

OPERATING INSTRUCTIONS

Dynamics Carts with Masses No. 32157

1. Purpose

These Dynamics Carts with Masses are designed for easy handling and precision measurements in dynamics experiments. You can use the carts in basic experiments on fixed-speed departure, repulsion, cart docking, and velocity exchanges.

2. Description

The (70w x 150d x 37h mm) die-cast aluminum carts weigh 500 grams apiece and feature special U-grooved wheels that place little friction against a traveling surface. The four-wheeled carts can travel on either a smooth, flat surface, or they can ride on the rails of Cenco No. 32159 Acceleration Experiment Stand. (The Acceleration Experiment Stand adds to the basic experiments you can do with the carts.) Each cart has a red index mark so that you can easily determine its position.

Four 250-gram disk-shaped masses are included to attach to each cart (on the center spindle), or to attach to the pulley of the Cenco No. 32158 Cart Acceleration Apparatus. An individual cart's weight is balanced at the center; therefore, the carts can be used to demonstrate the balance of force on a slope.

The center spindle is threaded to accept a screw-on top. This top has a center hole. Thread a string through the hole and knot it, pulling the string taut after knotting, and screw the top back onto the spindle in order to suspend the cart by the string. The center spindle also serves as a mark if you are using a photogate for timing.

Velcro tapes are glued to the end of each cart for cart-docking or inelastic experiments, and for towing.

You can achieve three different velocities, using the grooved launching rod and trigger. A mallet is included to strike the launching trigger.

There is a screw-on clip on each end of the cart. Use the clip to attach spark recording tape. Loosen the clip and place the tape beneath it. Tighten the clip.

A length of rubber string is also included.

3. Setup

The carts can be set up on any smooth, flat surface. For your convenience, we recommend that you use the carts with the Acceleration Experiment Stand (Cenco No. 32159). This stand provides rails for your carts' wheels and a centimeter scale on its track for easy distance measuring. It can be inclined at any angle through 10 degrees, adding to the many possible experiments that you can do with these carts.

3. Operation

The following illustrations (figures 1-6) represent only the most basic experiments. It is interesting to vary the components of each experiment and apply the variations to other experiments.

Fig. 1 Launching at a Constant Speed

Fig. 2 Repulsion of Two Carts

Fig. 3 Cart Docking

Caution! Separate the carts at the docking point by tilting them down and away from each other. (The Velcro tape could eventually be pulled away if you disconnect the carts by pulling them straight apart.)

Fig. 4 Collision

Fig.5 Exchange of Speed

Fig. 6 Force Balancing on a Slope

Note: Use a spring balance to measure the horizontal and vertical force components.

5. Maintenance

Keep the carts in a clean dry area when storing. (Both dust and rust are bad for the bearings.) Occasionally oil the bearings through the slot on the outer wheel. Use a light machine oil. Otherwise, the Dynamics Carts with Masses need no special maintenance. If you should experience any difficulty with a cart, please contact Central Scientific Company, giving details of the problem. To ensure better service, please do not return any apparatus to Central Scientific Company until we have sent you authorization.

Written 6/89

