

# COUPLED TANKS

## Reconfigurable process control system for a range of modeling and control experiments

The Quanser Coupled Tanks system is a reconfigurable, open-architecture platform that models real industrial liquid-level processes found in chemical, water, and process industries. A single pump supplies two transparent Plexiglas tanks equipped with precision pressure sensors, enabling experiments in flow dynamics, interaction, and nonlinear behavior.

By adjusting plumbing paths and selecting interchangeable outflow orifices, users can configure the system for Single Input Single Output (SISO), cascaded, or Multiple Input Multiple Output (MIMO) control. Fully compatible with MATLAB®/Simulink®, LabVIEW™, and QUARC®, it shortens the loop from simulation to real-time hardware implementation. The platform is complemented by the QLABS Virtual Coupled Tanks digital twin, which replicates the hardware's dynamics to support hybrid learning, remote access, and accelerated prototyping. Together, these capabilities make Coupled Tanks a versatile platform for modern control education and experimental research across engineering disciplines.

### Features



#### Reconfigurable

Modular tank design and interchangeable orifices support SISO, cascade, and MIMO control configurations



#### Open Software Architecture

Fully open models integrate seamlessly with MATLAB®, Simulink®, LabVIEW™, and QUARC®



#### Precision

Clear Plexiglas tanks and high-accuracy pressure sensors deliver reliable, repeatable level measurements



#### Courseware Adaptability

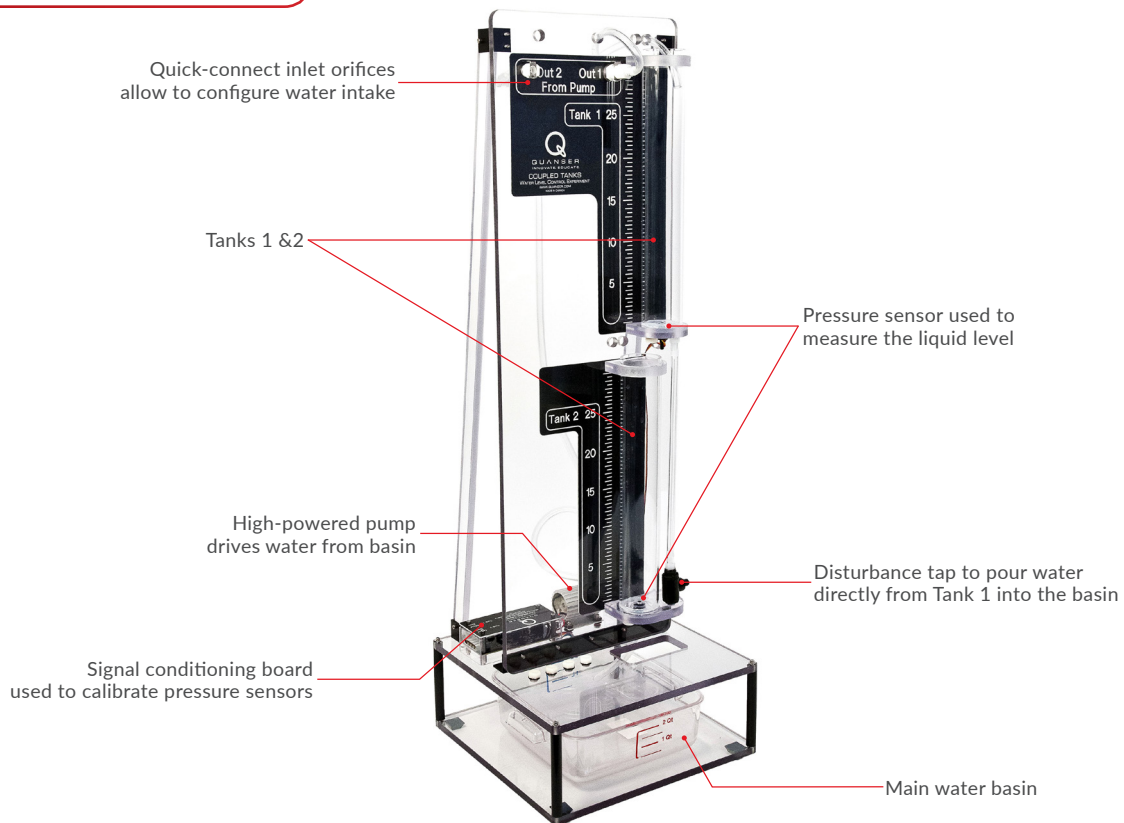
Enables hands-on control and modeling studies across disciplines and course levels

### Workstation Components

Control design environment	Quanser QUARC® add-on for MATLAB®/Simulink®
Documentation	Quanser Rapid Control Prototyping (RCP) Toolkit® add-on for NI LabVIEW™
Real-time targets	Quick Start Guide, User Manual, Instructor and Student Workbooks
Data acquisition devices	Microsoft Windows® and NI CompactRIO
Amplifier	Quanser VoltPAQ-X1 linear voltage amplifier

A linear state space model and a sample controller(s) are supplied

## Product Details



## Courseware

- Derivation of dynamic model from first principles
- Transfer function representation
- Linearization
- Level control
- PID
- Feed-forward
- Control parameter tuning

## Device Specifications

Device mass	6.6 kg
Frame dimensions (H × W × L)	30.5 cm × 30.5 cm × 91.5 cm
Pump flow constant	3.3 cm <sup>3</sup> /(V·s)
Pressure sensor sensitivity	6.1 cm/V
Pressure sensor range	0 to 6.89 kPa
Tank height	30 cm
Tank inside diameter	4.45 cm
Small outflow orifice diameter	0.32 cm
Medium outflow orifice diameter	0.48 cm
Large outflow orifice diameter	0.56 cm

### About Quanser:

Quanser is the world leader in education and research for real-time control design and implementation. We specialize in outfitting engineering laboratories to help universities captivate the brightest minds, motivate them to success, and produce graduates with industry-relevant skills. Universities worldwide implement Quanser's open-architecture control solutions, industry-relevant curriculum, and cutting-edge workstations to teach introductory, intermediate, or advanced controls to students in Electrical, Mechanical, Mechatronics, Robotics, Aerospace, Civil, and various other engineering disciplines.

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. ©2025 Quanser Inc. All rights reserved.