MTA SKILLLAB SDN. BHD.

ELIMINATE DOWNTIME & SAVE ENERGY

This course not just equips you with the troubleshooting skill but also to optimize your pneumatic systems for peak efficiency. You'll learn to identify and eliminate costly air leaks, properly size and maintain components, and implement a systematic approach that reduces machine stoppages and cuts compressed air energy costs

Duration: 2 days **Venue:** MTA Training Center, Prai **Time:** 9am - 5pm

COURSE TITLE: MASTER PNEUMATIC POWER & SYSTEMATIC TROUBLESHOOTING

Learning Outcomes

- Explain the fundamental principles of pneumatic power, including the generation, treatment, and distribution of compressed air
- Identify the function, operation, and symbol of key pneumatic components
- Design and draw basic pneumatic circuits for industrial applications using standard ISO 1219 symbols.
- Assemble, test, and operate basic pneumatic circuits on training panels, translating diagrams into physical systems.
- Apply a systematic, step-by-step troubleshooting methodology to isolate and rectify faults in pneumatic systems efficiently and safely.
- Implement best practices for routine pneumatic system maintenance to ensure reliability and energy efficiency.
- Diagnose common pneumatic problems (e.g., slow operation, no movement, etc)

Who Should Join?

Courses are often tailored for industrial technicians, maintenance staff, and engineers

Learning Content

Session 1: Introduction to Pneumatic Power

Session 2 : Air Generation, Treatment & Conditioning

Session 3: Pneumatic Actuators & Directional Control Valve

Session 4 : Developing Basic Industrial Circuits

Session 5: Maintenance Best Practices

Session 6: Common Pneumatic System Failure

Session 7: Systematic Troubleshooting Methodology

Session 8: Energy Efficiency on Components sizing & Pressure Optimization

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Course Outline

DAY 1: FOUNDATIONS, COMPONENTS & CIRCUIT DESIGN

Session 1 : Introduction of Pneumatic Power (90min)

- Fundamentals of pneumatics: How air power works.
- Properties of compressed air: Force, pressure, flow.
- The compressed air system: Overview from compressor to actuator.
- Introduction to ISO 1219-1 fluid power symbols.

Hands-On:

Lab 1: Pressure & Force calculation exercises to sizing correct cylinder for different load application.

Session 2: Air Generation, Treatment & Conditioning (90min)

- Types of compressors.
- The critical role of air preparation/selection: FRL Units (Filter, Regulator, Lubricator).
- Air quality standards (ISO 8573-1).

Hands-On:

Lab 2: Disassembly, inspection, and reassembly of Filter, Regulator, and Lubricator. Setting correct pressure.

Session 3: Pneumatic Actuators & Directional Control Valves (90min)

- Linear actuators: Single-acting vs. Double-acting cylinders, construction, cushioning.
- Rotary actuators.
- Directional Control Valves (DCVs): Construction types (spool, poppet), actuation methods (manual, mechanical, solenoid, pilot), and port configurations (3/2, 5/2, 5/3).

Hands-On:

Lab 3: Disassembly, inspection, and reassembly service of pneumatic Actuator & control valve.

Session 4: Developing Basic Industrial Circuits (90min)

- Direct and indirect control circuit.
- Motion sequences control circuit
- Pilot-operated valves control circuit.
- Interlock safety control circuit
- Two speed control Circuit
- Quick extend control circuit

Hands-On :

Lab 4: Designing an automatic reciprocation control circuit, assemble and test run

Course Outline

DAY 2: CIRCUIT DESIGN, MAINTENANCE & SYSTEMATIC TROUBLESHOOTING

Session 5: Maintenance Best Practices (90min)

- Proactive vs. reactive maintenance.
- Daily, weekly, and monthly checklists for pneumatic systems.
- Leak detection and the cost of air leaks.
- Lubrication best practices.

Session 6: Systematic Troubleshooting Methodology (90min)

- Define the Problem & Gather Information.
- Observe & Perform Safety Lockout.
- Identify Probable Causes (Using diagrams and experience).
- Systematic Isolation Test: The "Half-Split" method applied to pneumatics.
- Repair/Replace and Test.
- Document the Solution.

Session 7: Common Pneumatic System Failure & Solution (90min)

- Air Supply & Quality
- Contamination & Lubrication.
- Components wear & tear.
- Mechanical installation issues.

Hands-On :

Lab 5: Systematic Fault Finding Challenge - Participants work in teams on pre-faulted training panels (e.g., "Cylinder does not extend," "Cylinder creeps," "Erratic speed").

Session 8: Energy Efficiency on Components sizing & Pressure Optimization (90min)

- Right-Sizing Pressure
- Oversizing Consequences
- Energy-Efficient Cylinders
- Valve Flow Optimization
- Differential Pressure Control