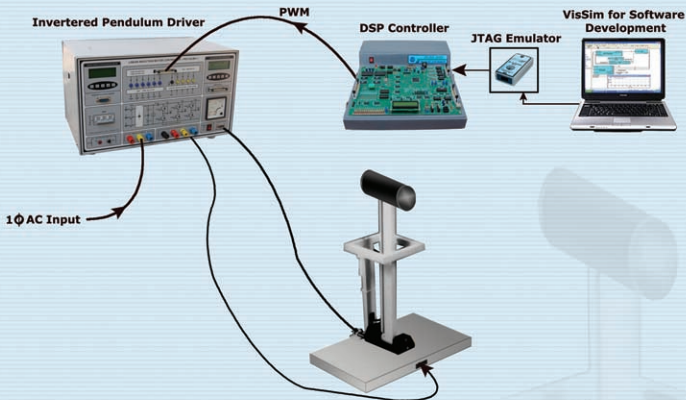


# INVERTED PENDULUM (PEC16INP01)



Inverted pendulum system is nonlinear unstable system, an ideal experiment platform for teaching control theories and conducting various control experiments. Many abstract control concepts, such as the stability and the controllability of a control system, can all be shown visually through the inverted pendulum system. In addition to educational purposes, an inverted pendulum is also a research area for many researchers of modern control theories. Through the continuous research on new ways of controlling inverted pendulum, researchers have developed new control methods, and apply them to the high tech areas such as aeronautical engineering and robotics, thanks to the characteristics of the system, such as high-order, instability, multi-variables, non-linearity and strong coupling.

The inverted pendulum (PEC16INP01) consists of a pendulum rod, directly driven by a high performance PMDC servo motor, moves in a vertical plane within  $\pm 45^\circ$  from the vertical axis.

At rest, the pendulum rod is stationary and rest on the frame, which is  $45^\circ$  from the vertical axis. One control objective is to move the axis in such a way that the pendulum rod swings and balances vertically. This is obviously a position of unstable equilibrium.

PEC16INP01 is equipped with sensors to detect the angular position and velocity of the pendulum rod as well as the angular position of the pendulum.

## Specifications :-

### Dimensions :-

- \* Pendulum : 9 mm (W), 30 mm (D), 330 mm (H)
- \* Base and Support : 240 mm (W), 150 mm (D), 170 mm (H)

### Weight :-

- \* Pendulum : 0.5 kg
- \* Base and Support : 1.75 kg

- Motor control : Four-quadrant Uni-polar PWM Chopper control with Forward, Reverse & Brake operation.
- Motor Specification : 24V PMDC servo motor - 1kg/cm Torque-speed 1500 rpm
- Feed back Sensor : QEP Encoder (A, B & Z (TTL compatible signals, 512 lines) or Servo Potentiometer.
- Measurement : Pendulum Angle, Motor speed & Direction
- Supply Voltage : 230V AC @ 50Hz
- Number of AXES : One
- Controller : Standalone Digital Controller built in with the Inverter Pendulum Driver. Optionally any one type of Digital Controller (DSP / FPGA / dsPIC/ VisSim / dspace / Matlab + System Generator with FPGA) based control of Inverted Pendulum is Possible



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