QUANSER
INNOVATE·EDUCATE

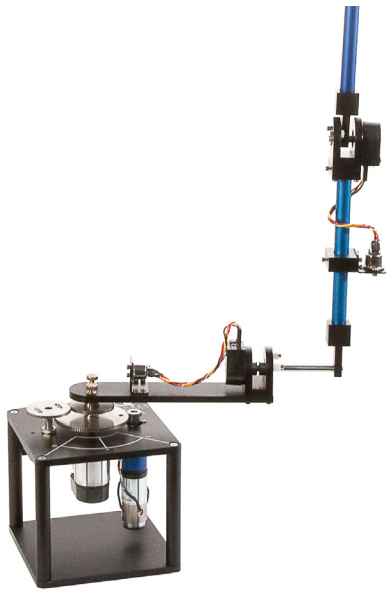
ROTARY DOUBLE INVERTED PENDULUM

Take the inverted pendulum challenge to the next level of complexity

The Rotary Double Inverted Pendulum module is ideal to introduce intermediate and advanced control concepts, taking the classic single inverted pendulum challenge to the next level of complexity. Demonstrate and explore real-world control challenges related, for example, to takeoff stabilization of a multi-stage rocket.

The Rotary Double Inverted Pendulum module consists of a flat arm that mounts to the Rotary Servo Base Unit. A short pendulum rod is attached to the arm's metal shaft, instrumented with a high-resolution encoder measuring the pendulum's angle. The second encoder is mounted on the top of the short pendulum, measuring the angle of the second, longer pendulum rod. The Rotary Servo Base Unit rotates the arm with the double pendulums in a horizontal plane.

Features



Precise

The system's inherent precision helps deliver accurate, repeatable results required for teaching & research labs.

Robust

A durable system able to accommodate enthusiastic undergraduate students.

Comprehensive Courseware

Complete dynamic model, pre-designed Simulink® and LabVIEW™ covers controllers and laboratoty guide.

Expandable

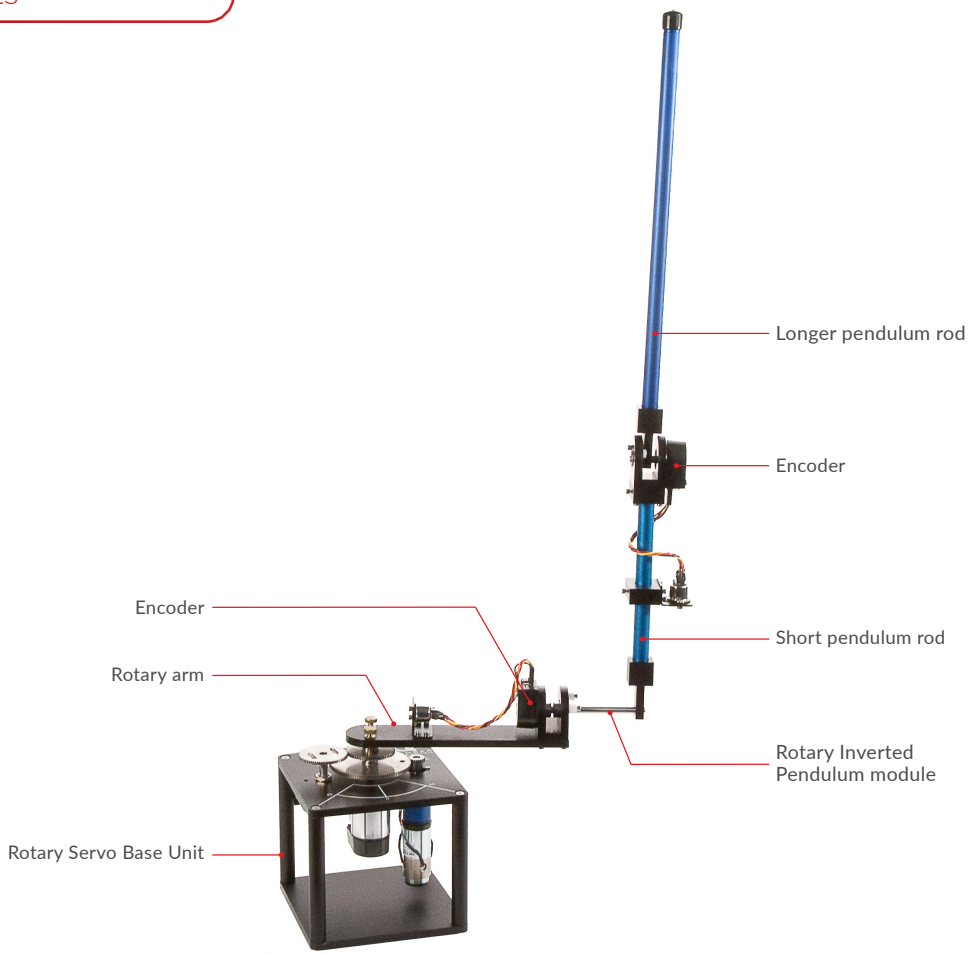
Use the Rotary Servo Base Unit on its own, or add one of other nine modules[1] for experiments of varying complexity across a wide range of topics and disciplines.

Workstation Components

Plant	Rotary Servo Base Unit Rotary Double Inverted Pendulum module
Data acquisition device	Quanser Q8-USB
Amplifier	Quanser VoltPAQ-X1
Control design environment	QUARC for MATLAB®/Simulink® QRCP for LabVIEW™

[1] The add-on modules are sold separately

Product Details



Courseware

Modelling Topics

- Lagrange derivation
- State-space representation
- Linearization

Control Topics

- Linear-quadratic regulator

Device Specifications

Rotary arm length	21.6 cm
Short pendulum length	20 cm
Longer pendulum length	33.65 cm
Encoder resolution (in quadrature)	4096 counts/rev

About Quanser:

For 30 years, Quanser has been the world leader in innovative technology for engineering education and research. With roots in control, mechatronics, and robotics, Quanser has advanced to the forefront of the global movement in engineering education transformation in the face of unprecedented opportunities and challenges triggered by autonomous robotics, IoT, Industry 4.0, and cyber-physical systems.