

A215/A220 Series

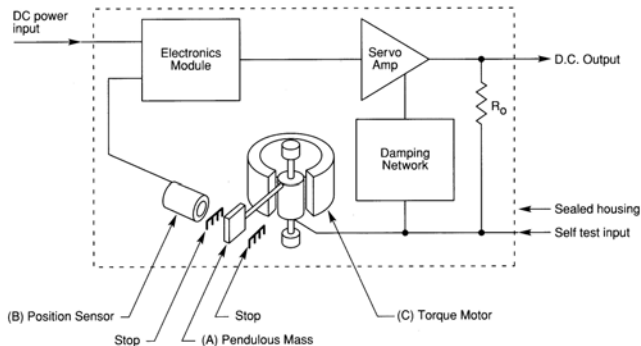
Gravity Referenced Linear Servo Accelerometers


Sherborne Sensors
... the first choice in precision

Introduction

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

All A200 Series Accelerometers operate as a closed-loop torque balance servo system.



Referring to the illustration above, 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 Sherborne Sensors design accelerometers for specific applications. These custom designed units are often manufactured and tested to conform to military standards.



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 ISO 9001:2000 standards
- 1g bias option to compensate for earth's gravity (A220 only)

Applications

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



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Specifications

Environmental Characteristics

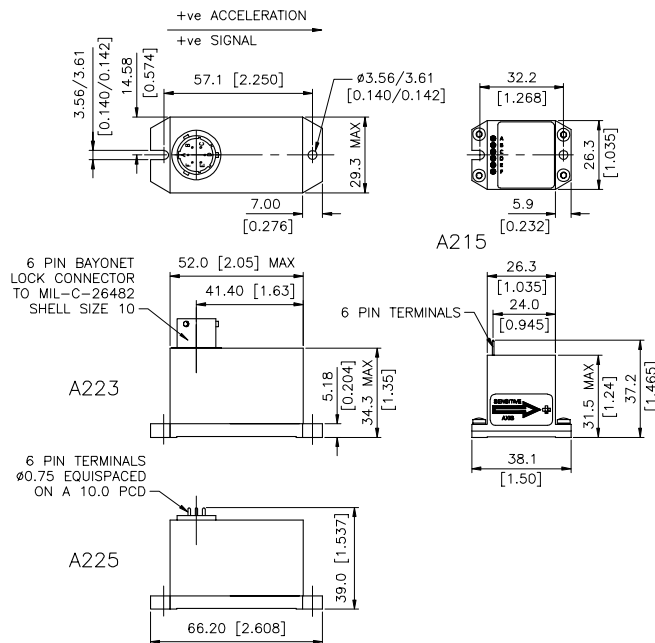
Operating Temperature Range	°C (°F)	-55 to +95 (-67 to 203)
Survival Temperature Range	°C (°F)	- 65 to 105 (-85 to 221)
Constant Acceleration	g	100g in all 3 axes without damage
Shock		100g, 11ms ½ sine
Altitude	m (ft)	30,000 (98,400)
Environmental Sealing		IP65
EMC Directive		EN 61326:1998
EMC Emissions		EN 55022:1998
EMC Immunity		EN 61000-4-2 incorporating A1: 1998 & A2: 2001 EN 61000-4-3: 2002 EN 61000-4-4: 2004 EN 61000-4-6: 1996 incorporating A1: 2001 EN 61000-4-8: 1994 incorporating 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	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 (4) A215; 115 (4.1) A220		

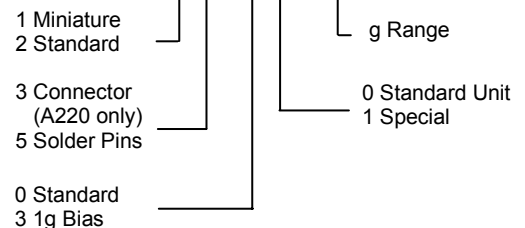
Notes

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

A2□□ - □□ 01□g



Specify Mating Connector 3CON-0009 if required (A220 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