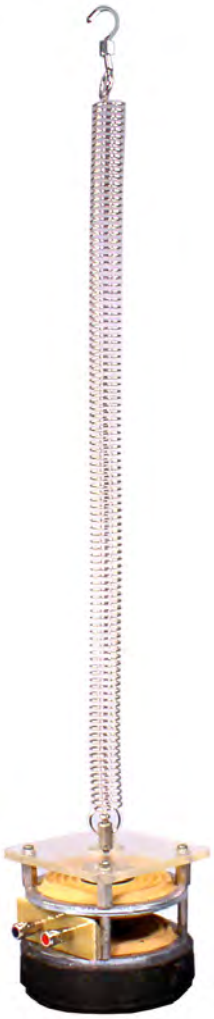
613-0010 (55-230) Vibration Generator



Additional Materials Needed:
- Ring stand with clamp
- Signal generator
- Banana plugs

Theory: Wave theory is a difficult concept for many students to grasp. For one thing, most waves are too small to see: light oscillates between 400 and 700 nanometers. The human eye cannot detect fluctuations that small, making it difficult for students to comprehend. Conversely, sound waves are larger, but they take place in air, which is invisible.

To help work around this problem, a popular solution is to use a mechanical oscillator to drive a spring. The spring will then vibrate in a sinusoidal pattern. Because springs are large and heavy, the fluctuations occur slowly enough for the human eye to track. This allows students to see genuine wave motion, and thus gain a greater understanding of it.

Description:

This apparatus is designed to demonstrate wave theory. This unit is best used with a wave-form generator. These can be purchased independently and are sometimes found built into oscilloscopes and other devices. A low voltage power supply can be used for basic demonstrations. Banana jack included for attaching chladni plates, etc.

Procedure:

Connect the ring at the end of 1) the spring through the hole in the top of the vibration generator. Secure the spring in an upright position with the set screw on the top. The spring will be vibrating furiously, and will work itself loose if possible. Make sure it is fully secured.

Connect the other end of 2) the spring to a ring stand using an extended beam. Raise the beam until the spring is extended upright.

Connect a waveform generator to 3) the red and black contacts on the base of the generator. The generator will create a series of electrical impulses with a specific amplitude and frequency. These will then get converted by the audio driver into mechanical perturbations. In effect, you can view the whole apparatus as a method of looking at electrical oscillations.

Adjust your generator to your 4) desired waveform and frequency. You may have to adjust the tension of the spring to obtain desired results. For example, large scale oscillations will be easier to see, but you will get fewer of them on your spring. Smaller ones are more subtle, but more of them will fit, which tends to balance things out.

Try adjusting your signal 5) generator to produce 'nodes'. A node is a place in an oscillation where the amplitude is minimal. They occur when two identical waves travel in opposite directions and cancel each other out where the waves intersect. In a perfect world, there will be no amplitude at all, but this is unachievable in the lab. However, you can cause the spring to vibrate so little at node points that it appears to be still. This is because a wave travels through the spring, reflects off the ring stand, and cancels out a second wave moving up. Generally, high frequency waves reflect nicely. You will see the spring become a blur except at certain points. You may have to experiment with different waveforms until you find an optimal one.

Warranty and Parts:

We replace all missing or defective parts free of charge. We accept Mastercard, Visa, checks, school P.O.'s. All products guaranteed free from defect for 90 days after sale, defined as 90 days after date of invoice. This guarantee does not include accident, misuse, or normal wear and tear.

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Vibration Generator teaching concepts:
Wave theory.

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