



# EMERSON APPARATUS

## SPECIFICATIONS

Model PSM 100 Pneumatic Shock Machine

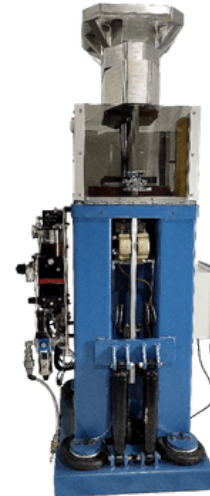
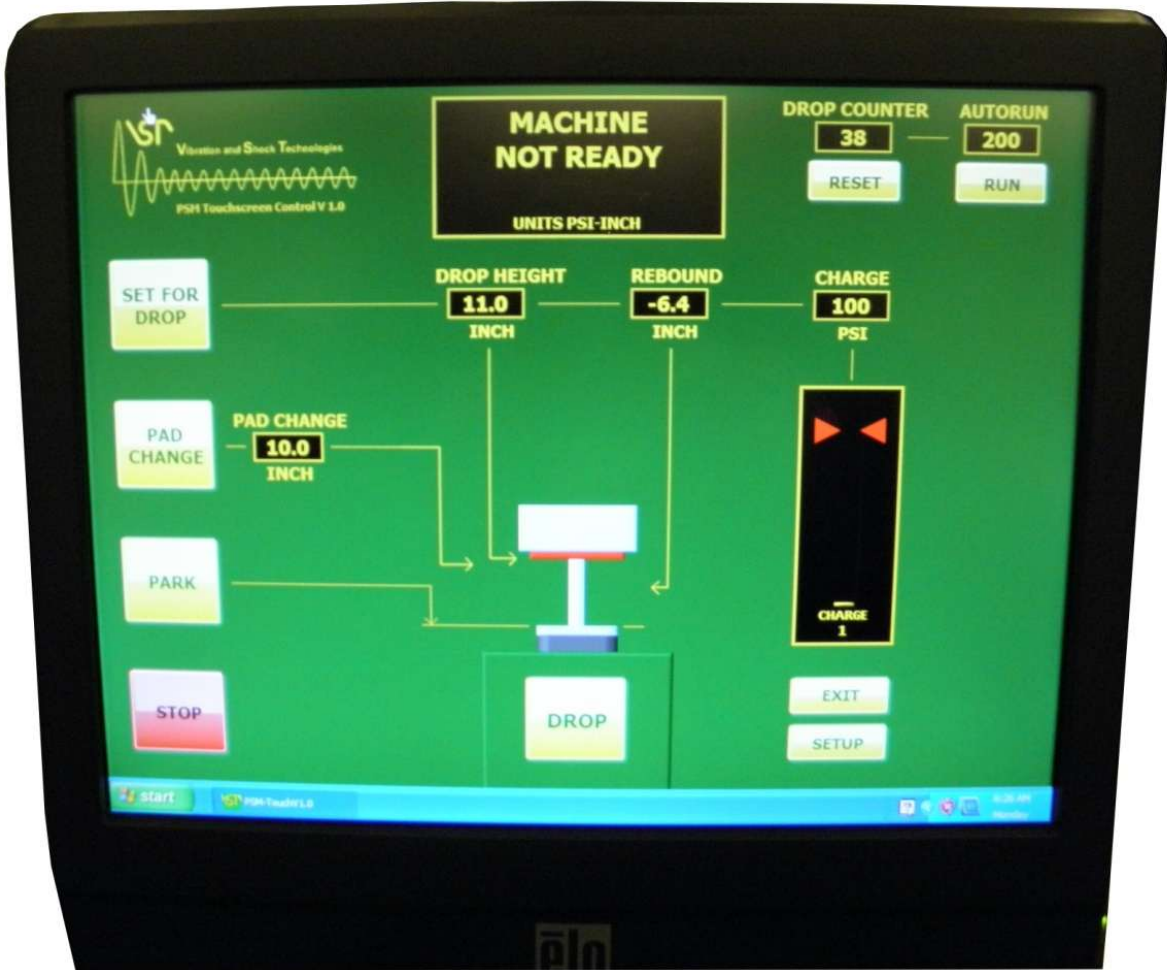


Table / Carriage Size	9 in x 9 in
Payload Capacity	100 lb
Maximum Specimen Height	Unlimited
Maximum Stroke	25 in
Cycling Rate	~15 shocks per minute (slower with air amplifier)
Velocity Change	420 in/sec (No Load)
	350 in/sec (50lb Load)
	260 in/sec (100lb Load)
Maximum Velocity (Air Amplifier)	Up to 600 in/sec
Shock Pulse Duration	3 ms min / 30 ms max
Lift Mechanism	Pneumatic
Brake System	Hydraulic, externally mounted
Shock Isolation	Impact loads isolated from floor; seismic foundation supplied
Overall Height	Less than 6 ft
Floor Space Required	~40 in x ~40 in
Machine Weight	~1,900 lb
Electrical Requirements	115V or 220V, 1-phase, 60 Hz
Pneumatic Supply	Plant air or bottled nitrogen, 80–120 psi

**Touch Screen Control, hardware/software to control the following:**

- 1) **System on/off**
- 2) **Drop Height**
- 3) **Brakes**
- 4) **Cycle Count**
- 5) **Charge Pressure**



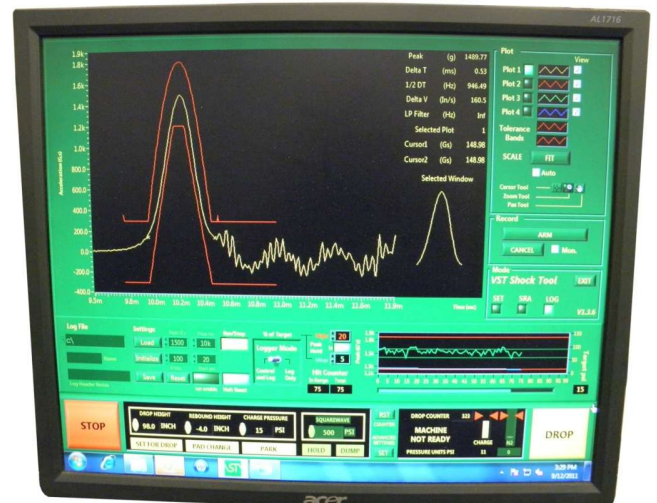
**VST ST DAS4U, Four Channel Digital Shock Pulse Instrumentation System to run on Windows® OS:**

- **DAS4U 4 Channel USB Signal Conditioning Box**
- **Cables and Manuals**
- **Installation in PC provided with machine**
- **ST-4 Software Including;**

- Waveform Display on Graph
- Analysis of pulse width, peak G and velocity change
- Hard copy report
- Tolerance window overlay on Graph and Hard Copy
- Pulse waveform storage and retrieval
- Low pass built-in filter

**Automation Software**

- Regulate amplitude
- Save each shock pulse
- Execute a count of shock pulses on a pneumatic shock machine
- Create a report and graph of shock history
- Provide the ability to review individual shock pulses that were saved during a program run.
- Provide the ability to filter the control channel to provide a more consistent history of amplitude in order to maintain a trend within a user specified tolerance





# Mousetrap Amplifier

Shock amplifiers produce high acceleration shocks on a spring-loaded table. The mousetrap amplifier consists of:

- a. base plate mounted on the top surface of shock machine carriage
- b. specimen mounting carriage which is supported by soft Springs
- c. a resilient decelerating pad between the shock machine and its carriage

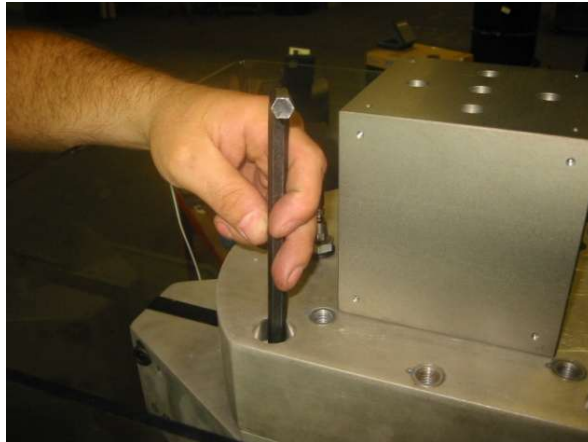
As the main carriage accelerates down, impacts upon its resilient pad and decelerates up - the specimen mounting carriage continues to travel downward (or in the opposite direction of the main carriage) as they collide. The resultant acceleration at impact is much greater than would be achievable if only the main carriage impacted against a stationary base.

The Mousetrap Shock Amplifier is used for two primary purposes. First, as an amplifier to produce increased velocities. Second, because the Mousetrap Amplifier is supported on springs, the springs act as a "mechanical filter" which serve to reduce the ringing associated with short time duration pulses. We define short time duration as any pulse less than 3 ms.

**0909-MTA**  
Mounting Surface: 9 in x 9 in  
Hole Pattern: As Required  
Pulse Duration: 2.0 - 0.5 ms  
Max load: 30 lbs  
Peak Acceleration: 5,500 g



The Mouse Trap amplifier is designed as an intricate part of the drop table. When not required the moving portion of the mouse trap is bolted to the carriage. To activate the mouse trap 4 bolts must be removed as seen in (Fig. AA) allowing the springs to lift the moving portion of the mouse trap. If the payload on the mouse trap does not allow the top to lift, you have exceeded the capacity of the mouse trap. If used under an overloaded condition damage may result.



# Typical Mouse Trap Amplifier Data



VST Shock Tool Data File

Wed 09-07-11 @ 13:02:41  
 Sample rate(Hz): 100000  
 plot scale assign  
 Sensor Sensitivities (mV/UNIT)  
 0.9330  
 Data (Volts)

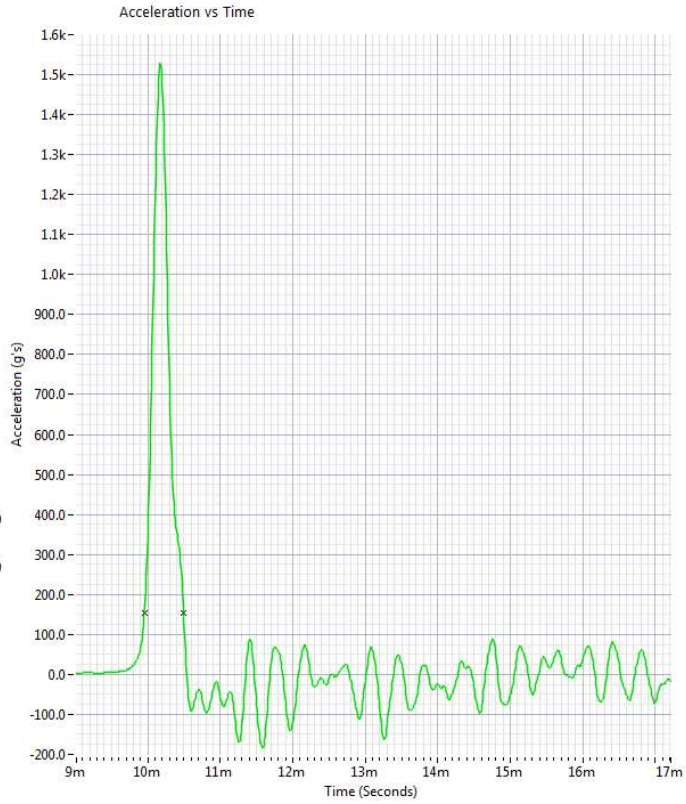
Tolerance Bands Tol  
 Settings Tol

Current Time 13:10:44  
 09/07/2011

Notes  
 Drop Height 5" Rebound -3"  
 Charge Pressure 35 PSI

Cursor 1 (G's) 152.89  
 Cursor 2 (G's) 152.89

Selected Plot		1
Peak (g)		1.529k
Delta T (ms)		0.532
Delta V (In/s)		159.7
1/2Delta T (Hz)		939.8
LP Filter (Hz)		5.0k



VST Shock Tool Data File

Wed 09-07-11 @ 13:17:22  
 Sample rate(Hz): 100000  
 plot scale assign  
 Sensor Sensitivities (mV/UNIT)  
 0.9330  
 Data (Volts)

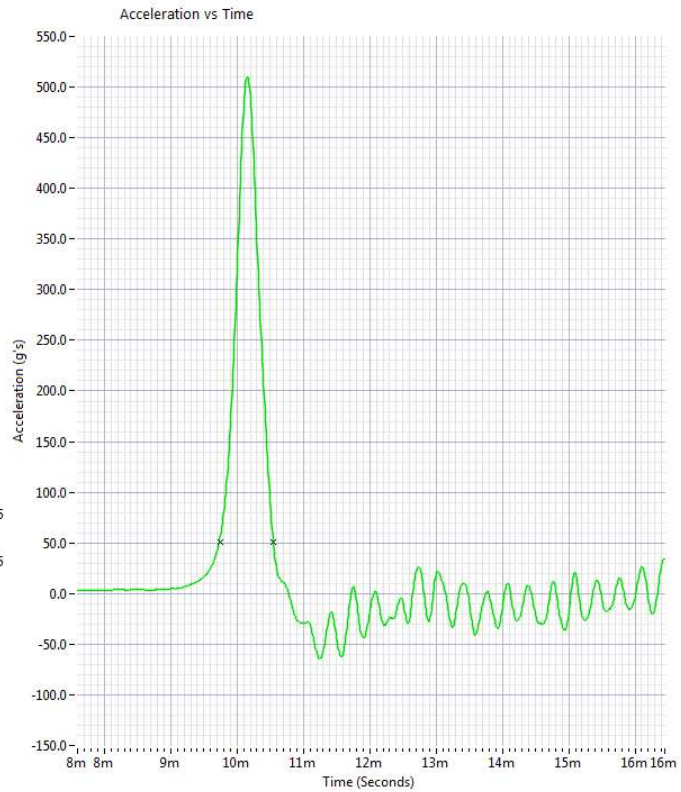
Tolerance Bands Tol  
 Settings Tol

Current Time 13:18:24  
 09/07/2011

Notes  
 Drop Height 1.4" Rebound 0"  
 Charge Pressure 35 PSI

Cursor 1 (G's) 510.538  
 Cursor 2 (G's) 510.538

Selected Plot		1
Peak (g)		510.538
Delta T (ms)		0.804
Delta V (In/s)		84.1
1/2Delta T (Hz)		621.7
LP Filter (Hz)		5.0k



### Models

Pneumatic Shock Machine	Table Options Working Surface in Inches X Inches							Power Requirements
Payload LBS	09 x 09	16 x 16	18 x 18	24 x 24	30 x 30	40 x 40	60 x 60	Control Power Min Air Requirement**
100	X	X*						110-220 VAC 90W 90 PSI @ 5CFM
500			X	X	X			110-220 VAC 90W 90 PSI @ 10CFM
1000			X	X	X	X*		110-220 VAC 90W 90 PSI @ 10CFM
2500						X	X*	110-220 VAC 90W 90 PSI @ 30CFM
Options								Notes
0404MTA	Bolt On	Bolt On	Bolt On	Bolt On	Bolt On	Bolt On	Bolt On	0.2ms-1.5ms up to 5000g Half-sine
0909MTA	Built In	Built In	Bolt On	Bolt On	Bolt On	Bolt On	Bolt On	0.5ms-3.0ms up to 2000g Half-sine
VH Vertical Horizontal			X	X	X			Machine can be used in either mode
SW Square Wave			X	X	X	X	X	Not Available on PSM100
TSP Terminal Sawtooth Pulse	X	X	X	X	X	X	X	Achieved by impacting lead pellets

\* Working Surface is achieved via Head Plate / Head Expander

\*\* The cycling rate increases with more CFM