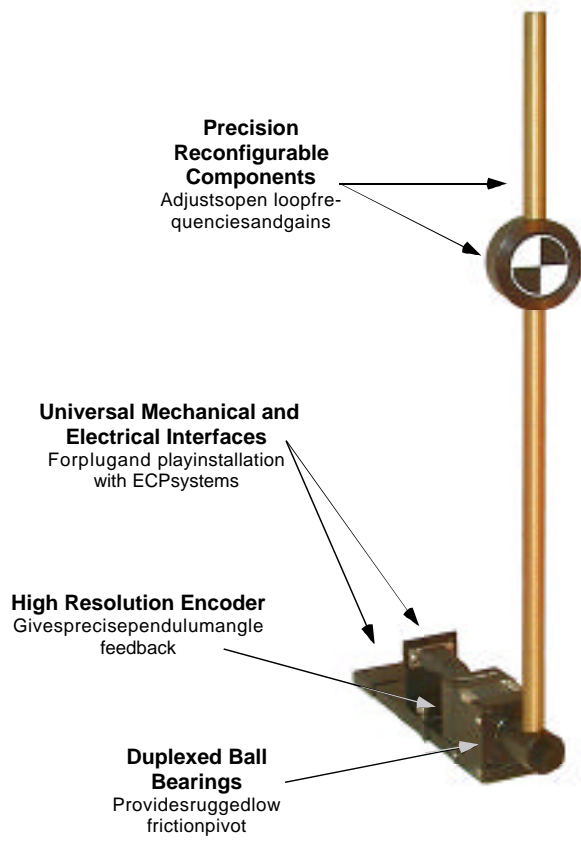


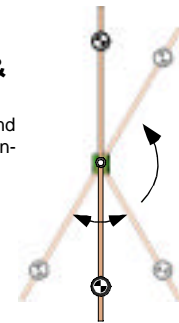
Inverted Pendulum Accessory

A Second Pendulum Option From ECP: Modular System Add-on



Self-Erecting, Inverted & Noninverted Operation

Lets you control open loop stable and unstable systems and dynamically transition between the two

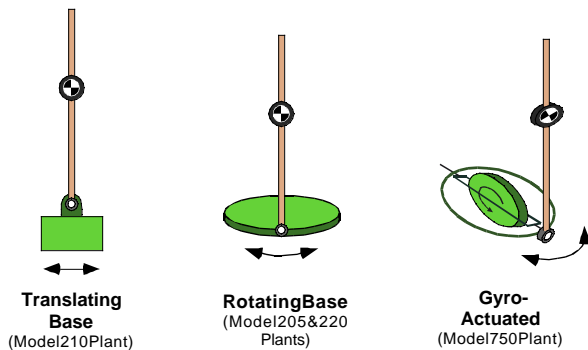


Fully Adjustable Dynamic Parameters

Adjustable pendulum weight, rod length, and base inertia are ideal for studying control robustness and supporting multiple student assignments with same equipment



Easily Adapts to Most ECP Plants



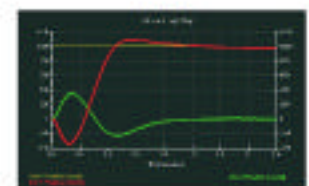
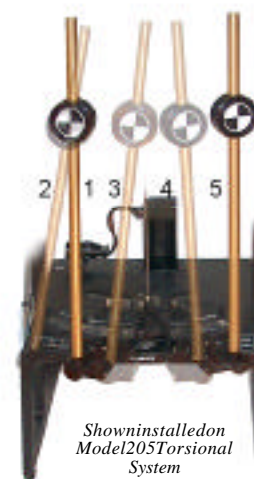
Our inverted pendulum accessory is a cost effective way to enhance your laboratory's capability. It has a wealth of features not found in any other commercially available inverted pendulum apparatus. Precision construction, fully adjustable dynamic parameters, and easy installation make it a valuable addition to any control systems laboratory. As with all ECP systems, complete dynamic models and example controllers are provided along with Matlab® scripts, for easy control modeling and design. The Executive USR® program lets you easily implement control and characterize the system via transient response, frequency response, stability and parameter robustness test features. With provided controllers and plug-and-play installation you will get the system up and running in just minutes and perform interesting experiments the very same day!

Two Pendulum Solutions From ECP

ECP now offers two pendulum choices. Our ECP Inverted pendulum (Model 505) is a stand-alone system with unique dynamic characteristics (right half plane zeros and poles). This system has proven itself in 10 years of reliable in-field use and offers one of the lowest cost solutions for a stand-alone experiment commercially available. The Pendulum Accessory (A51) described on this page is based on the classical inverted pendulum model and adds on to other stand-alone ECP systems using their actuators, base feedback, and electronics.

Stimulating Experiments

(Example: High Bandwidth Step Response)



Commanded position (yellow), Base Position (red) and Pendulum Angle (green) test data show classical response characteristics

A high bandwidth stabilizing controller regulates the base position. In the step response, the base makes an initial rapid reverse motion (no minimum phase controller) [2], then moves in a positive direction [3] and overtakes the rod [4], to decelerate it and come to a final position [5]. The maneuver is complete in 0.8 seconds.