



Triaxial Particle Motion Sensor

Advanced Near-Field Acoustic Vector Measurement

Triaxial Particle Motion Sensor is designed to quantify the acoustic impact of highenergy marine activities on species that rely on particle motion for hearing, communication and behavioural response.

While conventional hydrophones measure pressure, many marine organisms detect the particle motion component of sound. This system enables direct measurement of acoustic vector quantities in the near field, providing improved characterisation of impulsive and constructionrelated noise sources.

Developed for offshore construction environments, the system is configurable to suit specific client and project requirements.

Measurement Capabilities

The system provides:

- Direct measurement of triaxial particle acceleration
- Acoustic vector determination
- Sound intensity estimation
- Characterisation of ground roll and structure-borne components
- Improved relevance for fish and invertebrate impact assessment

The system is intended for integration alongside calibrated hydrophones to enable simultaneous measurement of pressure and particle motion.

Applications

- + Offshore construction monitoring
- + Pile driving and demolition
- + UXO clearance and explosive activities
- + High-intensity impulsive noise studies
- + Near-field acoustic measurements
- + Environmental impact assessment

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Key Features

- Triaxial accelerometer architecture
- High-resolution recording (24-bit)
- Typical sampling rate: 48 kHz
- Designed for near-field impulsive environments
- Configurable deployment duration
- Customisable system architecture depending on project requirements

Suggested Deployment Configuration

For full acoustic characterisation, the particle motion sensor is typically deployed alongside two hydrophones of differing sensitivities (to capture both low-level ambient and high-intensity impulsive signals)

System configuration - including channel count, storage architecture and deployment endurance - can be tailored to meet specific offshore construction monitoring requirements.

Mechanical Overview

Parameter	Specification
Sensor Type	Triaxial accelerometer
Typical Sampling Rate	48 kHz
Resolution	24-bit
Structure Rigid	seabed frame
Footprint	~1 m per side (deployment frame)
Weight	64–100 kg (configuration dependent)

Positioning

This system is aimed at projects where pressure-only measurements may not fully represent biological impact. By capturing the vector component of sound, it supports improved understanding of exposure in species sensitive to particle motion.

The architecture is adaptable and will be refined in collaboration with end users to meet evolving regulatory and scientific requirements.

