COURSE OVERVIEW ME0530
HVAC Direct Digital Control (DDC)

Course Title
HVAC Direct Digital Control (DDC)

Course Date/Venue
September 21-25, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Course Reference
ME0530

Course Duration/Credits
Five days/3.0 CEUs/30 PDHs

Course Description

This practical and highly-interactive course includes practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.

(**1**) **Industrial Facility Visit:** Course participants will be taken to an industrial facility where they will practice testing, maintenance and troubleshooting. In case that this course is organized inside client premises (In-House), then client shall provide access to its HVAC and refrigeration workshop for practical sessions.

(**2**) **HVAC Simulator:** Participants will use in the class the state-of-the-art HVAC Simulator to practice some of the skills learnt.

Over the last 20 years, no one area of the HVAC industry has changed so dramatically as controls. These critical HVAC subsystems have undergone significant and fundamental changes, perhaps the most drastic of any in our industry. We have evolved from pneumatic controls to "overlay" energy management systems and first generation Direct Digital Controls (DDC), to current generation distributed DDC. The transition has been rapid and today we find ourselves dealing with control systems that are very different than those that were available just a few years ago.

The computer industry's trend of increasing processing power and memory at a lower cost over time is quickly influencing DDC controllers. The advent of open protocols and increased availability and use of site/building/campus networks has increased the complexity of the design, procurement, and operations of these systems. Twenty years ago, we were looking at pneumatic receiver controllers, transmitters, and actuators, along with first-generation, expensive, and centralized DDC products.

Today, our control systems are graphical, decentralized, relatively inexpensive, and serve up information to us via the Internet. We have moved from a non-proprietary communication protocol that relied on air pressure, to a very proprietary one that allows us to receive and respond to control alarms via our cell phones. Additionally, the control logic that in the past was distributed to single-function hardware components (receiver controllers, switching relays, etc.) now resides in software.

The DDC system is the "brain" of the HVAC system. It dictates the position of every damper and valve, along with which fans, pumps, and chillers run, and at what speed or capacity. Yet, proportionally, it receives very little consideration as compared to the rest of the system during the design phase. This applies in the procurement, installation and maintenance phases as well. Therefore, this course is designed to improve the participant's knowledge of current DDC systems and the issues surrounding their correct deployment into HVAC systems. The course will give participant a broad range of knowledge to understand the principles and technical concepts used by the various manufacturers. This understanding is essential for the acquisition, implementation, and operation of a cost-effective system. The course will also cover planning, designing and specifying DDC systems. It will provide participant with a comprehensive understanding of the technologies available today.

Course Objectives

This intensive and interactive course is your opportunity to expand your knowledge of direct digital control systems (DDC) for control of HVAC processes. This course will enable you to:-

- Define your requirements for a DDC system to serve HVAC and related building systems
- Describe the hardware and software elements that make up a DDC system
- Develop a DDC architectural master plan for your requirements
- Describe the essential elements of a DDC system specification
- Define the application requirements for the building systems
- Plan for the commissioning of the DDC system
- Determine how to design HVAC DDC Systems
- Identify the various types of commonly used control systems
- Review open DDC systems that allow for future expansion and interoperability
- Recognize the Internet DDC system
- Use the WEB-Browser for Automation Interface
- Apply the critical do's and don'ts as well as accepted rule-of-thumb checks in HVAC control design

Exclusive Smart Training Kit - H-STK®

*Participants of this course will receive the exclusive "Haward Smart Training Kit" (**H-STK®**). The **H-STK®** consists of a comprehensive set of technical content which includes **electronic version** of the course materials conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides an overview of all significant aspects and considerations of HVAC direct digital control (DDC) for consulting, design, and energy engineers, commissioning authorities, applications engineers, plant engineers, architects and planning technical staff responsible for the design, acquisition or operation of environmental control systems in commercial, institutional or industrial facilities. You will design, specify and estimate costs for DDC system. The course is recommended for those interested in or involved with HVAC DDC systems, including mechanical engineers, HVAC designers, building engineers, facility engineers, utility engineers, HVAC contractors, manufacturers representatives, other technical staff and recent college graduates in engineering.

Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

30% Lectures
20% Practical Workshops & Work Presentations
30% Hands-on Practical Exercises & Case Studies
20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

Course Fee

US$ 5,500 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

Certificate Accreditations

Certificates are accredited by the following international accreditation organizations:-

- British Accreditation Council (BAC)

  Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

- The International Accreditors for Continuing Education and Training (IACET - USA)

  Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

  Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

  Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:

Mr. Dimitry Rovas, CEng, MSc, PMI-PMP, SMRP-CMRP is a **Senior Mechanical & Maintenance Engineer** with extensive industrial experience in **Oil**, **Gas**, **Power** and **Utilities** industries. His expertise includes **Boiler** Inspection & Maintenance, **Boiler** Systems, **Boiler** instrumentation & Controls, **Boiler** Start-up & Shutdown, **Boiler** Operation & Steam System Management, **Boiler** Water Chemistry & Treatment, **Boiler** Efficiency & Waste Heat Recovery, **Boiler** Inspection & Testing, **Boiler** Maintenance, **Boiler** Troubleshooting & Safety, **Boiler** Emissions & Pollution Control, **Combustion** Analysis & Tuning Procedures, **Water Treatment** Technology, Heat Recovery Steam Generating (**HRSG**), **Impulse Tube** Installation & Inspection, **Parker Compression Fittings**, **Pipes & Fittings**, **PSV Inspection**, **Root Cause Failure Analysis**, **Tank** Design & Engineering, **Tank Shell**, **Tanks & Tank Farms**, **Vacuum Tanks**, **Gas Turbine** Operating & Maintenance, **Diesel Engine**, **Engine Cycles**, **Governors & Maintenance**, **Crankshafts** & Maintenance, **Lubrication** System Troubleshooting & Maintenance, **Engines/Drivers**, **Motor** Failure Analysis & Testing, **Motor** Predictive Maintenance, **Engine** Construction & Maintenance, **HP Fuel Pumps & Maintenance**, **Fired Equipment** Maintenance, Combustion **Techniques**, **Process Heaters**, Glass Reinforced Epoxy (**GRE**), Glass Reinforced Pipes (**GRP**), Glass Reinforced Vent (**GRV**), **Mechanical Pipe Fittings**, **Flange Joint Assembly**, Adhesive Bond Lamination, **Butt Jointing**, **Joint & Spool Production**, **Isometric Drawings**, **Flange Assembly** Method, **Fabrication & Jointing**, Jointing & Spool Fabrication, **CAESAR**, **Pipe Stress Analysis**, **Pipe Cuttings**, **Flange Bolt Tightening** Sequence, **Hydro Testing**, **Pump** Technology, Fundamentals of **Pumps**, **Pump** Selection & Installation, **Centrifugal Pumps & Troubleshooting**, **Reciprocating & Centrifugal Compressors**, **Screw Compressor**, **Compressor** Control & Protection, **Gas & Steam Turbines**, **Turbine** Operations, **Gas Turbine** Technology, **Valves**, **Process Control Valves**, **Bearings & Lubrication**, Advanced **Machinery Dynamics**, **Rubber Compounding**, **Elastomers**, **Thermoplastic**, **Industrial Rubber Products**, **Rubber** Manufacturing Systems, **Heat Transfer**, **Vulcanization Methods**, **Process Plant Shutdown & Turnaround**, **Professional Maintenance Planner**, Advanced **Maintenance Management**, **Maintenance Optimization & Best Practices**, **Maintenance Auditing & Benchmarking**, **Material Cataloguing**, **Reliability** Management, **Rotating Equipment**, **Energy Conservation**, **Energy Loss Management** in Electricity Distribution Systems, **Energy Saving**, **Thermal Power Plant** Management, **Thermal Power Plant** Operation & Maintenance, **Heat Transfer**, **Machine Design**, **Fluid Mechanics**, **Heating & Cooling Systems**, **Heat Insulation Systems**, **Heat Exchanger & Cooling Towers**, **Mechanical Erection**, **Heavy Rotating Equipment**, Material Unloading & Storage, Commissioning & Start-Up. He is currently the **Project Manager** wherein he is managing, directing and controlling all activities and functions associated with the domestic heating/cooling facilities projects.

During his life career, Mr. Rovas has gained his practical and field experience through his various significant positions and dedication as the **EPC Project Manager**, **Maintenance Manager**, **Mechanical Engineer**, **Field Engineer**, **Preventive Maintenance Engineer**, **Lead Rotating Equipment Commissioning Engineer**, **Construction Commissioning Engineer**, **Offshore Lead Maintenance Engineer**, **Researcher**, **Instructor/Trainer**, **Telecom Consultant** and **Consultant** from various companies such as the Mytilineos Aluminium Group, Podaras Engineering Studies, Metka and Diadikasia, S.A., **Hellenic Petroleum Oil Refinery** and COSMOTE.

Mr. Rovas has **Master's** degrees in **Energy Production & Management** and **Mechanical Engineering** from the **National Technical University of Athens** (**NTUA**), **Greece**. Further, he is a **Certified Instructor/Trainer**, a **Certified Maintenance and Reliability Professional** (**CMRP**) from the Society of Maintenance & Reliability Professionals (**SMRP**), **Certified Project Management Professional** (**PMI-PMP**), **Certified Six Sigma Black Belt**, **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**), **Certified Construction Projects Contractor**, **Certified Energy Auditor** and a **Chartered Engineer**. Moreover, he is an active member of **American Society for Quality**, Project Management Institute (**PMI**), **Body of Certified Energy Auditors** and **Technical Chamber of Greece**. He has further received various recognition and awards and delivered numerous trainings, seminars, courses, workshops and conferences internationally.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1: Sunday, 21st of September 2025

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	**PRE-TEST**
0830 – 0930	**Fundamentals of Automatic Control** Control Loops ● Types of Control Action ● Controller Technologies
0930 – 0945	Break
0945 – 1100	**Control Loops** Controlled Variable ● Sensor ● Controller ● Controlled Device ● Controlled Agent
1100 – 1215	**Types of Control Action** Two-Position (On/Off) ● Floating ● Proportiona ● Proportional–Integral (PI) ● Proportional–Integral–Derivative (PID)
1215 – 1230	Break
1230 – 1420	**Controller Technologies** Pneumatic (Pneumatic Controller and Pneumatic Controlled Device) ● Analog-Electric (Analog Electric Controller and Electronic Controlled Device) ● Microprocessor-based (Microprocessor Based Controller and DDC Controlled Device)
1420 – 1430	**Recap** Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow
1430	Lunch & End of Day One

Day 2: Monday, 22nd of September 2025

0730 – 0830	**Automatic Control of HVAC Systems** Unit-Level Control ● System-Level Control ● System Optimization ● Failure Recovery
0830 – 0930	**Unit-Level Control** VAV Air handler
0930 – 0945	Break
0945 – 1100	**System-Level Control** Chilled-Water VAV System ● System-Level Operating Modes ● Rooftop VAV System Optimum Start ● Morning Warm-Up ● Air-Cooled Chiller, Fan-Coil System Chilled-Water Reset ● Two-Pipe Changeover Requirements ● Water-Source Heat-Pump System Optimized Loop Control ● Loop Temperature Control
1100 – 1215	**System Optimization** VAV System Fan-Pressure Optimization ● Rooftop VAV System Optimum Start ● Air-Cooled Chiller, Fan-Coil System Chilled-Water Reset Water-Source Heat-Pump System Optimized Loop Control

1215 – 1230	Break
1230 – 1420	***Failure Recovery*** *Sequences of Operation • Stand-Alone Operation*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Two*

Day 3: Tuesday, 23rd of September 2025

0730 – 0930	***Building Automation Systems Technology (Part One)*** *Responding to Comfort Complaints • Graphical User Interface • Time-of-Day Scheduling*
0930 – 0945	*Break*
0945 – 1100	***Building Automation Systems Technology (Part Two)*** *Centralized Alarms and Diagnostics • Remote Access • Reports*
1100 – 1215	***Building Automation Systems Technology (Part Three)*** *Preventive Maintenance • Integration with Other Systems • Connecting Multiple Sites*
1215 – 1230	*Break*
1230 – 1420	***Building Automation Systems Technology (Part Four)*** *Automation System Components • Web-Browser Interface*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Three*

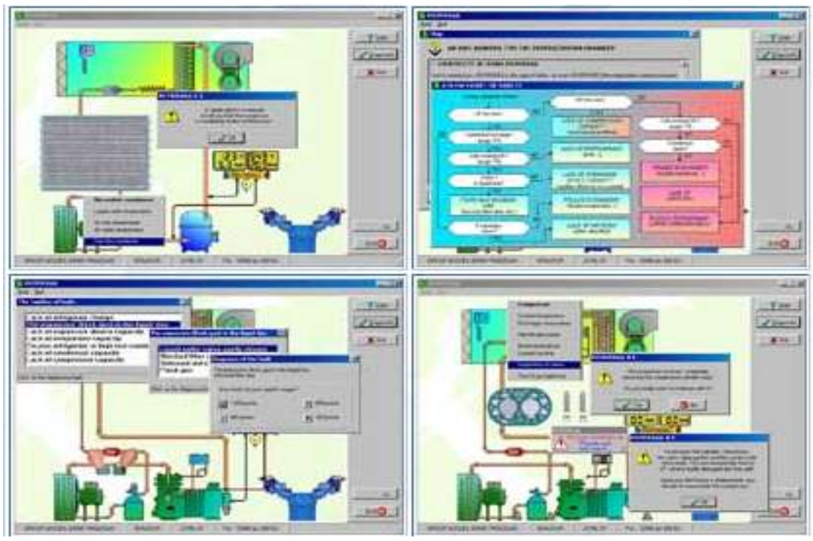
Day 4: Wednesday, 24th of September 2025

0730 – 0930	***Interoperability (Part One)*** *Network • LAN Versus WAN • Intranet Versus Internet • "Tiered" BAS Architecture*
0930 – 0945	*Break*
0945 – 1100	***Interoperability (Part Two)*** *Communications Protocols • Gateways*
1100 – 1215	***Interoperability (Part Three)*** *System-Level Interoperability • Unit-Level Interoperability • Interchangeability*
1215 – 1230	*Break*
1230 – 1420	***Interoperability (Part-Four)*** *BACnet • LonTalk • "Tiered" BAS Architecture • "Flat" BAS Architecture*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Four*

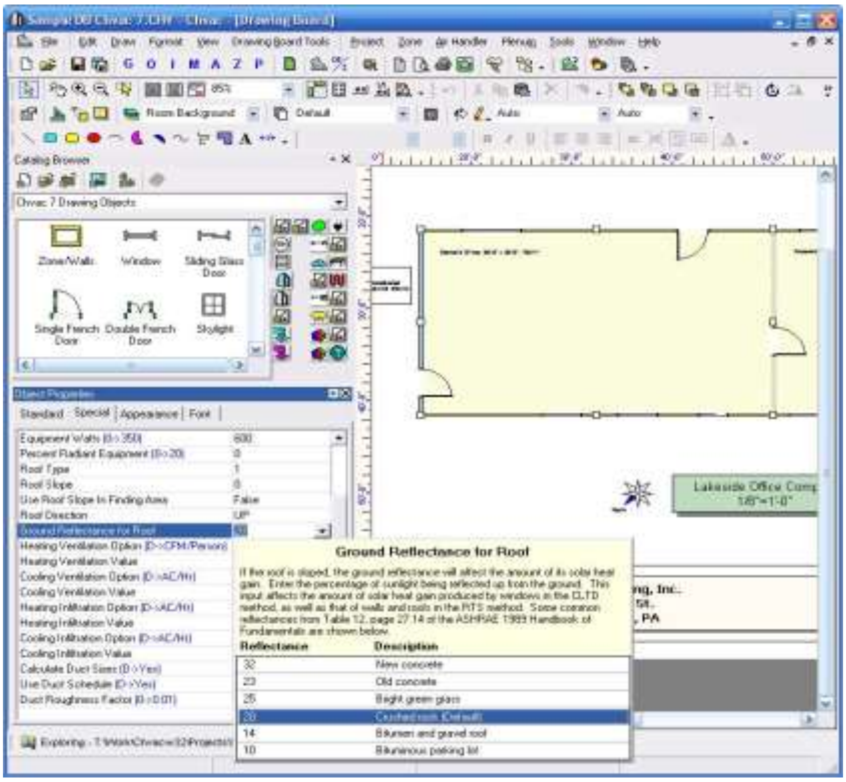
Day 5:	Thursday, 25^{th} of September 2025
0730 – 0930	***Practical Session # 1***
0930 – 0945	*Break*
0945 – 1100	***Practical Session # 2***
1100 – 1215	***Practical Session # 3***
1215 – 1230	*Break*
1230 – 1345	***Practical Session # 4***
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Practical Sessions/Site Visit

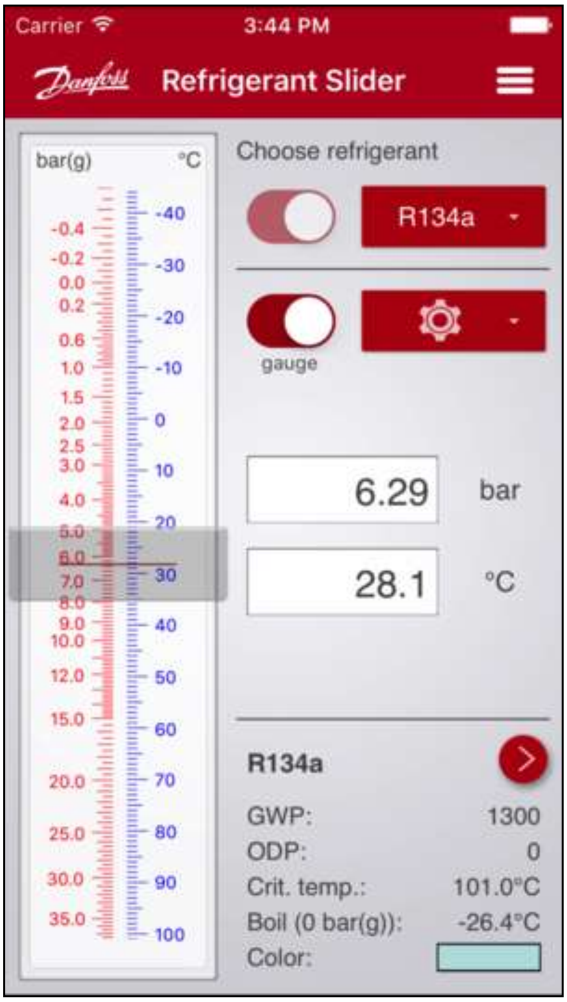
Simulator (Hands-on Practical Sessions)

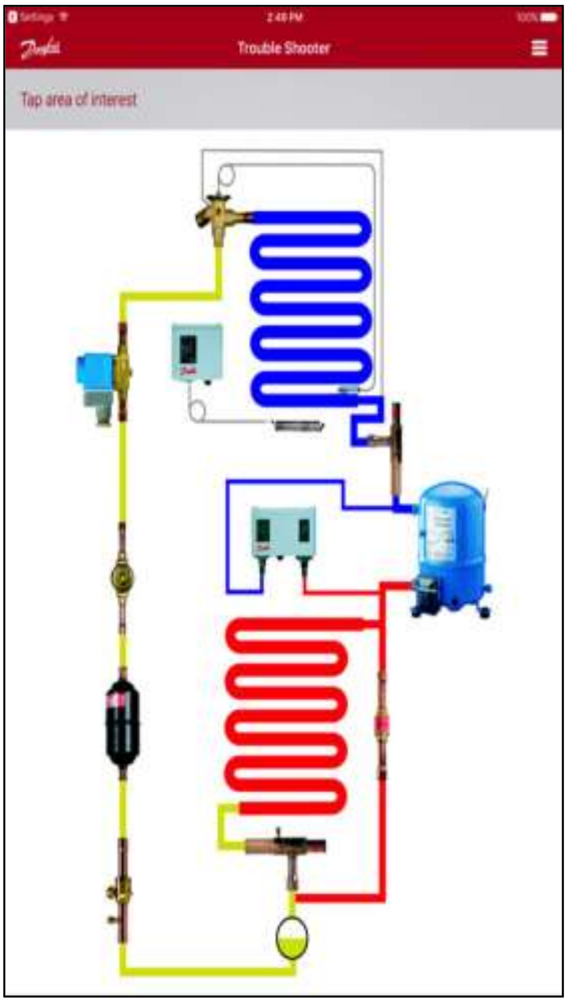


KOTZA HVAC Simulator



Elite CHVAC Simulator





<u>Danfoss Refrigerant Slider App</u> **<u>Danfoss Troubleshooter App</u>**

<u>Course Coordinator</u>

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