tailBeaconX-EXP MODE S ADS-B transponder

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Overview

tailBeaconX-EXP is a Mode S Extended Squitter (ES) ADS-B OUT transponder, integrated with an internal WAAS GPS into a LED rear position light. tailBeaconX-EXP is a complete system designed to meet the transponder and ADS-B requirements for operating in controlled airspace worldwide, while minimizing installation costs.

Features

Mode S Transponder

- Meets the performance requirements od TSO-C112e Class 1, Level2els

1090 ES ADS-B Transmitter

- Meets the performance requirements of TSO-C166b Class B1S

WAAS GPS

- Meets the performance requirements of TSO-C145e Class Beta-1
- Integrated RAIM processor for Security and Integrity protection
- SBAS corrections and health messages used to detect and correct satellite range errors
- Satellite pseudorange step errors detected and excluded
- SBAS fast and long-term corrections applied

LED Position Light

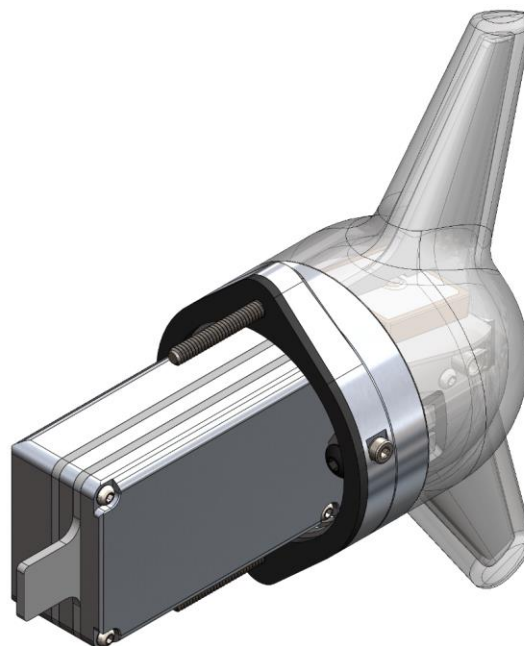- Meets the performance requirements of TSO-C30c

PC configurable over WiFI

Control Interface

- uAvionix transponder control head or compatible EFIS
- Powerline modem or RS232

U.S. Patents Pending

FCC ID: 2AFFTP200S

Contains FCC ID: 2AC7Z-ESPWROOM02U

Technical Specifications

Specification	Value
Input Voltage	11-31V DC
Operating Power	3Watts
Size	113x105x48mm
Weight	90grams
SDA/SIL	2/3
Operating Temp	-45 to 70°C
1090ES ADS-B Transmitter	
Power Classification	250Watts Nominal
WAAS GPS	
Tracking Reacquisition Cold Start	-166dBm -160dBm -148dBm
LED Position Light	
Color	Aviation White
Intensity	20 candelas
Control Head	
Physical	RS232 or Power Line Modem
Protocol	UCP

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Mechanical Specification
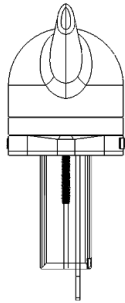
Wire Color	Connection
RED	Aircraft Power
BLACK	Aircraft Ground
GREY	TXD Output
ORANGE	RXD Input
WHITE	Suppression Input
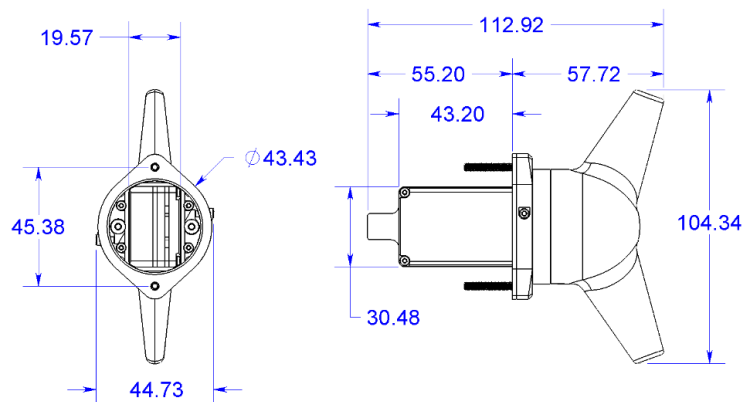
Mounting Template

FITS #4 OR #6 SCREWS
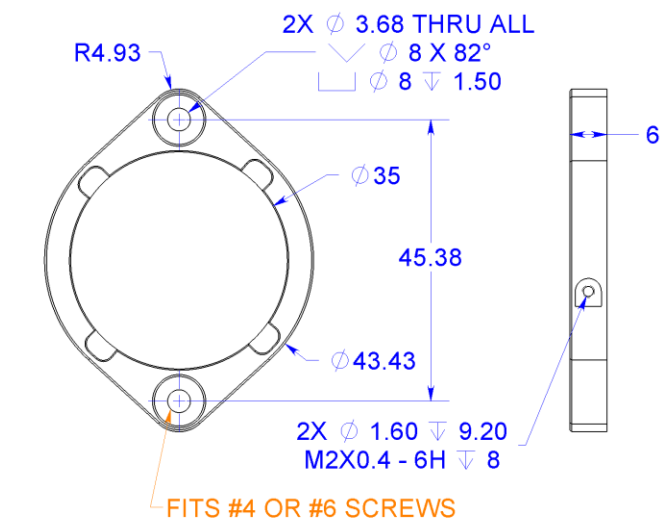
MOUNTING PLATE CAN BE INSTALLED WITH SCREWS
IN HORIZONTAL OR VERTICAL ORIENTATION

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AV-10 Control Head
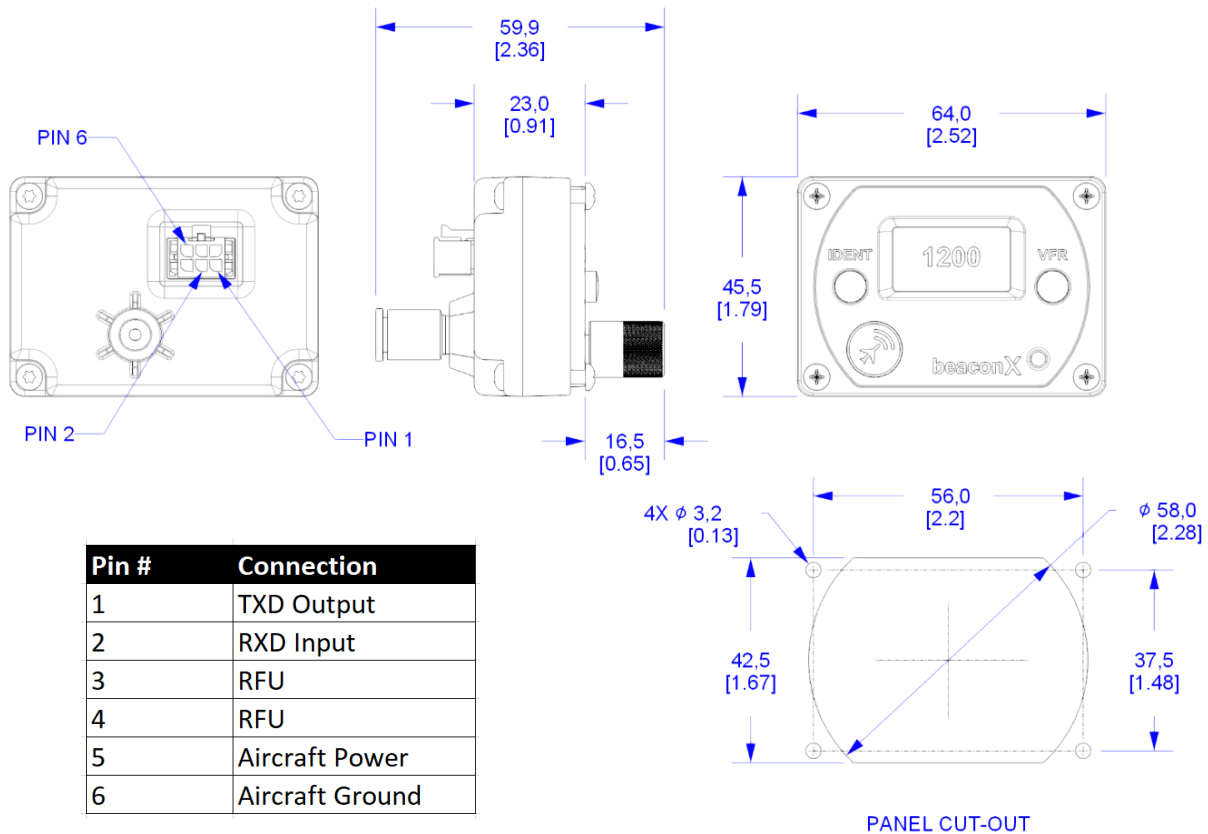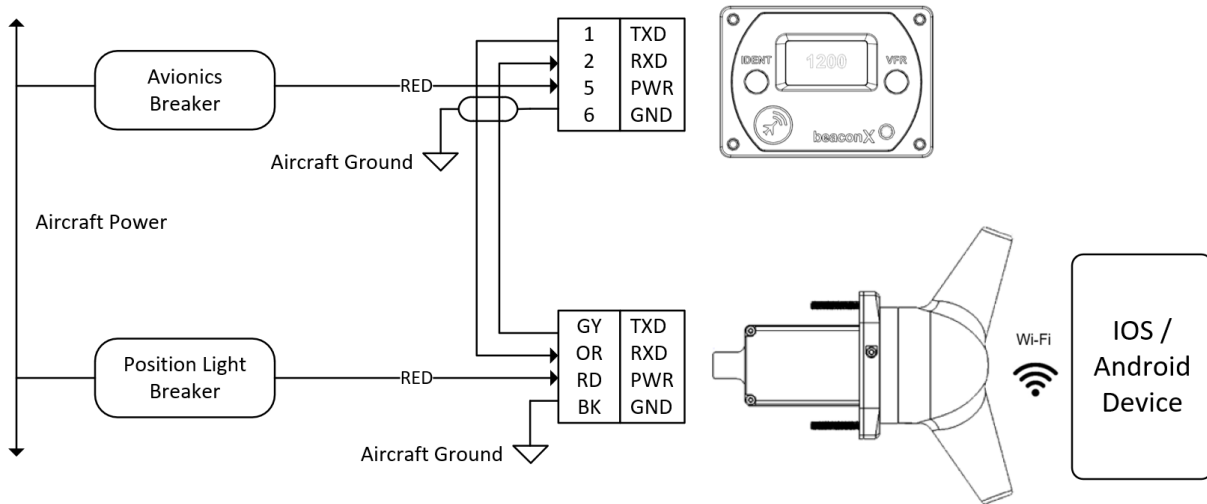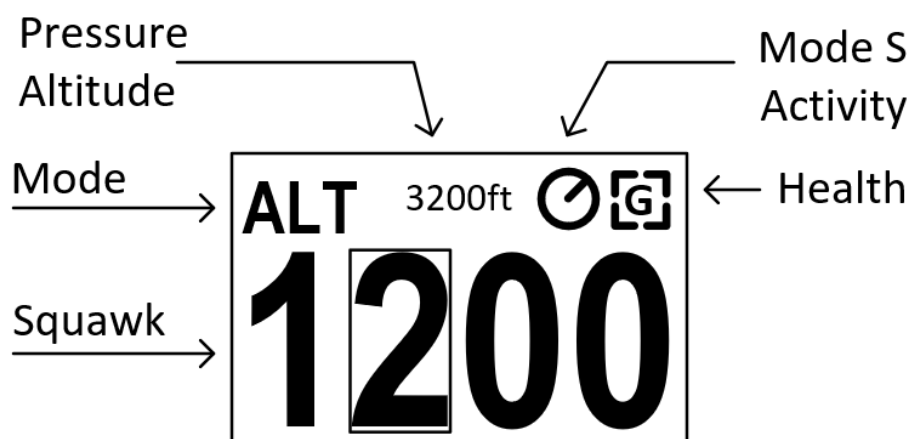
Pin #	Connection
1	TXD Output
2	RXD Input
3	RFU
4	RFU
5	Aircraft Power
6	Aircraft Ground

Control Head Operation

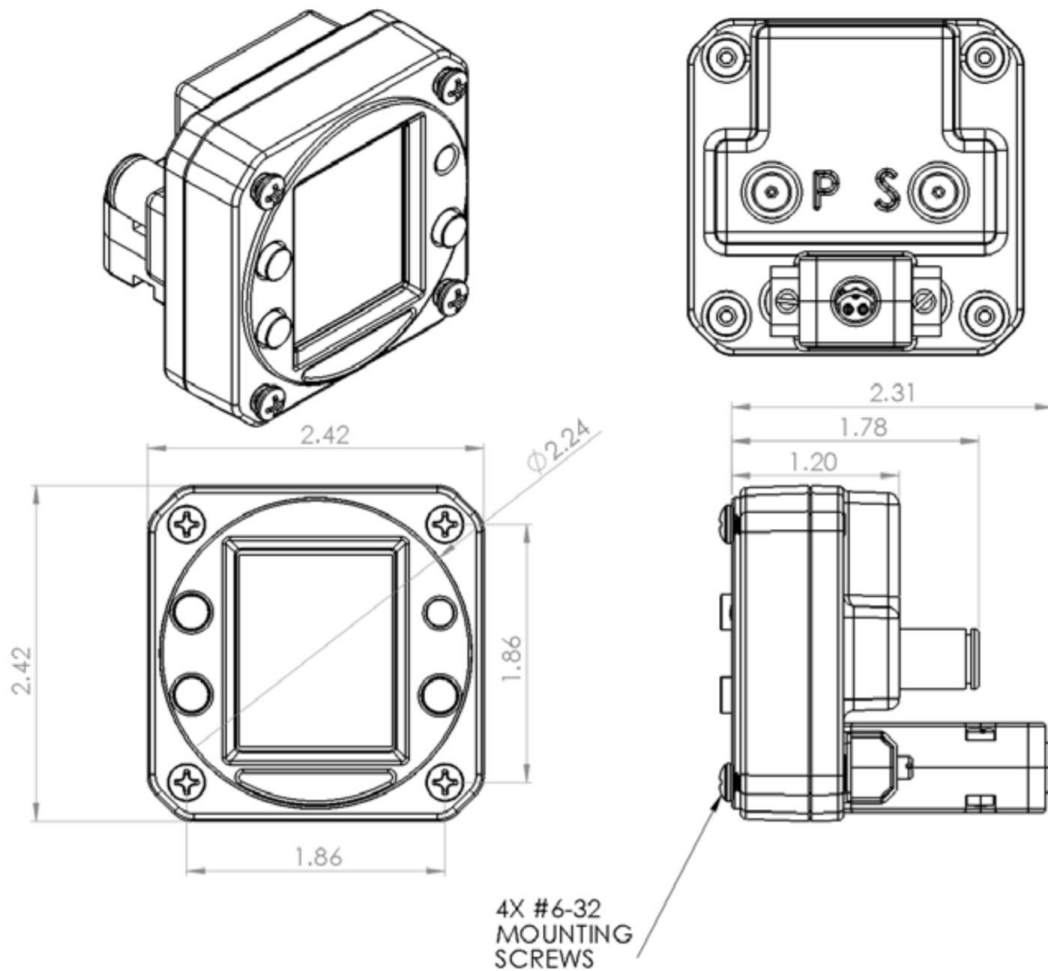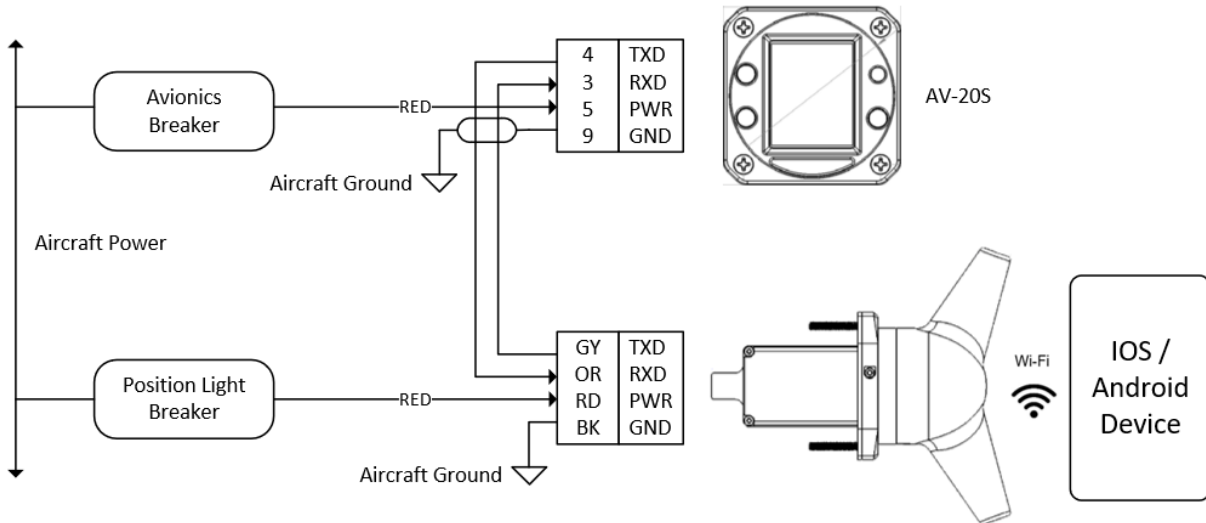| MODE	STBY	**Standby and Programming Mode**
	ON	**ADS-B and Mode S Active, altitude (Mode C) reporting disabled**
	ALT	**ADS-B and Mode S Active, altitude reporting** enabled
	ADSB	**Mode S disabled, ADS-B active (Development Only)**
Mode S Activity	◔	**Flashing – Mode S activity**
Health	⇅	**Flashing – Communications Healthy**
	[G]	**Flashing – Communications Healthy and GPS locked**

VFR Button Operation
When the VFR button is pressed the squawk code returns to 1200.

IDENT Button Operation
When the IDENT button is pressed, the squawk code field inverts during the IDENT transmission interval.

AV-20E Control Head

4	TXD
3	RXD
5	PWR
9	GND

AV-20S

GY	TXD
OR	RXD
RD	PWR
BK	GND

Avionics Breaker — RED

Aircraft Ground

Aircraft Power

Position Light Breaker — RED

Aircraft Ground

Wi-Fi

IOS / Android Device

2.42

Ø2.24

2.42

1.86

1.86

2.31

1.78

1.20

4X #6-32 MOUNTING SCREWS

P S

Pin #	Connection
1	OAT PWR
2	UAT IN
3	RXD
4	TXD
5	PWR
6	OAT IN
7	AUDIO +
8	AUDIO G
9	GND

Control Head Operation
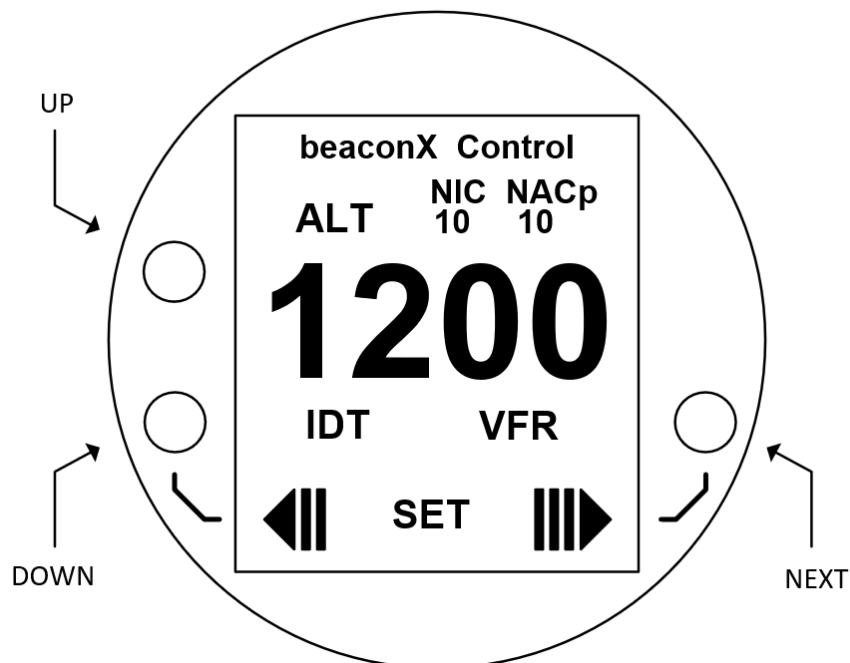
MODE	STBY	Standby and Programming Mode
	ON	ADS-B and Mode S Active, altitude (Mode C) reporting disabled
	ALT	ADS-B and Mode S Active, altitude reporting enabled
GPS Health	NIC	Navigation Integrity
	NACp	Navigation Accuracy
Ident	IDT	Activates IDENT
Reset Squawk	VFR	Returns the SQUAWK code to VFR (1200)

AV-30E Control Head

5	TXD	
4	RXD	
1	PWR	
9	GND	

Avionics Breaker — RED —

Aircraft Ground

Aircraft Power

AV-30

GY	TXD	
OR	RXD	
RD	PWR	
BK	GND	

Position Light Breaker — RED —

Aircraft Ground

Wi-Fi

IOS / Android Device

P   S

2.35
1.56
0.85

3.38
3.38
⌀ 3.10
2.48
2.48
2.97
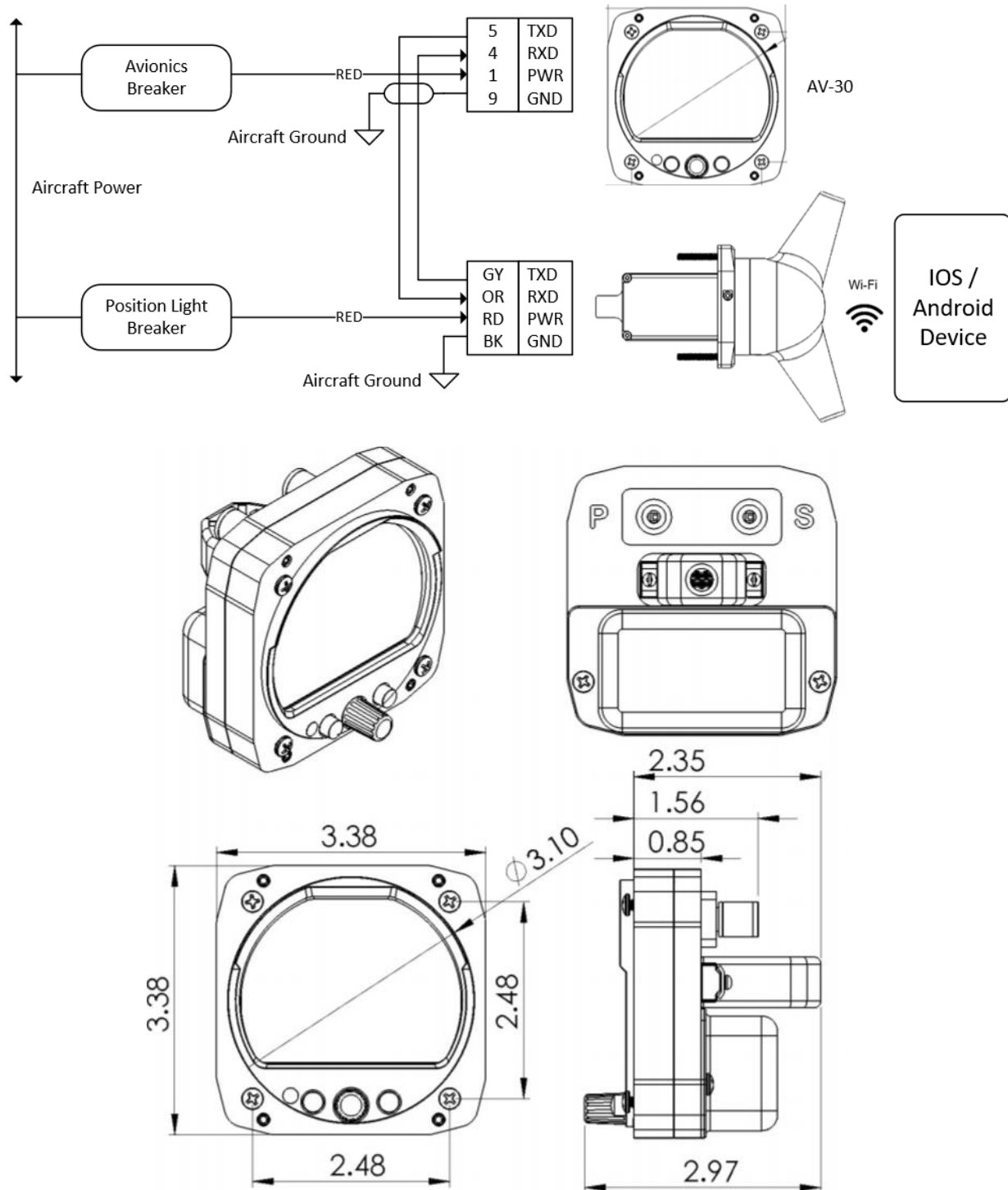
Pin #	Connection
1	PWR
2	GPS RX
3	Spare Serial TX
4	BeaconX RX
5	BeaconX TX
6	Spare Serial RX
7	OAT Supply
8	Mfg Serial RX
9	GND
10	Aux PWR Ret
11	Audio H
12	Audio L
13	Aux PWR Out
14	OAT Return
15	Mfg Serial TX

BEACON X

SQWK
1200

MODE
ALT

IDENT
- - -

STAT

IDENT

SQUAWK

MODE /
VFR

MODE	STBY	Standby and Programming Mode
	ON	ADS-B and Mode S Active, altitude (Mode C) reporting disabled
	ALT	ADS-B and Mode S Active, altitude reporting enabled
GPS Health	NIC	Navigation Integrity
	NACp	Navigation Accuracy
Ident	LEFT BTN	Activates IDENT
Reset Squawk	RIGHT BTN	Returns the SQUAWK code to VFR (1200)

Operating Limitations

The conditions and tests required for STC approval of tailBeaconX-EXP are minimum performance standards. The installer must determine if the conditions are appropriate for installation on a specific aircraft.

Continued Airworthiness

There is no requirement for periodic service, inspection or preventative maintenance for continued airworthiness of tailBeaconX-EXP.

U.S. 2020 Regulatory Compliance

tailBeaconX-EXP meets the Minimum Operational Performance Standards of DO-260B Class B1S, and meets the performance requirements of DO-181E Class 1 Level 2els. When installed in accordance with the installation instructions of this guide, the device complies with the aircraft requirements of 14 CFR 91.227.

Environmental Specifications

Conditions	DO-160G Section	Description of Conducted Tests
Temperature and Altitude	4.0	Equipment tested to Category B2
Low temperature ground survival	4.5.1	-55°C
Low Temperature Short-Time Operating	4.5.1	-45°C
Low Temperature Operating	4.5.2	-45°C
High Temperature Operating	4.5.4	+70°C
High Temperature Short-Time Operating	4.5.3	+70°C
High Temperature Ground Survival	4.5.3	+85°C
Loss of Cooling	4.5.5	Cooling air not required (+70°C operating without cooling)
Altitude	4.6.1	25,000feet
Decompression	4.6.2	Equipment identified as Category B2 – no test
Overpressure	4.6.3	Equipment identified as Category B2 – no test
Temperature Variation	5.0	Equipment tested to Category A
Humidity	6.0	Equipment tested to Category C
Operation Shocks	7.2	Equipment tested to Category B
Crash Safety	7.3	Equipment tested to Category B type 5
Vibration	8.0	Aircraft zone 5: type 4 (Multi Engine) to Category S level L, type 5 (Single Engine) to Category S level M Aircraft zone 3: type 1 (Helicopters) to Category U level H
Explosion	9.0	Equipment identified as Category X – no test
Waterproofness	10.0	Equipment identified as Category S
Fluids Susceptibility	11.0	Equipment identified as Category X – no test
Sand and Dust	12.0	Equipment identified as Category S
Fungus	13.0	Equipment identified as Category X – no test
Salt Spray	14.0	Equipment identified as Category S
Magnetic Field	15.0	Equipment identified as Category B
Power Input	16.0	Equipment identified as Category BX
Voltage Spike	17.0	Equipment identified as Category B
AF Conducted Susceptibility	18.0	Equipment identified as Category B
Induced Signal Susceptibility	19.0	Equipment identified as Category AC
RF Susceptibility	20.0	Equipment identified as Category TT
RF Emissions	21.0	Equipment identified as Category B
Lightening Induced Transient Susceptibility	22.0	Equipment identified as Category XXXX – no test
Lightening Direct Effects	23.0	Equipment identified as Category X – no test
Icing	24.0	Equipment identified as Category X – no test
Electrostatic Discharge	25.0	Equipment identified as Category X – no test
Fire, Flammability	26.0	Equipment identified as Category C

Installation Procedures

tailBeaconX-EXP is rear position light. The assembly should be mounted as far outboard on the aircraft as practical, parallel to the vertical and horizontal centerlines of the aircraft. Ensure that when mounted, the antenna fin is oriented vertically. The top of the assembly should be free from obstructions.

IOS / Android Configuration Utility

Download the "uAvionix skyBeacon Installer" app from the iOS App Store or Google Play Store. Note: DO NOT use the "uAvionix Ping Installer" or "uAvionix Echo Installer" apps. The app will guide you through the configuration process. STBY mode must be selected on the control head to enable configuration.
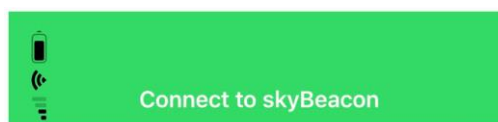
Connect

Launch the "skyBeacon Installer" app and follow instructions to connect to the tailBeaconX for configuration.

The SSID of the tailBeaconX is in the form Beacon-xxxx, for example Beacon-7782.

The tailBeaconX Wi-Fi connection is secure. [The WPA2 passphrase is written on an inclusion in your package, and should be entered exactly as printed. WPA2 passphrases are case sensitive. Keep the inclusion containing Wi-Fi information in a safe place, preferably with your aircraft records.] Note - Beta tailBeaconX systems are shipped without a WiFi password.

Connect to skyBeacon

⏻ Turn on power to your skyBeacon

📶 Connect to the skyBeacon Wi-Fi network

1. Open iOS Settings
2. Select Wi-Fi
3. Select Beacon-xxxx and enter passphrase included with device
4. Wait for a check mark to appear next to Beacon Wi-Fi

Wi-Fi	🟢
✓ Beacon-3559	🔒 📶 ⓘ
No Internet Connection	

Note: iOS may indicate "No Internet Connection". This is normal.

👍 Return to this app to continue

Configure

The configure screen provides all configuration options.

Call Sign:
The CALL SIGN can be up to an 8-digit code that corresponds to the tail number of the aircraft. (0-9, A-Z). Note: This is typically your aircraft N-number (e.g. N8644B), unless otherwise advised by the FAA or ATC.

ICAO Number:
The ICAO address is a 24-bit number issued to the aircraft by the registration authority of the aircraft. These addresses are usually written as a 6-digit hexadecimal number.

Maximum Aircraft Speed (knots):
Mode S transponders can transmit their maximum airspeed characteristics to aircraft equipped with TCAS. This information is used to identify threats and to plan avoiding action by the TCAS equipped aircraft. The airspeeds are grouped in ranges.

Vso (knots):
This parameter allows tailBeacon to automatically switch between airborne and ground modes and should be set to the aircraft stall speed.

ADS-B In Capability:
Sets the ADS-B In equipment capability reporting. This is used to indicate the existing aircraft configuration. Tap "Update" when complete.

Emitter Type:
To assist ATC tracking of aircraft, an aircraft category can be transmitted. Select the aircraft category that most closely matches the aircraft.

Aircraft Length:
Enter the aircraft Length in Meters. Aircraft Width: Enter the aircraft width in Meters.

GPS Antenna Offset (Lateral):
Enter the position of tailBeacon relative to the center of the aircraft Roll axis in Meters.

GPS Antenna Offset (Longitudinal):
Enter the position of tailBeacon relative to the nose of the aircraft in Meters. Transponder Monitor Threshold: Adjust this value only if experiencing difficulties with the transponder monitor (squawk and barometric altitude) function, and at the direction of uAvionix Support. Tap "Update" when complete.

Post Installation Checks

Configure tailBeaconX before performing system checkouts.
Tab to the "Monitor" screen on the Installer App.

Verify that Status is listed as "OK".

Verify that the Call Sign matches your aircraft's
N-number (including the 'N').

Verify that the ICAO number is correct as
entered.