

PC Environmental are proud to present

MR2002-CE

Red Box from Syscom



The ultimate vibration measurement system from SYSCOM Instruments. Modular design, rugged packaging and 100% Swiss quality provide reliable performance in civil engineering environments. Efficient, reliable and easy-to-use – the RED BOX provides data you always can rely on.

Optional features include:

RED ALERT Remote Alerting / Remote Control
RED SAFE Up to 640 Mbyte Mass Storage
DEEP RED Dynamic Range of 130dB

The RED BOX MR2002-CE from SYSCOM is a compact, modular vibration recorder, designed for diverse civil engineering applications. It consists of a recording unit and an external triaxial velocity or acceleration sensor in rugged and splash proof aluminium casings. The RED BOX is very easy to install and to operate. Vibration measurements and monitoring tasks are carried out economically. For long-term vibration monitoring, its dual mode operation is an important asset: triggered events are recorded as time histories while at the same time the vibration level for the entire monitoring time is recorded as peak values for each user selectable interval (=background mode).

The VIEW 2002 software provides comprehensive analysis and professional presentation of MR2002-CE data. VIEW 2002 is a powerful analysis tool specifically developed for the MR2002. VIEW 2002 includes analysis in time and frequency domain as well as specific analysis according to different national codes such as DIN 4150/2 and US standards.

A pleasure to measure!

THE ULTIMATE TOOL FOR VIBRATION RECORDING

- Site Evaluation and Seismic Re-qualification (Buildings, Bridges, Towers etc.)
- Construction Monitoring (Pile Driving, Compaction etc.)
- Subsoil Characterization (Nakamura Method)
- Traffic Induced Vibrations Measurement (Railway, Highway and Subway)
- Sensitive Equipment and Industrial Vibrations Measurement
- Long-Term Monitoring of Buildings and Installations
- Monitoring of Blasting (Tunnels, Demolition, Quarrying & Mining)

DATA CAPTURE YOU TRUST

- Data Analysis According to Various National Codes
- Splash Proof and Rugged Aluminium Casing
- Internal Battery Provides up to 3 Days Autonomy
- Alarm Functions
- Remote Control
- Remote Alarm
- Remote Download
- Mass Storage, optional up to 640 MB
- Frequency Weighted Alarms
- Dynamic Range: 96 dB, up to 130 dB with DEEP RED option
- Frequency Range: 1 to 160 or 1 to 315 Hz
- Vibration Velocity: 0.00007 to 115mm/s, 0.0000028 to 4.526 in/s
- Vibration Acceleration: 0.0001 to 10 g

VIBRATION MEASUREMENT FOR RAILWAYS

Vibration measurement for railways in general requires the recording of huge amounts of data. Without the adequate measurement system and dedicated software, these measurements are difficult to reach. The MR2002-CE and VIEW 2002 are the perfect match for this task.

The MR2002-CE Standard Plus model is often used for this application. Three uni-axial velocity transducers simultaneously measure the vibrations inside the building, on the building foundation and in the freefield. In this setting, the free-field transducer is used as trigger sensor in order to record only train vibrations, and not those caused within the building. Thus, fully automatic measurements over 24 or more hours can be carried out with minimal effort.



All analysis tools required in the context of train induced vibrations are included in VIEW 2002. The event plot displays the temporal distribution of train passages over the measuring period. The file group processing in VIEW 2002 allows analysis according to DIN 4150/2. With a mouse click, averaged amplitude or octave band spectra may be computed, or transfer spectra between measuring points calculated.



CONSTRUCTION SITE MONITORING

Construction site monitoring requires rugged and 100% reliable measuring equipment that is easy to install and to operate. Construction sites may employ from one to 12 or more recorders. The MR2002CEs may be used freestanding with no cabling, or linked in a network. The RED ALERT option is available for remote alarms.

Recorded data may be downloaded whenever required by the user. For each station an overview diagram is created, and user-selected time histories may be plotted. Stations with RED ALERT send their alarm messages in form of a text message (SMS), fax messages or e-mail to the user-selected recipients.

The fully comprehensive sensor self-test as well as a daily test message including memory and battery status ensure that the monitoring works without interruption.

If alarm messages come in from stations with the RED ALERT option, data can be quickly downloaded and analyzed without a visit to the construction site to facilitate prompt corrective action.

MONITORING OF VIBRATIONS CAUSED BY BLASTINGS NETWORK CONTROL CENTER - NCC

For the simultaneous monitoring of vibrations with several sensors, a NCC is used. The NCC connects up to 8 MRs in a star topology network. Each station works as an autonomous unit. Synchronisation and triggering is managed by the NCC. Via its built-in voting logic, the NCC controls the alarm output. Download of data and the programming of the individual stations may also be carried out via NCC (single point access).

Recorders

MR2002-CE STANDARD

The Standard model includes the Basic MR2002-CE recorder, along with the triaxial MS2003+ sensor with mounting plate, the KB filter option, all cables, a rugged transport case, and communication and data analysis software.

MR2002-CE STANDARD-PLUS

For more complex vibration measurement tasks, where vibrations have to be measured simultaneously at different places. The Standard Plus package includes the MS2003+ uniaxial (vertical) and the MS2003+ triaxial sensor with connector for external z-axis, complete with mounting platforms and extension cord.

NCC LIGHT NETWORK CONTROL

The NCC provides on-site or remote, single-point network control for up to 8 MR2002-CE stations (24 channels). The NCC manages network communications, time synchronization, common triggering, alarms, and data transfer.

Optional Features

RED ALERT: REMOTE CONTROL

With the RED ALERT option, the MR2002 can be programmed and controlled via GSM (Mobile telecommunication). Alarm messages, system status information and peak values may be automatically sent via text message (SMS), fax or e-mail to as many as 7 user-specified recipients.

RED SAFE: MASS STORAGE

The RED SAFE option provides from 32 to 640 Mb of mass storage, with up to 8h (32 MB) of uninterrupted full waveform recording (background mode: up to 30 days in a single file of 64 KByte). The data is available on your PC within seconds.

DEEP RED: HIGH DYNAMIC RANGE

SYSCOM's new MS2003+ Sensor with its measuring ranges of 0.0001 – 2.3 mm/s and 0.0035 – 115 mm/s together with DEEP RED's dynamic range of 130dB make the MR2002-CE the appropriate instrument even for the most sensitive 'background-noise' measuring. This brings you an addition of applications for your MR2002-CE such as subsoil characterization studies utilizing the Nakamura method.

Sensors

MS2003+ VELOCITY SENSOR

Principle:	Active, Electronically Compensated Geophone
Direction:	Vertical or Horizontal Uni-axial), 3 Orthogonal Directions (Tri-axial)
Measuring range:	0.0035 to 115 mm/s (option: 0.00007 to 2.3 mm/s) 0.0001378 in/s to 4.528 in/s (option: 0.0000028 in/s to 0.09 in/s)
Frequency range:	1 to 315 Hz
Casing:	Alu (122 x 120 x 91 mm); approx. 1500 g

MS2002+ TRIAXIAL ACCELEROMETER

Principle:	Micro Mechanical (MEMS) Capacitive Accelerometer
Direction:	3 orthogonal directions
Measuring range:	0.137 mg to 2 g
Frequency range:	0 to 150 Hz
Casing:	Aluminium (80 x 75 x 57 mm); approx. 400g

MS2004+ TRIAXIAL ACCELEROMETER

Principle:	Micro Mechanical (MEMS) Force Balance Accelerometer (FBA)
Direction:	3 orthogonal directions
Measuring range:	0.069 mg to 1 g
Frequency range:	0 to 150 Hz
Casing:	Aluminium (80 x 75 x 57 mm); approx. 400g

MS2002+ TRIAX ACCELEROMETER 10g

Principle:	Micro Mechanical (MEMS) Capacitive Acceleration
Direction:	3 orthogonal directions
Measuring range:	0.69 mg to 10g
Frequency range:	0 to 150 Hz
Casing:	Aluminium (80 x 75 x 57 mm); approx. 400g



Features Alarm/Remote Control

REMOTE CONTROL

Syscom's user-friendly WINCOM software allows easy communication with the recorder for setup, monitoring or data retrieval, which may be done on-site by Direct Link or via IP address to a PC, or remotely via modem or Syscom's GSM cellular engine. Full remote access to a single recorder or an NCC network can achieve substantial savings in manpower and travel time.

ALARM BOX

In many cases vibration monitoring alone is not sufficient. To avoid damage, alarm output is required immediately after threshold limits have been exceeded. The Alarm Box connects to the alarm output of the MR2002-CE. Three LEDs (Error, Low Level Alarm und High Level Alarm) indicate the status of the MR2002-CE and three connectors are available for sirens, flashing lights.

Data Analysis Software

VIEW 2002: TIME DOMAIN

Time domain analysis includes the representation of recorded signals as time histories, the calculation of the derived signals such as displacement, velocity and acceleration and the calculation of the vector sum. The recorded signals are displayed as triplets (three orthogonal directions). They can be enlarged and displayed for all channels. With Zoom and Point functions the significant parts can be displayed and labeled.

VIEW 2002: DAMPING

The Damping function calculates eigen frequency and damping for a decaying vibration. VIEW 2002 calculates the damping ratio in terms of percent of critical damping (assuming a single degree of freedom system) for the signal section determined by the user. The graphical representation allows a straightforward control of the computed result.

VIEW 2002: FREQUENCY DOMAIN

Frequency analysis in terms of amplitude or power spectra are readily produced with VIEW 2002. The user interface includes procedures like "zero stuffing" and "windowing" easy to understand. Zoom and point functions allow quick and easy display and labeling of interesting data.

VIEW 2002: 3RD OCTAVE BAND AND RESPONSE SPECTRUM

The representation of the frequency analysis in terms of a 3rd octave band spectrum is primarily used in connection with train induced vibrations. Numerous analysis programs for train vibration prediction use these spectra. VIEW 2002 includes two types of 3rd octave band spectra: the average 3rd octave band spectrum und the maximum octave band spectrum. Response spectra are calculated with various damping ratios.

VIEW 2002: FILE GROUP ANALYSIS

File Group Analysis is a very powerful tool to analyze large amount of data. With this tool, a series of files in a directory can be processed and statistically analysed according to the selected method, including: peak values and vector sum; RMS values with threshold values; and, Peak vs. main frequency. Customized analysis methods can be created in the menu «Process Data», where various analysis procedures like Filters, Integration, Differentiation, Frequency analysis etc. can be combined.

VIEW 2002: P-F-DIAGRAM

The Peak Frequency Diagram with national code limits is fully implemented. Presently the SN 640 312a and DIN 4150/3 are available. Others can be entered by the user.

VIEW 2002 3-D-REPRESENTATION

Vibration recordings are not always easy to understand and interpret. With complex vibration time histories a 3-D-representation is often quite helpful. The 3-D-Diagram in VIEW 2002 can be rotated in all directions allowing an optimal display of the vibration process.

