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# **E-TX-21-0014 Rev IR**

## **Installation Manual**

### **TXA201 Triaxial Accelerometer**

**Texas Aerospace P/N TA20001-00**  
**Peregrine P/N PA-210618-801**

#### **REVISION STATUS**

Rev.	Description	Approved	Date
IR	Initial Release	T. Bailey	7/7/22

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**Acronyms and Abbreviations**

<b>Acronym/Abbreviation</b>	<b>Definition</b>
AC	Advisory Circular
AML	Approved Model List
ARINC	Aeronautical Radio, Incorporated
ATP	Acceptance Test Plan
ATR	Acceptance Test Report
CG	Center of Gravity
DC	Direct Current
DO	Document Order
EQ	Equipment Qualification
ESD	Electro-Static Discharge
FAA	Federal Aviation Administration
FDR	Flight Data Recorder
FSO	Full Scale Offset
MDL	Master Document List
MEMS	Micro-Electromechanical System
MPS	Minimum Performance Standards
mV	Millivolts
N/A	Not Applicable
PCB	Printed Circuit Board
RF	Radiated Fields
RTCA	Radio Technical Commission for Aeronautics
STC	Supplemental Type Certificate
TSO	Technical Standard Order
TSOA	Technical Standard Order Authorization

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# 1 GENERAL

## 1.1 Purpose

This manual provides Installation Instructions for the TXA201 Triaxial Accelerometer, including information on mounting, testing, and physical and electrical interfaces.

The TXA201 measures accelerations along the longitudinal, lateral and vertical axes of the aircraft. It does not measure angular acceleration rates.

The unit is designed to meet ARINC 542A mounting specifications and is sealed to prevent moisture incursion.

This accelerometer may be utilized as an input to flight data recorder (FDR) systems such as the Curtiss Wright Fortress Recorder.

The accelerometer utilizes a micro-electromechanical system (MEMS) device that converts gravitational and inertial forces into an analog direct-current (DC) voltage output for each of the three axes (vertical, longitudinal, and lateral). The equipment includes a voltage regulator to provide a controlled input to the device and circuitry to scale the output of the device to match the range expected by the FDR.



**Figure 1: TXA201 Triaxial Accelerometer**

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## 1.2 CAUTION

The TXA201 Triaxial Accelerometer can be damaged by static electricity. Observe ESD (electrostatic discharge) procedures when handling the unit.

Verify that power and ground leads are terminated correctly in the mating connector before applying power to the unit. Damage to the internal components may occur if power is applied incorrectly.

Cap the electrical connector when the accelerometer is disconnected or not installed.

Failure to follow these precautions may void the equipment warranty.

## 1.3 IDENTIFICATION

1.3.1 Texas Aerospace Part Number: TA20001-00

1.3.2 Peregrine Part Number: PA-210618-801

1.3.3 Placard

An identifying placard is affixed to the accelerometer prior to delivery. The placard includes a serial number of the format "0000" with the serial number of the first unit being 1001.

The placard also serves as an anti-tamper device. The placard is installed over one of the assembly screws. Removing or damaging the placard to access the screw will void the equipment warranty.

## 2 EQUIPMENT DETAILS

### 2.1 Mechanical

2.1.1 Mounting

The TXA201 is designed to meet ARINC 542A mounting specifications and attaches with four (4) #10 Pan Head Steel Fasteners. This equipment may be installed in a compartment that is non-pressurized and not temperature-controlled.

2.1.2 Alignment

The unit should be mounted with base of the accelerometer facing down on flat and level (within 4 degrees), rigid aircraft structure. Shock mounts or vibration dampeners should not be used when mounting this unit. Ensure the alignment notch (R.20 in Figure 3 below) is facing forward. Verify alignment using the arrows on the identification placard.

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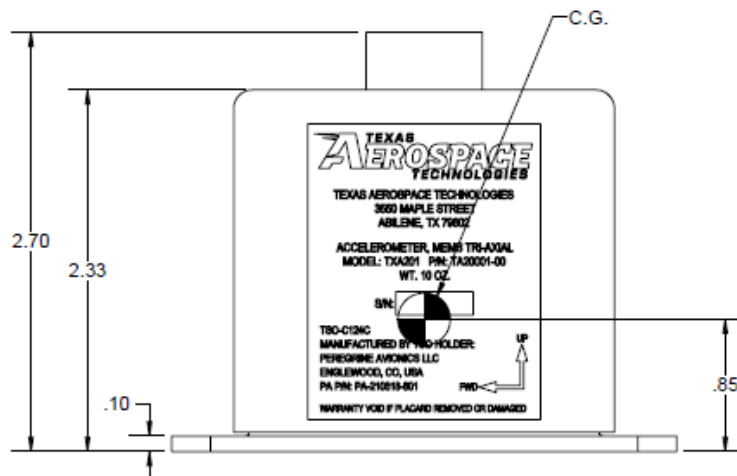
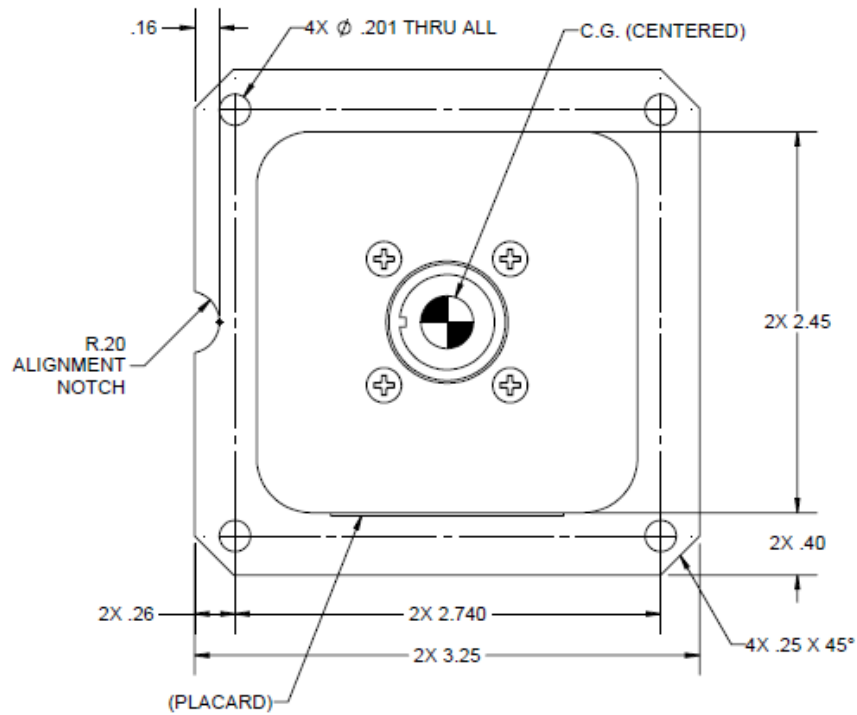
### 2.1.3 Location

The accelerometer should be mounted within 12 feet longitudinally and 6 feet laterally of the aircraft center of gravity to avoid erroneous readings due to aircraft rotational maneuvers.

2.1.4 Weight: 10 Oz.

2.1.5 Center of Gravity: See Figure 3 below

### 2.1.6 Dimensions



ALL DIMENSIONS REFERENCE ONLY

**Figure 2: TXA201 Dimensions**

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## 2.2 Electrical

### 2.2.1 Electrical Pin Configuration

A	+EXCITATION (Power)	B	-EXCITATION (Ground)
C	+VERTICAL UP	D	-VERTICAL DOWN
E	+LATERAL RIGHT	F	-LATERAL LEFT
G	+LONGITUDINAL FORWARD	H	-LONGITUDINAL AFT
J	+CASE GROUND	K	-SPARE

### 2.2.2 Electrical Signals

Range:

UP	+6g	5000mV
DOWN	-3g	200mV
FWD	+1g	5000mV
AFT	-1g	200mV
RIGHT	+1g	5000mV
LEFT	-1g	200mV

Axial Null:

VERTICAL	1800 mV
LONGITUDINAL	2600 mV
LATERAL	2600 mV

Excitation: 18 TO 32 VDC (28 VDC nominal)

Supply Current: <30 mA 32 VDC Excitation

Output: 5.0 VDC max

Accuracy: 0.05g (X and Y axis), 0.45g (Z axis)

Resolution: 0.004g, all axes

Bonding: Electrical bonding of the accelerometer housing to aircraft structure is not required.

### 2.2.3 Connectors

Accelerometer Connector: MS3113E12-10P

Mating Connector: MS3116E12-10S

### 2.2.4 Hardware and Software

The accelerometer includes no software or complex hardware.

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### 3 EQUIPMENT QUALIFICATION

#### 3.1 TSO

The TXA201 triaxial accelerometer meets TSO-C124c requirements and is intended to provide data to a flight data recorder (FDR) at a rate and accuracy that is compatible with the FDR.

#### 3.2 Application

The TXA201 is designed to provide accelerometer inputs for digital flight data recording equipment.

#### 3.3 Environmental

The accelerometer is environmentally qualified for aircraft applications per RTCA DO-160G testing as shown in Table 3. The environmental qualification categories shown support typical installations in Part 25 aircraft models.

**Table 1: Environmental Qualifications**

DO-160G Testing Summary		
Conditions	Section	Description of Tests Conducted
Temperature and Altitude	4.0	Equipment tested to Category F2
Low Temperature	4.5.1	
High Temperature	4.5.2 & 4.5.3	
In-Flight Loss of Cooling	4.5.4	
Altitude	4.6.1	
Decompression	4.6.2	
Overpressure	4.6.3	
Temperature Variation	5.0	Equipment tested to Category B.
Humidity	6.0	Equipment tested to Category B.
Operational Shock and Crash Safety	7.0	Equipment tested to Category B.
Vibration	8.0	Equipment tested to Category S and H, aircraft zone 1 for fixed wing aircraft fuselage using vibration test curves C3 and R.
Explosive Atmosphere	9.0	Equipment identified as Category X (no test)
Waterproofness	10.0	Equipment tested to Category W.
Fluids Susceptibility	11.0	Equipment identified as Category X (no test)
Sand and Dust	12.0	Equipment identified as Category X (no test)
Fungus	13.0	Equipment identified as Category X (no test)
Salt Fog Test	14.0	Equipment identified as Category X (no test)
Magnetic Effect	15.0	Equipment is Category Z.
Power Input	16.0	Equipment tested to Category A.
Voltage Spike	17.0	Equipment tested to Category B.
Audio Frequency Susceptibility	18.0	Equipment tested to Category B.
Induced Signal Susceptibility	19.0	Equipment tested to Category ZC.
Radio Frequency Susceptibility	20.0	Equipment tested for conducted susceptibility to Category T and for radiated susceptibility to Category T.
Radio Frequency Emission	21.0	Equipment tested to Category L.
Lightning Induced Transient Susceptibility	22.0	Equipment identified as Category X (no test)
Lightning 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 tested to Category A.
Fire, Flammability	26.0	Equipment identified as Category X (no test)



### 3.4 Installation Approval

The TXA201 Triaxial Accelerometer requires FAA approval for installation on an N-registered, type-certificated aircraft. Installation is not authorized by this manual.

## 4 TESTING

### 4.1 Fault Indication

This accelerometer does not include any fault indication features.

### 4.2 Pre-Installation Check

Each accelerometer completes an acceptance test prior to delivery. Unless damage during shipment or storage is suspected, a pre-installation test should not be required.

### 4.3 Functional Test Procedure

If damage or troubleshooting suggests that the performance of the accelerometer may be suspect, a function test may be performed using the following procedure:

#### 4.3.1 Requirements

- 28VDC Power Supply
- DC Voltmeter
- Tooling, fixtures, or other items that will allow the accelerometer to be rested on each of its six faces in a flat and level orientation.
- A test harness may be constructed to interface with the pinouts listed in Section 2.2.1

4.3.2 Connect the accelerometer to power and ground and connect to the output pins as shown in Section 2.2.1

4.3.3 Place the accelerometer flat and level on each of its six sides as shown in Table 2 below.

4.3.4 Record the voltage output on the pins indicated in Table 4 and ensure they are within the listed range.

4.3.5 Repeat the test for the remaining positions of the accelerometer.

4.3.6 If any recorded voltages are out of range, please see the contact information listed in Section 6.

### 4.4 Post-Installation Check

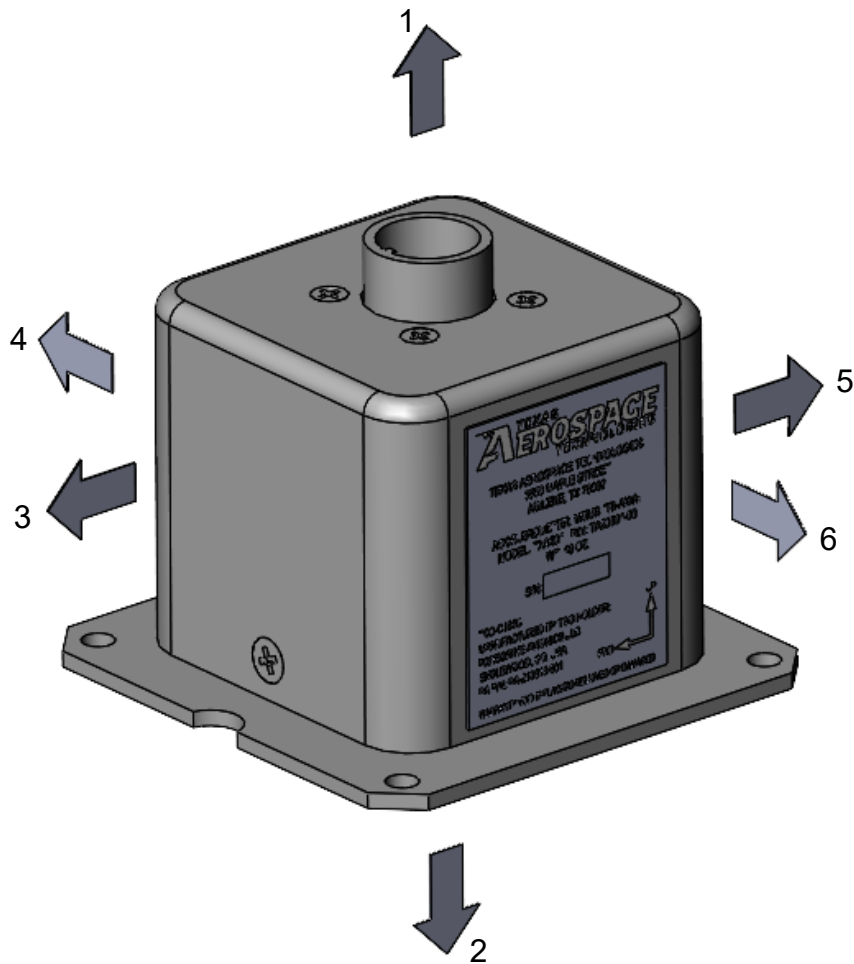
After installation, the accelerometer data provided to the receiving FDR or other equipment should be verified using a compatible data download and analysis tool

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such as the DART data analysis device from KGB Aviation or other services. Verify that the accelerometer data is properly received and is within expected parameters.

**Table 2: Test Orientations and Outputs**

Axis	Orientation (Position Arrow # "UP")	Gravity	Output and Range
Vertical	3	0g	Pin C: 1.800 +/- .0036 VDC
	1	+1g	Pin C: 2.333 +/- .0036 VDC
	2	-1g	Pin C: 1.267 +/- .0036 VDC
Lateral	1	0g	Pin E: 2.600 +/- .0036 VDC
	4	+1g	Pin E: 5.000 +/- .0036 VDC
	6	-1g	Pin E: 0.200 +/- .0036 VDC
Longitudinal	1	0g	Pin G: 2.600 +/- .0036 VDC
	3	+1g	Pin G: 5.000 +/- .0036 VDC
	5	-1g	Pin G: 0.200 +/- .0036 VDC



## 5 MAINTENANCE

### 5.1 Maintenance and Calibration

The TXA201 Triaxial Accelerometer does not require maintenance or calibration.

### 5.2 Cleaning

The unit may be cleaned with Isopropyl Alcohol and a cotton cloth or swabs. A soft bristled brush may also be used.

### 5.3 Repair

The TXA201 Accelerometer contains no user-serviceable parts and is not designed to be adjusted or repaired by field personnel. Return units that fail the Functional Test Procedure per the contact information shown in Section 6 for evaluation.

## 6 CONTACT

If you have questions, please contact:

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Abilene, TX 79602-7130

325-788-2418

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