Knock Sensor v1.0

Product Datasheet

Wireless Vibration & Shock Detection Instrument

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Product Overview

The Knock Sensor is a self-contained, battery-powered Bluetooth Low Energy instrument that detects and quantifies mechanical vibration and shock events. Its piezoelectric sensing element captures impact data at 500 Hz, while an onboard signal processing algorithm distinguishes genuine knock events from background noise.

Originally developed for automotive suspension diagnostics, the Knock Sensor is a general-purpose instrument suited to any application requiring detection and quantification of mechanical impulse events — including industrial machinery condition monitoring, structural inspection, and manufacturing quality control.

Up to 8 sensors can be deployed simultaneously, enabling multi-point comparison to pinpoint the exact source of a vibration anomaly in a single test session.

Key Features

- Wireless Bluetooth LE 5.0 connectivity — no cables, no wiring
- 12-bit piezoelectric sensor with 500 Hz sampling rate
- Automatic baseline self-calibration on power-up
- Up to 8 simultaneous sensors with live multi-point comparison
- On-demand PDF report generation with one-tap sharing
- CR2032 coin cell power — theoretical ~8 days continuous use
- Compact, fully sealed enclosure — mounts with straps or ties, no drilling
- Companion app on App Store (iPhone, iPad, Mac) and Google Play Store (Android)

Electrical Specifications

Parameter	Value
Power source	CR2032 lithium coin cell, 3 V, 220 mAh

External power	Not required — self-contained
Current — deep sleep	~3 µA
Current — advertising	150–300 µA average
Current — connected + streaming	Up to ~1 mA average, with TX peaks
Battery life	Theoretical ~8 days continuous connected operation

Sensor Specifications

Parameter	Value
Sensing element	Piezoelectric, internally mounted
Resolution	12-bit ADC (0–4095)
Sampling rate	500 Hz
Input range	0–3.6 V (internal reference)
Calibration	Automatic baseline calibration, 5-second warm-up on power-up
Detection method	Exponential moving average with adaptive threshold; 200 ms debounce

Wireless Communication

Parameter	Value
Technology	Bluetooth Low Energy 5.0
Frequency band	2400–2483.5 MHz
TX power	0 dBm (1 mW)
Typical range	~10 m (indoor, line of sight)
Maximum simultaneous sensors	8
Radio module (primary)	Raytac MDBT50Q-P1MV2 (Nordic nRF52840), pre-certified
Radio module (secondary)	Laird BL654 (Nordic nRF52840), pre-certified — alternative production source

Physical Specifications

Parameter	Value
Dimensions (L × W × H)	58 × 28 × 18 mm
Enclosure	Fully sealed housing, no externally accessible conductive parts
Mounting method	Velcro straps, cable ties, or wire — no drilling or permanent fixing required

Indicators	Single status LED (3 flashes on power-on; 2 flashes/5 s advertising; 1 flash/5 s connected)
Controls	Physical ON/OFF slide switch
Battery access	Removable bottom cover, 4 retaining screws

Environmental Specifications

Parameter	Value
Operating temperature	−20 °C to +60 °C
Storage temperature	−20 °C to +60 °C, dry environment

Companion App Requirements

Platform	Requirement
iPhone / iPad	iOS / iPadOS 16.0 or later
Mac	macOS 13 (Ventura) or later
Android	Android 8.0 (Oreo) or later
Availability	App Store (iPhone, iPad, Mac) · Google Play Store (Android)
Permissions required	Bluetooth, Location (required for BLE scanning on iOS and Android)
Key app functions	Live waveform display, knock event logging, multi-sensor comparison, PDF report generation and sharing

Compliance & Certification

Standard / Mark	Detail
UKCA	UK Conformity Assessed — UK Radio Equipment Regulations 2017 (S.I. 2017/1206)
EMC	BS EN 55032:2015+A1:2020 (emissions), BS EN 55035:2017+A11:2020 (immunity)
Radio module	UKCA, CE RED 2014/53/EU, FCC Part 15.247, IC RSS-247, Bluetooth SIG. Both production variants pre-certified. Module in use identified on product label.

A full UK Declaration of Conformity is available on request.

Ordering Information

Item	Description

Knock Sensor v1.0	4 × sensor units (batteries pre-installed), 8 × Velcro mounting straps (2 per sensor), quick start card. Full user manual available to download at rsensing.uk.

Companion app available free on the App Store and Google Play Store. Contact RSensing for bulk / fleet pricing.