

## Rotary Motion Sensor

PS-2120



### Sensor Specifications

<b>Resolution:</b>	0.02 mm (linear) and 0.09 degrees (angular)
<b>Accuracy</b>	+/- 0.09 degrees
<b>Maximum speed</b>	30 revolutions/sec
<b>Default sample rate:</b>	10 samples/sec
<b>Maximum sample rate:</b>	1000 samples/sec

## Rotary Motion Quick Start

The PS-2120 Rotary Motion Sensor measures both linear and angular position, velocity, and acceleration.

### Additional Equipment Needed

- USB Link (PS-2100) with USB-compatible computer or PS-2000 Xplorer
- EZscreen or DataStudio™ software (version 1.6.1 or later)

### Equipment Setup

1. Connect the sensor to a USB Link or to an Xplorer.
2. Connect the USB Link or Xplorer cable to a USB port on your computer or a USB hub.
3. The software launches when it detects a PASPORT sensor. Select **EZscreen** or **DataStudio**.



## Using the Rotary Motion Sensor

The PASPORT™ Rotary Motion Sensor will zero automatically when you click the **Start** button in DataStudio. This will reset all measurements of the Rotary Motion Sensor to zero upon beginning data collection. If you would like the sensor to “remember” its position between data runs, deselect the “Zero Automatically on Start” box, which is located in the Setup window (only available in DataStudio 1.6.2 or later). This “position memory” will be lost when you disconnect the sensor, or you reopen or quit DataStudio.

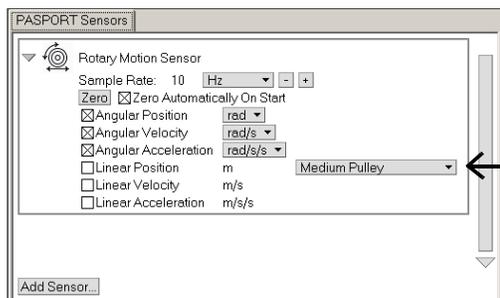


Figure 1: PASPORT setup window

Click the arrow to select from available rotational or linear accessories.

In addition, the **Zero** button in the Setup window can be used to *manually zero* the sensor. Deselect the “Zero Automatically on Start” box, place the sensor in the desired orientation, and click the Zero button.

When measuring either linear or rotational motion quantities, you must select the appropriate accessory from the pull-down menu in the setup window. The large pulley groove is the default, but you can select other configurations from the menu in the setup window (see Figure 1).

## Rotary Motion Activities

### EZScreen Activity

1. To take rotational measurements in your classroom, click **EZscreen** in the PASPORTAL window.
2. In the lower right corner of the EZscreen, click the Rotary Motion Sensor icon to cycle through measurement types. (Linear measurements are based on the large pulley groove.)
3. Click the **Start** button once to collect data and again to stop.

### DataStudio Activity - Angular Acceleration

1. Plug the PS-2120 Rotary Motion Sensor into a USB link or Xplorer.
2. Use the included clamp to attach the sensor horizontally to a ring stand.
3. Place a 30 cm section of string over the large pulley.
4. Choose two masses with a difference of 2 grams. Tie one mass on each end of the string.
5. Hold the masses (the lesser mass as low as possible) and click the **Start** button.
6. Release the masses, but catch them before hitting the pulley. Click the **Stop** button.
7. What does the angular position vs. time graph suggest about the motion of the masses after they were released?
8. Repeat the experiment for masses with a difference of 4 grams.
9. How does the angular position vs. time graph change? Explain.