~ Calibration Certificate ~

Per ISO 16063-21

SNCW 230805 Model Number: Serial Number: LW230805 (x axis) ICP® Triaxial Accelerometer Description: **PCB** Manufacturer: Back-to-Back Comparison AT401-3 Method: Calibration Data 10.2 VDC **Output Bias** Sensitivity @ 100 Hz 4.48 mV/g 4.7 % Transverse Sensitivity  $(0.457 \text{ mV/m/s}^2)$ Discharge Time Constant 0.44 seconds Sensitivity Plot Temperature: 73 °F (23 °C) Relative Humidity: 48 % 3.0 2.0 1.0 dB 0.0 -1.0 -2.0 -3.0-5000.0 100.0 1000.0 10.0 Hz Data Points Frequency (Hz) Dev. (%) Dev. (%) Frequency (Hz) 300 0.3 10 -0.5500 0.3 15 -0.3-0.11000 0.5 30 1.7 0.0 3000 50 5000 4.1 REF. FREQ. Mounting Surface: Tungsten Adapter Fastener: Adhesive Fixture Orientation: Inverted Vertical Acceleration Level (pk)!: 10.0 g (98.1 m/s²)

The acceleration level may be limited by shaker displacement at low frequencies. If the listed level cannot be obtained, the calibration system uses the following formula to set the vibration amplitude; Acceleration Level (g) = 0.008 x (freq)². The gravitational constant used for calculations by the calibration system is, 1 g = 9.80665 m/s². Condition of Unit As Found: New Unit, In Tolerance As Left: Notes 1. Calibration is NIST Traceable thru Project 683/287323 and PTB Traceable thru Project 17014. 2. This certificate shall not be reproduced, except in full, without written approval from PCB Piezotronics, Inc. 3. Calibration is performed in compliance with ISO 9001, ISO 10012-1, ANSI Z540.3 and ISO 17025. 4. See Manufacturer's Specification Sheet for a detailed listing of performance specifications. 5. Measurement uncertainty (95% confidence level with coverage factor of 2) for frequency ranges tested during calibration are as follows: 5-9 Hz; +/- 2.0%, 10-99 Hz; +/- 1.5%, 100-1999 Hz; +/- 1.0%, 2-10 kHz; +/- 2.5%. Robert Zsebehazy Date: 9/21/2017 Technician:



VIBRATION DIVISION
Headquarters: 3425 Walden Avenue, Depew, NY 14043 Calibration Performed at: 10869 Highway 903, Halifax, NC 27839 FAX: 716-685-3886 www.pcb.com

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TEL: 888-684-0013

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## ~ Calibration Certificate ~

Model Number:		356A01	•		
Serial Number: LW230805 (y axis)					
Description:	-		-		AT401-3
Manufacturer:			Method:	Back-to-Back Comparison	
		Calibro	ation Data		
Sensitivity @ 100 Hz		4.36 mV/g		Output Bias	10.4 VDC
Discharge Time Constant		(0.445 mV/m/s²)	Tran	sverse Sensitivity	4.5 %
		0.39 seconds			
		Sens	itivity Plot		
2.0	Temperature: 73 °F (		•	elative Humidity: 48 %	
2.0-					5.7
1,0-					
IB 0.0-		X			
-1.0~		· ,			•
-2.0∸					
-3.0-	··· e ··· e·· e··		ergen in demonstration of the second	. 1 1 1 1	: 
10.0 Hz		100.0	a Points	1000.0	8000.0
Frequency (Hz)	Dev. (%)	Frequency		Frequency (H	z) Dev. (%
10	-0.3	300	0.4	7000	2.7
15	-0.2	500	0.5	8000	3.2
30	-0.0	1000	0.6		
50	0.1	3000	1.2		
REF. FREQ.	0.0	5000	1.8		
Acceleration Level (pk): 10.0 The acceleration level may be	e limited by shaker displacement a avitational constant used for calcular	at low frequencies. If the listed level cannot one by the calibration system is: $1 g = 9.8060$	be obtained, the calibration system uses is nuss. ion of Unit	; the following formula to set the vibration amplitude:	: Acceleration Level
	ew Unit, In Tolera				
<ol> <li>This certifica</li> <li>Calibration is</li> <li>See Manufact</li> <li>Measurement</li> </ol>	te shall not be repr s performed in com turer's Specificatio s uncertainty (95%	thru Project 683/28732 roduced, except in full, upliance with ISO 9001, in Sheet for a detailed li	without written appro ISO 10012-1, ANSI sting of performance overage factor of 2) f	wal from PCB Piezotronics, Z540.3 and ISO 17025. specifications. or frequency ranges tested d	
Technician:		Robert Zsebehazy	R.Z.	Date: 9/21	/2017
ACCREDITED CALIBRATION CERT #186		PCB P  Headquarters: 3425 Wals Calibration Performed at: 108	VIEZOTRONICS  VIBRATION DIVISION den Avenue, Depew, NY 69 Highway 903, Halifax,	14043	CAL2-3588848335

## ~ Calibration Certificate ~

Model Number		356A01	***		
Serial Number: LW230805 (z : Description: ICP® Triaxial Acceleron		230805 (z axis)	_		
		l Accelerometer	_	Back-to-Back Comparison	AT401-3
Manufacturer:		РСВ			
		Calibr	ation Data		
Sensitivity @ 100 Hz 4.39 mV/g			Output Bias	10.5 VDC	
Discharge Time Constant		(0.448 mV/m/s²)	Trar	sverse Sensitivity	4.3 %
		0.46 seconds		•	
		<i>a</i>	to to mile		
	Temperature: 73 °F (		ritivity <b>Plot</b> R	telative Humidity: 48 %	
3.0-		, , , , , , , , , , , , , , , , , , , ,			
2.0-					
dB 0.0=					
0.0		*			
-1.0-					, , , , , , , , , , , , , , , , , , ,
-2.0-					
10.0		100.0		1000.0	0.0008
Hz		Da	ta Points		
Frequency (Hz	z) Dev. (%)	Frequency		Frequency (Ha	z) Dev. (%)
10	-0.1	300	0.3	7000	2.4
15	-0.2	500	0.3	8000	2.9
30	-0.1	1000	0.5		
50	0.0	3000	1.0		
REF. FREQ.	0.0	5000	1.5		
Acceleration Level (pk)*: "The acceleration level at (g) = 0.008 x (freq)* - *Th	av be innited by sligker displacement	at low frequencies. If the listed level cannitions by the calibration system is, $-1 \text{ g} = 9.80$	os be oblained, the calibration system use 665 nvs <sup>3</sup> Ition of Unit	rs the following formula to set the vibration amplitude;	Acceleration Level
•	New Unit, In Toler	ance			
			Notes		
<ol> <li>This certifies</li> <li>Calibration</li> <li>See Manufa</li> <li>Measurement</li> </ol>	cate shall not be rep is performed in con acturer's Specification on uncertainty (95%	npliance with ISO 9001 on Sheet for a detailed loconfidence level with	without written appro , ISO 10012-1, ANSI listing of performance coverage factor of 2)	oval from PCB Piezotronics, Z540.3 and ISO 17025.	
Technician:		Robert Zsebehazy	R.Z	Date: 9/21	/2017
ACCREDITE	D		PIEZOTRONICS VIBRATION DIVISION Alden Avenue, Depew, NY 1860 Highway 903, Halifax	14043 NC 27839	
CALIBRATION CERT #	1862.02	Langiauon Ferivilleu at. 10	309 mgnway 303, manaa.	rock neb com	A44.5.2000040757.41

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