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Course Name

Instrumentation Troubleshooting & Fault Diagnosis

Sector Name

Instrumentation & Controls

Document Type

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Instrumentation Troubleshooting & Fault Diagnosis

Course Introduction

Instrumentation faults do not always appear where the real problem exists. An abnormal process reading may originate from the sensing element, transmitter configuration, impulse lines, wiring, power supply, signal transmission, I/O channel, control-system configuration, or even from an actual process condition. Replacing instruments without identifying the source of the problem can increase downtime, introduce new faults, and leave the original issue unresolved.

Boost Consulting & Training offers this course to develop a systematic and practical approach to instrumentation troubleshooting and fault diagnosis.

Participants learn how to interpret symptoms, trace instrument signals, perform targeted checks, evaluate field and control-system evidence, and progressively isolate faults across industrial measurement and control systems. Practical cases emphasize making diagnostic decisions based on evidence rather than assumptions or unnecessary component replacement.

The **main concept of this course** is to trace instrumentation problems through the complete measurement and signal path,

narrowing possible causes until the actual fault is identified, corrected, and verified.

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Instrumentation Troubleshooting & Fault Diagnosis

Target Audience

- ✓ Instrumentation and control engineers
- ✓ Instrument and control technicians
- ✓ Automation and process-control specialists
- ✓ Engineers responsible for instrumentation reliability and troubleshooting

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Instrumentation Troubleshooting & Fault Diagnosis

Learning Objectives

- ✓ Apply a structured approach to industrial instrumentation troubleshooting.
- ✓ Interpret abnormal readings and instrument behavior as diagnostic evidence.
- ✓ Trace faults through sensors, transmitters, wiring, signals, I/O, and control systems.
- ✓ Diagnosing common pressure, temperature, flow, and level measurement problems.
- ✓ Identify electrical, signal, configuration, and installation-related instrumentation faults.
- ✓ Distinguish genuine process abnormalities from instrument and signal problems.
- ✓ Select appropriate diagnostic tests without unnecessary equipment replacement.
- ✓ Verify corrective actions and reduce recurrence of instrumentation faults.

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Instrumentation Troubleshooting & Fault Diagnosis

Course Outline

✓ DAY 01

Building a Troubleshooting Strategy

Reading the Fault before Taking Action

- ✓ Distinguish symptoms, faults, causes, and consequences within instrumentation systems.
- ✓ Gather operating history, process conditions, alarms, trends, and maintenance information before intervention.
- ✓ Separate confirmed evidence from assumptions during the initial investigation.

Tracing the Instrumentation Chain

- ✓ Follow the measurement path from sensing element through transmitter, signal transmission, I/O, and control system.
- ✓ Identify practical test points for progressively isolating possible faults.
- ✓ Complete a Fault Isolation Challenge using an abnormal process measurement.

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Course Outline

✓ DAY 02

Diagnosing Field Instrument Problems

Investigating Measurement Instruments

- ✓ Diagnose common faults affecting pressure, temperature, flow, and level measurements.
- ✓ Recognize symptoms associated with plugging, leakage, drift, damage, incorrect installation, and environmental effects.
- ✓ Compare actual process behavior with instrument indications to identify inconsistencies.

Testing Instrument Performance

- ✓ Check zero, span, range, configuration, response, and output behavior.
- ✓ Determine whether calibration, configuration, installation, or physical condition is causing the problem.
- ✓ Complete a Field Instrument Diagnosis involving several competing fault possibilities.

Instrumentation Troubleshooting & Fault Diagnosis

Course Outline

✓ DAY 03

Troubleshooting Signals and Electrical Connections

Tracing Instrument Signals

- ✓ Examine common analog and digital signal paths between field devices and control systems.
- ✓ Identify open circuits, short circuits, poor connections, grounding problems, and signal interruptions.
- ✓ Use measurements at selected points to determine where signal integrity has been lost.

Investigating Power and Wiring Problems

- ✓ Evaluate instrument power supply, polarity, terminal connections, shielding, and grounding arrangements.
- ✓ Recognize intermittent faults caused by loose connections, moisture, vibration, or environmental exposure.
- ✓ Run a Signal Path Investigation from field transmitter to control-system input.

Instrumentation Troubleshooting & Fault Diagnosis

Course Outline

✓ DAY 04

Finding Faults across the Control System Interface

Diagnosing I/O and Configuration Problems

- ✓ Trace abnormal information through field wiring, I/O channels, scaling, and system configuration.
- ✓ Recognize incorrect ranges, engineering units, channel assignments, and signal conversion problems.
- ✓ Distinguish field-device faults from control-system-side faults.

Separating Instrument Faults from Process Problems

- ✓ Compare instrument indications with independent process evidence.
- ✓ Recognize process conditions that can imitate instrument failure.
- ✓ Complete a False Instrument Fault Case where the apparent instrumentation problem originates elsewhere in the process.

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Instrumentation Troubleshooting & Fault Diagnosis

Course Outline

✓ DAY 05

Solving Complex and Intermittent Faults

Investigating Difficult Instrumentation Problems

- ✓ Diagnose faults that disappear, move, or occur only under specific operating conditions.
- ✓ Use trends, repeated measurements, event timing, and cross-checks to expose intermittent behavior.
- ✓ Narrow multiple possible causes without unnecessary adjustment or component replacement.

Restoring and Verifying System Performance

- ✓ Select corrective actions based on confirmed fault evidence.
- ✓ Verify the complete measurement and signal path after repair or adjustment.
- ✓ Complete an Instrumentation Troubleshooting Simulation from the first abnormal symptom through systematic fault isolation, corrective action, and final performance verification.

Instrumentation Troubleshooting & Fault Diagnosis

Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
Oct. 11, 2027	Oct. 15, 2027	5 days	4250.00 \$	UAE , Abu Dhabi
Jan. 4, 2027	Jan. 8, 2027	5 days	5950.00 \$	USA , Los Angeles
April 18, 2027	April 22, 2027	5 days	4250.00 \$	Bahrain , Manama
Aug. 30, 2027	Sept. 3, 2027	5 days	4250.00 \$	UAE , Dubai

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