Key Features

- Hydraulic Benches Dimensions: 3 m * 1.2 m * 1.5 m
- Weight: 300-500 kg
- Power supply: 400 V three-phase, 50 Hz
- Maximum pressure: 10 bar (safety triggered at 12 bar)
- Sensor accuracy: +-0.5% for pressure, +-1% for flow
- Operating temperature: 5^0 C to 40^0 C

Main Components

1. Hydraulic System

Centrifugal or piston pump:

o Power: 1.5 to 3 kW (400 V three-phase power supply).
o Max. flow rate: 50 to 150 L/min (adjustable via frequency inverter).
o Head: 20 to 50 m.

Reservoir:

o Capacity 200- 500 L, stainless steel, with particle filter (25 ɬm).
o Visible oil level + temperature control thermostat (fluid: water or ISO 32/46 oil).

Piping:

o Transparent pipes (PVC or polycarbonate) for flow visualization.
o Variable diameters: 20 mm, 40 mm, 80 mm (interchangeable).
o Leak-proof quick-release couplings (camlock type).

Valves:

o Manual valves (butterfly valve, ball valve).
o Electronic control valves (with 4- 20 mA linear actuator).
o Check valve and pressure relief valve.

2. Instrumentation

Pressure sensors:

o Analog pressure gauges (range 0-10 bar) + digital transmitters (accuracy ɹ0.5%).
o Differential sensors for measuring pressure drops (e.g., between two pipe sections).

Flow meters:

o Magnetic (accuracy +-1%) or ultrasonic (0-150 L/min).
o Analog output (4-20 mA) or USB for data acquisition.

Thermometers:

o PT100 probe for monitoring fluid temperature (0-80^{0}C).

Note: Specifications are subject to change, Photos shown above are Indicative, Actual Product can Vary.

Reynolds Counter:
o Module for displaying Reynolds number (laminar/turbulent flow) via an LCD display.
3. Control and Acquisition System
User Interface:
o Integrated touchscreen for manual control (flow, pressure, temperature).
o USB/Ethernet connectivity for data export.

Measurable Experimental Parameters
1. Regular and Singular Pressure Drops:
o Theory/Experiment Comparison Using the Darcy-Weisbach Formula.
o Study of losses in bends, widenings, and narrowings.
2. Pump characteristics:
o H-Q curves (head/flow rate) and efficiency as a function of speed.
3. Flow regimes:
o Visualization of laminar/turbulent flow (with coloring if transparent pipes).
o Calculation of critical Reynolds number.
4. Valve adjustment:
o Impact on flow rate and pressure losses.

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