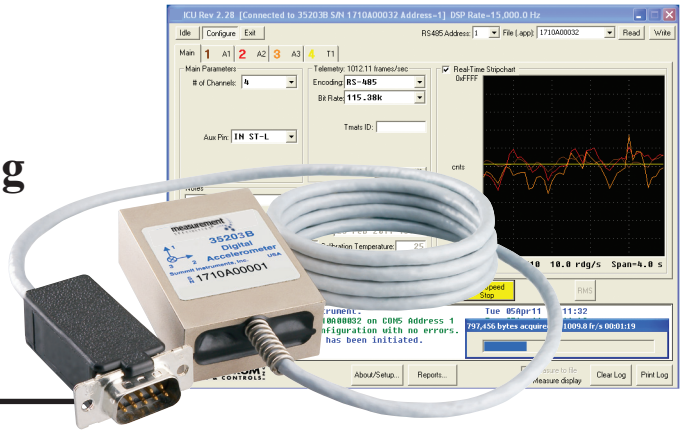
measurement SPECIALTIES™

**15203B** Uniaxial **25203B** Biaxial **35203B** Triaxial

# Digital Accelerometers
# User Configurable ±1 g to ±15 g




## Technical Data*

### Features and Benefits

**User Configurable Settings**
The analog/digital output range and low-pass filter of each digital accelerometer axis can be set via a built-in RS-485 interface using a free, downloadable Instrument Configuration Utility (ICU). An RS-485 to RS-232 adapter is available.

**RS-485 Serial and Analog Outputs**
Calibrated, ranged and filtered data can be streamed out at up to 3 Mbit/sec via RS-485. Analog outputs are also available for compatibility with existing systems.

**High Accuracy and Linearity over Wide Temperature Range**
Accelerometer accuracy is improved by minimizing variations due to temperature and aging effects. Each axial sensor has been tested over the -40° to + 85°C temperature range.

**Built-in Calibration**
Calibration data for each sensor is maintained in the accelerometer. All digital data output is fully calibrated and easily converted to user-configurable engineering units.

**Self-Test**
Self-test commands help verify channel integrity and wiring connections.

**Small Size**
Complete conditioned triaxial accelerometer with digital signal processing in approximately two cubic inches.

**Built-In Power Supply Regulation**
Unregulated DC power from +8.5 to +36 volts is all that is required to measure accelerations on all axes. Digital accelerometers are ideal for automotive applications as they survive both continuous reverse battery and load dump transients. MIL-STD-704A compatible.

**Easy Installation with Minimal Wiring Requirements**
A built-in terminal block or cable with 9-pin connector simplifies wiring. Tapped holes on bottom and back simplify horizontal or vertical mounting.

**Suitable for Harsh Environments**
These accelerometers are aluminum encased, potted, and are rugged enough to be used in harsh environments.

**Warranty**
These Measurement Specialties digital accelerometers come with a three-year factory warranty.

## Inertial Measurements Made Fast and Easy

These Measurement Specialties digital accelerometers are complete, easy-to-use, user-configurable sensors containing one to three accelerometers, a temperature sensor, signal processor, RS-485 interface and three analog outputs in a small, easy-to-install package.

All channels are sampled simultaneously to avoid data skewing. The digital signal processor takes 16-bit samples, filters, ranges, and calibration compensates at up to 42,500 samples/sec/channel. Digital data can be streamed out at up to 3 Mbit/sec.

The output range, filter frequency and calibration of each channel, as well as telemetry configuration, can be set by the user via the RS-485 command processor. CRC-8 and CRC-16 error checking is used to ensure command and data integrity.

The built-in temperature sensor can be used by critical applications to correct for any residual temperature effects.

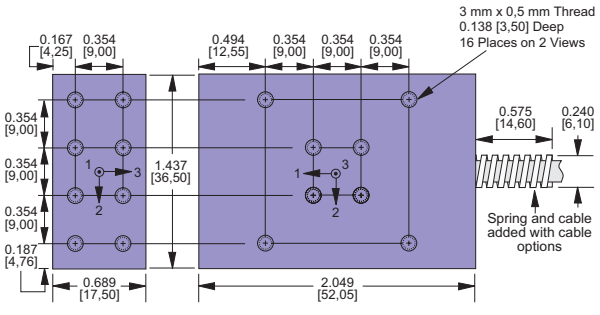
## Specifications for 15203B, 25203B and 35203B - *improved specifications available upon request*

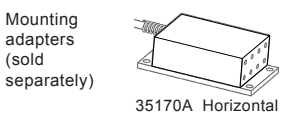
$T_A = T_{MIN}$ to $T_{MAX}$; Acceleration = 0 g unless otherwise noted; within one year of calibration.

| Parameter | Min | Typical | Max | Units | Conditions/Notes |
|---|---|---|---|---|---|
| **Accelerometers** Full Scale Range | | | | | On each axis. User configurable |
| Option R015 | | | ±15 | g | |
| Option R006 | | | ±6 | g | |
| **Sensitivity Drift** 25°C to $T_{MIN}$ or $T_{MAX}$ | | ±0.65 | | % | Percent of sensitivity at 25°C |
| **Zero g Drift** 25°C to $T_{MIN}$ or $T_{MAX}$ | | 60 | | mg | Repeatable, can be compensated |
| **Alignment** | | ±1.0 | ±3.0 | degrees | Deviation from ideal axes |
| **Transverse Sensitivity** | | 0.25 | | % | Inherent sensor error, excluding misalignment |
| **Nonlinearity** | | 0.1 | | % FSR | Best fit straight line |
| **Frequency Response** | 0† | | 800† | Hz | Lower filter cutoffs are user configurable |
| **Noise Density** | | 120 | | µg/√Hz | $T_A$ = 25°C |
| **Temperature Sensor** | | | | | |
| Range | -55 | | 125 | °C | |
| Resolution | | 0.25 | | °C | |
| Accuracy | | ±2.0 | ±3.5 | °C | $T_A$ = -40 to 85°C |
| **Digital Signal Processor** | | | | | |
| Internal Word Size | | | 32 | bits | |
| Sensor Scan Rate | | 15,000 | 42,500 | Hz | User configurable, channels processed in parallel |
| **Analog Outputs*** | | | | | Configurable to sensor |
| Voltage Swing | 0.25 | | 4.75 | V | $I_{OUT}$ = 5 mA |
| Impedance to Analog- | 100 | 130 | 220 | Ω | |
| Nonlinearity | | | 0.15 | % FSR | Excluding sensor nonlinearity |
| **Digital Output Word Size** | | | 16 | bits | Filtered, gained and calibration corrected |
| **Power Supply ($V_S$)** | | | | | |
| Input Voltage Limits | -80 | | +80 | V | -80 V continuous, >36 V if <550 ms, duty <1% |
| Input Voltage - Operating | +8.5 | | +36 | V | Continuous |
| Input Current | | 50 | | mA | |
| Rejection Ratio | 80 | 120 | | dB | DC |
| **Temperature Range ($T_A$)** | -40 | | 85 | °C | Terminal block Option T000 rated to -30°C |
| **Mass** | | 78 | | grams | |
| **Shock Survival** | -1500 | | +1500 | g | Any axis for 0.5 ms, limited by oscillator |

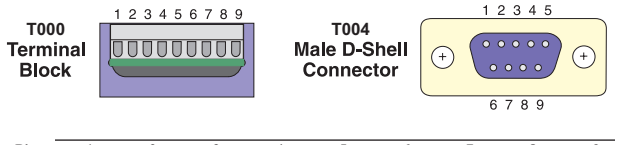
†*User configurable low-pass filter 3dB cutoff (number poles configurable)*
**Each channel's offset and gain are configurable*

## Mechanical




## Connections




| Pin | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| Signal | Analog1+ | Analog2+ | Analog3+ | Signal - | RS485- | RS485+ | Aux | +Vs | Gnd |
| Wire | Brown | Red | Orange | Yellow | Green | Blue | Violet | Grey | White |

## Ordering Information

**35203B - R015 - T004 - C002 - K11**

**Instrument**
35203B
25203B
15203B

**Accelerometer**
R015 : ±15 g 800 Hz
R006 : ±6 g 800 Hz

**Termination**
T004 : 4 ft. cable with DB9M
T000 : Terminal block
T*nnn*: Custom length, *nnn* ft.

**Calibration**
C001 : Standard room temp cal only
C002 : C001 cal plus offset data over -40 to +85°C range

**Adapter**
0 : None
1 : 35170A Horizontal mounting adapter
3 : 35172A Vertical mounting adapter

**Interface kit**
0 : None
1 : Interface kit with US power supply
2 : Interface kit with int'l power supply
3 : Interface kit for terminal block (US)
4 : Interface kit for terminal block (int'l)