

g AAA215/220 SERIES

DC-Operated, Gravity-Referenced Servo Accelerometers

FEATURES

- Available in ranges from $\pm 1g$ to $\pm 20g$
- High resolution down to 0.05 mg
- Closed loop force balance system
- Flight qualified versions available
- Self-Test facility
- DC Input – DC Output
- Manufactured to AS9100C and ISO 9001:2008 standards
- 1g bias option to compensate for earth's gravity (AAA220 only)

APPLICATIONS

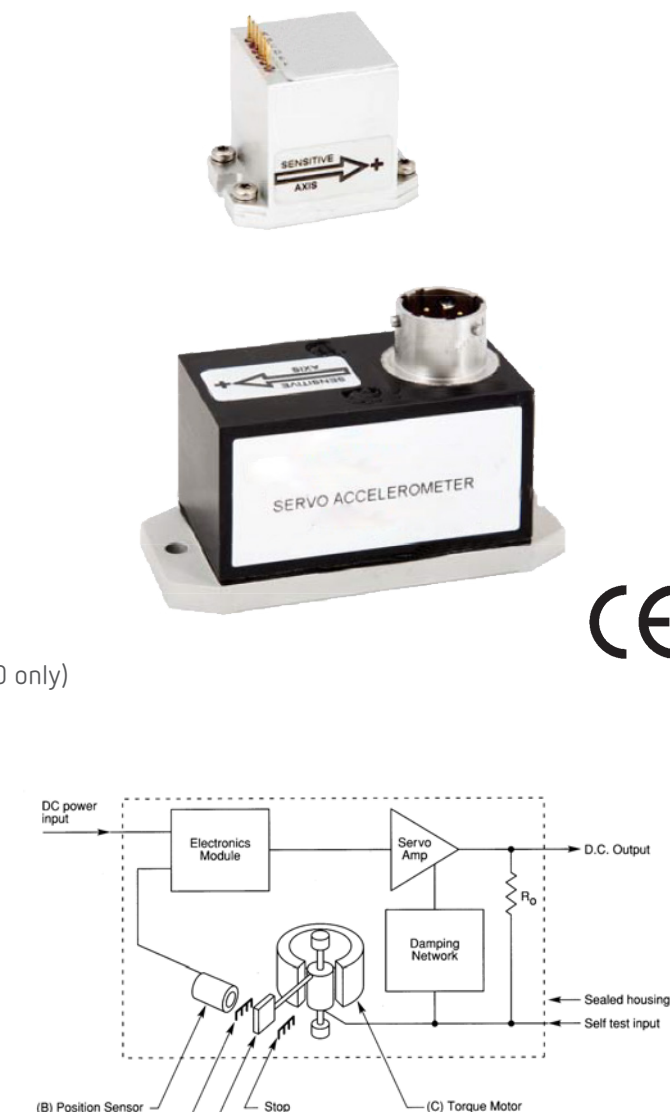
- Flight test monitoring
- Accident data collection
- Structural health monitoring
- Flight simulators
- Braking control in mass transit systems
- Road bed analysis
- Data acquisition systems
- Low frequency analysis

INTRODUCTION

The Sensors range of Servo Accelerometers measure vector acceleration with high accuracy using a closed loop force balance torquer mechanism.

All AAA200 Series Accelerometers operate as a closed-loop torque balance servo system. Referring to the illustration below, the pendulous mass 'A' develops a torque proportional to the product of its mass unbalance and the applied acceleration.

The movement of mass 'A' is detected by position sensor 'B' whose output signal is connected to a servo amplifier. The resulting current is fed into the torquer motor 'C' which then develops a torque exactly equal to, but



directly opposed to the initial torque from the pendulous mass 'A'. Mass 'A' stops moving, assuming a position minutely differing from its zero 'g' position. Simultaneously, the current to the torquer motor is fed through a stable resistor to provide an output voltage proportional to the applied acceleration. The system is electronically damped by means of a phase advancing network within the integrated servo amplifier. By adjusting the parameters of the servo amplifier and related electronic networks, the operating characteristics of a servo accelerometer can be optimised to suit a particular application.

In addition to the instruments offered in this bulletin, Althen Sensors design custom accelerometers for specific applications, often manufactured and tested to conform to exacting military standards.



SPECIFICATIONS

Environmental Characteristics

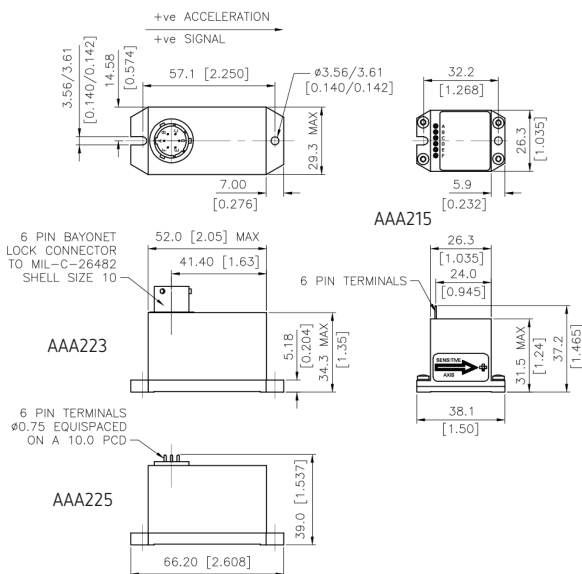
Operating Temperature Range	°C (°F)	-55 to +95 (-67 to 203)
Survival Temperature Range	°C (°F)	- 65 to 105 (-85 to 221)
Constant Acceleration	g	100g in all 3 axes without damage
Shock		100g, 11ms ½ sine
Altitude	m (ft)	30,000 (98,400)
Environmental Sealing		IP65
EMC Directive		EN61326: 1998
EMC Emissions		EN55022: 1998
EMC Immunity		EN61000-4-2 inc A1: 1998 & A2: 2001
		EN61000-4-3: 2002
		EN61000-4-4: 2004
		EN61000-4-6: 1996 inc A1: 2001
		EN61000-4-8: 1994 inc A1: 2001

Specifications by Range @ +25°C (+77°F)

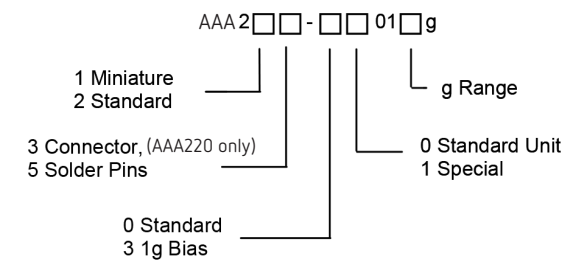
		± 1g	± 2g	± 5g	± 10g	± 20g
Excitation Voltage	Volts dc			± 15 (± 10%)		
Current Consumption	mA			<± 15		
Full Range Output (FRO) (see note 1)	Volts dc			± 5		
Output Standardisation	% FRO			± 1		
Output Impedance	Ω (nom)	5000	2500	5000	2500	5000
Output Noise (DC to 10kHz)	V rms			< 0.005		
Non-linearity (see note 2)	% FRO (max)	± 0.05	± 0.05	± 0.05	± 0.05	± 0.10
Hysteresis	% FRO (max)			0.02		
Resolution	% FRO (max)			0.0005		
Natural Frequency	Hz(min)	90	100	115	130	150
Sensitive Axis-to-Case Misalignment	deg			< ± 0.2		
Cross-axis Sensitivity (see note 3)	% FRO (max)	± 0.2	± 0.2	± 0.2	± 0.2	± 0.5
Zero Offset (see note 4)	% FRO			< ± 0.1		
Damping Ratio				0.6 ± 0.1		
Insulation Resistance	MΩ @ 50 Volts dc			≥ 20		
Thermal Zero Shift	%FRO/°C (%FRO/°F) (max)			≤ ± 0.002 (0.004)		
Thermal Sensitivity Shift	%Reading/°C (%Reading/°F)(max)			≤ ± 0.02 (0.04)		
Weight	Grams (ozs)			57 (2) A215; 115 (4.1) A220		

Notes

1. Full Range Output (FRO) is defined as the full acceleration excursion from positive to negative, i.e. ± 2g = 4g
2. Non-linearity is determined by the method of least squares
3. Cross-axis sensitivity is the output of unit when subjected to full range acceleration in cross-axis
4. Zero offset is specified under static conditions with no vibration inputs



MODEL DESIGNATION & ORDERING CODE



Specify Mating Connector 3CON-0009 if required (AAA220 only)

Electrical Connections

- Pin A +15V dc excitation
- Pin B 0V dc excitation/output
- Pin C -15V dc excitation
- Pin D ±5V dc output
- Pin E Not Connected
- Pin F Self Test