

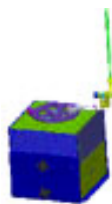
Configurable Circular Inverted Pendulum

[Patent No: 200330114101.4 & 200320115264.9]

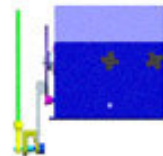
Overview

The GCIP2004 Configurable circular Inverted Pendulum is newly designed by Googol Technology for the basic control courses in automation, mechatronics, electronic, and electrical engineering. It satisfies the experiments of automatic control principle, modern control engineering, and electrical motor control. Equipped with embedded intelligent servo control module, the GCIP2004 is easy to be controlled and reliable result will be therefore obtained.

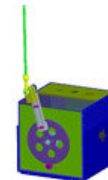
Its flexible mechanical structure combination also allows the user to easily integrate it into three different structure style such as, (a) the 1-stage rotary inverted pendulum, (b) the top inverted pendulum, and (c) bracket-inverted pendulum.



(a)



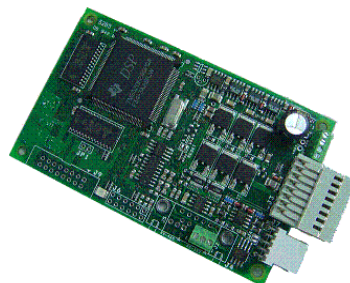
(b)



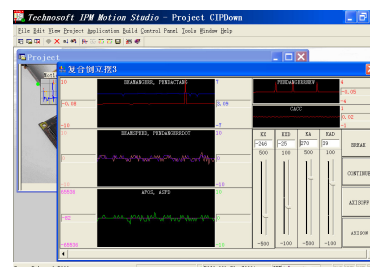
(c)

Main features

The GCIP2004 consists of two parts, the GCIP2004 body and the control system. The body consists of a cubic steel structure and a free rolling pendulum. The linear sensor measures the angle of the pendulum on the track by measuring the output voltage from the potentiometer. A DC motor is connects to a gear reducer, which controls the angle of beam, accordingly realize the angle control of the inverted pendulum.



Intelligent Control Module



Control Interface



The digital control system consists of an intelligent control module, which is a high precision, fully digital servo drive with embedded intelligence, and built-in amplifier and brushless motors. Programmable with the high-level Motion Language, the Intelligent Control module embeds on one board advanced motion control and PLC-specific functionality. Combined with a high-level Motion Language, a graphical platform for quick configuration, tuning and motion programming, the Intelligent Control module represents a flexible and easy way to implement solution for a wide range of applications. A user-friendly graphical control interface can visually shows the results of the controller and all of the operating data.

System specification

- Easily exchange the structure style from one to another.
- The rolling pendulum moving circularly without any mechanical restriction
- Open architecture DSP motion control development platform and testing software provided

Technical specification

Model	Power	Gear ratio	Transmission Precision	Dimension	Weight
GCIP2004	40W	7.8:1	$\pm 0.1\text{mm}$	256*244*335 mm	<20kg

Suggested Experiments

1. Servo motor control experiment;
2. Design of automatic control system: Mathematical modeling of dynamic systems;
3. Control system design by root-locus method;
4. Control system design by frequency response;
5. PID control system design;
6. Fuzzy control system design etc.

Ordering Guide

Model Number	Model Name	Description
GCIP2004	Configurable Inverted Pendulum	<ul style="list-style-type: none">• GCIP2004 Structure equipped with DC servo motor and intelligent drive.• Rotary module• Control software, including intelligent motion control development tool with a part of source code provided