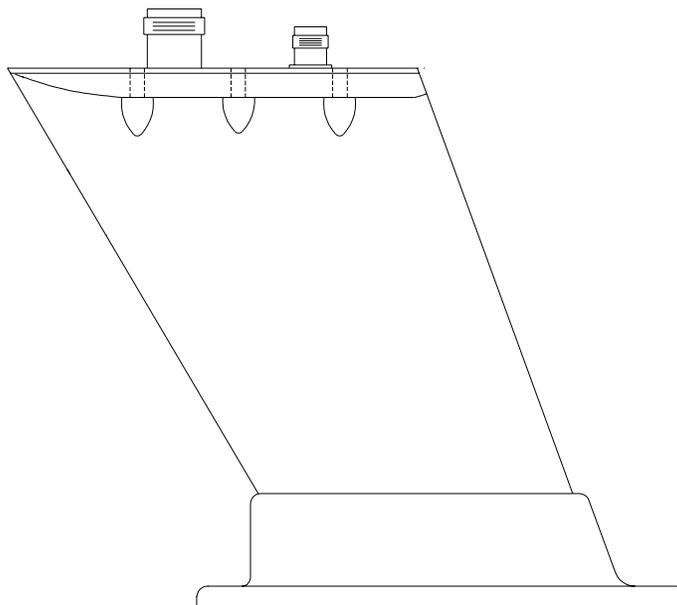




DUAL-POLARIZATION AirCell™ ANTENNA INSTALLATION MANUAL



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1. GENERAL DESCRIPTION

1.1. INTRODUCTION

This manual describes the physical, mechanical, and electrical characteristics and the installation requirements for the Dual-polarization AirCell™ Antenna as part of the GARMIN NavTalk Pilot Aircraft Provisions. After installation of the Antenna, FAA Form 337 must be completed by an appropriately certificated agency to return the aircraft to service.

1.2. EQUIPMENT DESCRIPTION

The Dual-polarization AirCell Antenna permits the in-flight use of a GARMIN NavTalk Pilot AirCell compatible cellular telephone.

1.3. TECHNICAL SPECIFICATIONS

Height	6.40"
Weight	1.0 lbs.
Environmental Testing	RTCA DO-160D. For more details see Environmental Qualification Forms

1.4. LICENSE REQUIREMENTS

None.

1.5. CERTIFICATION

The Dual-polarization AirCell Antenna initial certification was accomplished via STC by GARMIN in a Mooney M20J.

1.6. LIMITED WARRANTY

GARMIN Corporation warrants this product to be free from defects in materials and manufacture for one year from the date of purchase. 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. The customer is, however, responsible for any transportation costs. This warranty does not cover failures due to abuse, misuse, accident or unauthorized alteration or repairs.

THE WARRANTIES AND REMEDIES CONTAINED HEREIN ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED OR STATUTORY, INCLUDING ANY LIABILITY ARISING UNDER ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, STATUTORY OR OTHERWISE. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, WHICH MAY VARY FROM STATE TO STATE.

IN NO EVENT SHALL GARMIN BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, WHETHER RESULTING FROM THE USE, MISUSE, OR INABILITY TO USE THIS PRODUCT OR FROM DEFECTS IN THE PRODUCT. SOME STATES DO NOT ALLOW THE EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU.

To obtain warranty service, call the GARMIN Customer Service department (913-397-8200) for a returned merchandise tracking number. The unit should be securely packaged with the tracking number clearly marked on the outside of the package and sent freight prepaid and insured to a GARMIN warranty service station. A copy of the original sales receipt is required as the proof of purchase for warranty repairs. GARMIN retains the exclusive right to repair or replace the unit or software or offer a full refund of the purchase price at its sole discretion. SUCH REMEDY SHALL BE YOUR SOLE AND EXCLUSIVE REMEDY FOR ANY BREACH OF WARRANTY.

2. INSTALLATION

2.1. INTRODUCTION

Careful planning and consideration of the suggestions in this section are required to achieve the desired performance and reliability from the installed equipment. Any deviations from the installation instructions prescribed in this document shall be accomplished in accordance with the requirements set forth in FAA AC 43.13-2A.

2.2. ANTENNA PLACEMENT CONSIDERATIONS

The AirCell antenna (CI 5000-1) is designed for belly mounting, but must be mounted at a point on the fuselage that allows a clear view to the horizon in all directions. This antenna should be located on the forward portion of the fuselage, rather than the rear, as the cell-to-cell handoffs are more effective when done forward of the aircraft rather than aft. If the antenna is mounted under the wings, the reception is then reduced or obstructed as the aircraft banks. In this case, it would be better to mount the antenna aft of the wing if there were no space forward of the wing. However, NEVER mount the antenna on the upslope of the tail. The fuselage will block almost all forward reception. Care should be taken to assure that the engine nacelles hanging down from the wings do not block the view to the sides. Blade antennas should be mounted on the centerline of the aircraft to minimize performance differences from side to side. It is also important that the antenna mounting surface be maintained within 5 degrees of horizontal, since the antenna is designed for horizontal polarization and performs best when mounted on a horizontal surface.

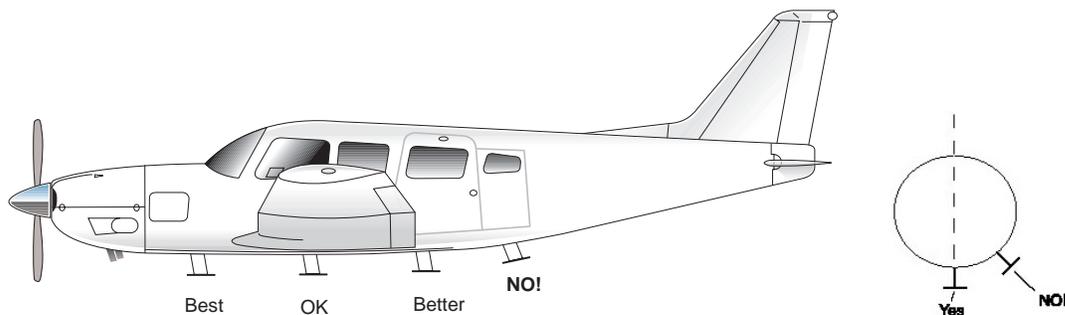


FIGURE 1. Cellular Antenna Installation Considerations

An AirCell Antenna should not be located in the vicinity of other antennas on the bottom of the aircraft. In particular, other antennas should be kept at least 18" and preferably 36" fore and aft of the AirCell antenna, and none should be mounted to the sides of the AirCell antenna. Of particular concern are horizontal wire elements such as older style ADF antennas or "bent wire" comm antennas and long wire ADF sense antennas still seen on older aircraft. Even though visually they do not seem to block the AirCell antenna, they will still significantly disturb its performance.

2.3. CABLING AND WIRING

Check that there is ample space for the cabling and mating connectors. Avoid sharp bends in cabling, particularly the antenna cables, and routing near aircraft control cables. Cabling should not be routed near components or cabling which are sources of electrical noise. Do not route the antenna cables near any ADF antenna cables.

The FCC has imposed strict requirements on the performance of the NavTalk Pilot System to prevent interference with ground cellular networks. To maximize the range of the system, prevent interference with ground cellular, and maintain the best reception, AirCell requires that finished coaxial cable assemblies are tested for loss and VSWR.

The total cable loss from the antenna to the cradle cable must be less than 1.5dB at 900 MHz and no more than 1.4:1 VSWR. Very long cables with loss higher than this amount may affect the airborne phone system performance under maximum range conditions. For installations requiring airborne phone coaxial cable lengths greater than 40 feet, consult AirCell Customer Service at 1-888-286-9876.

The three recommended coaxial cable vendors are PIC, ECS, and EMTEQ.

How to Determine Cable Part Numbers

1. Select a location for the NavTalk Pilot transceiver. From this location, determine the desired connection location to the cradle cable.
2. Determine the location for the antenna. The antenna should be installed on the bottom of the aircraft on a level location, not on an upslope. Mounting the antenna on the tail slope will cause antenna shadowing at certain attitudes and degrade system performance. See antenna installation guidelines for further information.
3. Determine the length of the coaxial cable needed. The length should include distance needed for service loops, and should include the connectors.
4. Look up the total coaxial cable length required in the table below. Part numbers for coaxial cable are listed from PIC Wire and Cable, ECS and EMTEQ.
5. Call your preferred cable vendor and give them the length of cable, the cable type and which type of connector that you wish (straight or 90°).

CAUTION

The Cellular Antenna cable must be tested (total cable loss no more than 1.5dB@900 MHz and VSWR less than 1.4:1) as an assembled unit. Remind the vendor that this must be done to assure optimal system performance. Retain certificate for performance verification.

CI 5000-1 AIR ANTENNA CABLE AND CONNECTORS

		Cradle Cable Connector	Cable	Antenna	
				TNC Male	TNC Male 90°
0-20 ft	ECS	CTS922	311501	CTS922	CTR922
	EMTEQ	TMS240-1	PFLX240-501	TMS240-1	TMR240-1
	PIC	190308	S33141	190308	190309
21-40 ft	ECS	CTS022	310801	CTS022	CTR022
	EMTEQ	TMS500-1	PFLX500-500	TMS500-1	TMR500-1
	PIC	190408	S22089	190408	190409

NOTE

For total coaxial cable length longer than 40 ft, Consult AirCell Customer Service at 1-888-286-9876

IMPORTANT

Overall loss from antenna to cradle cable input not to exceed 1.5 dB and VSWR less than 1.4:1.

3. INSTALLATION PROCEDURE

3.1. UNIT AND ACCESSORIES

The Dual-polarization AirCell Antenna is available under the following part number:

ITEM	GARMIN P/N
AirCell Antenna, Dual Polarization, includes: Cellular Antenna, Dual Polarization (700-00013-00) AirCell Antenna Installation Kit (013-00059-00)	010-10278-00

3.2. MISCELLANEOUS OPTIONS

None.

3.3. INSTALLATION ACCESSORIES REQUIRED BUT NOT PROVIDED

None.

3.4. ANTENNA INSTALLATION

Proper design for the installation of the antenna is critical for the system performance and meeting FAA regulations, especially on pressurized aircraft. Antenna installation requires proper FAA approval and must meet the requirements of FAA FAR 23.571 or FAR 25.571.

NOTE

Rule changes over recent years require that penetration in pressurized aircraft be analyzed. FAA AC 43.13-1B does not properly address the new rules for the installation of antennas in pressurized aircraft. An analysis is required to determine that the installation will not cause cracks and structural damage due to loads placed on antennas. This analysis is usually performed by a DER and documented on FAA Form 8110-3 and included as approved data on FAA Form 337.

NOTE

It is desirable to have at least 18" and preferably 36" of separation from other antennas. Please call AirCell Customer Service/Technical Support to discuss installs with less separation.

When using the Low Profile Antenna (CI 5000-1), the antenna must be mounted on the bottom of the aircraft on the lowest possible portion of the airframe in level flight. Best performance will result if the antenna is located forward or aft of the wing area. If possible, do not position the antenna under the wing and NEVER on the tail upsweep (see Figure 1 for more complete information on antenna placement).

NOTE

All antenna installations must comply with the applicable FARs.

IMPORTANT

The base of antennas must be metal to metal bonded with the aircraft skin. For the CI 5000-1 Antenna, no ground is provided via the mounting screws as the base plate screw holes do not have metal sleeves. Be sure to remove paint on aircraft skin, pre-treat, and treat with Alodine or equivalent conductive corrosion inhibiting treatment.

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.

The outline and footprint dimensions for the antenna and doubler plate are shown in Figures 3 and 4, respectively, on page 6.

1. Using the doubler plate as a template, mark the location of the mounting holes and the through hole for coaxial cable. Drill or punch the holes.
2. Use the doubler plate (part of 013-00059-00 kit) as required for thin-skinned aircraft.
3. The antenna installation must provide adequate support for the antenna. Observe guidelines for acceptable installation practices as outlined in AC 43.13-2A.
4. Fasten antenna to aircraft with six (6) #8-32 screws, lockwashers, and locknuts (parts of 013-00059-00 kit)
5. The “N Type” ground connector on the Low Profile Antenna is not used and should be capped with the plastic cover supplied with the antenna.

3.5. CABLE INSTALLATION

1. Route the coaxial cable to the NavTalk Pilot Adapter mounting location keeping in mind the recommendations of Section 2. Secure the cable in accordance with good aviation practice.
2. Trim the coaxial cable to the desired length and install the TNC connector per the cabling instructions on Figure 2. If the connector is provided by the installer, follow the connector manufacturer’s instructions for cable preparation.

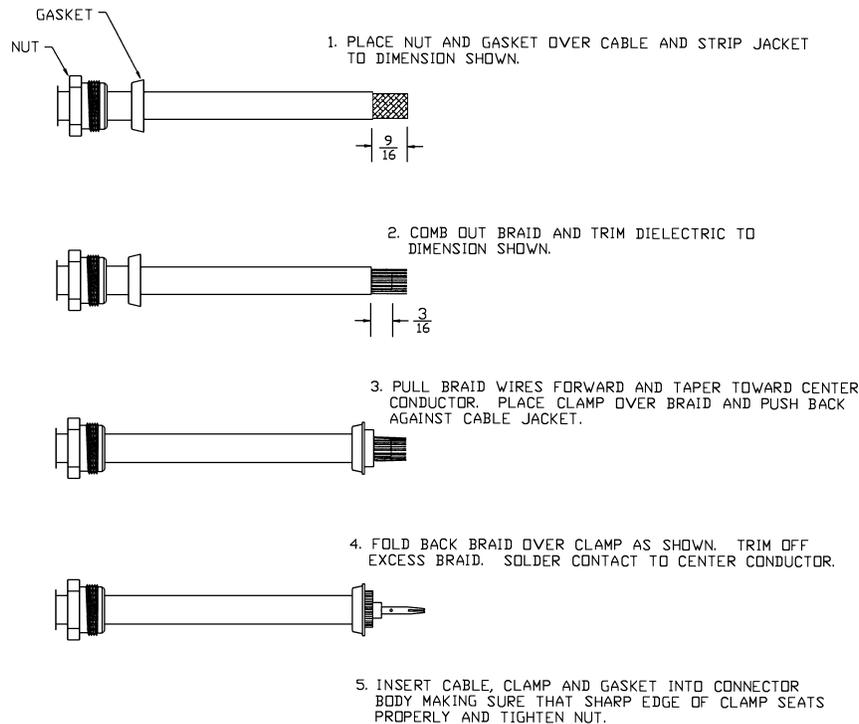


Figure 2. Coaxial Cable Installation

3.6. OUTLINE DRAWINGS

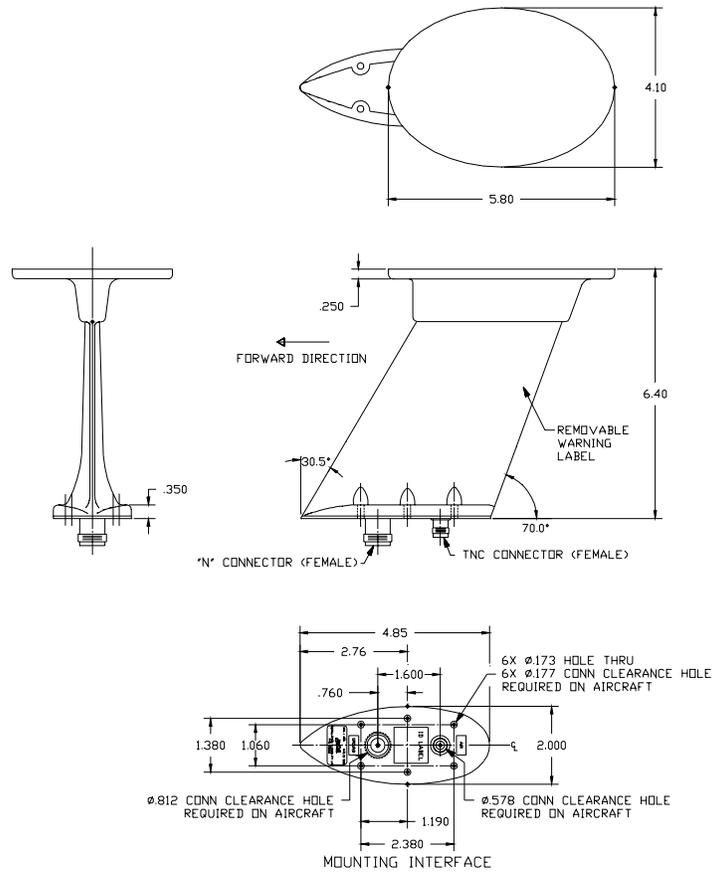


Figure 3. Dual-polarization AirCell Antenna Outline Drawing

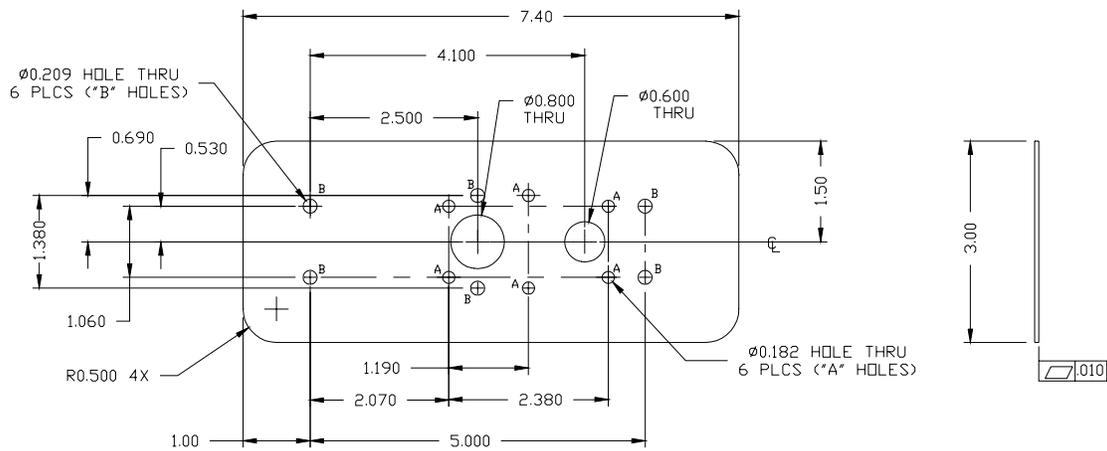


Figure 4. Antenna Doubler Plate Outline Drawing

APPENDIX A. CERTIFICATION DOCUMENTS

A.1. CONTINUED AIRWORTHINESS

Maintenance of the Dual-polarization AirCell Antenna is “on condition” only. Periodic maintenance of the antenna is not required.