

BALL AND BEAM

Introduce unstable closed-loop system control concepts

The Ball and Beam experiment is ideal for exploring various control concepts related to unstable closed-loop systems. You can use it to demonstrate real-world control challenges such as aircraft roll control.

The Ball and Beam module consists of a beam with a resistor, forming the track on which the metal ball is free to roll. The track is effectively a potentiometer, outputting a voltage proportional to the position of the ball. The module attaches to the Rotary Servo Base Unit, allowing to control the tilt angle of the beam.

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

ABET-aligned courseware for MATLAB®/Simulink® or LabVIEW™ covers modelling, position, and speed control topics.



Expandable

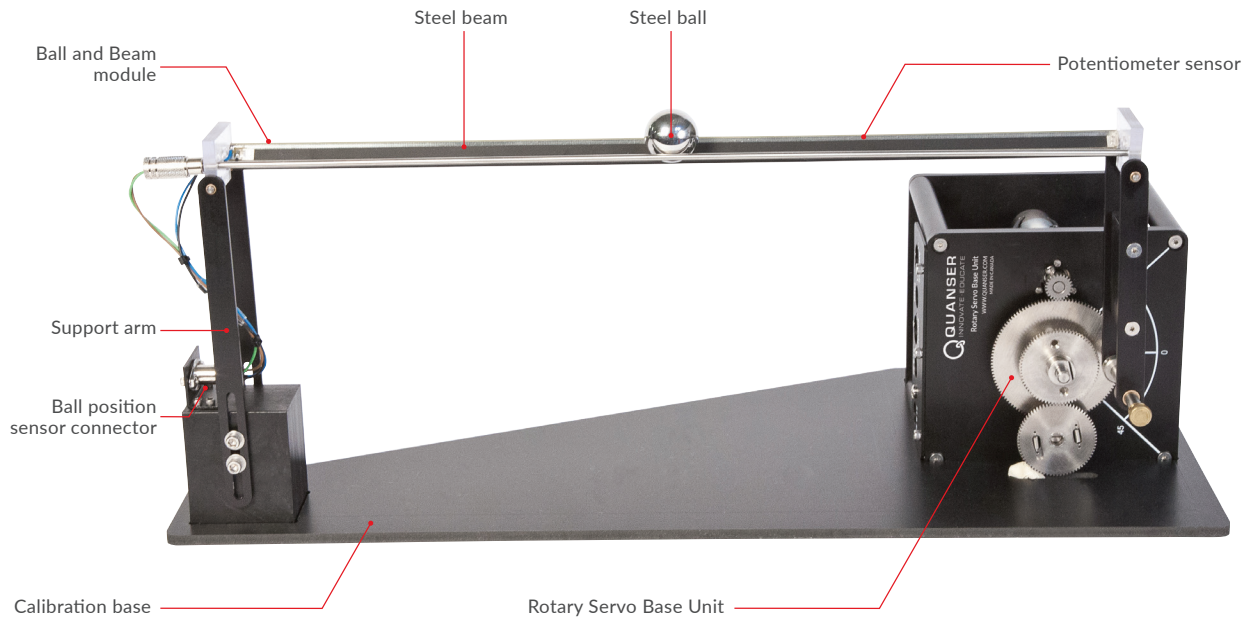
Use the Rotary Servo Base Unit on its own, or add one of other nine modules¹ for experiments of varying complexity across a wide range of topics and disciplines,

Workstation Components

Plant	Rotary Servo Base Unit Ball and Beam module
Data acquisition device	Quanser Q2-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

- First-principles derivations
- Transfer function representation
- Linearization
- Model validation

Control Topics

- PID control
- Multiple loops
- Root locus

Device Specifications

Dimensions (L x W)	50 x 22.5 cm
Weight of the Ball and Beam module	0.65 kg
Weight of the ball	0.064 kg
Diameter of the ball	2.54 cm
Beam length	42.55 cm
Ball sensor sensitivity	-4.25 cm/V
Ball position sensor measurement range	± 5 V

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.

Products and/or services pictured and referred to herein and their accompanying specifications may be subject to change without notice. Products and/or services mentioned herein are trademarks or registered trademarks of Quanser Inc. and/or its affiliates. ©2020 Quanser Inc. All rights reserved.