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# Precision Aligned $\pm 10$ g to $\pm 40$ g Triaxial Accelerometers with Signal Conditioning and Temperature Sensor

## Technical Data\*

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### Features and Benefits

#### Precision Alignment

Each Axis of the 34200A is precision aligned to minimize errors due to axis misalignment or transverse sensitivity.

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#### High Accuracy and Linearity over Wide Temperature Range

The voltage output for each axis of the 34200A is directly proportional to the acceleration along that axis. Each DC-coupled output is fully scaled, referenced, and temperature compensated. A force-balanced design improves accuracy by minimizing variations due to temperature and aging effects, resulting in a sensor that is more stable over temperature than piezoelectric or piezoresistive devices. Critical applications can use the built-in temperature sensor to compensate for residual temperature effects.

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#### Calibration Certificate

Each 34200A can be supplied with an optional calibration certificate listing gain, offset, and on-axis and transverse alignment parameters needed to ensure rapid and efficient system implementation. The alignment data can be used to compensate the measured values to achieve an even higher level of sensor accuracy.

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#### Self-Test on Digital Command

A TTL-compatible self-test input causes a simulated acceleration to be injected into all three sensors to verify channel integrity.

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#### Small Size

Complete conditioned triaxial accelerometer in less than a cubic inch.

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#### Built-in Power Supply Regulation

Unregulated DC power from +8 to +30 volts is all that is required to measure accelerations on all axes. The 34200A is ideal for automotive applications with the ability to survive both continuous reverse battery to -20V and load dump transients to +60V.

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#### Suitable for Harsh Environments

The 34200A is robust and can be used in harsh environments. The unit will survive 500 g powered and 2000 g unpowered.

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## Precisely Measure Real-World Accelerations

The Summit Instruments 34200A accelerometer has each mutually orthogonal axis precisely aligned within 3/4 degree of the theoretical ideal. This provides the accuracy required by most linear and angular measurement applications without any compensation. Critical applications requiring higher accuracy can use the alignment data provided on the optional calibration certificate to compensate for any small residual error.

Unregulated 8 to 30V DC power is all that is required to measure  $\pm 10$  g,  $\pm 15$  g,  $\pm 20$  g,  $\pm 25$  g,  $\pm 30$  g or  $\pm 40$  g accelerations on each of three axes. Each axial sensor has been tested over the  $-40$  to  $+85^{\circ}\text{C}$  temperature range and has a nominal full scale output swing of  $\pm 2$  volts. The zero g output level is nominally +2.5 volts. Precise values for each axis are available on an optional calibration certificate. Custom versions of the 34200A can be provided for applications which require different ranges and/or bandwidths.

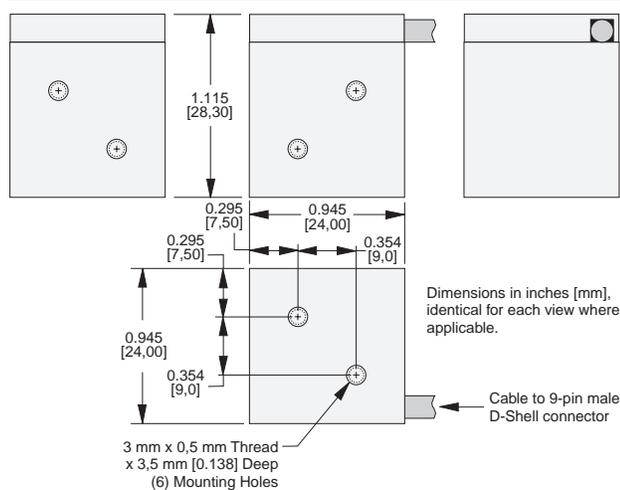
## Specifications

$T_A = T_{MIN}$  to  $T_{MAX}$ ,  $8 \leq V_S \leq 30$  V, Acceleration = 0 g, unless otherwise noted.

Parameter	Min	Typical	Max	Units	Conditions/Notes
<b>Range</b>					
Measurement Full Scale	±10		±40	g	On each axis. Must specify via Opt. Rnnn
Shock survival, powered	-500		+500	g	Any axis for 0.5 ms. Recovers on power cycle.
Shock survival, unpowered	-2000		+2000	g	Any axis for 0.5 ms.
<b>Sensitivity</b>					
At 25°C, ±40 g FSR		56 <sup>†</sup>		mV/g	Precise values on Opt. C001 cal certificate.
Drift $T_{MIN}$ to $T_{MAX}$		±0.5		%	Percent of sensitivity at 25°C
<b>Zero G Bias Level</b>					
At 25°C	2.1		2.9	V	Precise values on Opt. C001 cal certificate.
Drift $T_{MIN}$ to $T_{MAX}$		±0.2		g	Repeatable, can be compensated.
<b>Alignment</b>					
Deviation from ideal axes		±0.15	±0.75	degrees	Precise values on Opt. C001 cal certificate. Can be compensated if required.
<b>Transverse Sensitivity</b>		0.25		%	Inherent sensor error, excluding misalignment.
<b>Nonlinearity</b>		0.2		% FSR	Best fit straight line.
<b>Upper Cutoff Frequency</b>	4.6		1000	Hz	±10% Must specify via Opt. Bnnn.
<b>Noise Density</b>		1	2.5	mg/√Hz	10 Hz to 1 kHz (10 mg rms for DC to 100 Hz)
<b>Self Test Input Impedance</b>	30	50		kΩ	To ground.
<b>Temperature Sensor</b>					
Sensitivity		8.25		mV/°K	Precise values on Opt. C002 cal certificate. $V_T$ at -40°C ≈ 1.92V ; $V_T$ at +85°C ≈ 3.16V
Repeatability			±0.1	°C	At 25°C after temperature cycle
Long term drift			±0.1	°C	
Absolute error			±3	°C	25°C offset removed (±5°C uncorrected)
<b>Output Voltage Swing</b>	0.40		4.50	V	$I_{OUT} = \pm 0.1$ mA
<b>Output Capacitive Drive Capability</b>	1,000			pF	
<b>Power Supply (<math>V_S</math>)</b>					
Input voltage limits	-20		+60	V	-20V continuous, >30V if <100ms, duty <1%
Input voltage - operating	+8		+30	V	
Input current		16	24	mA	No load, quiescent.
Rejection Ratio	80	120		dB	DC
<b>Temperature Range (<math>T_A</math>)</b>	-40		+85	°C	
<b>Mass</b>		35		g	Opt. M001 reduces typical mass to 25g

<sup>†</sup> Scale linearly with range option Rnnn.

## Mechanical



Two 3 mm × 0.5 mm threaded holes are provided on each of three orthogonal faces for mounting.

## Connections

Pin	1	2	3	4	5	6	7	8	9
Signal	A1+	Signal-	A2+	+5VOut	A3+	T+	SelfTest	+ $V_S$	Gnd
Wire	Brown	Red	Orange	Yellow	Green	Blue	Violet	Grey	White

## Ordering Information

- 34200A** Triaxial accelerometer ±10 to ±40 g (-Bnnn, -Rnnn, & -Tnnn options required)
- Bnnn Bandwidth 3 dB cutoff (nnn Hz)
  - C001 Add calibration certificate
  - M001 Reduced Mass (requires bandwidth <100 Hz)
  - Rnnn Range (nnn g FSR)
  - Tnnn Termination via nnn foot cable with 9-pin male D-subminiature connector at end
  - W024 Extend warranty from 1 year to 2 years
- 34170B** Mounting adapter. Alternate mounting flange with four 0.148 [3,76] thru holes.  
Dimensions: 1.418 [36,0] × 0.946 [24,0] × 0.118 [3,0]

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