

ROCK Acceleration

Dynamic Structural Health Monitoring (SHM)



The SYSCOM ROCK Acceleration device is an automated vibration monitoring solution that incorporates ultra-low power integrated components, embedded LTE-M connectivity, SIM card and GNSS capability, eliminating the need for any gateway for swift notifications and data transfer.

Its internal battery, coupled with connectivity to an external solar panel, makes the ROCK Acceleration ideal for both temporary and permanent monitoring.

Featuring two models with distinct measuring sensitivities, this device covers many applications such as Structural Health Monitoring (SHM) and Operational Modal Analysis (OMA), especially with the high-sensitivity model.

The all-in-one solution provided together with the Syscom Cloud Software (SCS) brings unrivalled ease of use and fastest return on investment for data driven structural assessment.

Applications

- Bridges
- Buildings and civil structures
- Electrical substations
- Wind towers
- Geotechnical investigations

ROCK Acceleration dynamic structural vibration monitoring

The SYSKOM ROCK Acceleration is tailored for structural health monitoring (SHM) and modal analysis evaluations. Leveraging Syscom's expertise in vibration alongside cutting-edge electronic capabilities driven by the Internet of Things market, this device stands out as best in class for connectivity, ease of use and information processing. Empowered by the SCS (scs.syscom-instruments.com), the ROCK Acceleration introduces a disruptive solution to structural monitoring.

Major features

- Compact unit containing triaxial acceleration sensor, digital recorder, communication and battery. No need of any additional gateway.
- Two sensor models:
 - **ROCK Acceleration (SHM):** dedicated to standard SHM applications, with a self-noise of 25 $\mu\text{g RMS}/\sqrt{\text{Hz}}$
 - **ROCK Acceleration HD (OMA):** dedicated to highly sensitive monitoring like Operation Modal Analysis, with an ultra low self-noise of 0.2 $\mu\text{g RMS}/\sqrt{\text{Hz}}$
- Time synchronization of typically < 10 μs among different units, ideal for modal analysis applications
- Embedded memory for data safety
- Embedded SIM card
- Integrated 4G LTE and GNSS antenna
- Auto-orientation and auto-levelling of the axis
- Different mounting options according to the application
- Managed by Syscom Cloud Software



ROCK Acceleration

General

Sensor

Internal triaxial accelerometer. Please refer to the next page for the characteristics of the two models available.

Orientation

Self-orienting and levelling

Localization

By means of integrated GNSS module

Data/user interface

User interface managed by the Syscom Cloud Software

Data recording

Number of channels

3 (X, Y, Z orthogonal axis)

Time synchronization

Integrated GNSS module for absolute timing

Synchronization accuracy

< 10 μs among different units with GNSS

Recording principle

Trigger recording (time history), background recording (continuous), timed recording (periodic events recording) and manual common recording (among multiple synchronized ROCK Acceleration units)

Trigger

Principle

Level trigger

Level trigger

0.1 mg to 100% full scale

Event duration

Up to 15 minutes

Pre-event recording

1 - 16 seconds (2s @ 2kHz - 16s @ 250Hz)

Post-event recording

1 - 30 seconds

Alarm by SCS

Principle

Smart alarming managed by Syscom Cloud Software

Two alarm levels independently settable as threshold levels, or user-defined curves

Threshold levels

0.1 mg to 100% full scale

User-defined curves

Amplitudes and frequencies individually settable for each axis

Data memory

Embedded memory chip, 4 GB. Data buffer automatically uploaded to the SCS

Data processing by SCS Cloud Software

Notifications

Various notification options, individually settable for each axis

FTP forward

FTP/FTPS/SFTP client in SCS to automatically push data to any server, binary and ASCII data format available

Communication

Mobile Network

Multi-Band LTE Cat M1 and LTE NB-IoT

SIM card

Embedded SIM provided by Syscom. Please contact Syscom Instruments to verify the compatibility in your country

Antennas

Embedded LTE and GNSS antennas

Other features

LED

3 multicolors LEDs: Status, Record, 4G (Communication)

Switch ON/OFF

By means of a magnet and reed switch or internal switch button

Fixtures

2 holes, diameter 5.6 mm. Optional mounting plate

Power Supply

Supply Voltage

8 - 24 V DC using a DC power connector

Battery

Internal Li-Ion battery 275 Wh, UN 38.3 & IEC62133 certified

Autonomy

In full mode (recording 2 min/hour), with MS2010+ : typ. 14 days

In timed recording mode (5 min/day), with MS2012+: typ. > 1 year

ROCK Acceleration (SHM)

Sensor	MS2012+
Principle	MEMS accelerometer
Sampling rates	250, 500, 1000, 2000 sps
Hysteresis	None
Number of channels	3 orthogonal (x, y, z)
Noise	Typ. < 25 µg RMS/√Hz
Measuring range full scale	± 3 g
Frequency range	0 - 200 Hz
Dynamic range	Typ. > 87 dB

ROCK Acceleration HD (OMA)

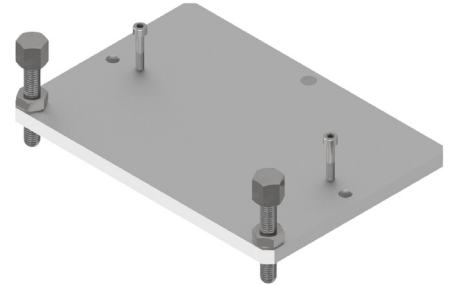
Sensor	MS2010+
Principle	Quartz crystal micro machined technology with built-in temperature compensation
Sampling rates	200, 500, 1000 sps
Hysteresis	None
Number of channels	3 orthogonal (x, y, z)
Noise	Typ. < 0.2 µg RMS/√Hz
Measuring range full scale	± 14 g
Frequency range	0 - 200 Hz
Dynamic range	Typ. > 139 dB @200 sps

Dimensions

Housing	Aluminum base, polymer cap, (L x W x H) 174 x 141.7 x 53.5 mm
Weight	1.5 kg
Protection degree	IP67

Regulation

Electrical Safety	In compliance with IEC 61010
EMI/RFI	In compliance with EN 61000
Environmental	Heat: -20°C up to +50°C Humidity: up to 100% RH
Conformity	CE



Standard mounting plate



ROCK Acceleration HD

Syscom Cloud Software (SCS)

The SYSCOM ROCKs have to be connected to the Syscom Cloud Software (SCS) in order to simply process all the device setup and data management.

The main features of the SCS include:

- easy parametrization with smart triggering modes
- different access levels (administrator, read/write, view only)
- FTP/FTPS/SFTP forward to any FTP server
- visualization of events/background monitoring
- comparison with reference standards
- automatic reporting
- smart notification, alarming and state of health, user settable with Emails and/or SMS
- data conversion into ASCII files, 1-click export
- SCS API integration with other software
- SCS AI (beta) for data empowering solution

Visit scs.syscom-instruments.com for more information.

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Ordering information

Every ROCK Acceleration contains: ROCK Acceleration recorder - 3 channels sensor - Internal battery - 4GB Memory - 4G LTE modem - embedded GNSS - DC connector - SCS compatibility

ROCK — **A** 2 0 1 0 I — **B** 1 4 — **P** E

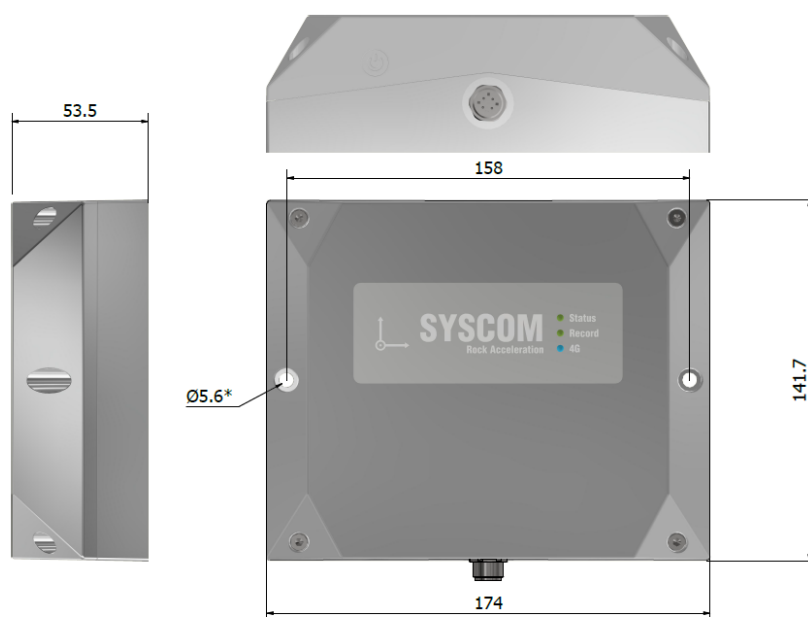
A	Sensor type
2012I	Internal triaxial accelerometer MS2012+
2010I	Internal triaxial accelerometer MS2010+

B	Full range
3	Full range ± 3 g (Only if A = 2012I)
14	Full range ± 14 g (Only if A = 2010I)

P	Version
E	With SIM card
F	Without SIM card

Ordering information - Accessories and mounting plates

Description	Part Number
POWER SUPPLY AND ACCESSORIES	
AC/DC converter for ROCK Acceleration (please add AC cable to grid)	87000332
AC cable from AC/DC converter to European power grid	81000023
AC cable from AC/DC converter to Swiss power grid	81000022
AC cable from AC/DC converter to UK power grid	81000379
AC cable from AC/DC converter to US power grid	81000256
Solar panel kit, including mounting support and DC connector	13100023
M12 DC connector, DC field cable not supplied	72520048
MOUNTING OPTIONS	
ROCK Acceleration mounting plate	13100022
Set of 3 pointed levelling screws (2 long, 1 short) for ROCK Acceleration (same as MR3003)	13100000
OTHERS	
Magnet to turn ON/OFF ROCK Acceleration	54700000
DC plug protective cap, M12	86010284
Carrying case for up to 4 ROCK Acceleration units with mounting plate	74710148



* Hole for M5 screw ISO 4762

Dimensions of the ROCK Acceleration in mm