KINEMETRICS

CONDOR2 System

For Nuclear Power Plants

The Complete Seismic Monitoring Solution

The Condor2 System is the world's most advanced and cost-effective system solution for monitoring seismic activity at nuclear power plants.

With its more than four decades of experience at developing and servicing systems for the special needs of the nuclear market, Kinemetrics is proud to introduce this system solution, that also capitalizes on the success of the Condor platform originally introduced in the late 90's.

Carefully designed for maximum effectiveness & ease-of-use, as well as for lowest cost of operation & maintenance, the Condor2 System quickly responds when a seismic event occurs, to help the NPP's operators make the most informed decisions possible. Featuring comprehensive event analysis & alarm-notification capabilities, the Condor2 System drastically reduces the time required for proper data analysis following a seismic event.

We also ensured high reliability by utilizing redundant components for critical components of the system, and based the recorder portion on the latest generation, the Rock+.

We made sure the Condor2 System was fully qualified to meet or exceed all applicable standards and finally, we leverage on the successful user interface we introduced with the first generation Condor that keeps the set up and maintenance of the system as quick and easy as possible.

FEATURES

- The most-comprehensive earthquake monitoring solution for nuclear power plants (NPPs)—including seismic-event data recording, retrieval, analysis and notification via hardware alarms, PDF & hardcopy reports – all in one system
- Automatic OBE/SSE & CAV analysis & alarm generation within minutes of seismic events
- Lowest overall cost-of-operation & cost-of-maintenance
- High reliability –redundancy for critical components
- Easy maintenance – extensive built-in testability
- Designed to meet all applicable nuclear industry regulations (USNRC RG 1.12, RG 1.166, IEEE 344 and ANSI/ANS 2.2)
- Easy and cost-effective upgrade capability – can use already installed sensors and cables
- Recorder based on Kinemetrics' latest generation of products, the Rock+

SPECIFICATIONS

Central Controller

General: The Central Controller provides control and monitoring of the multi-channel recorder in the system (including free-field recorders), as well as the Alarm & Interconnect Panel.
A single Controller/Recorder can support up to 8 single accelerometers and the Central Controller interfaces to NPP's LAN to allow remote control and monitoring, automatic event alerting via remote printing. Features automatic and interactive event-data analysis, including OBE/SSE & CAV along with configurable built-in tests of entire system. Report generation supported includes printed, PDF or ASCII files.

Computer: The Central Controller computer controls and monitors the entire system, and a custom software application provides the user interface, based on an industry standard Core™ i7-3770 PC, running Microsoft Windows 7 operating system. Housed in a 7" rack mount panel.

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SPECIFICATIONS

Recorder
General

Model:	Obsidian 24X
Quantity:	(1) One
Number of Channels:	24 channels

Data Acquisition

Type:	Individual 24-bit Delta Sigma converter per channel
Anti-alias filter:	Double Precision FIR Filter Causal/Acausal; >140 dB attenuation at output Nyquist
Dynamic Range:	200 sps ~127 dB (RMS noise to RMS clip - Typical) 100 sps ~130 dB (RMS noise to RMS clip - Typical)
Frequency response:	DC to 80 Hz @ 200 sps
Sampling rate:	1, 10, 20, 50, 100, 200, 250, 500, 1000, 2000, 5000 sps, selectable
Channel skew:	None – simultaneous sampling of all channels
Output data:	24 bit signed (3 bytes) in user selectable format. Kinemetrics' EVT standard

Trigger

Type:	IIR bandpass filter (three types available)
Channel Triggering:	Independently selected for each channel
Threshold Trigger:	Selectable from 0.01% to 100% of full scale
Threshold De-trigger:	Selectable from 0.01% to 100% of full scale
Trigger voting:	Internal, external and network trigger votes with arithmetic combination
Additional trigger:	STA/LTA, Time Window
Pre-event recording time:	Limited just by the storage capacity, selectable
Post-event recording time:	Limited just by the storage capacity, selectable

Timing

Type:	Oscillator digitally locked to GPS or PTP. Integrates completely with system, providing timing, internal oscillator correction, and position information.
Accuracy:	<1 microseconds of UTC with GPS or PTP

Storage

Data:	Internal SDHC Card Slot, standard 32 GB
System:	Internal SDHC Card Slot, 4 GB
Recording capacity:	Approximately 42 kB per channel per minute on Memory Card of 24-bit data @ 200 sps

Communications

Ethernet interface:	Standard TCP/IP

FSoftware

Type:	Multi-tasking operating system supports simultaneous acquisition and interrogation; allows remote and automatic firmware upgrades
Security:	Supports SSH and SSL
System control:	Configure sample rate, filter type, trigger type and voting, maintains communications and event storage
File formats:	Standard Kinemetrics EVT. Other available
Intelligent alerting:	Initiate communications when an event is detected or if an auto-diagnostic failure occurs
Auto-diagnostics:	Continuously check system voltages, temperature, humidity, and timing system integrity
Rapid setup:	Can be configured from a parameter file
System timing:	Supports PTP Slave and PTP Master timing (Using Internal GPS as Master clock), NTP and External 1PPS
I/O and Display Power input:	Mil-style connector for DC power input, external battery connection, Power over Ethernet (Option)
Interface:	10/100 BaseT Ethernet
EMI/RFI protection:	All I/O lines EMI/RFI and transient protected
LED:	System, power and event status, Ethernet Link & Data

Recorder Power Supply

Type:	Internal high efficiency switched power supply and battery charger system with extensive SOH outputs
DC input:	9-28 VDC (>15.5VDC for Battery Charger Operation)
External AC/DC:	Universal Input 100-250 VAC 50/60 Hz
Power module:	Output 15.5 VDC
Internal battery charger:	Digitally temperature compensated output for external Valve Regulated Lead Acid (VRLA) batteries with reverse protection and deep discharge recovery
Fuses:	None. Uses resettable Polyswitch protection
Current drain:	605mA @12V (without sensors)
External power supply:	110 VAC 60Hz
Operating temperature:	-20C to 70C
Humidity:	0 to 100 % RH
Enclosure rating:	IP67 Equivalent
Model Number:	114170-24-PL

System Power Supply

Type:	Rack-mountable Uninterrupted Power Supply
Power autonomy:	More than 48 hours. (For a standard system configuration with six FBA-3 sensors and 1500 VA UPS with two battery packs)

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SPECIFICATIONS

Sensor	
Model:	FBA-3
Quantity:	(6) Six
Type:	Triaxial Force Balance
Full scale range:	+/- 1G
Natural frequency:	50 Hz
Bandwidth:	DC to 50Hz
Damping:	Nominal 70% critical (measured values furnished with each Sensor)
Operating temperature:	-20C to 70C
Sensitivity:	2.5 V/G
Zero offset:	25 mV
Cross-axis sensitivity:	0.03g/g
Linearity:	<1% of Full scale
Noise (0 to 50 Hz):	25 µV
Noise (0 to 10,000 Hz):	2.5 µV
Dynamic Range (0 to 50 Hz):	100dB
Humidity:	0 to 100 % RH
Calibration:	Electrical commands can be applied to produce damping and natural frequency outputs
Enclosure:	Watertight
Model Number:	102450-PL (aluminum casing) 102450-K1-PL (stainless steel casing)
Alarm & Interconnect	Housed in a rack panel, this provides a relay, general-purpose Input/Output, and LEDs for Recorder Alarms, Event, OBE, AC Loss and DC Loss.
Uninterrupted Power Supply (UPS)	This UPS provides up to one half hour of operation for the Central Controller Com puter and Alarm Panel.
Printer	Printer in a rackmount panel.
System Cabinet	Seismically qualified.
Environment	Recorder and Sensor
Operating Temp:	-20°C to 70°C
Humidity:	0% to 100% RH
All other equipment	
Operating Temp:	5°C to 40°C
Humidity:	50% to 80% RH

(Note: All other equipment is installed in the system cabinet)

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