

Alkaline Membrane Water Electrolysis Educational Pilot Plant

Unit Operations Training System

Item Number: LPK-CHPE



Introduction

Hands-on educational pilot plant for alkaline membrane water electrolysis hydrogen production, integrating unit operations training with industrial PLC control, real-time data logging, customizable design, durable 316L stainless steel construction, explosion-proof safety, and modern 5G connectivity for university laboratories.

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Experimental Module	Technical Specifications & Components	Textbook Concepts & Knowledge Points Covered
Electrochemical Reaction & Gas Generation	- Alkaline membrane electrolytic cell - Stainless steel 316L alkali solution tank - Pure water feed tank	- Faraday's Laws of Electrolysis - Electrochemical kinetics and thermodynamics - Energy balance in reacting systems
Fluid Transport & Hydrodynamics	- Industrial shielded circulation pump - Make-up water dosing pump - Integrated flow control valves	- Fluid flow behavior and pressure drop - Pump performance curves and power consumption - Flow measurement principles
Gas-Liquid Separation	- High-efficiency oxygen separator - High-efficiency hydrogen separator	- Multi-phase fluid dynamics - Gravity settling and phase separation principles - Mass transfer across phase boundaries
Process Heat Transfer	- Stainless steel 316L tubular heat exchanger - Cooling water loop integration	- Heat transfer coefficient determination - Energy balance in heat exchangers - Thermal management of exothermic operations
Process Control & Instrumentation	15.6-inch touchscreen interface - Integrated pressure and liquid level sensors - PLC-based automated interlocks	- Process dynamics and feedback loops - Sensor calibration and signal transmission - Industrial safety interlock system design