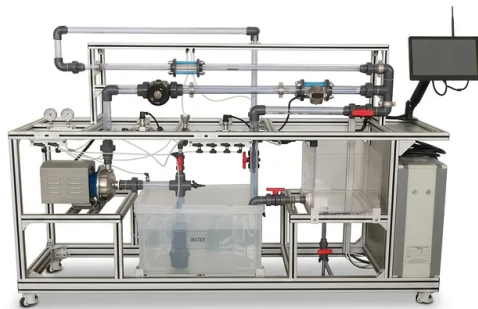


Centrifugal Pump Performance And Orifice Flowmeter Calibration Educational Pilot Plant

Item Number: LPK-LXBCD



Introduction

This versatile educational pilot plant enables engineering students to conduct centrifugal pump performance tests, orifice flowmeter calibration, and fluid mechanics experiments using a transparent flow loop, industrial HMI, and 3D virtual simulation for a comprehensive hands-on learning experience.

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Module / System Component	Description & Functionality
Fluid Circulation Loop	Includes a durable centrifugal pump, a transparent suction/discharge piping network, regulating valves, and storage reservoirs.
Measurement Suite	Integrated electronic pressure transmitters, differential pressure sensors, electromagnetic flowmeters, and digital temperature sensors.
Centrifugal Pump Analysis	Measurement of flow rate (Q), head (H), shaft power (N), and overall efficiency (η) to plot characteristic curves at constant rotational speeds.
Flowmeter Calibration	Calculation of the discharge coefficient (C_{d0}) of an orifice plate flowmeter and analysis of its variation in relation to the Reynolds number (Re).
Control Interface	Industrial touch-screen HMI and PLC system supporting automatic data logging, manual overrides, and system safety interlocks.

Discipline	Core Textbook Reference	Associated Unit Operations & Concepts
Chemical Engineering	<i>Unit Operations of Chemical Engineering</i>	Fluid statics and dynamics, friction loss in pipes, pump characteristic curves, Net Positive Suction Head (NPSH), and orifice meter calibration.
Bioprocess & Food Engineering	<i>Transport Processes and Separation Process Principles</i>	Momentum transfer in fluids, fluid flow measurement, power requirements for pumping Newtonian fluids, and pipeline system curves.
Process Plant Design	<i>Chemical Engineering Design</i>	Piping system sizing, selection of pumps and flow control valves, instrumentation diagrams, and process control loop configuration.