

**SAFETY IS OUR PRIORITY**

**BARTEC SYSCOM**

# MR3000DMS

Dam Monitoring System



The MR3000DMS is a dedicated strong-motion monitoring system for dams. Up to 32 units can be connected together to have a complete and reliable seismic monitoring system.

## Market Segments

### Strong motion

- All types of dams
- Dynamic behaviour assessment of large complex structures under seismic constraints

## MR3000DMS Dam Monitoring System

The MR3000DMS seismic monitoring system is the most compact, integrated and reliable system for dams, ensuring the highest level of safety and sustainability. Automatic earthquake detection and structural monitoring will ensure the dam full integrity over its lifetime.

The MR3000DMS is extremely versatile and easy to install, thanks to its state of the art Ethernet master-slave connectivity and the command & control access through embedded web server.

3 relays output (alarm 1, alarm 2, device error) can be directly connected to the control room for a centralized overview and an automatic logic response in case of any seismic event.

### Major features

- Compact unit containing sensor, recorder, battery and communication
- Fiber optics communication
- Internal AC/DC with Overvoltage protection, type I + II
- Embedded Web server for easy configuration and control
- Optional accurate timing (GPS)
- 3 output relays
- Industrial cable glands and internal terminals (no additional junction box needed)



MR3000DMS



Panel mount RJ45 connector with cap for LAN kit

### Technical specifications

#### Data acquisition

##### General

<b>Principle</b>	4th order delta-sigma ADC per channel
<b>Resolution</b>	24 bits
<b>Sampling-rate</b>	50, 100, 200, 400, 500, 800, 1000, 2000sps
<b>Number of channels</b>	3
<b>Channel to channel skew</b>	None, simultaneous sampling on all channels
<b>Dynamic range</b>	Typ. 130 dB @ 250 sps, 127 dB @ 500 sps
<b>Data Filter</b>	Anti-aliasing filters
<b>Trigger Filter</b>	Digital IIR filter: 0.5 – 15 Hz band-pass (Strong Motion Applications)

#### Trigger and de-trigger

##### Principle

<b>Principle</b>	Level trigger or STA/LTA or automatic adjustment of trigger level
<b>Trigger voting logic</b>	Predefined AND or OR combinations, individual channel votes
<b>Trigger level</b>	0.1 mg to 4 g
<b>STA / LTA</b>	STA: 0.1 to 25s, LTA: 1 to 250s, ratio 0.1:25
<b>Smart Trigger / De-Trigger</b>	Automatic adjustment of trigger level

#### Microprocessor

##### Recording

<b>Principle</b>	Event recording (time history), continuous time recording or manually triggered
<b>Header</b>	Contains status information at time of trigger and event summary
<b>Pre-event recording</b>	1-30 s (in 1 second steps)
<b>Post-event recording</b>	1-100 s (in 1 second steps)
<b>Max. recording time</b>	Unlimited
<b>Memory Removable</b>	SD flash card (4GB)

##### Timing

<b>System clock</b>	1ppm, could be disciplined by GPS or NTP
---------------------	--

#### Data / User Interface

##### Web interface

<b>Web interface</b>	Easy to use command & control through embedded web server
<b>Intelligent Alerting</b>	System initiates communications and sends e-mail when an event is recorded
<b>FTP Built-in</b>	FTP client to push data to an FTP-server

#### Alarm triggers

##### Principle

<b>Principle</b>	Two alarm levels independently settable as threshold levels or user-defined curves, with various notification options (individually settable for each axis)
<b>Alarm level range</b>	0.1 % to 100% full scale
<b>User-defined alarm</b>	Thresholds and frequencies individually settable for each axis
<b>System status</b>	3 LEDs Run, Recording, Warning/Error. Internal LCD with status info and important settings

#### Network capabilities

##### Common trigger and common alarm

##### Sync. in LAN network

##### Max. number of MR3000DMS

##### Remote control

<b>Common trigger and common alarm</b>	Configurable with AND/OR logic, for every device within the same network
<b>Sync. in LAN network</b>	Typically 1 ms with NTP protocol
<b>Max. number of MR3000DMS</b>	32, in Master/slave configuration
<b>Remote control</b>	VPN, DDNS

#### Power Supply

##### Power supply

##### Internal battery

##### Consumption

##### Battery autonomy

<b>Power supply</b>	100 - 240 V AC, 50 - 60 Hz, OVP protected, type I and II. Optional DC power 10-36 V DC
<b>Internal battery</b>	12 V, 12 Ah
<b>Consumption</b>	4 W (with charged battery), 25 W (AC max. and battery in charge)
<b>Battery autonomy</b>	Typ. 40 hours

## I/O (glands and connectors)

<b>Relays (3)</b>	M16 cable gland 7-11mm / Terminals
<b>Power</b>	M16 cable gland 4-11mm / Terminals
<b>Kit LAN</b>	On request, 3 m Ethernet cable
<b>Kit GPS</b>	On request, connector and GPS antenna with 5 m cable for time synchronization
<b>FO</b>	M20 cable gland 6-13 mm / ST connectors

## Fiber Optics

<b>FO type</b>	Multimode OM2 fiber with wavelength 1300 nm, 50/125 µm, Rx/Tx
----------------	---

## Relays

<b>Configuration</b>	3 output configurable relays, No/Nc
<b>Current</b>	2 A, 30 V DC

## Acceleration sensor

<b>Principle</b>	Micro-machined capacity MEMS accelerometer
<b>Hysteresis</b>	None
<b>Noise (10 to 1000 Hz)</b>	Typ. 7 µg/√Hz
<b>Frequency range</b>	DC to 600 Hz
<b>Dynamic range</b>	Typ. 100 dB @ 200 sps
<b>Measuring range</b>	±4 g
<b>Sensitivity</b>	1.25 V/g differential
<b>Scale factor error</b>	< 1 %
<b>Orientation</b>	Horizontal or vertical mounting, to be specified when ordering
<b>Self test</b>	Test-pulse, configurable

## Housing

<b>Dimensions</b>	330 x 230 x 110 mm
<b>Weight</b>	10 Kg
<b>Protection degree</b>	IP66

## Environmental

<b>Shock</b>	30 g/11 ms half-sine
<b>Heat</b>	-20 °C to +50°C
<b>Humidity</b>	up to 100% RH

## Regulations

<b>EMC</b>	IEC 61326-1
<b>Electrical safety</b>	IEC 61010
<b>Conformity</b>	CE
<b>Origin</b>	Swiss Made

## SYSCOM Instruments SA

Rue de l'Industrie 21  
1450 Sainte-Croix  
SWITZERLAND

T. +41 (0) 24 455 44 11

www.bartec-syscom.com  
info@bartec-syscom.com  
scs.bartec-syscom.com

## Syscom Cloud Software (SCS)

The MR3000DMS can be connected to the Syscom Cloud Software (SCS) in order to simply visualize the data recorded and manage different projects.

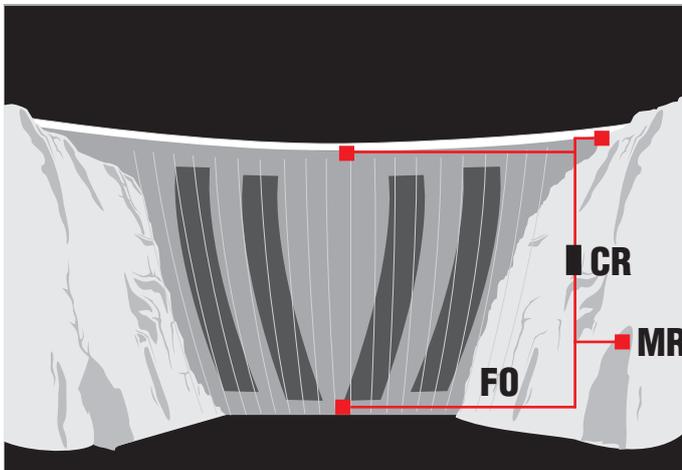
The main features of the SCS include:

- plug & play M2M communications
- management by projects
- different access levels (administrator, read/write, view only)
- visualization of events/background monitoring
- comparison with reference standards
- automatic reporting

Please visit [scs.bartec-syscom.com](http://scs.bartec-syscom.com) for more information.

**SCS**  
[scs.bartec-syscom.com](http://scs.bartec-syscom.com)

## Arch dam instrumentation



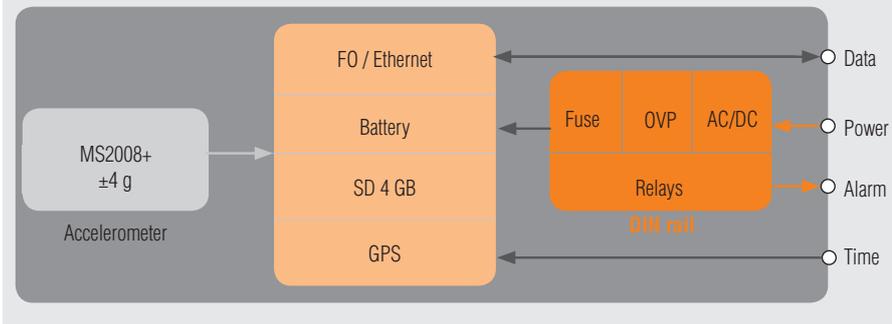
MR : MR3000DMS    FO : Fiber Optics  
CR : Control Room with FO switch

## Dam Strong-motion, minimal instrumentation

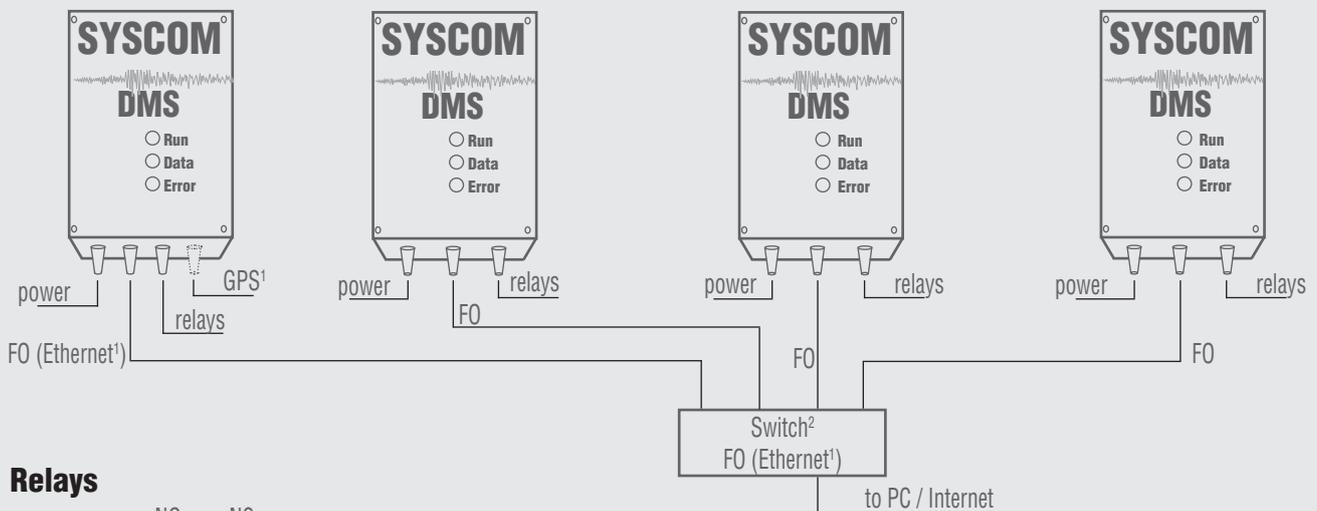
- 2 MR3000DMS at the dam top (middle and embankment)
- 1 MR3000DMS at the dam base
- 1 MR3000DMS at the free field
- Connections with fiber optics to reach the Control Room

Contact SYSCOM Instruments SA for complete dam monitoring guidelines

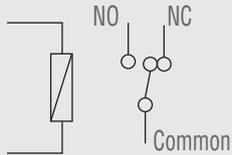
## Block diagramm MR3000DMS



## Wiring diagram



### Relays



FO 1300 nm, 50/125 µm, Rx/Tx, OM2  
 Relays 3 alarm relays  
 Power 100-240 V AC 50-60 Hz, DC on request

<sup>1</sup> kit on request

<sup>2</sup> the switch is not supplied by SYSCOM

## Ordering information

Sets descriptions:

MR3000DMS main unit with internal triaxial accelerometer containing: internal battery, internal AC/DC converter, Over Voltage Protection, 3 relays, 4 GB Memory, Embedded server for configuration and control with master/slave settings for Ethernet network	Part Number	AC Power supply & OVP	DC Power supply	Horizontal mounted	Vertical mounted
MR3000DMS ±4g, horizontal mounted, AC 100-240 V AC, fiber optic communication	MR3000DMS-2008I-H4-F-AC-X	x		x	
MR3000DMS ±4g, vertical mounted, AC 100-240 V AC, fiber optic communication	MR3000DMS-2008I-V4-F-AC-X	x			x
MR3000DMS ±4g, horizontal mounted, DC 10-36 V DC, fiber optic communication	MR3000DMS-2008I-H4-F-DC-X		x	x	
MR3000DMS ±4g, vertical mounted, DC 10-36 V DC, fiber optic communication	MR3000DMS-2008I-V4-F-DC-X		x		x
MR3000DMS ±4g, horizontal mounted, AC 100-240 V AC, LAN communication	MR3000DMS-2008I-H4-L-AC-X	x		x	
MR3000DMS ±4g, horizontal mounted, AC 100-240 V AC, LAN communication, GPS compatibility*	MR3000DMS-2008I-H4-L-AC-G	x		x	
KIT GPS for MR3000DMS complete (cable, connectors, GPS)	12110201				
MRs network Master/Slave firmware option**	88010003				
Mounting platform in PE-HD black with mounting screws and bolts	13000048				
IP66 plug for KIT LAN with X meter cable. Please specify length in -X meters, in standard 3m.*	81000585-X				

\*to be ordered at purchase time

\*\*Master MR to be specified at purchase time, 1 MR master per network.