Mechanical Wave Driver
Sine Wave Generator
P7-1000, P7-2000

ARBOR SCIENTIFIC

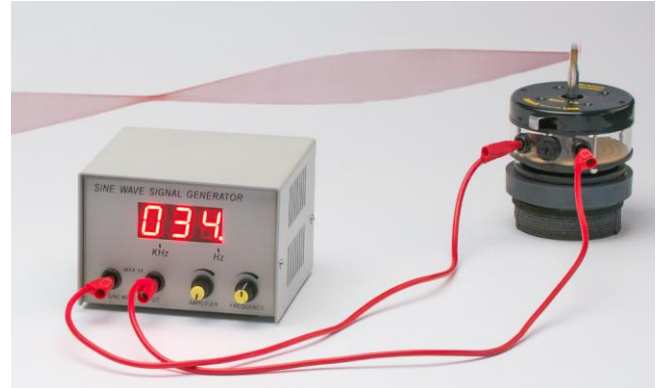## INSTRUCTIONAL GUIDE

Contents

Mechanical Wave Driver (P7-1000)
- 1 Wave Driver
- 2 Banana Plugs

Sine Wave Generator (P7-2000)
- 1 Wave Generator

Introduction

The Mechanical Wave Driver is a heavy duty long-throw speaker that can vibrate with variable amplitude and frequency. Attached to the middle of the speaker cone is a metal drive shaft, which can be used to drive a wide variety of wave and resonance experiments. You will need a function generator or sine wave generator producing a current of up to 1 ampere in conjunction with the wave driver.

The Sine Wave Generator is an excellent tool for generating waves with speakers or our mechanical wave driver (see above). It allows both the frequency (1-400 Hz/1 Hz resolution; 10-4000 Hz/10 Hz) and amplitude of the sine wave output to be varied. Students can observe the quantum nature of standing wave patterns as the Sine Wave Generator jumps from one resonant frequency to the next.

Set-Up

Set up the apparatus following the steps outlined below:

1. Lock the drive shaft by sliding the locking lever to the "Lock" position. This protects the speaker from being pulled or pushed too far when connecting or disconnecting apparatuses to the drive shaft. *It is important to unlock the drive shaft when running your experiments.*

2. After connecting a banana plug holder to the wave demonstration apparatus, insert the banana plug holder on the apparatus into end of the drive shaft.

3. Unlock the drive shaft locking arm and connect the output from the sine wave generator to the wave driver input with banana plug patch cords.

4. Using the output knobs on the sine wave generator, adjust the frequency and amplitude to produce mechanical vibrations to drive your experiments.

Activities

Longitudinal Wave Spring (P7-1500-01)
Demonstrate longitudinal standing waves on a stretched spring.

Resonance Wire Loop (P7-1500-02)
Produce standing waves on a wire loop to explain the atomic model's electron orbitals.

Transverse Wave String (P7-1500-03
Dramatic node and antinode patterns make it easy to measure the wavelength, amplitude, and speed of the waves.

Chladni Plates Kit (P7-1500-04)
Vibrate the plates and observe the standing wave patterns. Sand collects in the nodal regions and forms sharply distinct lines of destructive interference against the black metal.

Metal Resonance Strips (P7-1500-05)
Demonstrate the principle of resonance between the frequency of the driver and the standing waves that form on different length metal strips.

Related Products

Mechanical Wave Complete Bundle (P7-1100) The Arbor Scientific Mechanical Wave Complete Bundle makes harmonic and motion demonstrations affordable for ALL Physics classrooms.

Digital Signal Generator (P6-8080) The digital signal generator provides a continuous signal sweep from 0.1Hz to 100kHz via fast change buttons and fine adjust, this eliminates the need for switching ranges.

Spring Wave (P7-7220) Use this highly visible Spring Wave to observe phase reversal at the fixed end of wave pulses and to test fundamental and multiple vibrations. Experiment with determining the speed of propagation of transverse and longitudinal waves. Expands 20in to 12ft