SAFETY IS OUR PRIORITY

BARTEC SYSCOM

MARMOT SYSTEM

BARTEC SYSCOM's MARMOT Seismic Monitoring and Trip System perfectly responds to the increasing safety demand in vulnerable industries such as Nuclear Power Plants (NPP), Nuclear Storage Facilitites and Liquefied Natural Gas Storage (LNG). With its distributed intelligence it guarantees dependable alarms for automatic shut down (trip) information depending on the impact of earthquakes on structures

Seismic Monitoring and Trip System

Applications

- Nuclear Power Plants
- Gas Turbine Power Plants
- LNG-Terminals
- Chemical Process Industries

MARMOT Seismic Monitoring and Trip System

BARTEC SYSCOM

Trip

Safety Category A (IEC 61226)
SIL 3 (IEC 61508)

Automatic shut down control

Seismic Switch
(Safety Class A)

MR2002-SM16-K

MS2002+
Accelerometer

A/D Converter
Threshold Detector

Safety Serial Interface

Relay Output

Recorder
(Safety Class C)

Transient Recorder

User Serial Interface

Block Diagram MRSK2002

Triple redundancy

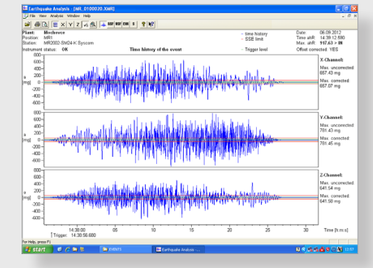
Monitoring Safety Category C (IEC 61226)

MR2002-SM16-K

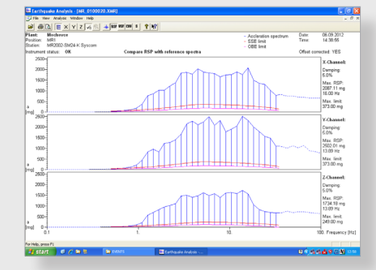
MS2002+

MRSK2002 – Seismic Switch/Strong Motion Recorder

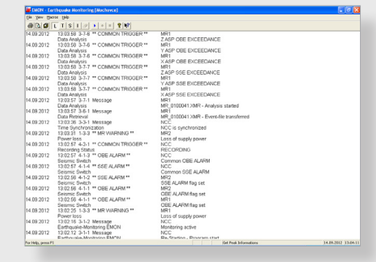
Serial Connections Fiberoptic



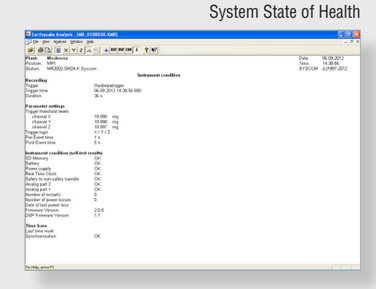
Time Histories



Spectra Comparison



Log files



System State of Health

CABINET
seismically braced

SYSCOM

NCC
Time synchronization
Voting Logic
3 relays

Display

Keyboard

PC

Printer

Power Supply 1

Power Supply 2

Safety Category C (IEC 61226)

Strong Motion Recorder

Recorder
(Safety Class C)

MR2002-SM24-K

MS2008+
Accelerometer

A/D Converter
DSP: Filtering

Transient Recorder

Alarm Relay Output

User Serial Interface

Block Diagram MR2002-SM24-K

MR2002-SM24-K

MS2008+

Serial Connections Cupper/Fiberoptic

Free Field Recorder

Recorder
(Safety Class C)

MR2002-SM24-K

MS2007+
Accelerometer

A/D Converter
DSP: Filtering
CAV Calculation

Transient Recorder

Alarm Relay Output

User Serial Interface

Block Diagram MS2002-SM24-K

MR2002-SM24-K

MS2007+

Seismic Intensity (CAV)

Serial Connections Cupper/Fiberoptic

MARMOT

Seismic Monitoring and Trip System for Nuclear Power Plants / LNG-Terminals / Gas Turbine Power Plants / Chemical Process Industries

BARTEC SYSCOM's MARMOT Seismic Monitoring and Trip System perfectly responds to the increasing safety demand in vulnerable industries such as Nuclear Power Plants (NPP), Nuclear Storage Facilitites and Liquefied Natural Gas Storage (LNG). With its distributed intelligence it garantees dependable alarms for automatic shut down (trip) information depending on the impact of earthquakes on structures.

MARMOT complies with all the relevant standards applicable in these industries, fully tested and certified. MARMOT's modular design offers cost effective solutions for the individual requirement of a plant structure. The use of proven state-of-the-art technology guarantees a minimum of 15 years of life and support!

BARTEC SYSCOM's System Qualification Plan for the MARMOT System is based on the following sources and guidelines

1. IEC 60780 10/1998
   Nuclear power plants - Electrical equipment of the safety system - Qualification
2. IEC 60980 06/1989
   Recommended practices for seismic qualification of electrical equipment of the safety system for nuclear generating stations
3. RCC-E 12/2005
   Design and construction rules for electrical equipment of nuclear islands
4. IEC 61180-1 10/1992
   High-voltage test techniques for low-voltage equipment
5. IEC 60439-1 04/2004
   Low-voltage switchgear and control gear assemblies - Part 1: Type-tested and partially type-tested assemblies
6. IEC 60068-2-1 03/2007
   Environmental testing - Part 2-1: Tests - Test A: Cold
7. IEC 60068-2-2 07/2007
   Environmental testing - Part 2-2: Tests - Test B: Dry heat
8. IEC 60068-2-6 12/2007
   Environmental testing - Part 2: Tests - Test Fc: Vibration (sinusoidal)
9. IEC 60068-2-14 01/1984
   Basic environmental testing procedures. Part 2 : Tests - Test N: Change of temperature
10. IEC 60068-2-27 02/2008
    Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock
11. IEC 60068-2-30 08/2005
    Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)
12. IEC 60068-2-57 11/1999
    Environmental testing - Part 2-57: Tests - Test Ff: Vibration - Time-history method
13. IEC 60068-2-78 08/2001
    Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state
14. IEC 61000-4-2 01/1995
    Electromagnetic compatibility (EMC) - Part 4: Testing and measuring techniques - Section 2: Electrostatic discharge immunity test - Basic EMC publication
15. IEC 61000-4-3 11/2007
    Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test
16. IEC 61000-4-4 07/2004
    Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test
17. IEC 61000-4-5 11/2005
    Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test
18. IEC 61000-4-6 05/2006
    Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields/Combines IEC 61000-4-6 (2003-05), AMD 1 (2004-10) and AMD 2 (2006-03)
19. IEC 61000-4-8 06/1993
    Electromagnetic compatibility (EMC) - Part 4: testing and measurement techniques; section 8: power frequency magnetic field immunity test; basic EMC publication
20. IEC 61000-4-11 06/2004
    Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques Voltage dips, short interruptions and voltage variations immunity tests
21. IEC 61000-4-12 09/2006
    Testing and measurement techniques - Ring wave immunity test
22. IEC 61000-6-4 07/2006
    Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments
23. EN 55011 08/2007
    Industrial scientific and medical (ISM) radiofrequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement
24. IEC 61000-4-9 06/1993
    Electromagnetic compatibility (EMC) - Part 4-9: Testing and measurement techniques; Pulse magnetic field immunity test
25. IEC 61000-4-18 06/2007
    Electromagnetic compatibility (EMC) - Part 4-18: Testing and measurement techniques - Damped oscillatory wave immunity test
26. IEC 61000-4-16 06/1998
    Electromagnetic compatibility (EMC) - Part 4-18: Testing and measurement techniques - Test for immunity to conducted, common mode disturbances in the frequency range 0 Hz to 150 kHz
27. IEC 61000-4-10 06/1993
    Electromagnetic compatibility (EMC) - Part 4- 18: Testing and measurement techniques - Damped oscillatory magnetic field immunity test
28. IEC 60721-3-3 10/2002
    Classification of environmental conditions - Part 3-3: Classification of groups of environmental parameters and their severities - Stationary use at weather protected locations
29. IEC60364-3 12/1995
    Electrical Installations of Buildings

All tests have been carried out by accredited test labs such as IABG (Munich) or Montena (Fribourg). Test reports are available.

SYSCOM Instruments SA
Rue de l'Industrie 21
1450 Sainte-Croix
SWITZERLAND

T. +41 (0) 24 455 44 11
F. +41 (0) 24 454 45 60

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

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