

# Circular Double Inverted Pendulum Acrobatic Robot

## Overview

The circular double pendulum acrobatic robot is a new product of the inverted pendulum family. Based on the control of multiple-stage inverted pendulum swing up, the acrobatic robot controls the pendulum rod in different equilibrium status and interchange status so that the rod can erect when it is in motion. It can be applied in simulation of artificial intelligent control and other automatic control research and experiments.

The robotic system adopts a large base to enhance its stability. Planetary gear and belt pulley are used for deceleration. Noise is thus reduced when the system is in motion. The length of the arm is adjustable; the electrical system uses industrial standard AC servo drive system and encoder to ensure its reliability when it is in motion. The electrical wiring of the rotation part adopts slip ring connection.

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.



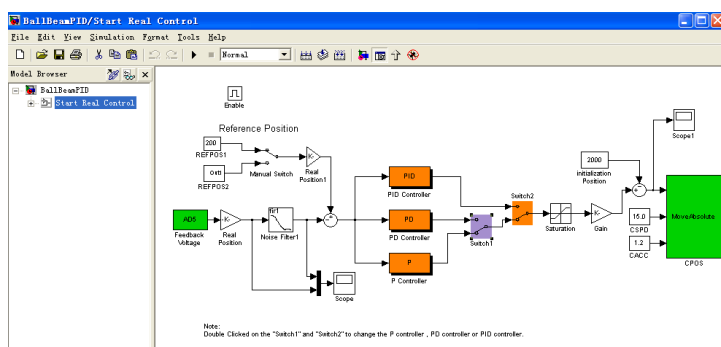
GRIP3002

## System model and characteristics:

1. Open architecture system structure.
2. Unlimited revolutions of the arm.
3. Encoder signal is fed via the slip ring, no limitation on number of revolutions.
4. System input: acceleration of the motor; system output: motor position and speed, angular speed, angle of the pendulum rods.
5. A typical single-input, multiple-outputs, coupled non-linear system.

## Technical specification

AC servo motor power	200W
Motor encoder	2500P/R
Pendulum rod encoder	600P/R
Deceleration ratio	1 : 15
Arm length	270 - 450mm
Dimensions (LxWxH)	700x700x1725mm
Weight	50KG



Matlab control interface



GRIP4002

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## Reference experiments

- Modeling and analysis of nonlinear system
- Modern control theory experiment
- Intelligent control algorithm experiment
- Swing up control experiment

## Ordering guide

Model Number	Product Name	Product Configuration	
GRIP3002	Circular double inverted pendulum acrobatic robot	ARIP-BS-3000	Circular inverted pendulum main body
		ARIP-R-2002	Circular 2-stage IP components
		ARIP-EB-3002	Circular inverted pendulum electric control module
		GT-400-SV-PCI-EDU	GT-400-SV motion controller
		SRIP-DOS-3001	Circular 1-stage IP experiment software (DOS version, source code included)
		SRIP-DOS-3002	Circular 2-stage IP experiment software (DOS version, source code included)
		S-UP-MAT	Googol Simulink software experiment platform
GRIP4002	Humanoid acrobatic robot	ARIP-BS-4002	Humanoid Acrobatic robot main body
		ARIP-R-3002	2-stage IP components
		ARIP-EB-3002	Circular inverted pendulum electric control module
		GT-400-SV-PCI-EDU	GT-400-SV motion controller
		ARIP-TC-4002	Industrial PC with touch screen
		SRIP-VC-4001	Humanoid acrobatic robot demo software (VC ver.)
		S-UP-MAT	Googol Simulink software experiment platform

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