

VibControl

Shock Control

Shock testing simulates an extreme event that a unit under test is exposed to during handling, shipment and/or daily use (e.g. dropping an object or exposure to an explosive event). The profile for this type of testing is defined by the shape of the time domain waveform together with its amplitude and duration. m+p international's VibControl system offers full functionality for classical shock and shock response spectrum testing as well as for tests using external pulses or the capture of transient signals.

Key Features

- Shock testing fully compliant with DIN and MIL-STD 810 standards
- Support on electrodynamic and hydraulic shakers
- Automatic operation or manual controls
- Peak-to-peak displacement for best shaker performance
- Earthquake simulation mode according to Bellcore specifications, all zones
- Use of pre-stored drive signal, for minimal equalization

Classical Shock

- Reference waveforms: half-sine, haversine, sawtooth, triangle, rectangle, trapezoid
- Sampling frequency up to 32,768 samples/sec.
- Record length up to 8,192 samples
- Maximum record duration: 64 sec
- Displacement and velocity compensation
- SRS analysis
- Alarm limits include common standards such as MIL- STD 810, DIN, GAM-EG 13 as well as user defined

Shock Response Spectrum (SRS)

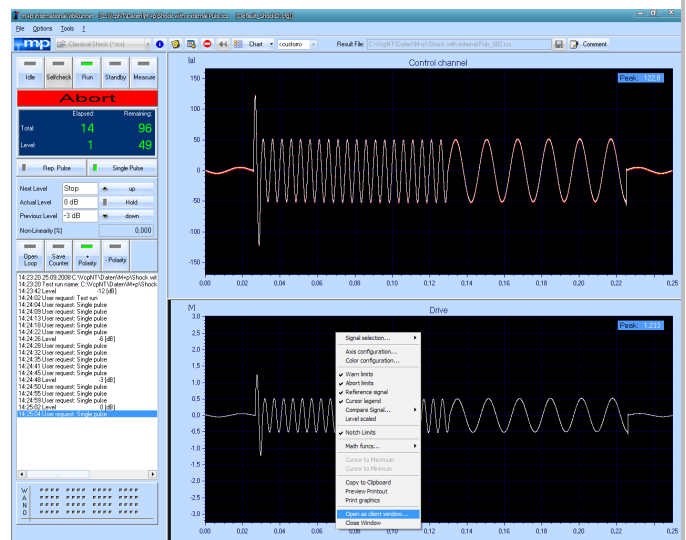
- Frequency range up to 12.8 kHz
- Maximum record duration: 64 sec.
- Calculation of MaxiMax/positive/negative shock response spectrum
- Automatic SRS optimization
- Wavelets and damped sine components

External Pulse

- Import of ASCII data for replication with pulse editor
- Synthesis of any pulse form
- Kinematic compensation for minimum shaker displacement

Transient Capture

- Capture of transient signals such as drop table or pyroshock pulses
- SRS analysis
- Scope function
- Various triggers
- Optional: Throughput mode for capture of multiple pulses



Applications

- Classical shock testing
- Duplicating short-duration pyrotechnic events (explosions, rocket blasts) or long-duration events at lower frequencies (earthquakes) using the shock response spectrum
- Replicating pre-recorded time sequences (crash tests)
- Synthesis of any pulse form
- Earthquake simulation
- Capture of transient signals such as drop tables or pyroshock pulses

Classical Shock

VibControl's Classical Shock testing performs closed-loop control of transient waveforms. It applies all classical reference waveforms: half-sine, haversine, initial and terminal peak sawtooth, triangle, rectangle, trapezoidal pulse shape, in a controlled way to the specimen. The peak-to-peak displacement optimizes the pulse displacement in both directions, thus making optimum use of the shaker performance. The user-defined alarm limits are compliant with all standards such as MIL-STD 810, DIN and GAM-EG 13 and are excellent to document the compliance of the shock test to these standards.

VibControl provides simple automatic controls for routine testing as well as manual controls (single or repetitive pulse, polarity, open loop, level, non-linear correction) which may be disabled. While the test is running, the most important information on the closed-loop control can be seen at a glance for fast and direct monitoring. A full selfcheck ensures feasibility of the test setup. A date and time stamped test log is created showing details of the selfcheck and every test event. The test safety is continuously checked.

The advanced data review and report program included in VibControl allows reports to be printed directly from the control window; alternatively the displayed data can be copied to standard Windows applications such as Word or Excel. There is also the automatic on-click Word documents generation. Post-test analysis includes extensive handling and analysis of the shock data, single and multiple data graphing and custom report formatting including company logo or other custom styles. These together with advanced cursor functions, peak search and display of several traces in one graphic mean high-quality reports are completed easily and quickly. The analysis functions are available on all engineer's workstations connected to the data server. Data filtering is available to quickly select the most relevant data from all that was stored during the test. For the ultimate step in reporting, data and graphics can be directly exported to or dragged and dropped into m+p international's SO Analyzer e-Reporter package.

- Sampling frequency from 128 to 32,768 samples/sec.
- Record length from 256 to 8,192 samples
- Maximum record duration 64 sec.
- Reference waveforms : half-sine, haversine, initial and terminal peak sawtooth, triangle, rectangle, trapezoid
- Positive and negative going pulses, user-selectable during test
- Peak or peak-peak displacement calculation
- Pre- and post-pulse compensation on all classical shock pulses. Pre- and post independent shapes (sine, square, rounded, ...) and length for optimum displacement performance
- Unlimited pre-test and test duration schedule including measurement storage and looping
- User-defined alarm limits as per MIL-STD 810, DIN and GAM-EG 13
- Manual controls during the test (can be disabled): single or repetitive pulse, polarity, open loop, level, non-linear correction
- Earthquake simulation mode according to Bellcore specifications, all zones.
- User-defined external data file import including custom pulse editor. The pulse graphical editor helps conditioning field measured pulses to be able to run on a laboratory shaker.

Shock Response Spectrum (SRS)

Shock Response Spectrum (SRS) testing enables the test engineer to synthesize transient pulses and reproduce them on the shaker. This method is widely used for simulating high-frequency pyrotechnic events and long-duration events such as earthquakes. The transients may be manually or automatically generated from damped/undamped sine waves and/or wavelets components. Time delay, positive and negative slope are freely combinable. The peak-to-peak displacement optimizes the pulse displacement in both directions, guaranteeing best shaker performance. VibControl uses an automatic technique to optimize SRS wavelets.

- Frequency ranges from 0-50 Hz to 0-12.8 kHz
- Maximum record duration 64 sec.
- Calculation of MaxiMax/positive/negative shock response spectrum
- Octave spacing from 1/1 to 1/12 octaves
- Synthesis of reference pulse: damped sine waves or wavelets components; time delay and slope up/down selectable
- Peak-peak displacement to make optimum use of the maximum shaker displacement
- Automatic SRS optimization for minimal or user-defined displacement
- Interactive online SRS (re-)synthesis of the control pulse/SRS
- Earthquake simulation mode according to Bellcore specifications

External Pulse

To save you the time-consuming synthesis of pulses, it may be the best to replicate time sequences acquired for instance through crash testing or in earthquake tests. VibControl's External Pulse option allows you to import an external ASCII data file which can then be adapted to the test requirements and shaker limits in the pulse editor. Generally speaking, the External Pulse function synthesizes any pulse form. A kinematic compensation is performed for minimum shaker displacement. External pulses can be integrated both into classical shock tests and shock response spectrum tests.

- Import any ASCII pulse. Two column pulse containing time vs. amplitude, or one column pulses with amplitude and delta time
- Compensation for measurement error such as DC-offset, drifts, residual velocity and displacement
- Advanced option includes user-defined pre- and post-pulses, half sine pulses sequences
- Sine burst support, with user-defined burst frequency, number cycles for ramp-up, full level and ramp down. Multiple sine bursts in one sequence are also supported

Transient Capture

The Transient Capture module allows the test engineer to acquire any transient event such as drop table, crash test or pyroshock pulses. Functions include calculation and visualization of an online SRS and display of the reference SRS graphics and the online SRS graphics in a single window for immediate evaluation of the test. Additional operating modes make this module an ideal tool for measuring, displaying and storing signals in general. Optionally the time domain data can be throughput to disc in a continuous data stream. This option is for capturing a series of pulses. Triggering is then done in post-test, avoiding missing a real-time trigger.

- Maximum blocksize: 8,192 samples
- Maximum sampling up to 192 kHz (hardware dependent)
- Channel or manual trigger together with free run mode as scope
- User-defined trigger channel and conditions (level, slope, pre-trigger)
- Optional: Data throughput to disc to capture a continuous data stream of multiple pulses (e.g. solar panel deployment)

Post-Processing & Reporting

Post-Processing

- Peak value analysis: Peak values will be marked automatically in the graphics and listed with their numerical data in a table
- Graphical and Numerical Measurement and Reference Data Analysis:
 - Control and response spectra with reference, alarm and abort limits
 - Error
 - Drive
 - FFT amplitude and phase
 - Maximax, positive and negative shock response spectrum
 - Multiple damping values calculations with graphical overlay
- Printouts
 - Multiplot: Displaying and printing several traces in one graphic
 - Autoplot: Automatically printing a preselected series of graphics
 - Printing a list of preselected test parameters
 - Printing directly to MS Word using a customer defined template

Reporting

- Interface to m+p international's SO Analyzer e-Reporter software for comprehensive analysis and reporting
- One click printing to a Word document of all or a selection of result data
- Copy and paste of all or a selection of result data to Excel for matrix analysis

General Information

Operating System

- Microsoft Windows XP/Vista

Ordering Information

- VC-CLS Shock Classical
- VC-SRS Shock SRS
- VC-EXP External Pulse
- VC-TRC Transient Capture
- VC-TRT Transient Capture – Throughput

Optional VibControl Software Modules

- VC-RAN Random
- VC-RNO Random Notching
- VC-SIN Sine
- VC-SNO Sine Notching
- VC-SRD Sine Resonance Search & Dwell
- VC-SRE Sine Reduction
- VC-SRT Sine Reduction – Throughput
- VC-RRE Random Reduction
- VC-RRT Random Reduction – Throughput
- VC-DCO Displacement Control

- VC-SOR Sine-on-Random
- VC-ROR Random-on-Random
- VC-RLD Time Domain Replication (e.g. Road Load)
- VC-CRT Crash Test
- VC-ACO Acoustic Control
- VC-MOC Momentum Control
- VC-HFS High-Frequency Sine
- VC-APP Advanced Post-Processing
- VC-SVU VibUtil
- VC-AVU Advanced VibUtil
- VC-RSC Multi-Monitor
- VC-VBM Visual Basic Module
- VC-NOF VibCo Pilot (No Frontend Licence)
- VC-CAL VibCalibrate

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m+p

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