EDUSUPPORTS.COM

enhance your mind

AutoControl

Advanced Hydraulic Fault Diagnosis and Maintenance Training System

Edusupports

www.edusupports.com

sales@edusupports.com

EDUSUPPORTS.COM

enhance your mind

Advanced Hydraulic Fault Diagnosis and Maintenance Training System

The **Advanced Hydraulic Fault Diagnosis and Maintenance Training System** is designed to equip trainees with the essential skills to analyze and troubleshoot hydraulic systems efficiently. This hands-on training platform enables users to quickly identify and resolve faults within hydraulic systems, enhancing their technical proficiency.

Key Training Capabilities of the Advanced Hydraulic Fault Diagnosis and Maintenance Training System

SKU: 0401010130

- **Comprehensive Understanding of Hydraulic Components:** Trainees will gain in-depth knowledge of the structure and working principles of various hydraulic components, enabling them to understand how each part functions within the system.
- **Familiarity with Hydraulic Circuits:** The training system provides a thorough understanding of hydraulic circuit composition and characteristics. This knowledge is crucial for diagnosing issues within complex hydraulic networks.
- **Mastering Fault Diagnosis:** Trainees will learn to identify the causes of hydraulic component failures and apply effective solutions. This training ensures that users can swiftly and accurately pinpoint faults, reducing downtime and improving system efficiency.

EDUSUPPORTS.COM

enhance your mind

This Advanced Hydraulic Fault Diagnosis and Maintenance Training System is ideal for those looking to develop advanced diagnostic skills in hydraulic systems, making it an essential tool for technical training in industrial maintenance and engineering programs.

- **Hydraulic Industrial Valve Circuit Experiment:** Learn and practice basic hydraulic valve circuits, focusing on industrial applications and circuit overlap.
- **Performance Testing of Hydraulic Components:** Conduct performance tests on commonly used industrial hydraulic components to understand their behavior and operational efficiency.
- **Hydraulic Transmission System Demonstration:** Explore the structure and working principles of hydraulic transmission systems through hands-on demonstration and disassembly experiments.
- **Simulation and PLC Control Experiment:** Utilize simulation software for hydraulic systems and engage in physical experiments with PLC control to bridge theory with practical application.
- **Hydraulic System Fault Diagnosis:** Engage in fault simulation, diagnosis, and treatment for common issues within hydraulic systems, preparing for real-world challenges.
- **Electrical Fault Diagnosis in Hydraulic Systems:** Learn to diagnose and treat common electrical faults within hydraulic systems, ensuring a holistic approach to system maintenance and repair.
- **Hydraulic Component Fault Diagnosis:** Simulate, diagnose, and treat faults in hydraulic components, enhancing troubleshooting capabilities.
- **PLC Programming and Integrated Control:** Develop skills in PLC software programming, focusing on the integration of mechanical, electrical, and hydraulic systems for comprehensive control.

Performance and Characteristics for Advanced Hydraulic Fault Diagnosis and Maintenance Training System

- **Robust Frame Construction**: The system features a frame made of 2mm cold-rolled steel, meeting industrial standards. The surface is coated with durable plastic, ensuring longevity. It incorporates a mesh-type, multi-filter oil return structure, chrome-plated hole mesh plate, and a superimposed oil tank for efficient operation.
- **Specialized Work Surface**: The experimental training surface is crafted from a custom anodized aluminum alloy with a T-slot design. The large effective working area allows for complex hydraulic circuit configurations, enhancing training flexibility.
- **Plug-and-Play Training Circuits**: The training circuits feature quick-change connectors with one-way valves and self-locking mechanisms, ensuring no pressure oil leakage during disconnection. The system uses PTFE sealing rings for improved durability.
- **Precision Control Module**: The electric control module box is built with a 2.5mm aluminum alloy panel, featuring a wire-drawing process for enhanced aesthetics and durability. It includes a main control power module, instrument module, button module, PLC controller, relay module, and fault diagnosis module, offering comprehensive electrical safety and control functionalities.
- **Comprehensive Safety Measures**: The system is equipped with grounding, leakage, overload, and hydraulic pump anti-reverse protections. High-insulation safety sockets and training wires ensure user safety, adhering to national safety standards.
- **Industrial-Grade Components**: All hydraulic components are standard industrial-grade, utilizing advanced Rexroth technology for superior performance and reliability.
- **Versatile Control Methods**: The system supports various control technologies, including mechanical, traditional relay, and advanced PLC control, allowing for diverse training scenarios.
- **Expandable Training Platform**: The equipment offers expansion capabilities, allowing for additional components and control methods to be integrated, enhancing training versatility and functionality.

- **Advanced PLC and PC Communication**: The PLC communicates with PCs for electrical automation control, online programming, monitoring, and fault detection. The system supports secondary development for in-depth hydraulic control applications.
- **Modular Electrical Control**: The platform's electrical control is modular, combining different functional boards to meet various training requirements. The remote-controlled fault diagnosis modules ensure concealed and repeatable testing.
- **PLC Programmable Design Simulation(optional)**: The software also includes PLC programmable design and control features, enabling trainees to simulate real-world control scenarios. It offers 360-degree component assembly, technical indicator measurement, electrical component connection, parameter adjustment, and fault diagnosis within a 3D virtual environment, ensuring comprehensive and practical learning.
- **Virtual Simulation Software(optional)**: The system includes advanced hydraulic and pneumatic design and control virtual simulation software, developed on Unity3D. It offers 3D roaming, component recognition, circuit construction, and typical system tests, providing an immersive and interactive learning experience. The software supports detailed inspection of all components and integrates seamlessly with the overall training platform.

Typical Training Contents of **Advanced Hydraulic Fault Diagnosis and Maintenance Training System**

Basic Circuit Training of Hydraulic Transmission

Pressure Control Circuits:

Pressure Regulation Control Circuit:

- Overflow valve pressure setting circuit.
- Overflow valve single-stage remote pressure regulation circuit.

Pressure Change Circuit:

- First-stage pressure reducing circuit.

Unloading Circuit:

- Unloading circuit of three-position four-way reversing valve.
- Unloading circuit of two-position two-way valve.

Pressure Stabilizing Circuit:

- Hydraulic control check valve pressure maintaining circuit.

Pressure Relief Circuit:

- Throttle valve pressure relief circuit.
- Sequence valve pressure relief circuit.

Speed Control Circuits:

Speed Control Circuit:

- Oil inlet throttling speed control circuit.
- Oil return throttling speed control circuit.
- Bypass throttling speed control circuit.
- Speed control valve speed control circuit.
- Differential connection speed increase circuit.
- Secondary feed circuit with speed control valve and throttle valve in parallel.
- Pressure reducing circuit with solenoid valve and speed control valve.

Synchronous Circuits:

- Synchronous circuit controlled by throttle valve.

Directional Control Circuits:

Reversing Circuit:

- Reversing circuit controlled by reversing valve.
- Sequential circuit controlled by sequence valve.
- Sequential circuit controlled by two-position four-way valve and proximity switch.
- Sequential circuit controlled by pressure relay.

Locking Circuits:

- Locking circuit with reversing valve.
- Locking circuit with hydraulically controlled check valve.
- Locking circuit with check valve.

Part B: Common Hydraulic Component Fault Diagnosis

1. **Hydraulic Pressure Valve Fault Diagnosis and Treatment**.
2. **Hydraulic Reversing Valve Fault Diagnosis and Analysis**.
3. **Hydraulic Flow Valve Fault Diagnosis and Treatment**.
4. **Hydraulic Actuator Fault Diagnosis and Treatment**.
5. **Common Fault Diagnosis and Treatment of Hydraulic Systems**.
6. **Electromechanical and Hydraulic Control Fault Diagnosis**:
   - Common fault diagnosis and treatment of hydraulic pumps.
   - Common fault diagnosis and treatment of PLC control systems.
   - Common fault diagnosis and treatment of electrical control systems.

Common Hydraulic Component Performance Tests

1. **Hydraulic Pump Characteristic Test**.
2. **Static Characteristic Test of Overflow Valve**.
3. **Throttle Valve Speed Load Characteristic Test**.
4. **Speed Control Valve Speed Load Characteristic Test**.
5. **Static Characteristic Test of Pressure Reducing Valve**.
6. **Hydraulic Cylinder Characteristic Test**.
7. **Programmable Logic Controller (PLC) Electrical Control Training**:
   - PLC instruction programming and ladder diagram programming.
   - Learning and using PLC programming software.
   - Communication between PLC and computer, with online debugging.
   - Application of PLC in hydraulic transmission control and control scheme optimization.

Main Technical Parameters for Advanced Hydraulic Fault Diagnosis and Maintenance Training System

Three-Phase Motor:

- **Rated Power**: 2.2 kW
- **Rated Speed**: 1450 r/min

Quantitative Vane Pump:

- **Rated Displacement**: 8 ml/rev

Three-Phase Motor:

- **Rated Power**: 2.2 kW
- **Rated Speed**: 1450 r/min

Variable Vane Pump:

- **Rated Displacement**: 10 ml/rev

Working Pressure: 7 MPa

Working Voltage: 380V

Dimensions: 1640×650×1600 mm