

BOB ARCHER
SPORTCRAFT ANTENNAS
21818 Ocean Avenue
Torrance, California 90503
Tel. 310-316-8796
"E" mail <bobsantennas@earthlink.net>

INSTALLATION INSTRUCTIONS
for
COMPOSITE AIRCRAFT TRANSPONDER ANTENNAS

1.0 INTRODUCTION.

1.1 GENERAL. These antennas have been designed by Bob Archer of Torrance, California utilizing concepts common to military aircraft and space vehicles. The antenna performance is superior to most in use today in private aircraft. The only requirement for maximum performance is that the antennas must be installed in accordance with the installation instructions contained herein. These antennas were designed to be installed in fuselage or wings which must be built of dielectric (plastic, non-conductive) material and have vertical internal dimensions must be at least 6 inches high by 7 inches long.

1.2 INSTALLATION. If at any time there is a conflict in the technique of installation, this document shall take priority, unless the conflict is of a mechanical nature. If the latter is true the installation mechanic shall make the decision. Follow the rules contained herein for electrical information and for any mechanical techniques an aircraft mechanic should be consulted.

2.0 ANTENNA DESCRIPTION.

2.1 GENERAL. The SA-005 Transponder antenna is designed for reception of vertically polarized energy in the frequency range of 960 to 1215 MHz. The antenna is constructed of etched copper clad glass epoxy circuit board material etched to form a vertical dipole. The voltage standing wave ratio (VSWR) is less than 1.5:1 over the frequency range of 1030 to 1090 MHz. and is less than 2.0:1 over the range of 960 to 1215 MHz. There may be variations in VSWR due to installation variations. These frequency bands cover the DME band of 960 to 1215 and the two transponder operating frequencies of 1030 and 1090 Mhz. The antenna has been optimized for the 1030 to 1090 band and in this band the VSWR is normally less than 1.2:1. Because of the popularity of GPS and Loran DME is very seldom being installed these days.

3.0 INSTALLATION INSTRUCTIONS

3.1 COAXIAL CABLE. A length of coaxial cable is required for the flush mounted antennas . The coaxial cable is not supplied. RG-55 /U or any double shielded 50 ohm cable may be used for the installation. These cable has a stranded center conductor which contributes to a longer life in a high vibration aircraft environment. At these frequencies coaxial cable losses are considerably more than at VHF frequencies and a better cable might be considered for cable runs of more than 10-15 feet. Any other coaxial cable which has the same or better electrical characteristics and physical properties may be used. RG-55, RG-400, or RG-142 are all higher performance cables. All these cables are approximately 0.20 inches in diameter. A compatible coaxial connector will be required for the antenna and for the radio end of the cable also may be required though most modern radios have the coaxial cable soldered into the rear of the case. A check with the local electronics supply house should reveal all necessary information.

3.2 CABLE INSTALLATION. Run sufficient cable to reach from the radio equipment to the antenna location with enough excess cable at the antenna to secure the cable to the composite material along the cable route after passing through the cable clamp at the antenna. (Check the installation drawing.) Secure the cable as required to minimize cable movement . Try to maintain a cable bend radius of 2" or greater.

3.3 MOUNTING ANTENNA .

A. Wing Installation

1. When mounting the antenna in the wing you must have a vertical height of six inches and seven inches in the horizontal plane. Very good results have been obtained in canard type aircraft by mounting the antenna in the end of the strake though a location farther out in the wing would be better. Very near the tip would be best if you have enough wing depth. Try to keep away from large vertical conductive objects.

2. The area shown in the installation drawing may be used to mount brackets etc. or a foam block may be bonded to the antenna, then shaped to fit a rib etc. and then bond the foam to the rib or such. Make sure the antenna connector is positioned so that the cable will depart the antenna in the proper direction to the cabin area while not interfering with the antenna.

B. Fuselage Installation.

1. When mounting the antenna inside the fuselage it should be installed as far back in the tailcone as possible. This is to minimize the blockage from the engine, people, and cabin area stuff. If you have a ventral fin on your aircraft that would be ideal. Try to keep the antenna away from large vertical conductive objects.

2. Again bonding a foam block to the antenna and then forming the foam to fit the inside fuselage contour and then bonding into the tail cone would work well though as above brackets or other holding devices could be installed in the areas shown on the drawing. Do not use excessive amounts of bonding material.

3.4 CONNECTION OF CABLE TO ANTENNA. After installing the connector on the cable connect it to the antenna and route the cable toward the cabin securing the cable along the way with bonding strips, cable clamps or whatever it takes to keep the cable under control. Make sure connector is properly installed on cable with no shorts or opens.

3.5 FINAL ASSEMBLY. Before continuing check all steps and procedures contained herein and check all screws and connections for tightness. Make sure the coaxial cable runs as directly as possible to the radio without allowing the cable to droop or drape across the antenna and try to get the cable to lie smoothly for the entire run. (CHECK INSTALLATION DRAWING.) Fasten as required. Connect the antenna cable to the radio equipment in the aircraft; turn on the equipment; do a complete check out.

3.6 HINTS AND WORDS OF WISDOM. This antenna being vertically polarized will be minimally effected if at all by horizontal cables, rods or what have you. However all metal devices should be kept as far from the antenna as possible. Tiny ones are no problem. The cable run should ideally be as straight toward the cabin area with no droops or loops over the antenna elements which would tend to short the energy to ground. Connector installation instructions are being provided for those that will be helped by them.

NOTE

If this transponder antenna is being installed in the tail cone try to get the antenna as far aft and as low in the tail as possible to reduce the possibility of blockage by the engine, firewall and other metallic objects.

ANOTHER NOTE

If this antenna is being installed in a canard type aircraft the best results seem to be obtained with the antenna mounted in the outer end of the strake.

INSTALLATION DRAWING

