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AutoControl

# Practical Hydraulic and Pneumatic Trainer



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## Practical Hydraulic and Pneumatic Trainer

The **Practical Hydraulic and Pneumatic Trainer** is meticulously designed to support comprehensive training and assessment in hydraulic drive, pneumatic transmission, and PLC control in colleges and vocational schools. This versatile system integrates a wide array of industrial-grade pneumatic and hydraulic components, along with programmable controller modules, making it ideal for both basic and advanced training. It allows students to perform conventional control circuit experiments, explore complex hydraulic-pneumatic integration, and develop curriculum-based projects.



SKU: 0401010030

### Key Features of Practical Hydraulic and Pneumatic Trainer

- **Dual-Sided Platform Design:** This trainer features a vertical, dual-sided platform. One side is dedicated to pneumatic experiments, while the other is designed for hydraulic experiments.
- **Industrial-Grade Components:** All hydraulic, pneumatic components, and valves used in this trainer are of industrial grade, ensuring students work with real-world equipment.
- **User-Friendly Panel Design:** The T-slot panel design, combined with rapid joint connections, allows for easy assembly and operation. Circuit experiments are further simplified with leak-proof, fast-inserted interfaces, ensuring clean and efficient circuit setups.

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- **Modular Hydraulic Components:** The trainer's hydraulic components are independent modules equipped with spring pins, allowing for easy assembly of various hydraulic circuits on the T-slot panel.
- **Dual Control Modes:** The hydraulic circuits can be controlled either by a relay unit or by PLC, providing a practical comparison of traditional relay control and modern PLC programming. This feature enhances students' understanding of PLC control advantages.
- **Safe and Reliable:** The trainer includes multiple safety features, such as quick couplings for hydraulic connections, protective training wires for electrical control circuits, current leakage protection, and thermal protection circuit breakers for motor control. The system also automatically unloads when the pressure exceeds 6.3MPa, preventing damage.
- **Comprehensive Integration:** The system integrates a variety of real hydraulic components, relay control units, PLC, and computer configuration technologies, offering a complete learning environment.
- **High-Pressure Demonstration:** The demonstration components use compression-resistant hoses, capable of handling pressures up to 15MPa.

### Hydraulic Experimental Panel

The hydraulic control unit includes:

- **Power Module:** Equipped with three-phase leakage protection and output voltages of 380V/220V, along with a 24V DC supply.
- **PLC Module:** Similar to the pneumatic panel, it includes secure sockets for input and output points, plus PLC software and accessories.
- **Relay Unit:** Connectors for various relays are integrated for ease of use.
- **Button Switch Unit:** Features connectors for various push-button switches for easy operation.
- **Solenoid Valve Control Interface:** Connectors for solenoid valves facilitate efficient training.
- **Hydraulic Components Module:** These components are mounted on a fast backplane for easy assembly and disassembly.

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### Pneumatic Experimental Panel

The pneumatic control unit consists of the following modules:

- **Power Module:** Features single-phase leakage protection with an output voltage of 220V. If the earth leakage current exceeds 30mA, the power automatically cuts off. The DC 24V electric control includes overvoltage protection.
- **PLC Module:** The module is equipped with secure sockets for input and output points, along with PLC programming software, learning software, and a programming cable.
- **Relay Unit:** Various relays' connectors are integrated into the panel for easy connection during training.
- **Button Switch Unit:** The unit includes connectors for various push-button switches, allowing easy operation.
- **Solenoid Valve Control Interface:** Connectors for various solenoid valves are provided for straightforward training exercises.
- **Pneumatic Components Modules:** These components are mounted on a fast backplane, facilitating easy assembly and disassembly.

### Control System

The control system offers multiple control methods:

#### 1. PLC Control:

- Programming control
- Delay sequence control

#### 2. Relay Control:

- Proximity switch control for sequence and position
- Manual control with double solenoids and three interfaces, plus six single electric control interfaces

The **Practical Hydraulic and Pneumatic Trainer** is a complete training solution that equips students with the skills needed for mastering hydraulic and pneumatic systems, ensuring they are well-prepared for the demands of modern industrial environments.

## Typical Training Contents of [Practical Hydraulic and Pneumatic Trainer](#)

### Hydraulic Training Modules

#### Part A: Basic Hydraulic Circuit Training

##### 1. Pressure Control Circuits

###### Pressure Regulation Circuits

- Pressure regulated circuit via pressure relief valve/overflow valve
- Single-stage pressure regulation from remote port via pressure relief valve/overflow valve

###### Pressure Holding Circuits

- Pressure holding circuit utilizing a pilot check valve

###### Pressure Reduction Circuits

- Single-stage pressure reduction circuit

###### Decompression Circuits

- Decompression circuit via throttle valve
- Decompression circuit using sequence valve

###### Pressure Relief Circuits (Pressure-Venting)

- Pressure relief circuit with three-position four-way reversing valve
- Pressure relief circuit with two-position two-way valve

##### 2. Speed Control Circuits

###### Speed Regulation Circuits

- Oil-inlet throttle speed regulation circuit
- Oil-return throttle speed regulation circuit
- Bypass throttle speed regulation circuit
- Speed regulation circuit using speed regulating valve
- Differential connection for fast-speed movement circuit
- Speed-reduction/slow-speed circuit via solenoid valve and speed regulating valve
- Secondary feed circuit with speed regulating valve in series
- Secondary feed circuit with speed regulating valve in parallel

## 3. Directional Control Circuits

### Reversing Circuits

- Reversing circuit via reversing valve
- Sequence action circuit using sequence valve
- Sequence action circuit with two-position four-way valve and proximity switch
- Sequence action circuit using proximity switch
- Sequence action circuit via pressure relay

### Lock Circuits

- Lock circuit using reversing valve
- Lock circuit using one-way valve
- Lock circuit via pilot check valve

## Part B: Hydraulic Drive System Demonstration

## Part C: Observing, Disassembly, and Assembly Training for Hydraulic System Components

## Pneumatic Training Modules

- Single pneumatic acting cylinder direct control
- Dual pneumatic acting cylinder speed control
- Dual pneumatic acting cylinder “AND” direct control
- Dual pneumatic acting cylinder “OR” direct control
- Dual pneumatic acting cylinder “AND” & “OR” direct control
- Dual pneumatic acting cylinder “AND” and delay control
- Hand-operated (serial) circuit control
- “Remote” operation (parallel) circuit control
- Interlock “remote” independent operation circuit control
- Delay forward-back circuit control
- Dual-solenoid continuous reciprocating/forward-back circuit control
- Multi-cylinder, single electric solenoid electric-pneumatic control circuit with delay sequence control
- Dual-cylinder reciprocating/forward-back electric-pneumatic control circuit

## Main Technical Parameters for the [Practical Hydraulic and Pneumatic Trainer](#)

### Hydraulic Part

#### 1. Motor

- Power: 1.5KW
- Speed: 1420 r/min

#### 2. Variable Pump

- Rated Pressure: 7 MPa
- Rated Flow: 8 ml/rev

#### 3. Input Power

- Three-phase four-wire:  
~380V  $\pm$  10%, 50Hz

#### Power Consumption

- Less than 2 KVA

### Pneumatic Part:

#### Silent Air Compressor

- Compressor Displacement:  
65L/min
- Noise Level: <57 dB (Mute)

#### Motor

- Power: 750W
- Working Voltage: AC 220V
- Speed: 2860 r/min

#### PLC Model

- FX1S-20MR-001

#### Input Power

- Single-phase: 1P + N ~ 220V  
 $\pm$  10%, 50Hz

#### Power Consumption

- Less than 1 KVA

#### Bench Dimensions:

- 1650mm × 900mm ×  
1750mm