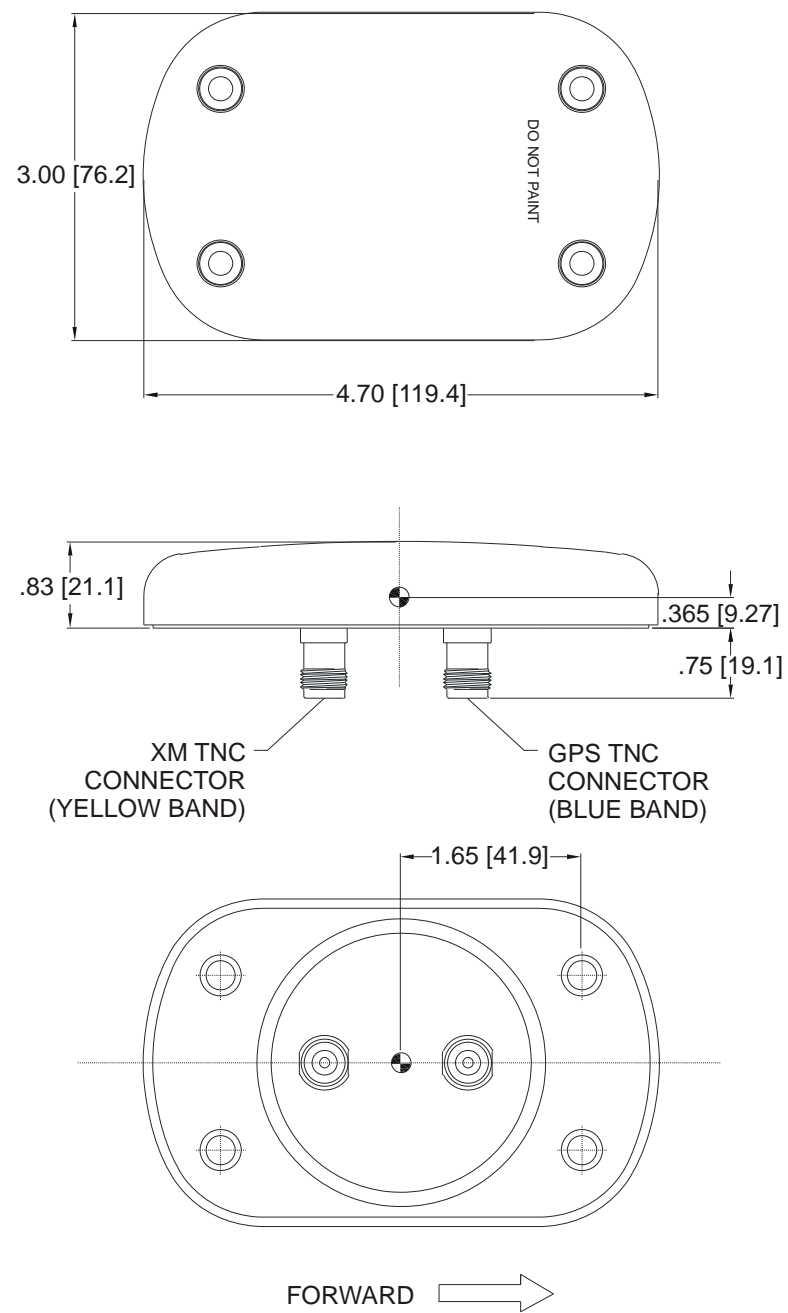


Figure A-2. GA 36 Antenna Installation Drawing



NOTES:
1. DIMENSIONS: INCHES [mm]

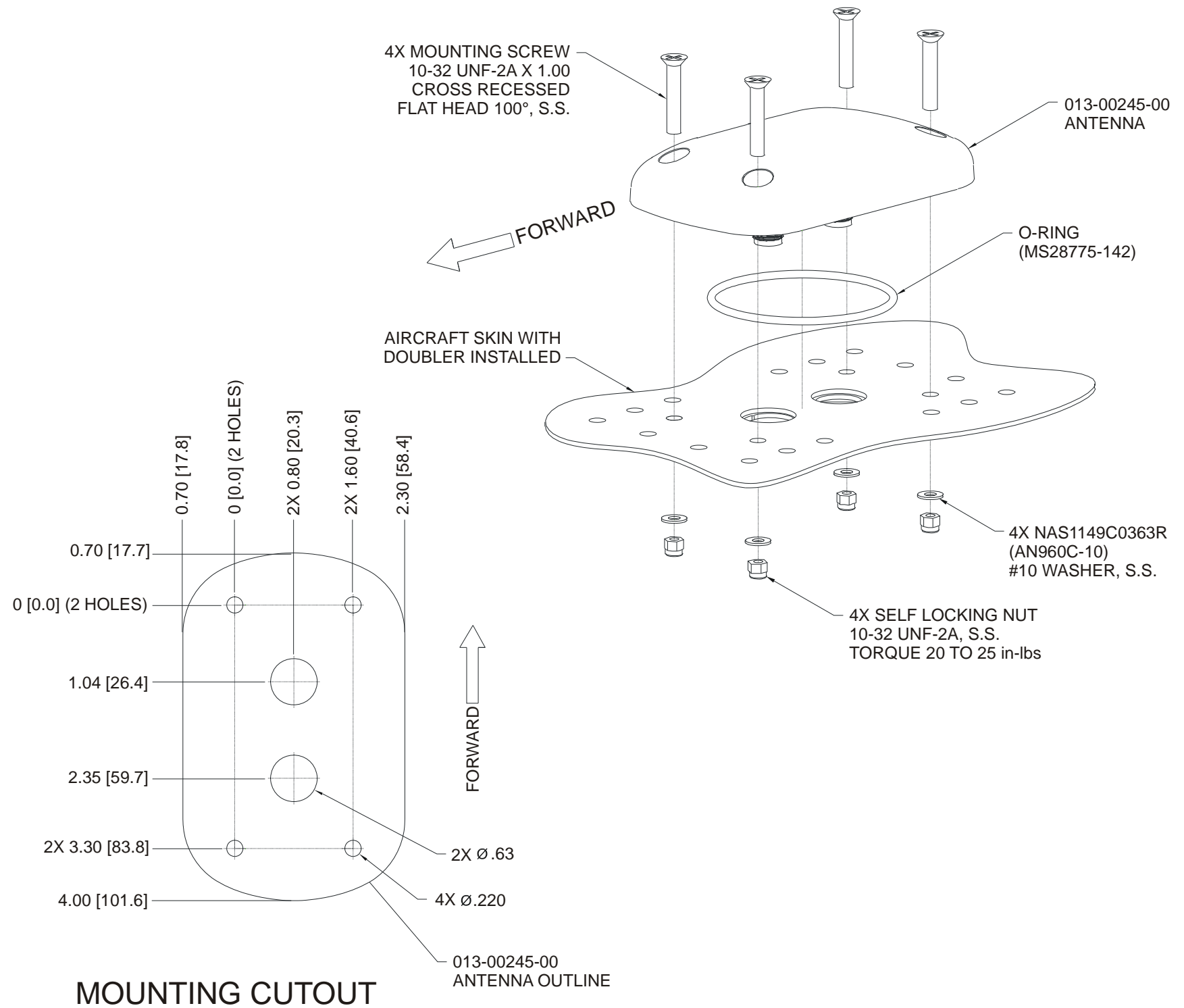


Figure A-3. GA 37 Antenna Installation Drawing

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