# A215/A220 Series

## Gravity Referenced
## Linear Servo Accelerometers

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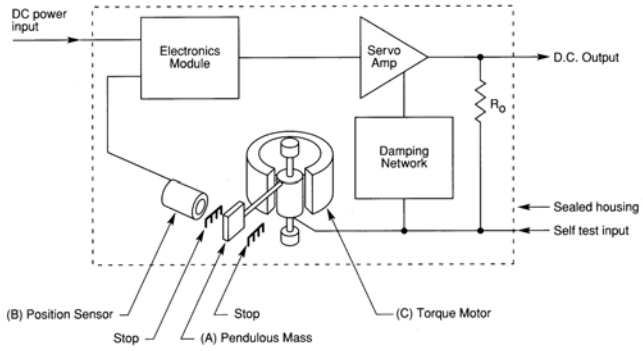
### Introduction

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.




Refering 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 it's 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 ±1g to ± 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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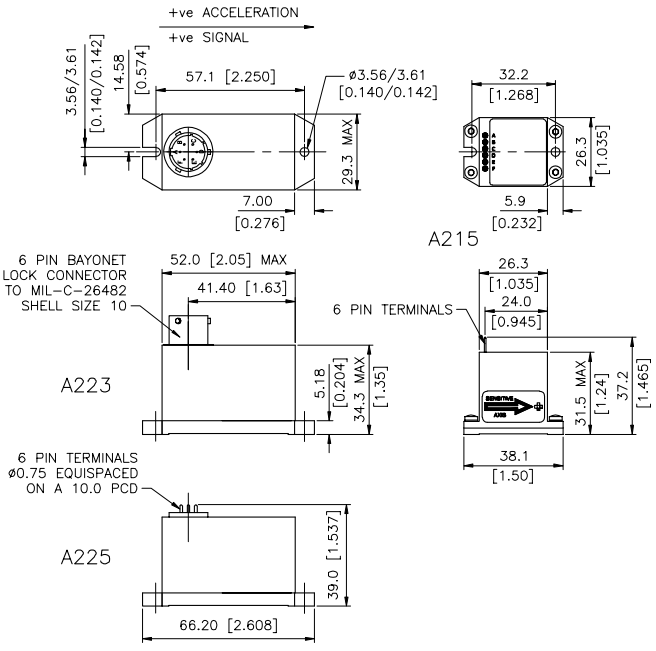
# Specifications

| 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<br>EN 61000-4-3: 2002<br>EN 61000-4-4: 2004<br>EN 61000-4-6: 1996 incorporating A1: 2001<br>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

- 1 Miniature, 2 Standard
- 3 Connector (A220 only), 5 Solder Pins
- 0 Standard, 3 1g Bias
- 0 Standard Unit, 1 Special
- g Range

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 |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