

### SHIVER

#### SITE EMISSION MULTI-AGENT MONITORING STATION

The RECOVIB.SHIVER is a family of high-end instruments dedicated to the monitoring of site emission levels - reporting any combination of **vibration**, **air over-pressure**, and **particle concentration**.

The SHIVER devices are linked with the recovib.io platform (Micromega Dynamics Cloud Software) to offer a near real-time reporting solution with norm comparison.

Using SHIVER devices ensures environmental and workplace compliance whilst retaining good relationships with neighboring people and businesses.



## **FIELDS OF APPLICATION**

### **Quarry blasting Monitoring**

Quarry operations, mainly blasts, generate vibration and sound waves (air blasts) that propagate to the neighboring infrastructures both above ground, such as houses and industrial buildings or below ground, such as pipes and foundations. Depending on the blast type, nuisances can be felt far away from the quarry. These nuisances can be light leading to discomfort or heavy leading to damages to nearby structures. Monitoring these sound and vibration nuisances is essential for quarry managers to improve operations and limit resulting negative effects and therefore manage good relationships with the site neighbors.

### **Construction Site Monitoring**

On a construction site, activities such as pile driving, heavy vehicle movements, soil compaction and excavation generate vibrations, which can lead to discomfort for the inhabitants of nearby homes. These vibrations can be felt far away from the site. In addition to compliance with regulations, monitoring these nuisances is essential to maintain good relationships with the site neighbors and improve acceptance.

### **Demolition Site Monitoring**

Demolition activities such as concrete block cracking and the movement of heavy vehicles usually generate nuisances in the form of vibrations leading to discomfort for neighboring residents. In addition to compliance with regulations, monitoring these nuisances is essential to maintain good relationships with the site neighbors and improve acceptance.

### **Traffic Nuisances Monitoring**

Traffic vibrations, from both road and rail traffic, is a well-known source of environmental nuisance for neighboring residents. The vibration levels are generally a source of discomfort but in some cases, such as speed bumps or potholes, they may also be the cause of structural damage to buildings (cf. DIN4150-2).

## **ADVANTAGE OF RECOVIB.SHIVER**

The SHIVER station is designed specifically for the online monitoring of environmental nuisances like vibration, particle concentration, and air blast - due to road/rail traffic, as well as quarry, construction and demolition site activities. Thanks to wireless communication and the related online monitoring platform (Recovib.io), the SHIVER allows site managers to monitor the effect of their activities on the neighboring environment and to make decisions to minimize their negative impact. It can therefore help prevent complaints and manage good relationships with site neighbors.

### **KEY FEATURES**

- SHIVER can be equipped with multiple environment sensors to suit your needs. The system is flexible and can accommodate any combination of vibration, air overpressure and particle concentration sensors.
- Logging and Visualization Statistics.
- Alarms based on pre-set threshold levels (sent by email, SMS, etc.).
- Visualization of bursts.
- Device management through the cloud platform.
- Users can choose between mains and solar power options.

### **KEY BENEFITS**

- Global 4G/LTE coverage.
- Easy to setup - Plug & Play.
- Robustness to environmental conditions.
- Short-term or permanent long-term monitoring.
- Monitoring of remote areas.
- Detailed reporting.

## SPECIFICATIONS

VIBRATION	
Number of channels	3-axis
Measurement Range	0 to 20 mm/s <sup>(1)</sup>
Frequency Range	1 to 100 Hz <sup>(1)</sup>
Resolution	0.03 mm/s
Operating Temperature Range	-40°C to 60°C

<sup>(1)</sup> Other ranges upon request

AIR OVERPRESSURE	
Maximum Sound Pressure Level	3000 Pa (163.5 dB)
Frequency Weighting	Linear
Frequency Range	2 to 250 Hz
Resolution	0.1 Pa
Operating Temperature Range	-10°C to 60°C

PARTICULATE	
Available Cut Points	TSP Inlet Standard, PM10, PM2.5 sharp-cut cyclone inlets available
Measurement Range	0 to 100 mg/m <sup>3</sup>
Measurement Sensitivity	0.001 mg/m <sup>3</sup>
Accuracy	3 5% traceable standard with 0.6 µm PSL
Particle Size Sensitivity	0.1 to 100 µm Optimal sensitivity 0.5 to 10 µm particles
Zero calibration	Automatic Zero Calibration every hour or as programmed from 1 to 999 minutes.
Flow Rate	2.0 liters/minute 3 0.1
Alarm Output	NO/NC relay 30 VDC @ 1A maximum
Operating Temperature Range	0 to 50°C
Barometric Pressure	600 to 1040 mbar
Ambient Humidity Range	0 to 90% RH, non-condensing
Intake Moisture Control	Automatic 10W inlet heater
Factory Service Interval	24 Months typical, under continuous use in normal ambient air

GENERAL	
Enclosure protection	IP65
Power consumption	2W (vibration and overpressure), 20W (dust sensor)

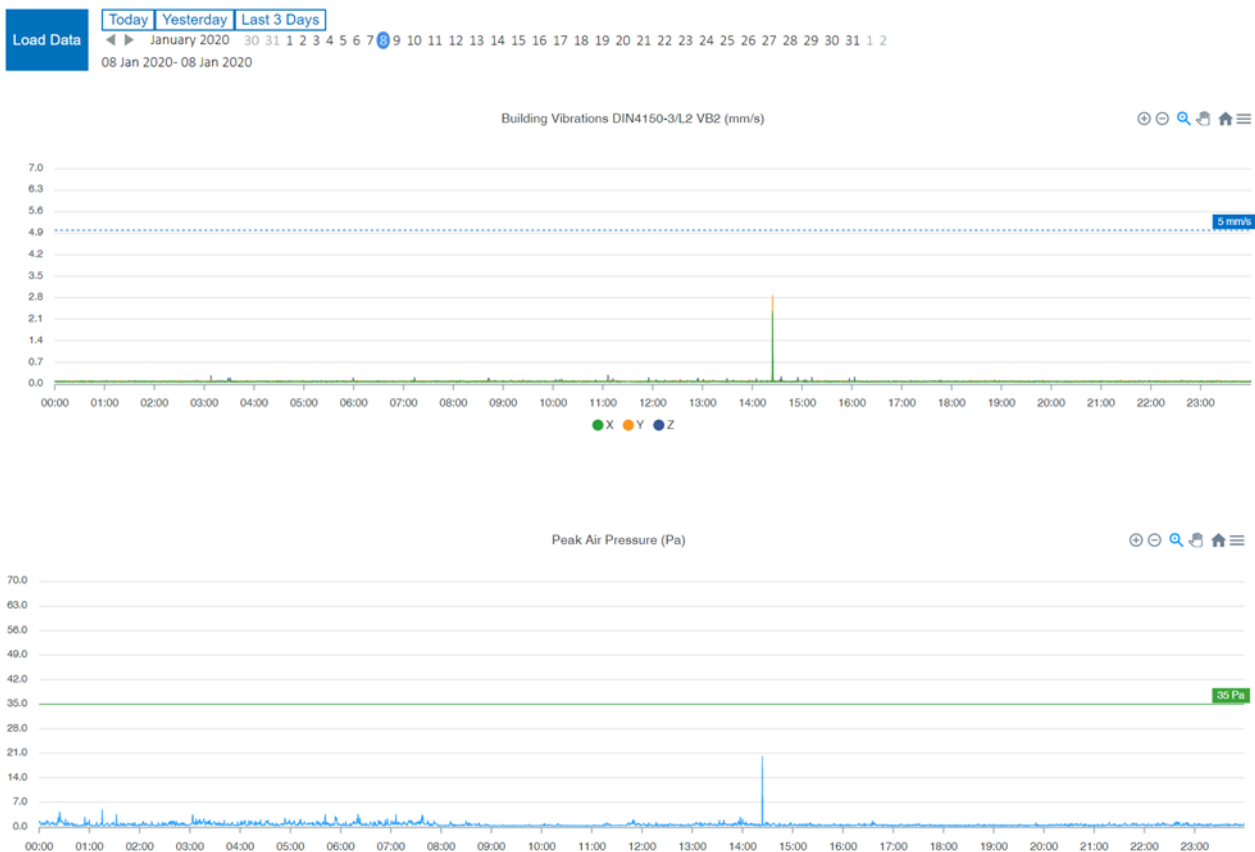
# CERTIFICATIONS

	STANDARD	STANDARD REFERENCE	LIMIT LEVEL
<b>EMC COMPLIANCE</b>	Radiated Emission	EN 55016-2-3/CISPR 16-2-3	EN/IEC 61000-6-3 30MHZ - 1 GHZ
	Electrostatic Discharge Immunity	EN / IEC 61000-4-2	4 kV by contact 2, 4 & 8kV in air Criterion B
	Magnetic Field Immunity	EN / IEC 61000-4-8	80 A/m 50 & 60 Hz Criterion A
	Radiated, radiofrequency, electromagnetic field immunity	EN/IEC 61000-4-3	80 MHz - 1 GHz 10 V/m 1.4 - 2.0 GHz 3 V/m 2.0 - 2.7 GHz 1 V/m AM 80% 1 kHz Criterion A
<b>DUST &amp; WATER INGRESS PROTECTION LEVEL</b>	Degree of Protection provided by enclosures (IP code)	IEC 60529	IP65

# RECOVIB.IO

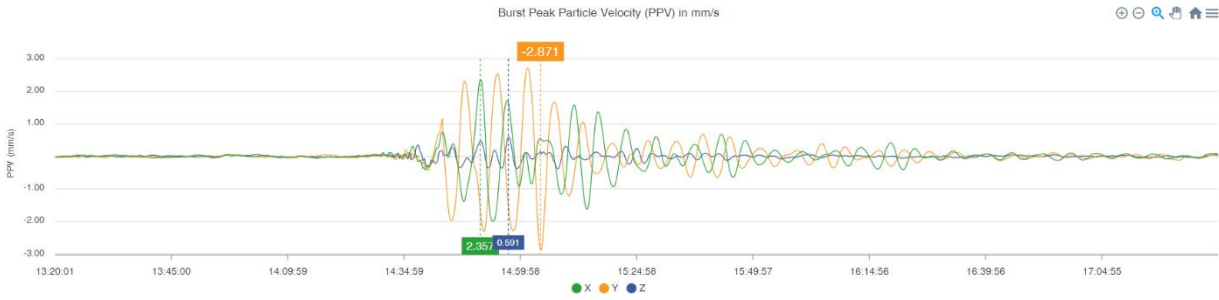
Using the RECOVIB.IO platform users

- have access to data from anywhere using a web browser.
- can switch between sites where SHIVER stations are installed.
- can receive alerts by SMS or email.



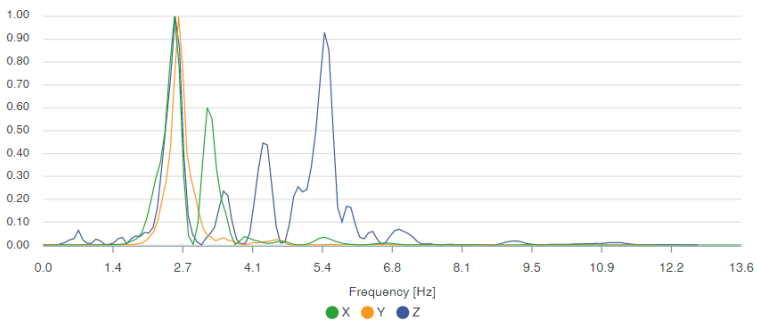
Bursts Details

add tags

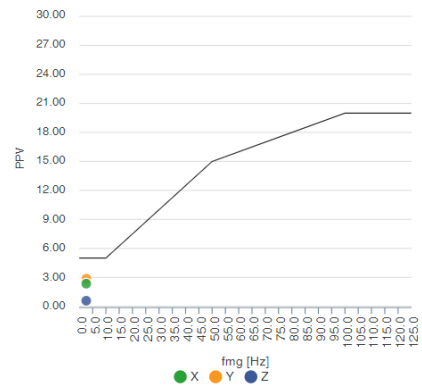


Normalized Spectrum

Navigation icons



Din 4150-3/Line 2



INSTALL YOUR MONITORING DEVICES ANYWHERE



BE AWARE OF EVENTS THROUGH GLOBAL NOTIFICATIONS



MANAGE YOUR DEVICES FROM ANYWHERE








RECOVIB.IO

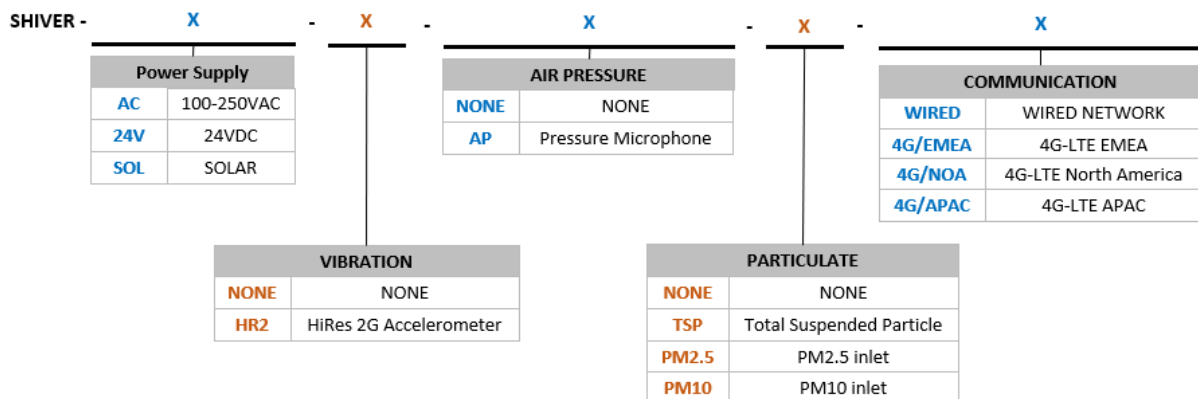
ACCESS YOUR DATA FROM ANYWHERE



# PRODUCT RANGE

Models					
Vibration	x	x	x	x	x
Air Pressure	x	x	x		x
Dust				x	x
Installation	Portable	Permanent	Permanent	Permanent	Permanent
Usage	Inside	Outside	Outside	Outside	Outside
Power supply	Battery 8h autonomy	External 230VAC or 24VDC	Solar panel	External 230VAC or 24VDC	External 230VAC or 24VDC
Accessories	Accelerometer HiRes Ud Micro Blast	Accelerometer HiRes Ud Micro Blast	Accelerometer HiRes Ud Micro Blast	Accelerometer HiRes I	Accelerometer HiRes I Micro Blast
Heart	Monitor-4 board 4G card optional	Monitor-4 with 4G card	Monitor-4 with 4G card	Monitor-4 with 4G card	Monitor-8 with 4G card

# ORDERING REFERENCE



**EXAMPLE**  
SHIVER - SOL - HR2 - AP - 4G/EMEA

### NOTE

Solar Kit is not available when dust sensor is included due to heater module power requirements (20W).

# ENGINEERING SERVICES

- Additional Inputs for external sensors.
- Specific Mechanics (Poles, etc.).
- Solar panel and battery dimensioning based on geographical location.
- Periodic calibration.
- On-site installation.
- On-site maintenance.