



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. It's high dynamic range and it's ability to calculate Seismic Intensity (CAV) continuously makes it particularly suitable for both free field and structural monitoring.

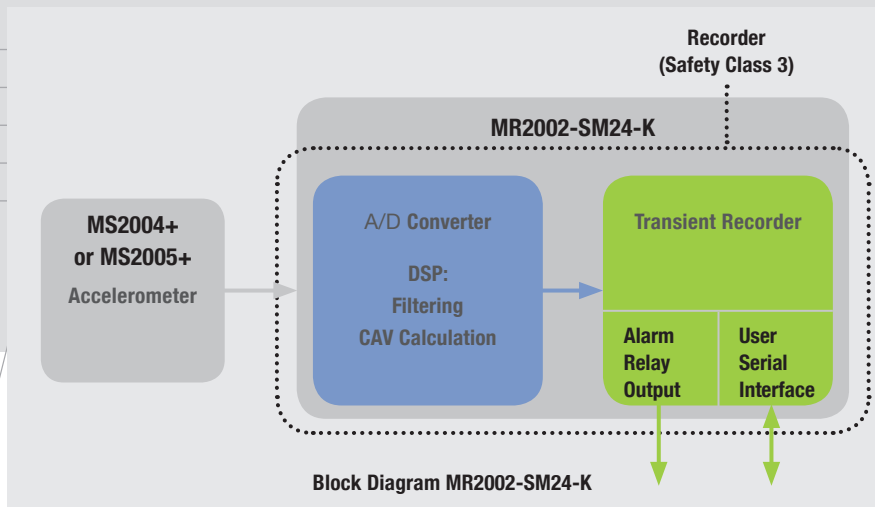
The MR2002-SM24-K provides outstanding features:

- Rugged design
- Superb quality, extremely reliable
- Calibrated for a lifetime (in combination with accelerometer MS2004+ / MS2005+ / MS2007+)
- 1 GByte event memory (500 hours)
- High dynamic range (120 dB)
- Calculates and provides alarms for seismic Intensity (CAV)
- Designed for use in monitoring network
- Certified to meet the following Standards:
 - IEC 60780 / IEC 60980
 - IEC 61513 Class 3/ IEC 61226 Cat.C
 - IEC 61508 SIL1
 - IEC 60880

Technical Specification

MR2002-SM24-K

Strong Motion Recorder



Technical Specifications MR2002-SM24-K

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 - default Optional: User defined FIR or IIR digital filters
Trigger Filter	Digital IIR filter: 1 - 10 Hz band-pass - default 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 autonomy	20 ppm (10 min/year) with Lithium back-up battery > 5 years autonomy with backup battery
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Firmware

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

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

Primary Memory	Internal 2 MByte SRAM
Secondary Memory	Removable SD Flashcard (1 GByte), FAT formatted
Recording Capacity	Approx. 500 hours (at 200 Sps)

Power Supply

Battery	Internal lead-acid gel cell 7 Ah, optionally 9 Ah
Battery Charger	Integrated
Supply Voltage	DC 10-36 V
Power consumption	Approx. 200 mA @ 12 V (standard modules)
Autonomy (with int. battery)	Typ. 40 hours

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	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, fiberoptic for NCC Network Control Center
Power	Metallic connector - internal line filter

Ordering Information

Product Codes

Motion Recorder	MR2002-SM24-K for external MS2004+ / MS2005+ sensor aluminium, prepared for fiber-optic interface	
	MR2002-SM24-K for external MS2004+ / MS2005+ sensor aluminium, prepared for current-loop interface	
	MR2002-SM24-K for external MS2004+ / MS2005+ sensor stainless steel, prepared for fiber-optic interface	
	MR2002-SM24-K for external MS2004+ / MS2005+ sensor stainless steel, prepared for current-loop interface	
	other configurations:	
	MR2002-SM24-K with differential inputs for external MS2004+ / MS2005+ sensor	consult factory
	MR2002-SM24-K with interface for external MS2007+	consult factory
	MR2002-SM24-K for internal MS2004+ / MS2005+ sensor	consult factory
Alarm/Status-interface	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	93.11.2070
Network-interface	Connection to NCC Network Control Center - Fiber-optic interface 850 nm Tx/Rx, distance up to 3 km - Current-loop interface 4-20 mA Tx/Rx, distance up to 1 km Power consumption approx. 40 mA @ 12 V	93.11.2051 93.11.2060

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), opt. IP67

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

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