MTA SKILLLAB SDN. BHD.

ELIMINATE DOWNTIME & SAFETY OPERATION

This course is designed to provide maintenance technicians and engineers with strong practical and technical knowledge of industrial sensors used in automation systems. The program focuses on understanding different types of industrial sensors, their operating principles, signal types, and communication protocols, as well as best practices for preventive maintenance and performance optimization

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

COURSE TITLE: MASTERING INDUSTRIAL SENSOR

Learning Outcomes

- Identify and explain the operating principles of common industrial sensor types
- Understand sensor electrical characteristics, output signals, and industrial communication protocols
- Correctly select sensors based on application, environment, and performance requirements
- Perform proper installation, wiring, and connection of sensors to control units (PLC, controller, I/O modules)
- Apply preventive maintenance strategies to ensure sensor reliability and longevity
- Diagnose and troubleshoot common sensor faults and failures
- Optimize sensor performance for accuracy, stability, and process efficiency

Who Should Join?

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

Learning Content

Session 1: Introduction of industrial sensor

Session 2 : Variety Sensor & Functions

Session 3: Sensor output signal & communication protocol

Session 4 : Connecting Sensors to Control Units

Session 5 : Preventive Maintenance for Industrial Sensors

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Course Outline

Core Technologies, Protocols, Installation and Maintenance

Session 1 : Introduction of Industrial Sensor (90min)

- Role of Sensor in Automation system
- Sensor Identification - visual identify sensor's form factor, connection type, and housing material
- Classify sensors as discrete or analog
- Match sensors to industrial applications
- Discuss environmental and protection requirements (IP rating)

Lab Exercise 1: Sensor Identification and match to industrial application

Session 2: Variety of Industrial Sensor Types (90min)

- Proximity Sensors (Digital) - Inductive & Capacitive
- Photoelectric Sensors (Digital) - Diffuse, Retro-reflective, Through-beam
- Area / Safety Sensors (Digital) - Light curtains
- Pressure Sensors (Analog / Digital) - Gauge , Absolute, differential
- Level Sensors (Analog / Digital) - Capacitive, ultrasonic, radar, float
- Distance Sensors (Analog / Digital) -Laser, ultrasonic, radar
- Temperature Sensor (Analog / Digital - Thermistor, RTD, Thermocouples, IR
- Flow Sensor (Analog /Digital) - Mechanical, Magnetic, Vortex, Ultrasonic

Lab Exercise 2: Identify sensor & application

Session 3: Sensor Output Signals & Communication Protocols (90min)

- Identify PNP vs NPN wiring diagrams
- Distinguish analog vs digital outputs
- Analyze IO-Link vs traditional wiring scenarios
- Protocol: Modbus (RTU/TCP), Ethernet/IP, PROFINET, IO-Link, OPC UA

Lab Exercise 3:Signal & protocol recognition.

Course Outline

Session 4: Connecting Sensors to Control Units (90min)

- Wiring 2 (AC/DC), 3 (PNP/NPN) or 4-wire sensor to digital input module (simulation or real)
- Connect analog sensor to analog input module
- Verify signals using multimeter or PLC diagnostics
- Perform commissioning checklist

Lab Exercise 4: Sensor Wiring & PLC I/O Connection.

Session 5: Preventive Maintenance & Basic Troubleshooting (90min)

- Importance of Preventive maintenance
- Common sensor failure modes
- Basic troubleshooting steps (technician level)
- Environmental and installation issue