

# Action Meter



3digit 7segment LED's display users choice of:

**Acceleration in 3 axis (x, y, z) up to +/-6g's**

**Net acceleration**

**Air time**

**Speed (for car/bike or snowboarding/skydiving)**

**Horsepower**

**In maximum or real time values**

Values are updated every .06seconds from averages of x, y and z values taken every .0006seconds

Maximums and 1second of readings can be stored even when power is shut off

Device can send readings to computer

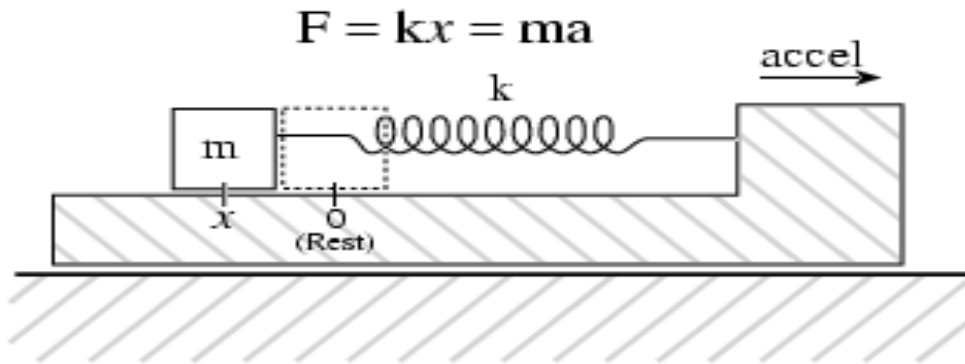
Speed is calculated using x-accel for car/bike, or net-accel for snowboarding/skydiving mode

Takes 4 x AA batteries

Case dimensions: 10cm x 10cm x 5cm



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There are 3 of these inside the accelerometer, one for each axis.

$k$  = force it takes to stretch the spring 1 meter

$m$  = mass

$x$  = distance mass travels

$a$  = accel

$k$  and  $m$  are known and  $x$  is measured using differential capacitors

Acceleration is found from these values and output as an analog voltage

There are 3 outputs from the accelerometer, one for each of  $x$ ,  $y$ , and  $z$  directions

$$\text{Net Acceleration} = \sqrt{x^2 + y^2 + z^2}$$

Acceleration ( $m/s^2$ ) x Time(s) = Change in Speed

Acceleration x Speed x Weight = Horsepower

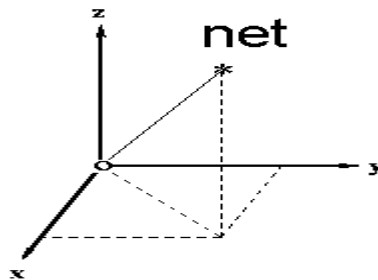
When falling with no air friction, net accel =  $0g$

When not accelerating, net accel =  $1g$  (from gravity)

For snowboarding/skydiving mode, accel =  $1g - \text{net accel}$

For car/bike mode, accel =  $x\_accel$

Snowboarding/skydiving mode is for any system where the only force causing increase in speed is gravity. Speed is only properly calculated if only force other than gravity is 180degrees to the forward direction of travel.



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