FUNDAMENTALS OF PRACTICAL BUILDING AUTOMATION SYSTEMS (BAS)

WHAT YOU WILL LEARN:

- How Building Automation Services (BAS) operate and are controlled, monitored and maintained
- Type of systems used in the HVAC industry i.e. pneumatic, electric, electronic, Direct Digital Controls (DDC)
- How to identify the key building blocks of a BAS
- Why DDC and BAS systems are so popular and user friendly
- How to undertake design, installation and commissioning of a simple BAS
- How to generate a point schedule
- Simple troubleshooting procedures for a BAS
- How to describe the key codes and standards relating to a BAS
- How to program and configure a simple BAS
- The essentials of web based access to your building operation, monitoring and fault finding and maintenance options
- How to troubleshoot and work with SCADA systems
- How to implement simple energy efficiency strategies

WHO SHOULD ATTEND:

- Control and instrumentation engineers and technicians
- Design engineers
- Maintenance engineers, technicians and staff
- Mechanical engineers and technicians
- Operation, inspection and repair managers, supervisors and technicians
- Plant engineers

IDC
TECHNOLOGIES

Technology Training that Works

The Workshop

A Building Automation System (BAS) is a computerised intelligent network of electronic devices that is used to control and monitor the mechanical, lighting and security systems in a building. It is sometimes referred to as an intelligent building system. It is most often used for control of heating, ventilation and air conditioning (HVAC) systems. A BAS can result in a dramatic reduction in building energy and maintenance costs. Building automation systems can also monitor other parameters such as temperature, air pollution levels, fire alarm status and building integrity.

Most of the underlying networks underpinning a BAS comprise a primary and secondary bus which connect high-level controllers with lower level devices which interface to the digital and analog input/outputs.

After an initial overview of the topic, the first day of the workshop covers controllers, industrial networks, lighting, air handlers, water systems and the central plant. The second day provides you with a solid understanding of heating, ventilation, air conditioning (HVAC) and the associated electrical systems. You will also be exposed to alarms and security, room automation and the vital topic of energy efficiency. The workshop is concluded with the interesting topic of SCADA systems where all the building information is brought together.

Throughout the workshop you will learn the essentials in installing, commissioning and troubleshooting individual components and systems.

Practical demonstrations, videos and exercises

We (and you) know that no matter how good the instructor is (and ours are very good!) no one learns from listening to a lecture. The best way of learning and gaining real skills is a high level of interaction with your peers and your instructor and also in undertaking hands-on exercises which relate to the real practical world. Hence we have a busy and enjoyable schedule of useful activities to help you really learn, including:

- 25 short, punchy videos on BAS
- 32 short, practical design exercises on each topic using simulation software and calculators
- 4 case studies on operating and commissioning a BAS where you will work in small groups to solve real electrical engineering problems

Please bring a calculator to get maximum benefit.

To gain full value from this workshop, please bring your laptop/notebook computer.

The Program

DAY ONE

INTRODUCTION TO A BUILDING AUTOMATION SYSTEM (BAS)
- What is building automation?
- Why building automation is required
- Direct Digital Controls (DDC)
- Predecessors to DDC controls
- Overall topology
- Key building blocks
- Industrial networks
- Overview of the course

CONTROLLERS
- Different types
- Programmable Logic Controllers/System
- Network controllers
- Terminal unit controllers
- Connectivity with networks
- Configuration and programming
- Troubleshooting of controllers

INDUSTRIAL NETWORKS
- Different systems
- Proprietary versus non proprietary systems
- BACnet (ASHRAE)
- LonTalk
- Wireless (Zigbee)
- Industrial Ethernet
- Remote control
- Configuration and troubleshooting

OCCUPANCY
- Occupied/unoccupied/morning warm-up and night-time setback
- Monitoring and corrective action in case of inadequate fresh air, other pollutants in occupied areas
- Requirements of BAS

LIGHTING
- Automated systems
- Demand response

AIR HANDLERS
- Air handling units
- Constant volume
- Variable volume
- Variable volume hybrid units
- Typical control set ups and monitoring requirements

CENTRAL PLANT
- Operation and troubleshooting of chillers, boilers, cooling towers, pumps

DAY TWO

WATER SYSTEMS
- Chilled water system
- Condenser water system
- Hot water system

HVAC CONTROLS AND INSTRUMENTATION
- Sensors and elements
- Pneumatic, hydraulic, electric, electronic, direct digital controls
- Two position control
- PID control
- Parameters to be controlled (temperature supply and return air)
- Preheat and humidification (winter air conditioning)
- Cooling, dehumidification and reheat control (summer air conditioning)
- Face and by-pass control
- All year round air conditioning system
- Zone control system

ALARMS AND SECURITY
- Temperature sensors
- Differential pressure sensors
- Status alarm (e.g. pumps)
- Valve actuators
- Carbon monoxide and carbon dioxide sensors
- Refrigerant sensors
- Current sensors

ROOM AUTOMATION
- Corporate boardrooms/presentation suites
- Videoconferencing/video projectors
- Lighting control system
- Public address systems

ENERGY EFFICIENCY
- Costs of fuels
- Energy performance
- Energy audit of your building
- Case studies

THE SCADA (OR HMI) SYSTEM FOR BAS/DDC SYSTEMS
- Basic implementation
- Troubleshooting
- Application of ASHRAE
- Features
- Remote control and monitoring

On-Site Training

✓ SAVE over 50% by having an IDC workshop presented at your premises.

✓ Customise the training to YOUR workplace.

✓ Have the training delivered when and where you need it.

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