

Model 141 High Output Linear Accelerometer For Vibration, Shock, Impact

Ranges from: $\pm 2g$ to $\pm 600g$
With External R_{cal} Calibration



The Model 141 is a linear accelerometer that produces a high level instantaneous DC output signal proportional to sensed accelerations (ranging from static acceleration up to 3000 Hz as reported below).

Setra accelerometers are unique in their ability to withstand exceedingly high g overload without damage. The Model 141 incorporates the super-rugged Setra capacitance-type sensor and a new miniaturized electronic circuit.

Its excellent dynamic response is maintained by air damping, which varies with temperature

approximately one-tenth as much as the best fluid damping.

The electrical characteristics are compatible with conventional strain-gage type signal conditioning, including the use of shunt R_{cal} over any selected range up to 100% full scale.

The stainless steel case is O-ring sealed, has a well-defined base plane and is quite insensitive to mounting strain.

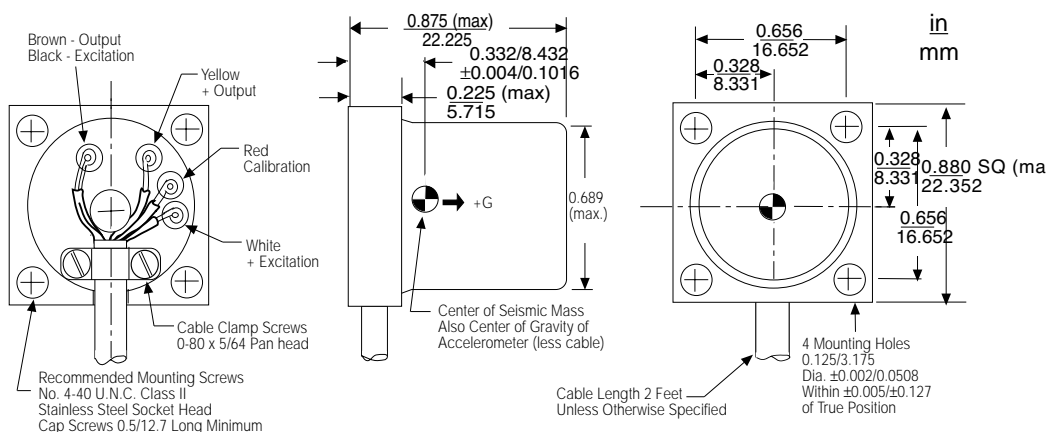
Cross axis interference is exceedingly low. The external easy-to-replace cable attachment facilitates installation and service.

Full Scale Ranges

For each of the available g ranges, the linearity is characterized by this range chart:
(Non-linearity as % full range, best straight line)

Nominal Range	Non-Linearity			Natural Frequency (Nominal)	Flat Response (± 3 db) 0 Hz to:
	$\pm 0.5\%$	$\pm 1\%$	$\pm 3\%$		
$\pm 2g$	$\pm 1.5g$	$\pm 2g$	$\pm 2.5g$	300Hz	200Hz
$\pm 4g$	$\pm 3g$	$\pm 4g$	$\pm 5g$	440Hz	260Hz
$\pm 8g$	$\pm 6g$	$\pm 8g$	$\pm 10g$	570Hz	300Hz
$\pm 15g$	$\pm 10g$	$\pm 15g$	$\pm 20g$	840Hz	400Hz
$\pm 30g$	$\pm 20g$	$\pm 30g$	$\pm 40g$	1200Hz	700Hz
$\pm 60g$	$\pm 40g$	$\pm 60g$	$\pm 80g$	1560Hz	1000Hz
$\pm 150g$	$\pm 100g$	$\pm 150g$	$\pm 200g$	2600Hz	1600Hz
$\pm 600g$	$\pm 400g$	$\pm 600g$	$\pm 800g$	5000Hz	3000Hz

Outline Drawing



Features

- Excellent static and dynamic response
- Temperature-insensitive gas damping (0.7 critical)
- High output signal
- High overload capability, (2000g static)
- Low transverse sensitivity (.012 g/g)
- Wide-range R_{cal} type calibration
- Easy-to-replace cable attachment
- Compact, lightweight
- Optional EMI Filter Upgrade

Model 141 Specifications

Other Accuracy Data

(Please refer to chart on front page)

Hysteresis	<±0.10%
Non-Repeatability	<±0.05% Nominal range
Transverse Acceleration Response	<±.012 g/g
Damping	Approximates second order system with 0.7 critical damping. The frequency band for all ranges is flat from static to approximately 60% of the natural frequency. Damping is gas squeeze-film, 0.7 ±0.2 of critical at 77°F (25°C). Damping ratio increases approximately 0.15%/°F.
Resolution	Infinite, limited only by output noise level.
Thermal Effects	
Operating temperature °F (°C)	-10 to 150 (-23 to 65)
Zero Shift	<±0.02% Nominal Range/°F (<±.036%/°C)
Sensitivity Shift	<±0.02% Nominal Range/°F (<±.036%/°C)
	Slightly higher thermal effects when 141A is operated at excitation voltage below 10 VDC.
Zero G Output	<±25 mv (factory calibrated at designated excitation)
±FS G Output	<±25% of nominal output
Noise Level	<±0.01% Nominal Range (RMS, in-band)
Calibration Data	Each unit is supplied with a computer generated plot of output vs. acceleration (centrifuge), at a designated excitation voltage. Sensitivity is reported at Nominal Range. Model 141A calibrated at 10 VDC excitation. Model 141B calibrated at 24 VDC excitation.

Electrical Data

Electrical Circuit	Three-terminal equivalent: common, -excitation and -output signal. Circuit is capacitively isolated from case, greater than 100 megohm isolation. Power applied to output, or shorted output, will not damage unit. No reverse excitation protection. Operates at internal frequency approximately 20 MHz. Model 141B operable on regulated 28 VDC aircraft power (recommend high voltage transient protection to prevent damage by emergency power conditions as defined in MIL-STD-704A, and voltage regulation to attain highest accuracy).
Calibration Signal (R_{cal})	Available up to 100% Nominal Range by shunting external calibration resistor from calibration lead to -signal lead.
Voltages and Currents	Two versions are available, offering a choice of units for different excitation voltages. Output is proportional to excitation voltage. Output impedance 9K ohms (nominal).
EMI Filtering	EMI filter option available (MIL STD. 462; consult factory).

Cable, Weight, Case

Electrical Connection	2 foot multiconductor cable
Weight	30 grams (not including cable)
Case	Stainless steel, O-ring sealed

Options

Option 620	Calibration at Special Excitation
Option 649	EMI/RFI Filter Option (Consult factory)
Option 701	Wide Operating Temperature -65°F to 220°F (-54°C to 104°C) 141A, 141B.
Option 803-825	Up to 25 feet of cable can be supplied on your order; please specify cable length when ordering (e.g.. 805 for 5ft. cable). Consult factory for cables longer than 10 feet.

Ordering Information

Specify:	Model 141A or Model 141B
Specify G Range:	Nominal Range (±specific g)
Specify:	Excitation voltage for calibration (if non-standard, use Option 620 at extra charge)

Typical performance for nominal G range:

Model	Excitation Range	At Excitation Voltage of:	Excitation Current	Nominal Output (open circuit)
141A	5VDC-15VDC	10V	5 milliamperes	±500 millivolt
141B	10VDC-28VDC	24V	10 milliamperes	±1000 millivolts

NOTE: Setra adheres to strict quality standards including MIL-I-45208A and ANSI-Z540-1. The calibration of this product is NIST traceable.

Specifications subject to change without notice.