

Model 141

High Output Linear Accelerometer



DESCRIPTION

The Model 141 is a linear accelerometer that produces high level instantaneous DC output signal proportional to sensed accelerations (ranging from static acceleration up to 3000 Hz as indicated 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 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-gauge 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 interface is exceedingly low. The external easy-to-replace cable attachment facilitates installation and service.

BENEFITS

- Excellent Static and Dynamic Response
- Temperature-Insensitive Gas Damping (0.7 Critical)
- High Output Signal
- High Overload Capability, 2000g static
- Low Transverse Sensitivity (0.012 g/g)
- Wide-Range R_{cal} Type Calibration
- Easy-to-Replace Cable Attachment
- Compact and Lightweight
- Optional EMI Filter Upgrade



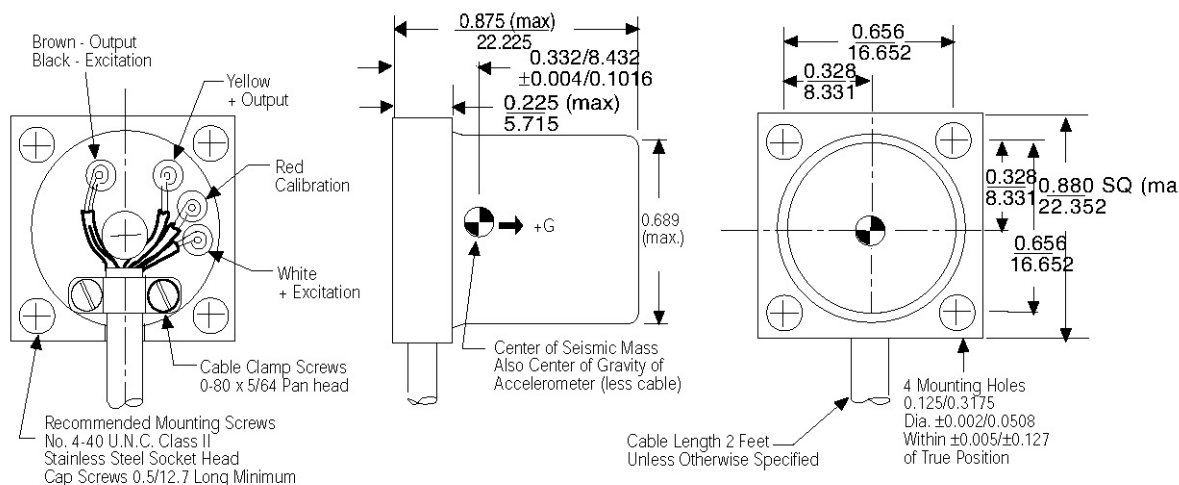
SPECIFICATIONS

Performance Data		Thermal Effects		Electrical Data		
Non-Linearity (Best Fit Straight Line)	±1.0% FS	Operating Temperature °F(°C)	-10 to +150 (-23 to +65)	Electrical Circuit ¹	3-Wire (Com, -Exc, -Out)	
Hysteresis	0.10%	Zero Shift	<±0.02% Nominal Range/°F (<±0.36%/°C)	Isolation	100 M ohms	
Non-Repeatability	0.05%	Sensitivity Shift	<±0.02% Nominal Range/°F (<±0.36%/°C) Slightly higher thermal effects when 141A is operated at excitation voltage below 10 VDC	Internal Frequency	20 MHz approx.	
Transverse Acceleration Response	<±0.012 g/g	Zero G Output	<±25 mV (factory calibrated at 10 VDC or 24 VDC excitation)	Calibration Signal (R_{cal})	Available up to 100% Nominal Range by shunting external calibration resistor from calibration lead to -signal lead.	
Damping	Approx. second order system with 0.7 critical damping (Gas Squeeze-Film 0.7 ±0.2 of critical at 77°F [25°C]). Damping ratio increases approx. 0.15%/°F.	FS G Output	<±25% of Nominal Output	Excitation/Output ² Code	BT	2S
				Excitation Range	5-15 VDC	10-28 VDC ³
Frequency Band	Flat from static to approx. 60% of natural frequency (all ranges)	Noise Level	<±0.01% Nominal Range (RMS, in-band)	Calibrated Excitation Voltage	10 VDC	24 VDC
				Excitation Current	5 mA	10 mA
Resolution	Infinite, limited only by output noise level	Physical Description		Nominal Output (open circuit)	±500 mV @ 10 VDC	±1000 mV @ 24 VDC
Calibration Data	Each unit is supplied with a computer generated plot of output vs. acceleration (centrifuge) at the specified excitation voltage.	Electrical Connection	2 foot multiconductor cable	¹ Circuit is capacitively isolated from case. Power applied to output, or shorted output, will not damage unit. No reverse excitation protection.		
Sensitivity	Reported at Nominal Range	Weight	30 grams (not including cable)	² Typical performance for nominal g range: Output is proportional to excitation voltage. Output impedance 9k ohms (nominal).		
Excitation Voltage	Model 141 calibrated at 10 VDC or 24 VDC	Case	Stainless Steel, O-Ring	³ Operable on 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.)		

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DRAWINGS & DIMENSIONS



FULL SCALE RANGES

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

Nominal Range	Natural Frequency (Nominal)	Flat Response (±3 db) 0 Hz to:
±2g	300Hz	200Hz
±4g	440Hz	260Hz
±8g	570Hz	300Hz
±15g	840Hz	400Hz
±30g	1200Hz	700Hz
±60g	1560Hz	1000Hz
±150g	2600Hz	1600Hz
±600g	5000Hz	3000Hz

NOTE: Setra adheres to strict quality standards including ISO 9001 and ANSI-Z540. The calibration of this product is NIST traceable.

ORDERING INFORMATION

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Model	Range	Units	Type	Output	Termination	Accuracy	Options
141 1411	002 ±2g	A G Force	B Bi-Direction	BT ±500 mV (10VDC EXC)	02 2' Cable	G ±1.0% FS	NN None
	004 ±4g			25 ±1000 mV (24VDC EXC)	10 10' Cable		6 Calibration Special EXC
	007 ±8g				25 25' Cable		7 EMI/RFI Filter
	015 ±15g				XX Consult factory for other lengths		3 Wide Oper. Temp. -65 to 220°F
	030 ±30g						
	060 ±60g						
	150 ±150g						
	600 ±600g						

Both boxes must be filled in alphanumeric order:
 • If No options: N + N
 • If 1 option: Option Code + N
 • If 2 options: Option Code + Option Code