

Antenna Specification

Antenna Model: 97mm diameter air coil

Antenna Matching Host Device: RFA-682 Pet Containment Wireless

Manufacturer: Suga Electronics(Dongguan) CO., LTD.

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Transmitter Document
Version: V1.0

1. Overview

1.1 Purpose of Preparation

This specification defines and describes the magnetic field transmitting performance, mechanical structure, assembly requirements, operating environment and inspection criteria of the RFA-682 triaxial orthogonal magnetic field transmitting coil antenna. It serves as the official technical basis for antenna production, incoming material inspection, complete machine assembly and FCC certification testing.

1.2 Scope of Application

This triaxial orthogonal coil antenna is matched with the RFA-682 low-frequency magnetic field wireless containment transmitter. The equipment is applied to pet boundary isolation systems, which demarcate activity boundaries by emitting low-frequency alternating magnetic fields, and the matched wearable receiver worn by pets identifies relative positions. This antenna only radiates low-frequency magnetic field (H-field) and belongs to a near-field induction coil. Conventional RF antenna metrics such as antenna gain and far-field radiation indicators are not applicable.

1.3 Brief Description of Product Operating Principle

The antenna consists of three mutually perpendicular independent coils (X/Y/Z axes). The on-board ASIC chip generates three paths of phase-controlled 18.72 kHz PWM driving signals to drive the triaxial coils to simultaneously produce orthogonal alternating magnetic fields. The receiver collects the composite magnetic field signals of the three axes to judge whether it is inside or outside the containment boundary. The system adopts BPSK modulation and is equipped with a closed-loop current feedback circuit to ensure stable magnetic field intensity output from the coils.

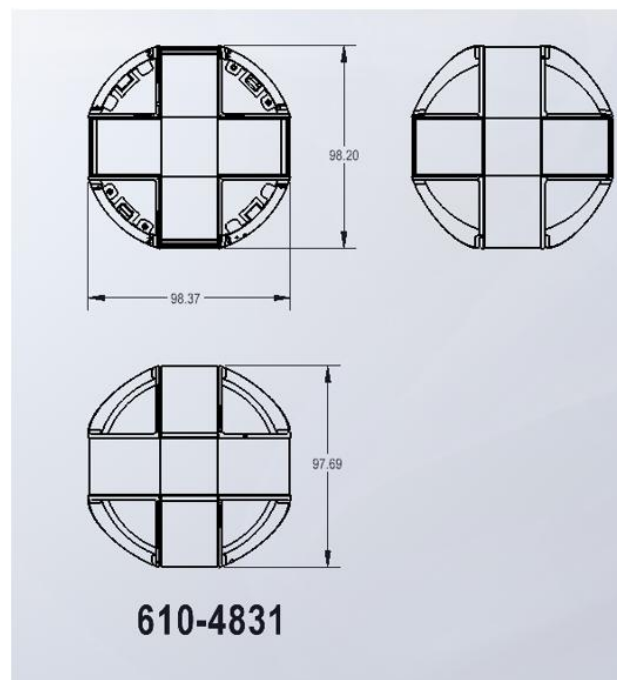
2. Structure & Dimensions

2.1 Structure Description

The antenna is integrally composed of X-axis coil, Y-axis coil, Z-axis coil, coil fixing frame and lead terminals:

1. Triaxial induction coils: Wound with multiple turns of enameled copper wire; the three sets of coils are assembled orthogonally perpendicular to each other.
2. Supporting frame: Integrally formed insulating flame-retardant plastic bracket, which limits and fixes the three sets of coils to ensure the 90° orthogonal angle of the three axes without offset.
3. Resonance matching components: Coupling capacitors and current-sense transformers are corresponding to each coil to form a single-channel LC resonant network.
4. Output leads: Each set of coils is independently led out with two wires, which are connected to the half-bridge drive output ports of the main board respectively.
5. Sampling components: Each coil channel is equipped with an independent current-sense transformer for closed-loop current feedback.

2.2 Structural Dimension Description



3. Bill of Materials

Component Name	Material Used	Material Standard / Performance Requirement
X/Y/Z Triaxial Winding Coils	Oxygen-free Copper Enameled Magnet Wire	High temperature resistant insulating layer, resistant to high-frequency alternating current, low risk of inter-turn short circuit
Coil Fixing Frame	Flame-retardant ABS Plastic	UL94-V0 flame retardant grade, non-magnetic insulation material

Component Name	Material Used	Material Standard / Performance Requirement
Resonance Coupling Capacitor	High-frequency Film Capacitor	to avoid magnetic field shielding Suitable for 18.72 kHz low-frequency resonance, low temperature drift
Current-sense Transformer	Manganese-Zinc Ferrite Core + Enameled Winding	High magnetic permeability core, high precision for low-frequency current sampling
Coil Lead Wires	High-temperature Resistant Multi-strand Insulated Wire	Good bending resistance, resistant to breakage after soldering
Insulating Auxiliary Materials	PET Insulating Tape	Isolate coils from metal housings to prevent electric leakage and short circuits

4. Installation Guidelines

4.1 Installation Position & Orientation

1. Install the entire antenna in the center of the inner cavity of the RFA-682 transmitter; avoid large-area metal shielding on the equipment housing.
2. Reserve a non-metallic buffer area around the installation position. Metal housings and metal brackets will shield low-frequency magnetic fields and greatly reduce the effective containment range.
3. Ensure the orthogonal angle of the triaxial coils does not deform during assembly; fully fasten the frame buckles to prevent displacement caused by vibration during transportation.