

# XL403D Digital Accelerometer

Rugged  $\pm 1$  g to  $\pm 15$  g  
Dynamic Interface  
Built-in Analyses

## Advanced Digital Accelerometer

Measurement Specialties' XL403D accelerometers offer precision measurements while additionally performing basic functions within the sensor. Reduce the need for post-processing time and equipment plus shrink data file sizes; simply request minimum or maximum values, peak-to-peak, magnitude, tilt, or threshold. The output is configurable by the user – choose number of axes, units returned, bandwidth, sample rates, function specifics, and analysis results.

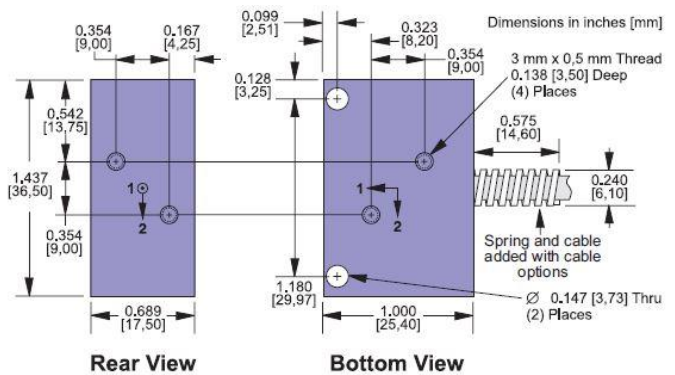
Accuracy is improved by minimizing variations due to temperature and aging effects, and their tough, compact housing holds potted electronics.

Choose the number of axes and specify any range option up to  $\pm 15$ g to best suit your application.

Users are supplied with a calibration certificate listing sensitivity and offset for each sensor. Custom versions can be provided.



## dimensions



## FEATURES

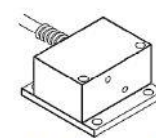
- Built-in Analyses
- Dynamic Customer Interface
- Flexible Output
- High Accuracy and Linearity over Wide Temperature Range
- Rugged for Harsh Environments
- Built-in Power Supply Regulation
- Easy Installation
- Three Year Warranty

## APPLICATIONS

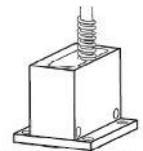
- Vehicle dynamics
- Construction Equipment
- Research & Development
- Test & Measurement
- Military/Aerospace

Two through holes and four 3 mm x 0.5 mm threaded holes are provided for mounting.

Mounting adapters (sold separately)

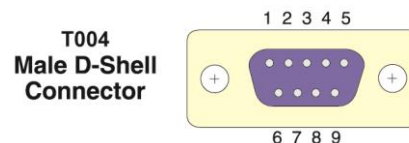


35173A Horizontal



35172A Vertical

## connections



Pin	1	2	3	4	5	6	7	8	9
Signal	A1+	A2+	A3+	Signal -	RS485-	RS485+	ST/Aux	+Vs	Gnd
Wire	Brown	Red	Orange	Yellow	Green	Blue	Violet	Grey	White

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# XL403D Digital Accelerometer

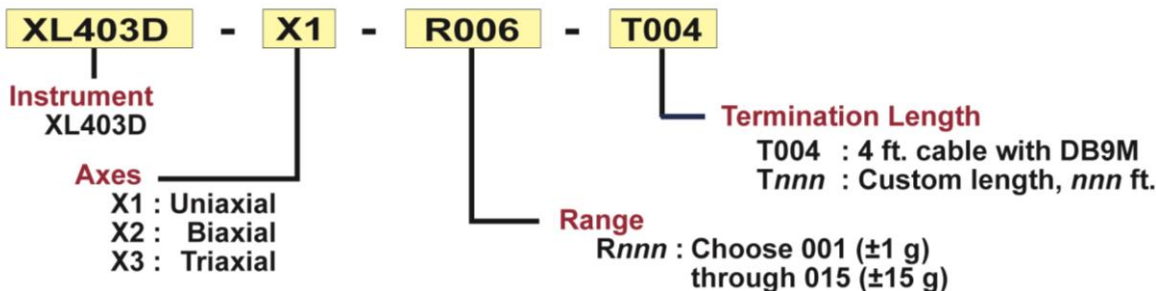
## performance specifications

$T_A = T_{min}$  to  $T_{max}$ ;  $8.5 \leq V_S \leq 36$  V; Acceleration = 0 g unless otherwise noted; within one year of calibration. Improved specifications available upon request.

PARAMETERS	Min	Typical	Max	Units	Conditions/Notes
<b>Range:</b> Measurement Full Scale	±1		±15	g	On each axis. Must specify via Option Rnnn
<b>Sensitivity</b>					
At 25°C, Option R005		400*		mV/g	Precise values on cal certificate
Drift $T_{min}$ to $T_{max}$		±0.65	±3	%	Percent of sensitivity at 25°C
<b>Zero g Bias Level</b>					
At 25 °C		2.5		V	Precise values on cal certificate
Drift to $T_{min}$ or $T_{max}$		±10	±20	mg	At <1.25°C/min. temperature rate of change
<b>Alignment</b>					
Deviation from Ideal Axes		±1.0	±2.0	degrees	Precise values on cal certificate. Can be compensated if required
<b>Transverse Sensitivity</b>		±0.25		%	Inherent sensor error, excluding misalignment
<b>Nonlinearity</b>		±0.1	±0.25	% FSR	Best fit straight line
<b>Frequency Response</b> , 5-pole	0		800	Hz	Upper cutoff per User selection, -3 dB pt ±10%
<b>Noise Density</b>		100		µg/√Hz	10 Hz to 400 Hz
<b>Self-Test Pull-Up Resistor</b>	5			kΩ	Logic "1" ≥3.5 V, Logic "0" ≤1.5 V; "0" causes self-test
<b>Temperature Sensor</b>					
<b>Scan Rate</b>	0.0007		±0.2	°C	Accuracy ±1 °C
<b>ADC Resolution</b>		10	2500	bits	Default scan list (A1, A2, A3, T1)
Absolute Accuracy		±2		LSB	
<b>Outputs</b>					
Output Voltage Swing	0.5		4.5	V	$I_{out} = \pm 0.5$ mA
Capacity Drive Capability		1000		pF	
<b>Power Supply (V<sub>s</sub>)</b>					
Input Voltage Limits	-80		+80	V	-80 V continuous, >38 V if ≤550 ms, duty <1%
Input Voltage - Operating	+8.5		+36	V	Continuous
Input Current		25		mA	
Rejection Ratio		>120		dB	DC
<b>Temperature Range (T<sub>A</sub>)</b>	-40		+85	°C	
<b>Mass</b>		38		grams	Precise values on cal certificate
<b>Shock Survival</b>	-5000		+5000	g	Any axis for 0.5 ms, powered or unpowered

\*Scale linearly with range option Rnnn; see Ordering Information

## ordering info



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<http://www.sensorway.cn>

Please note: PC Interface kit is required for digital sensor

# XL403D Digital Accelerometer

## setup

Use the 35250AK0/AK1 interface kit (sold separately) to connect the XL403D to a computer with a serial port and supply power (USB adapters available if needed). Use an ASCII terminal emulator of your choice to interface with the sensor (Tera Term Pro is recommended).

### Sample Commands

Set Commands		Query Commands	
ROUT:SCAN	set channels to be scanned	IDN?	device identification
INP:FILT:FREQ	set cutoff frequency	ROUT:SCAN?	channels being scanned
TRIG:SOUR:TIM	set time-based scan	READ?	show single scan
TRIG:COUNT	set maximum number of triggers	INP:FILT:FREQ?	current cutoff filter setting
INIT	begin scanning as configured	TRIG:SOUR?	current trigger source
OUT:FMT	format output	TRIG:COUNT?	current max number of triggers
CONF:FNC <name>	configure function	SYST:ERR?	current error status
		OUT:FMT?	current formatting
		CONF:FNC?	current function definitions

```

Tera Term - COM1 VT
File Edit Setup Control Window Help
out: fmt?
FLT,Units
read?
0.013g,-0.002g,-1.006g, 28.5°C
out: fmt hex
read?
0203,01FF,01c1,0272
out: fmt flt,units,cnt
read?
0004,-0.005g,-0.002g,-1.024g, 28.8°C
read?
0005,-0.023g, 0.016g,-1.024g, 28.5°C
out: fmt hex,cnt,crc
read?
0006,0201,01FF,01c1,0272,380c
read?
0007,0201,01FF,01c1,0272,F4bc
read?
0008,0201,0200,01c1,0274,969c
  
```

Display engineering units (FLT), HEX values; add a scan count or CRC to each scan

### XL403D Functions

Configure XL403D's built-in functions to execute as needed. Each unique function is performed on the scan measurements, with results maintained internally within the sensor.

- MIN – tracks the minimum reading on each channel since the function was configured
- MAX – tracks the maximum reading on each channel since the function was configured
- MAG – calculates the magnitude of the vector sum of axes A1, A2 and A3
- PTP – tracks the peak-to-peak value for each channel since the function was configured. This is equal to MAX – MIN for each channel
- TLT – calculates the 2-axis tilt angle for any 2 axes that are in scan
- TH1 – tracks channels readings against individual channel threshold values
- TH2 – tracks MAG or TLT values against a threshold
- OU1/OU2/OU3 – output functions that print the values of functions on a configurable periodic basis

When the XL403D threshold function is set, external controls can be triggered when the threshold is reached. Receive a warning, flip a switch, apply a brake - take action immediately when limits are exceeded.