

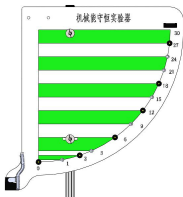



Instruction Manual for Digital Conservation of Mechanical Energy Demonstrator

Product No.: TP6017

■ Description

The product consists of main body, photogate part, Y-shape base, screw, wing screw, USB cable and Bluetooth adapter. The photogate is built in the bob. It is able to measure kinetic and potential energy of multiple points for one swing to verify conservation of mechanical energy.

■ Product Specification

NO.	Name	Picture	Quantity	Remark
1	Main body		1 set	Include 6 light barriers and bob holder 406x437x38mm
2	Photogate part		1 set	353x60x48mm
3	Y-shape base		1 piece	213*213*50
4	Screw		1 piece	M6x12

5	Wing screw		2 pieces	M6x12
6	USB cable		1 piece	
7	Bluetooth adapter		1 piece	Bluetooth 2.0

Tab.1

■ Product General Assembly Figure



Fig.1: Digital Conservation of Mechanical Energy Demonstrator

■ Product General Assembly Procedures

1. Mount the main body on Y-shape base using screw tightly.
2. Mount the photogate part on main body using wing screw. Make sure the edges of battery box and main body are parallel.
3. Refer to the latest experiment guide for carrying out experiment.

■ Experimental Case

Experiment name

Verify conservation of mechanical energy.

Experiment aim

Verify conservation of mechanical energy of bob falling.

Experimental principle

Photogate is built in the bob. For one swing, the velocity of bob which passes through multiple points can be measured so that its kinetic energy can be calculated. The potential energy also can be calculated via height of each point. Eventually, the mechanical energy can be calculated.

Experimental apparatus

Computer, digital conservation of mechanical energy demonstrator and data cable.

Experiment installation figure



Fig.1: Experiment Installation

Experimental procedures

Preparation:

Adjust the apparatus to keep it horizontal. Switch on the demonstrator. Open experiment software. In the 'Energetics', select 'Wireless connect' or 'USB connect'. Click 'Conservation of mechanical energy'.

Experiment:

1. Calculation for single point:

Click 'Set' and choose the point (such as ② 0.24) to be measured. Place the bob at top position and click 'Start'. Release the bob and the corresponding velocity will be shown in the table. Stop the experiment and

click 'Calculate'. The kinetic, potential and mechanical energy will be calculated sequentially. The points are plotted on the figure (Fig.2). You can choose single point from high to low to compare.

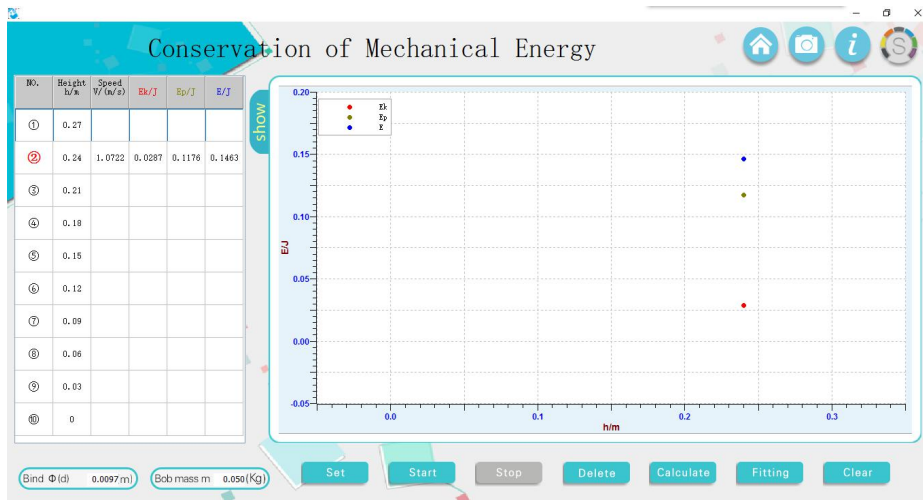


Fig.2: Mechanical Energy Calculation for Single Point

2. Calculation for multiple points:

Choose multiple points to measure, calculate and compare. When height decreases, kinetic energy rises and potential energy decreases while mechanical energy remains constant. You can choose 'Select all' in 'Set' to compare ten points to verify conservation of mechanical energy (Fig.3).

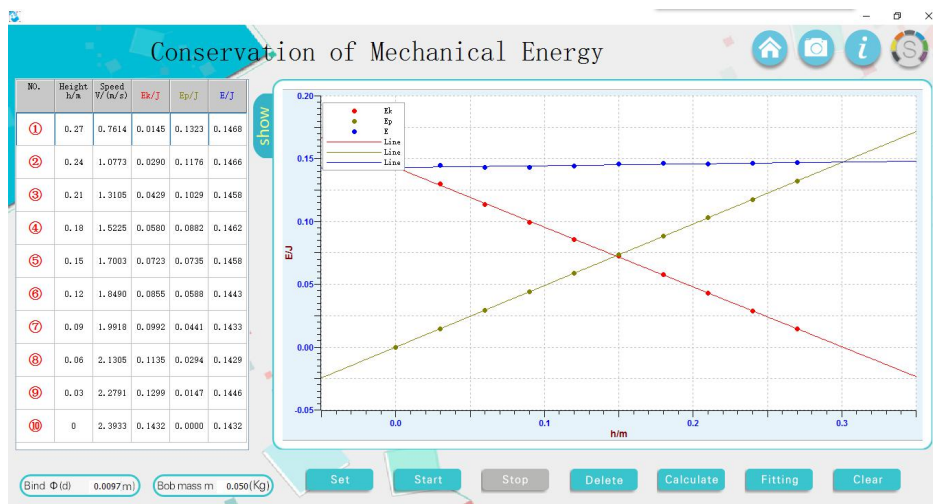


Fig.3: Mechanical Energy Calculation for Multiple Points

■ Operating System

Connection	Support both wire and wireless connection. The wire port is used to charge the demonstrator.
Supported	Windows XP and above, iOS 7.0 and above, android 4.0 and above.

system	
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■ Notes

1. Be careful during using. Try not get hurt by the sharp part.
2. Before experiment, adjust screws on Y-shape base to keep the demonstrator horizontal. Bob covers the origin when it is naturally droop.
3. In order to collect a new set of data, clear the measured data.
4. Do not use the demonstrator under strong light. Otherwise, it will affect the data collecting.

■ Maintenance

The device should be placed in a cardboard box if not in use. Use a damp cloth to wipe out the dust on the surface lightly. Avoid scratches caused by sharp articles on the surface.