

# Circular Inverted Pendulum

## Overview

The circular inverted pendulum series of products adopts an open architecture control solution and a modularized experiment platform. With the circular motion module as the base platform, it is easy to build circular one-stage inverted pendulum, circular two-stage serial inverted pendulum, circular two-stage parallel inverted pendulum, and even the combined serial-parallel inverted pendulums of three and four-stages, satisfying the various needs for control teaching and research. Googol's PC plug-in motion controller is used as control module, MATLAB or C Language can be used and thus facilitate users to carry out experiments and research works.



## Main Feature

### System Specification

- Circular track with no travel limit for the inverted pendulum, suitable for swing up algorithm design.
- Slip ring to feed signal to the controller.
- Floor-standing structure, no workbench is required.
- Industrial incremental encoder I feedback and AC servo motor.

### Open Architecture

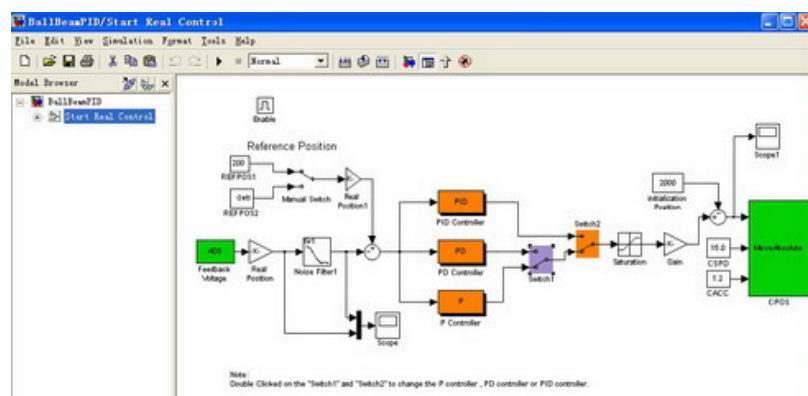
- Open platform based on PC and DSP-based motion controller.
- Open experiment verification and demonstration program of DOS version, with source codes provided, especially suitable for research of control algorithm.
- Googol Simulink software experiment platform provided for experiments such as system modeling, simulation and real time control.

### User Creativity

- Configure unique experiment platform
- Develop and verify one's own control algorithm.
- Tackle the challenging control problems of controlling the balance of parallel inverted pendulum and starting of serial inverted pendulum.

### Modularized Platform

- Circular motion module
- Circular one-stage inverted pendulum
- Circular two-stage serial inverted pendulum
- Circular two-stage parallel inverted pendulum
- Combined serial and parallel inverted pendulum of three- and four-stages



Matlab Control Interface

# Circular Inverted Pendulum

## Specification

AC servo motor power	200W		
Motor encoder	2500P/R		
Pendulum rod encoder	600P/R		
Deceleration ratio	15:1		
Rotation Radius (mm)	270~450		
Rotation Angle	360°		
Power supplier	AC220V; 3A		
Weight (kg)	80 – 83 kg		
Dimension (L x W x H) (mm)	GRIP2001: 700×700×1425	GRIP2002: 700×700×1600	
Rod Length (mm)	GRIP2001: 500	GRIP2002: Rod 1: 175; Rod 2: 500	
Rod weight (kg)	GRIP2001: 0.13	GRIP2002: Rod 1: 0.06 Rod 2: 0.13	

## Ordering Guide

Model Number	Model Name	Description
GRIP2001	Circular One-Stage Inverted Pendulum	<ul style="list-style-type: none"> <li>➤ GRIP circular inverted pendulum platform</li> <li>➤ One-stage inverted pendulum module</li> <li>➤ inverted pendulum control system (motion controller + single-axis servo motor)</li> <li>➤ control box, houses a power supply, a servo amplifier, and terminal interconnections</li> <li>➤ One stage inverted pendulum experiment software pack (DOS version), with source code</li> <li>➤ Googol Simulink software experiment platform</li> </ul>
GRIP2002	Circular Two-Stage Inverted Pendulum	<ul style="list-style-type: none"> <li>➤ GRIP 2001 Pacakge</li> <li>➤ two-stage serial inverted pendulum module</li> <li>➤ two-stage serial inverted pendulum experiment software pack (DOS version)</li> </ul>
GRIP2011	Circular Two-Stage Parallel Inverted Pendulum	<ul style="list-style-type: none"> <li>➤ GRIP 2001 Pacakge</li> <li>➤ two-stage parallel inverted pendulum module</li> <li>➤ Googol Simulink software experiment platform</li> </ul>

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