

MR2002-SM24-K / Strong Motion Recorder



The MR2002-SM24-K is a Strong Motion Recorder that meets the certified safety standards for safety related applications.

Applications

Seismic Monitoring Solutions for safety related applications in

- Nuclear Power Plants
- Nuclear Fuel Storage Plants
- Nuclear Fuel Enrichment Plants
- LNG Terminals
- Oil & Gas

MR2002-SM24-K Strong Motion Recorder

The MR2002-SM24-K is a Strong Motion Recorder that meets the certified safety standards for safety related applications. Its high dynamic range and its ability to calculate Seismic Intensity (CAV) continuously makes it particularly suitable for both free field and structural monitoring.

Major features

- Rugged design
- Superb quality, extremely reliable
- Calibrated for a lifetime
(in combination with accelerometers MS2002+ / MS2008+)
- 1 GB event memory (500 hours)
- High dynamic range (130 dB)
- Calculates and provides alarms for seismic Intensity (CAV)
- Designed to be used in monitoring network
- Certified to meet the following standards
IEC 60780 / IEC 60980
IEC 61513 Class 3
IEC 61226 Cat. C
IEC 60880



MR2002-SM24-K connected to MS2002+
sensor and cable ordered and delivered separately

Data acquisition

Principle

3 individual delta-sigma modulators and digital filtering (32 bit DSP)

Recording

24 bit signed (3 bytes)

Resolution

up to 24 bit

Sampling-rate

50, 100, 200, 500 sps, others on request

Number of channels

3 (X,Y,Z) data channels

Channel to channel skew

None

Dynamic range

130 dB @ 200 sps (RMS noise/RMS clip)

Analog Filter

2 Pole Butterworth (anti-alias filter)

Data Filter

Digital CIC and FIR filter cut-off at 80 % of Nyquist frequency
Optional: User defined FIR or IIR digital filters

Trigger Filter

Digital IIR filter: 1 - 10 Hz band-pass

Optional: User defined FIR or IIR digital filters

Trigger and De-trigger

Principle

Level trigger

Channels

X,Y or Z axis, software

Range

0.01 to 50 % full scale

Microprocessor

Recording principle

Event recording (time history) with on-line data compression (approx. 20 minutes/MByte @ 200 sps, 3 channels)

Header

Contains status information at time of trigger and event summary

Pre-event recording

1 - 100 seconds (in 1 sec steps)

Post-event recording

1 - 100 seconds (in 1 sec steps)

Max. recording time

Event recording: unlimited (Typ: 30 Min./event)

Alarm triggers principle

Level trigger with unlimited signal 2 levels (individually settable for each axis)

Channels

OR combination of the 3 axis

Range

0.1 % to 100 % full scale

Optional

Seismic intensity alarm, based on CAV (Cumulative Absolute Velocity)

Clock

Accuracy

20 ppm (10 min/year) with Lithium back-up battery

Autonomy

> 5 years autonomy with backup battery

Firmware principle

Multitasking environment, simultaneous data acquisition and communication (data retrieval or parameter setting)

Display

4 LED

Power Supply, Run, Recording/Memory use, Warning/Error

Memory

Primary Memory

Internal 2 MB SRAM

Secondary Memory

Removable SD Flashcard (1 GB), FAT formatted

Recording Capacity

Approx. 500 hours (at 200 sps)

Power supply

Battery

Internal lead-acid gel cell 8,5 Ah

Battery Charger

Integrated

Supply Voltage

DC 10 - 36 V

Power consumption

Approx. 170 mA @ 12 V (standard modules)

Autonomy

Typ. 48 hours (with internal battery)

I/O and connectors

Type

Metallic self-latching push-pull connectors with positioning key (LEMO)

Sensor

Bipolar input (0 ± 4 V), optional differential or pseudo-differential input (0 ± 4 V)

RS-232

Communication with PC or Modem with full galvanic isolation

Alarm/Status relay (opt.)

3 low voltage relays (Seismic Switch)

- rating 2 A @ 30 V DC, NC or NO configurable by user

Power consumption

approx. 40 mA @ 12 V

Interconnection

4 - 20 mA current loop interface or fiber optic for NCC Network Control Center

Power

Metallic connector - internal line filter

Dimensions

Casing (Aluminium)

200 x 230 x 110 mm

Casing (Stainless Steel)

255 x 262 x 131 mm

Weight

7.5 kg

Protection degree

IP 65 (splash-proof)

Regulations

EMI/RFI

in compliance with EN 61000

Environmental

in compliance with IEC 60068

Heat

-35 °C up to +50 °C (with battery)

-35 °C up to +70 °C (without battery)

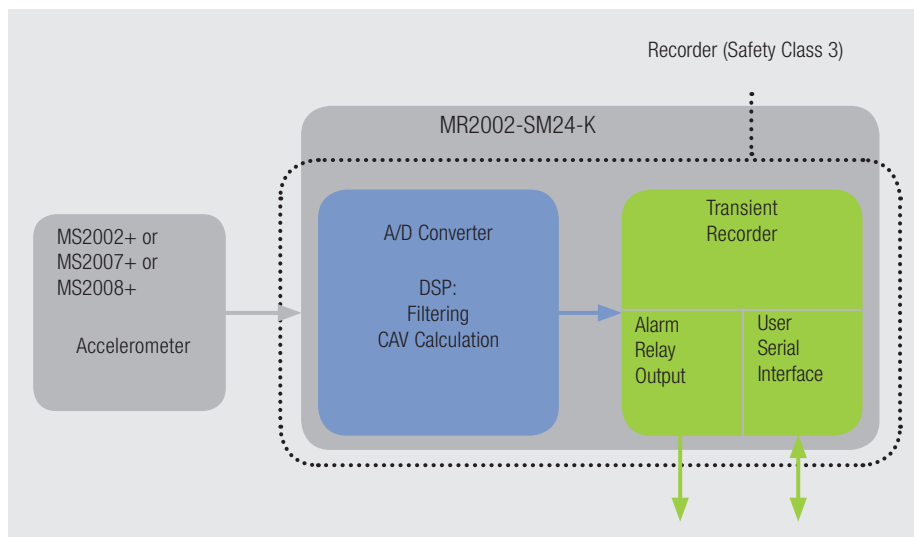
Humidity

up to 100 % RH

Conformity

CE

Block diagram MR2002-SM24-K



Ordering information

MR2002SM24K — **A** 2 0 0 8 **I** — **B** H 4 — **E** F O — **N** 3 R — **T** A

A	Sensor type
2002E	External MS2002+ accelerometer
2002I	Internal MS2002+ accelerometer
2008E	External MS2008+ accelerometer
2008I	Internal MS2008+ accelerometer
2007E	External MS2007+ accelerometer

B	Mounting and range
H2	Horizontal mounted, $\pm 2g$ (only for 2002I)
V2	Vertical mounted, $\pm 2g$ (only for 2002I)
H4	Horizontal mounted, $\pm 4g$ (only for 2008I)
V4	Vertical mounted, $\pm 4g$ (only for 2008I)
EX	External accelerometer

T	External case
A	Aluminium
S	Stainless steel

N	Relays
3R	3 relays
4R	4 relays
XX	No relays

E	Interface
CL	Current Loop
FO	Fiber Optic
XX	No communication interface

Sensors

Detailed data sheets and ordering information available on www.bartec-syscom.com



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