## ~ Calibration Certificate ~

SNLW 230616 356A01 Model Number: Serial Number: LW230616 (x axis) ICP® Triaxial Accelerometer Description: **PCB** Back-to-Back Comparison AT401-3 Manufacturer: Method: Calibration Data **Output Bias** 10.2 VDC Sensitivity @ 100 Hz 4.84 mV/g 3.9 % Transverse Sensitivity (0.493 mV/m/s2) 0.49 seconds Discharge Time Constant Sensitivity Plot Temperature: 72 °F (22 °C) Relative Humidity: 50 % 3.0 2.0 1.0 dB 0.0 -1.0--2.0--3.0 1000.0 5000.0 100.0 10.0 Hz Data Points Dev. (%) Frequency (Hz) Dev. (%) Frequency (Hz) 300 0.2 -1.210 0.3 -0.4500 15 1000 0.5 -0.330 3000 1.7 -0.250 5000 3.5 0.0 REF. FREQ. Mounting Surface: Tungsten Adapter | Fastener: Adhesive | Fixture Orientation: Inverted Vertical Acceleration Level (pk)\*: 10.0 g (98.1 m/s\*) | 10.0 g (98.1 m/s\*) |

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)<sup>2</sup>. The gravitational constant used for calculations by the calibration system is; 1 g = 9.80665 m/s<sup>2</sup>. Condition of Unit As Found: n/a 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%. 9/21/2017 Robert Zsebehazy Date: VIBRATION DIVISION
Headquarters: 3425 Walden Avenue, Depew, NY 14043 Calibration Performed at: 10869 Highway 903, Halifax, NC 27839

TEL: 888-684-0013

www.pcb.com

CAL2-3588853620,552+0

## ~ Calibration Certificate ~ Per ISO 16063-21

| Model Number:   |   | 356A01  | _  |  |                       |
|---|---|---|--|--|-----------------------|
| Serial Number:LW230616 (y ax  |   | 30616 (y axis)  | _  |  |                       |
| Description:  |   |   |  |  |                       |
| /anufacturer:   |   |   | Method:  | Back-to-Back Comparison                                | AT401-3               |
|   |   | Calibr  | ation Data   |  |                       |
| Sensitivity @ 100 Hz 4.36 mV/g  |   |   | Output Bias  | 10.4 VDC   |                       |
| , -   |   | (0.444 mV/m/s²)   | Tran   | sverse Sensitivity                                     | 3.7 %                 |
| Discharge   | Time Constant   | 0.42 seconds  |  |  |                       |
|   |   | Sens  | sitivity Plot  |  |                       |
| • •   | Temperature: 72 °F (2   |   |  | elative Humidity; 50 %                                 |                       |
| 2.0-  |   |   |  |  | ·<br>·                |
| 1.0-  |   |   |  |  |                       |
| В 0.0-  |   | ——————————————————————————————————————  |  |  |                       |
| -1.0-   |   |   |  |  |                       |
| -2.0-   |   |   |  |  | :                     |
| -3.0-   | \$  | 400.0   | · - ·· b>  | 1000.0   | 8000,0                |
| 10.0<br>Hz  |   | 100.0   | n ta   | 1000.3   | 333,3                 |
| Frequency (Hz   | z) Dev. (%)   | <i>Da</i><br>Frequency  | ta Points<br>(Hz) Dev. (%)   | Frequency (H   | Iz) Dev. (%           |
| 10  | -0.5  | 300   | • •  | 7000   | 2.3                   |
| 15  | -0.3  | 500   | 0.2  | 8000   | 2.8                   |
| 30  | -0.2  | 1000  | 0.4  |  |                       |
| 50  | -0.1  | 3000  | 0.9  |  |                       |
| REF, FREQ.  | 0.0   | 5000  | 1.4  |  |                       |
|   |   |   |  |  |                       |
| Acceleration Level (pk) <sup>1</sup> :  | av be limited by shoker displacement a                                  | t low frequencies. If the listed level cans<br>ons by the calibration system is: $1 g = 9.80$     | ioos nvs.  | s the following formula to set the vibration amplitude | e; Acceleration Level |
| As Found:   | n/a   | Conai   | ition of Unit  |  |                       |
|   | New Unit, In Tolera   | ince  |  |  |                       |
|   |   |   | Notes  |  |                       |
| <ul><li>2. This certifi</li><li>3. Calibration</li><li>4. See Manufa</li><li>5. Massurame</li></ul> | cate shall not be repr<br>is performed in com<br>acturer's Specificatio | oduced, except in full<br>pliance with ISO 900<br>n Sheet for a detailed<br>confidence level with | I, ISO 10012-1, ANSI listing of performance coverage factor of 2): | Z540.3 and ISO 17025.                                  |                       |
| Technician:   |   | Robert Zsebehazy  |  | Date: 9/2  | 1/2017                |
|   |   | <b>®PCB</b>   | PIEZOTRONICS   | =  |                       |



Calibration Performed at: 10869 Highway 903, Halifax, NC 27839 EL: 888-684-0013 FAX: 716-685-3886 www.pcb.co www.pcb.com

CAL2-3588858861.481+0

## ~ Calibration Certificate ~

356A01 Model Number: Serial Number: LW230616 (z axis) ICP® Triaxial Accelerometer Description: **PCB** Manufacturer: Back-to-Back Comparison AT401-3 Method: Calibration Data Output Bias 10.2 VDC Sensitivity @ 100 Hz 4.60 mV/g 4.3 % (0.469 mV/m/s2) Transverse Sensitivity 0.49 seconds Discharge Time Constant Sensitivity Plot Temperature: 72 °F (22 °C) Relative Humidity: 50 % 3.0 2.0 1.0dΒ 0.0 -1.0 -2.0 -3.0 1000.0 100.0 10.0 Hz Data Points Frequency (Hz) Dev. (%) Frequency (Hz) Dev. (%) Dev. (%) Frequency (Hz) 7000 2.6 -0.4 300 0.4 10 8000 3.1 -0.2500 0.4 15 -0.11000 0.5 30 3000 1.1 0.0 50 5000 1.7 REF. FREQ. Mounting Surface: Tungsten Adapter | Fastener: Addesive | Fixture Orientation: Vertical Acceleration Level (pk)! | 10 tt g (98.1 m/s²) | The greatest tensor of the acceleration fevel 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)<sup>2</sup>. The gravitational constant used for calculations by the calibration system is; 1 g = 9.80665 m/s<sup>2</sup>. 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 9/21/2017 Date:



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

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CAL2-3588859026.500+0