

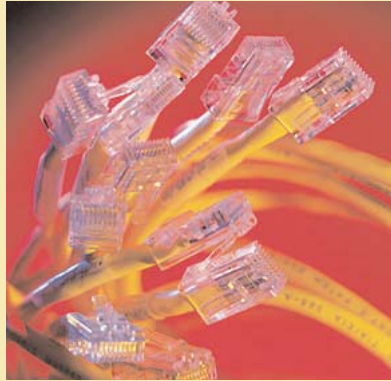
# Practical TCP/IP and Ethernet Networking for Industry

Full Program Details: [www.electricityforum.com/forums/ethernet-networking.html](http://www.electricityforum.com/forums/ethernet-networking.html)

TORONTO, ON - November 9-10, 2009

CALGARY, AB - November 12-13, 2009

DISCOUNT  
PROGRAM PRICING  
Details Page 4



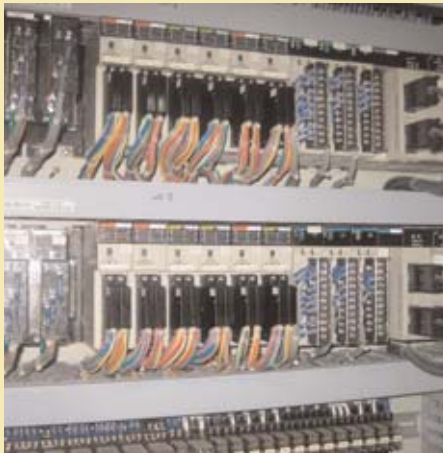
2-day course  
**\$1150**

# Practical Boiler Control and Instrumentation for Engineers and Technicians

Full Program Details: [www.electricityforum.com/forums/boiler-control.html](http://www.electricityforum.com/forums/boiler-control.html)

EDMONTON, AB - November 16-17, 2009

VANCOUVER, BC - November 19-20, 2009



2-day course  
**\$1150**

# Practical Instrumentation for Automation and Process Control

Full Program Details: [www.electricityforum.com/forums/automation.html](http://www.electricityforum.com/forums/automation.html)

MONTREAL, QC - November 19-20, 2009

EDMONTON, AB - November 23-24, 2009



2-day course  
**\$1150**



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### TCP/IP and Ethernet Networking Course Overview:

The workshop has been structured to cover the main areas of TCP/IP and Ethernet in detail, while going through the practical implementation of TCP/IP in computer and industrial areas and practical use of the Internet and intranets.

Troubleshooting and maintenance of TCP/IP networks and communication systems in an office and industrial environment are also covered.

### Boiler Control and Instrumentation Course Overview:

The first two modules of the workshop provide training on two subjects that are essential for anyone involved in using or applying controls to boilers. These are a basic knowledge of boiler and combustion processes and a basic knowledge of those control and instrumentation practices relevant to most boiler plant applications. The control training includes a review of the SAMA and ISA symbol standards used for depicting control system details.

The training then proceeds in a series of modules to describe the basic requirements and typical control solutions for the main control and safety functions in boilers. These functions are structured into individual modules allocated to feedwater supply and drum level, furnace air and the control of draft pressure, combustion controls, steam pressure and temperature controls. The combustion control module addresses the issues of dynamic response of the fuel and air feeds with examples of how ratio control, feedforward signals and cross limiting methods are applied to ensure good load following.

### Instrumentation for Automation and Process Control Course Overview:

It is for those primarily involved in achieving effective results for the industrial processes they are responsible for. This would involve the design, specification and implementation of control and measurement equipment.

The workshop focuses on real applications, with attention to special installation considerations and application limitations when selecting or installing different measurement or control equipment.

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Day 1	Day 2
<p><b>INTRODUCTION</b></p> <ul style="list-style-type: none"> <li>• Terms and definitions</li> <li>• LANs, WANs, VLANs and VPNs</li> <li>• Open Systems Interconnection, OSI and ARPA models</li> </ul> <p><b>ETHERNET</b></p> <ul style="list-style-type: none"> <li>• Fundamentals</li> <li>• 10Mbps Ethernet systems</li> <li>• Fast and Gigabit Ethernet</li> <li>• Collisions and performance</li> <li>• Full duplex, deterministic and dual redundant Ethernet</li> </ul> <p><b>INTERNET LAYER PROTOCOLS</b></p> <ul style="list-style-type: none"> <li>• IPV4</li> <li>• addressing</li> <li>• subnetting</li> <li>• supernetting and CIDR</li> <li>• fragmentation</li> <li>• header structure</li> <li>• ARP</li> <li>• ICMP</li> <li>• routing protocols</li> <li>• IPV6</li> <li>• addressing modes</li> <li>• header structure</li> <li>• extension headers</li> </ul> <p><b>HOST-TO-HOST LAYER PROTOCOLS</b></p> <ul style="list-style-type: none"> <li>• TCP/IP</li> <li>• ports and sockets</li> <li>• sequence and acknowledgement numbers</li> <li>• establishing and closing connections</li> <li>• sliding windows</li> <li>• UDP</li> </ul>	<p><b>PROCESS/APPLICATION LAYER PROTOCOLS</b></p> <ul style="list-style-type: none"> <li>• BOOTP, DHCP, TELNET, FTP, TFTP, NFS, SMTP, POP3, HTTP, SNMP, DNS</li> </ul> <p><b>TCP/IP UTILITIES</b></p> <ul style="list-style-type: none"> <li>• Ping, arp, tracert, netstat, ipconfig, winipcfg, etc</li> </ul> <p><b>CONNECTION DEVICES</b></p> <ul style="list-style-type: none"> <li>• Repeaters, hubs, bridges, switches, routers, gateways</li> </ul> <p><b>THE INTERNET AND COMMUNICATIONS</b></p> <ul style="list-style-type: none"> <li>• Creating an Intranet</li> <li>• Connecting to the Internet</li> <li>• VoIP</li> </ul> <p><b>SECURITY CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Authentication</li> <li>• Routers</li> <li>• Encryption</li> <li>• Firewalls</li> </ul> <p><b>CONFIGURING AND TROUBLESHOOTING ETHERNET AND TCP/IP</b></p> <p>To be covered during the practical sessions:</p> <ul style="list-style-type: none"> <li>• Configuration</li> <li>• Use of TCP/IP and third party utilities</li> <li>• Use of protocol analyzers</li> </ul> <p><b>SATELLITE COMMUNICATIONS</b></p> <ul style="list-style-type: none"> <li>• Essentials of satellites</li> <li>• Challenges with TCP/IP</li> </ul> <p><b>TYING IT ALL TOGETHER</b></p> <ul style="list-style-type: none"> <li>• Current and future trends</li> <li>• Critical areas of focus</li> </ul> <p><b>SUMMARY, QUESTIONS, OPEN FORUM AND CLOSING</b></p>

# Practical Boiler Control and Instrumentation for Engineers and Technicians

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EDMONTON, AB - November 16-17, 2009

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## Day 1

### ESSENTIALS OF BOILER PROCESSES

- Objectives of boiler controls
- Overview of boiler types
- Boiler processes in block diagrams to show key inputs and output variables
- Hazards of boiler operations
- The main control functions in boilers and furnaces

### REVIEW OF PROCESS CONTROL AND INSTRUMENTATION RELEVANT TO BOILERS

- Principles of sensors and transmitters with examples for boilers
- Closed loop control principles including feedback, feedforward, ratio and limiting.
- Control system hardware and software tools.
- Safety instrumented controls and the impact of IEC 61511
- Instrumentation diagrams and symbols per ISA and SAMA.
- Distributed control systems and the separation of safety systems

### FEEDWATER AND DRUM LEVEL CONTROL

- Performance requirements: Level, quality, stability
- Characteristic responses of drum level
- Level control solutions, 1, 2 and 3 element types
- Level measurement problems and practices
- Drum level safety systems

### FURNACE AIR AND DRAFT CONTROLS

- Performance requirements; pressures and temperatures
- Characteristic responses and means of control
- Pressure measurement methods and the pressure profile
- Temperature control and the impact of dew point
- Protection against implosion

## Day 2

### COMBUSTION CONTROLS

- The combustion process and its requirements for efficiency and safety
- Coal, oil and gas firing types.
- Stoichiometric air and excess air requirements
- Fuel-air ratio control and its measurements
- Firing rate controls and cross limiters for improving dynamic response
- Methods for measurements of boiler efficiency using analysers
- Application of optimising controllers

### BURNER MANAGEMENT SYSTEMS

- Safety and performance requirements of pulverisers, burners and igniters.
- Furnace safety standards and regulations
- Flame monitors and flame failure detection
- Start up protection and sequencing
- Furnace supervisory controls and shutdown system

### STEAM TEMPERATURE CONTROL

- Superheater and attemperator arrangements
- Essential control requirements
- De-superheater controls

### STEAM PRESSURE AND BOILER LOAD CONTROLS

- Pressure and flow response characteristics
- Single boiler load control
- Multiple boiler installations and load sharing controls

### SUMMARY, QUESTIONS, OPEN FORUM AND CLOSING

# Practical Instrumentation for Automation and Process Control

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MONTREAL, QC - November 19-20, 2009

EDMONTON, AB - November 23-24, 2009

## Day 1

### INTRODUCTION

- Basic concepts
- Definitions
- Overview of pressure, level, temperature and flow
- Overview of valves

### PRESSURE MEASUREMENT

- Principles
- Sources
- Transducers and elements
- Specifications
- Installation issues

### LEVEL MEASUREMENT

- Principles
- Simple sight glasses
- Buoyancy tape systems
- Hydrostatic pressure
- Ultrasonic measurement
- Radiation measurement
- Electrical measurement
- Density measurement
- Installation issues

### TEMPERATURE MEASUREMENT

- Principles
- Thermocouples
- Resistance temperature detectors
- Thermistors
- Liquid-in-glass, filled, bimetallic
- Pyrometers
- Installation issues

## Day 2

### FLOW MEASUREMENT

- Principles
- Differential pressure flowmeters
- Open channel flow measurement
- Oscillatory flow measurement
- Magnetic flow measurement
- Positive displacement
- Ultrasonic flow measurement
- Mass flow measurement
- Installation issues

### CONTROL VALVES

- Principles
- Control valve types
- Selection
- Characteristics / trim
- Noise and cavitation
- Actuators and positioners
- Installation issues

### PROCESS CONSIDERATIONS

- Transmitters
- Noise
- Material of construction

### INTEGRATION OF THE SYSTEM

- Individual instrument error and total error
- Testing and commissioning

### SUMMARY, QUESTIONS, OPEN FORUM AND CLOSING

