GENUINE VIBRATION MONITORING SOLUTIONS



MRSK2002 / SEISMIC SWITCH AND STRONG MOTION



APPLICATIONS

Seismic Monitoring Solutions for safety related applications in :

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

DATASHEET : MRSK2002

The MRSK2002 is the first instrument in the market to meet the certified safety standards for Nuclear applications.



MRSK2002 Seismic switch and strong motion recorder

The MRSK2002 is the first instrument in the market to meet the certified safety standards for Nuclear applications. It combines the functionality of a seimic switch for "Class 1" trip systems with the functionality of a strong motion recorder in a monitoring network.

Major features

- Rugged design
- Superb quality, extremely reliable
- Calibrated for a lifetime
- 1 GB event memory (500 hours)
- Suitable for trip systems in NPPs
- Designed to be used in monitoring networks
- Certified to meet IEC 60780 / IEC 60980 IEC 61513 Class 1 / IEC 61226 Cat. A IEC 61508 SIL 2* IEC 60880
 - *SIL 3 with triple redundancy





MS2002+

Data Acquisition

Principle Linear "track and hold" A/D-Converter, analog filtering Resolution 16 bit Sampling-rate 200 sps 3 (X,Y,Z) data channels **Number of channels Dynamic range** 96 dB (RMS) **Analog Filters** - 6 Pole Butterworth low-pass, -3 dB @ 50 Hz 120 dB/decade (anti-alias filter) - 1 - 10 Hz band-pass-pass (trigger filter) Trigger principle Level trigger **Channels** X,Y or Z axis, software OR combinations Range 0.1 % to 50 % full scale Microprocessors **Recording principle** Event recording (time history) with on-line data compression Header Contains status information at time of trigger **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, (30 Min./event) Level trigger with unlimited signal Alarm triggers principle (2 levels, individually settable for each axis) Channels OR combination of the 3 axis Range 0.1 % to 100% full scale Clock 20 ppm (10 min / year) or network Time synch. to master clock Accuracy Autonomy > 5 years with backup battery Firmware principle Multitasking environment, simultaneous data acquisition and communication (data download or parameter setting) **User interface** RS-232 up to 115200 Baud Packetized protocol with check-sum and one level password - Parameter setting - File-transfer XMODEM / YMODEM 1K - Firmware upgrade Download via RS-232 (non safety) - Parameters Trigger level, Post event trigger, Pre event trigger, Time synchronization and others Safety Interface (Internal) RS-232 - Parameter setting Packetized protocol with check-sum and one level password - File-transfer XMODEM / YMODEM 1K - Parameters Alarm Levels, Test Parameters **Autodiagnostics** Continuous monitoring of all important functions Fully comprehensive periodic self-test Display 4 LED Power Supply, Run, Recording / Memory use, Warning / Error

Memory

Primary Memory Secondary Memory Recording capacity Internal 2 MB SRAM Removable SD Flash Card 1 GByte, FAT formated Approx. 500 hours (at 200sps)

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93114000

Power Supply

Battery Battery Charger Supply Voltage Power consumption Autonomy (with internal battery) Internal lead-acid gel cell 8.5 Ah Integrated DC 10-36 V Approx. 200 mA @ 12 V Approx. 35 hours

I/O and Connectors

Туре	Metallic self-latching push-pull connectors with positioning key (LEMO)
Sensor	Bipolar input 0±2V (MS2002+)
Safety RS 232 (Internal)	Communication PC
User Serial Interface	Fiber optic with NCC Network Control Center or PC,
Power	Metallic connector - internal line filter
Safety Alarm Relay	2 low voltage relays (Seismic Switch)
	- rating 2 A @ 30 V DC, NC or NO configurable by user
	Power consumption approx. 40 mA @ 12 V
Error Alarm Relay	1 low voltage relay

1 low voltage relay - rating 2 A @ 30 V DC, NC or NO configurable by user Power consumption approx. 40 mA @ 12 V

Ordering Information

Seismic Switch with sensor MRSK2002

Dimensions

Casing Weight Protection degree Aluminium, 230 x 200 x 110 mm 7.5 kg IP 65 (splash-proof)

Regulations

RMI/RFI Environmental

Conformity

In compliance with IEC 61000 In compliance with IEC 60068 Heat: -20° up to +70°C

Heat: -20° up to +70°C Humidity: up to 100% RH





Technical Specifications MS2002+

Performance principleImage: Second secon

MEMS capacitive accelerometer with electronical signal conditioning \pm 2 g none 1mV/mg < 0.8% of FS 0 - 100 Hz typ. < 0.1 mg/°C < 0.1 mg typ. 18 μ V / \sqrt{Hz} , max. 24 μ V / \sqrt{Hz} > 84 dB (DC to 50 Hz)

Mechanical specifications MS2002+ Shock Survival 6000 g

Shock Survival Vibrations Cross Axis Sensitivity Operating Temperature Power Supply Power Consumption

20 g rms, 20 - 2000 Hz 30 mV/g -20 to 70 °C ± 5 VDC Typ. 6 mA@5V, 4mA@-5V

Physical Characteristics Housing Connector

Weight Protection degree Aluminum, 80 x 75 x 57 mm (W x L x H) Metallic self-latching push-pull connector with positioning key (LEMO) 0.5 kg IP 65 (splash-proof)







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