Accelerometer Simulator AS-156

USER MANUAL

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CONTENTS

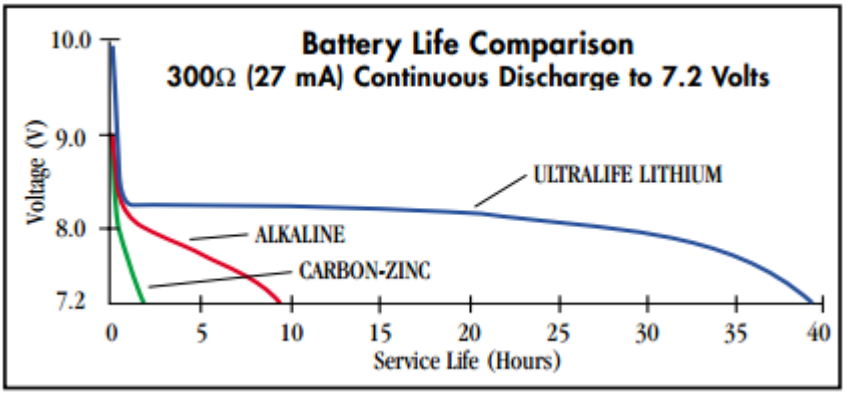
1 GENERAL

AS-156 is a pocket size instrument, able to simulate any ICP® (IEPE) standard accelerometer with a nominal sensitivity of 10, 50 or 100 mV/g.
This instrument might be used to detect cabling faults in the permanent vibration monitoring systems or for a quick check of any stationary or portable vibration instrument.

2 INSTRUMENT DESCRIPTION

The AS-156 instrument is powered only by applying a standard power for accelerometers (2.1÷4.5 mA@24V DC) to the input connector (2 Pin MIL-C-5015).
The instrument is power supplied with a standard 9V (PP3) battery.
The instrument can deliver precise amplitude and frequency sine signal, with a DC bias of 6V±1 V (for a 2mA accelerometer power supply) or 12±1 V (for 4mA accelerometer power supply). The signal frequency is 156.0±0.1 Hz and the amplitude can be selected as 5, 25 or 50 mV RMS (2% accuracy).

The recommended battery:
ULTRALIFE - U9VL - battery, LITHIUM, PP3, 9V from www.farnell.com (code 299390).



3 LED INDICATOR

***Table 1** - LED Status*

LED status	Description
No lit	The accelerometer cable is unplugged or the 9V internal battery is completely discharged.
Green	The instrument generates the settled sine wave signal.
Red	Low voltage battery; the signal accuracy isn't guaranteed or the instrument is completely damaged (there is no signal generation).

4 USING THE INSTRUMENT

First, connect the AS-156 input connector to any accelerometer cable with 2 Socket MIL-C-5015 (the accelerometer must be removed first). A cable adapter may be required for some types of accelerometers.
The green LED lit, indicates the accelerometer cable is plugged-on and the signal is available to the host instrument. If the red LED goes on, this indicates an instrument general failure or that the battery is completely discharged.
Select the proper signal amplitude, using the top slide switch.
Depending on the actual instrument transducer sensitivity settings, the vibration amplitude can be calculated with the formulas:

$VIB_a = A/S$ [g RMS]
$VIB_v = A/S \times 10$ [mm/sec RMS]
where:
S – Current instrument sensitivity setting (in mV/g)
A - AS-156 amplitude setting (5, 25 or 50 mV RMS)

***Table 2** – Velocity amplitude*

Accelerometer sensitivity [mV/g]	Switch position [mV RMS]		
	5	**25**	**50**
10	5 mm/sec RMS	25 mm/sec RMS	50 mm/sec RMS
50	1 mm/sec RMS	5 mm/sec RMS	10 mm/sec RMS
100	0.5 mm/sec RMS	2.5 mm/sec RMS	5 mm/sec RMS

***Table 3** –Acceleration amplitude*

Accelerometer sensitivity [mV/g]	Switch position [mV RMS]		
	5	**25**	**50**
10	0.5 g RMS	2.5 g RMS	5 g RMS
50	0.1 g RMS	0.5 g RMS	1 g RMS
100	0.05 g RMS	0.25 g RMS	0.5 g RMS

5 TECHNICAL SPECIFICATION

DYNAMIC SPECIFICATIONS	
Signal-to-Noise Ratio (SNR)	Min. 60 dB
Total Harmonic Distortion (THD)	Min. −56 dBc (See Fig.3)
Spurious-Free Dynamic Range (SFDR)	
Wideband (0 to 2MHz)	Min. −56 dBc
Narrow Band (±100 Hz)	Min. −67 dBc (See Fig.2)
Internal clock frequency	4 MHz
Clock Feed through	Min. −50 dBc
Wake-Up Time	200 ms
Output Frequency accuracy	156.0 ± 0.1 Hz (See Fig.1)
Output Amplitude level	Selectable: 5, 25 or 50 mV RMS
Output Amplitude accuracy	2% full range *
Output DC Level	6±0.5 V DC for 2 mA supply 12±0.5 V DC for 4 mA supply
Temperature range	−10°C to +80°C
Power	
External power	2.1 to – 4.5 mA @ 24V DC
Internal power	9V PP3 battery
Internal power consumption	Max. 20 mA @ 9V DC
Enclosure size (L x W x H)	96.52 × 60.96 ×25.4 mm
Protective Boot	Rubber, yellow

** Regular calibration required. The acceptable temperature range is 18 ÷30 °C.*
The Instrument input impedance has to be more than 50 kΩ.

6 DYNAMIC PERFORMANCE

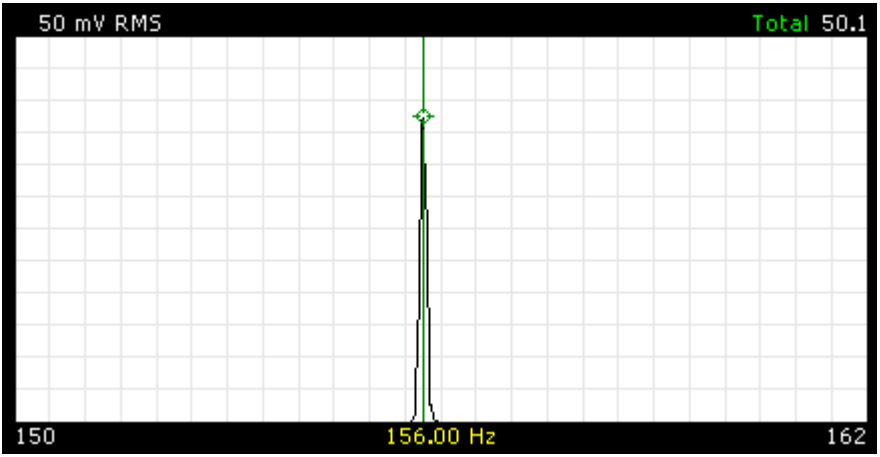


Fig. 1 - Narrow range spectrum

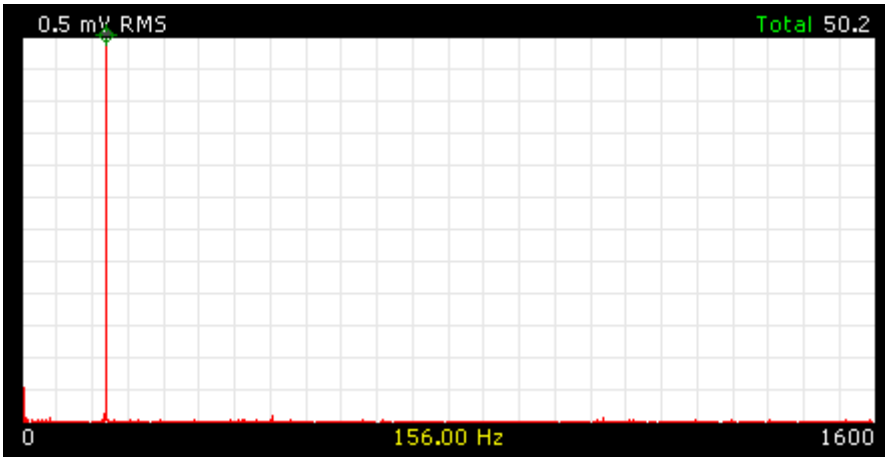


Fig. 2 - Wide range spectrum

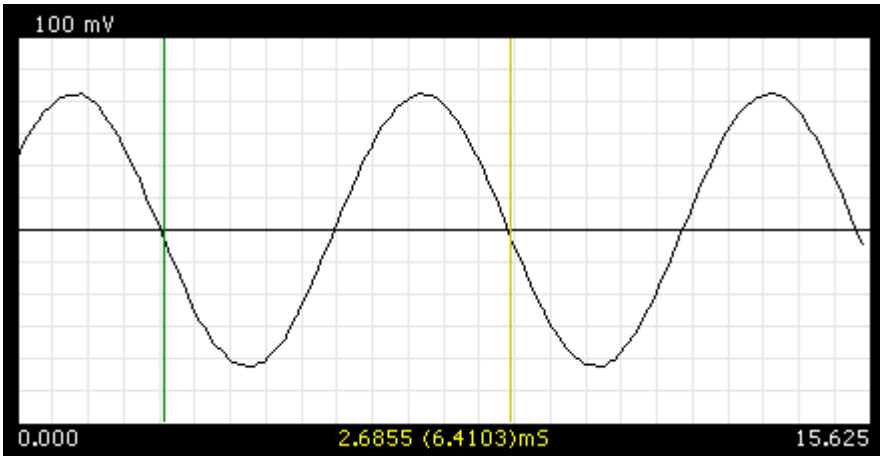


Fig. 3 - Time-signal

7 TERMINOLOGY

Total Harmonic Distortion (THD)
THD is the ratio of the RMS sum of harmonics to the RMS value of the fundamental. For AS-156, THD is defined as:

$$THD = 20\log\sqrt{\frac{V_2^2 + V_3^2 + V_4^2 + V_5^2 + V_6^2}{V_1}}$$

where V_1 is the RMS amplitude of the fundamental and V_2, V_3, V_4, V_5, and V_6 are the RMS amplitudes of the second harmonic through the sixth harmonic.

Signal-to-Noise Ratio (SNR)
SNR is the ratio of the RMS value of measured output signal and the RMS sum of all other spectral components, below the Nyquist frequency (2 MHz). The value for SNR is expressed in decibels.

Spurious-Free Dynamic Range (SFDR)
Along with the frequency of interest, harmonics of the fundamental frequency and images of these frequencies are present at the output of the instrument. The SFDR refers to the largest spur or harmonic present in the band of interest. The wideband SFDR gives the magnitude of the largest harmonic or spur relative to the magnitude of the fundamental frequency in the 0 to Nyquist bandwidth (0 to 2 MHz). The narrowband SFDR gives the attenuation of the largest spur or harmonic in a bandwidth of ±100 Hz about the fundamental frequency.

Clock Feed through
There is feed through from the internal oscillator to the analogue output. Clock feed through refers to the magnitude of the oscillator signal relative to the fundamental frequency in the output spectrum of the instrument.

OPTIONAL ACCESSORIES
CB912-1A – Adapter for BNC Plug
CB913-1A – Adapter for BNC Jack