COURSE OVERVIEW IE0129
ABB 800 ACS Drives

Course Title
ABB 800 ACS Drives

Course Date/Venue
July 06-10, 2025/TBA, Sheraton Riyadh Hotel & Towers, Riyadh, KSA

Course Reference
IE0129

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

Course Description

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

This course is designed to provide participants with a detailed and up-to-date overview of ABB 800 ACS Drives. It covers the features, benefits and application areas of 800 ACS drives; the importance of energy efficiency and sustainability; the AC and DC drives and the principles of variable speed drives, motor and drive synchronization; the role of drives in industrial automation; the hardware components covering power section, control panel and keypad, protective modules and their functions and cooling and enclosure design; the common industrial communication protocols and drive-to-PLC communication; and the parameterization for communication setups and troubleshooting communication issues.

Further, the course will also discuss the safety precautions during installation, mechanical and electrical installation and input/output wiring and connections; navigating drive interface, parameter group and settings and saving and restoring parameter backups; selecting the right drive for motor specifications and matching drive ratings to application requirements; adjusting acceleration and deceleration times, torque and speed control settings and PID controller integration; and the control methods, fault diagnostics and alarms and energy efficiency optimization.

During this interactive course, participants will learn the proper applications of ABB 800 ACS drives, drive customization features, custom macros and their usage; the application-specific configurations, optional modules and firmware updates and upgrades; the preventive maintenance schedule, cleaning and inspection routines and safety and protection; the harmonic distortion, drive's role in harmonic mitigation, active and passive filters and compliance with international standards; the load sharing and multi-drive systems, synchronizing multiple drives and load sharing techniques, the master-slave configurations and applications in conveyor systems; setting-up remote access and using cloud-based monitoring tools; the real-time performance tracking and alerts and notifications for fault conditions; the commissioning best practices and integrating ABB 800 ACS drives with PLC and SCADA; and the advanced troubleshooting techniques.

Course Objectives

Upon the successful completion of this course, each participant will be able to:-

- Apply and gain an in-depth knowledge on ABB 800 ACS drives
- Discuss the feature and benefits of 800 ACS drives, application areas of 800 ACS drives and importance of energy efficiency and sustainability
- Differentiate AC and DC drives and explain the principles of variable speed drives, motor and drive synchronization and the role of drives in industrial automation
- Identify hardware components covering power section, control panel and keypad, protective modules and their functions and cooling and enclosure design
- Recognize the common industrial communication protocols, drive-to-PLC communication, parameterization for communication setups and troubleshooting communication issues
- Apply safety precautions during installation, mechanical and electrical installation and input/output wiring and connections
- Navigate drive interface, discuss parameter groups and settings and save and restore parameter backups
- Select the right drive for motor specifications and match drive ratings to application requirements
- Adjust acceleration and deceleration times, review torque and speed control settings and apply PID controller integration
- Carryout control methods, fault diagnostics and alarms and energy efficiency optimization
- Illustrate proper applications of ABB 800 ACS drives and identify drive customization features covering custom macros and their usage, application-specific configurations, optional modules and firmware updates and upgrades
- Apply preventive maintenance schedule, cleaning and inspection routines and safety and protection
- Discuss harmonic distortion, drive's role in harmonic mitigation, active and passive filters and compliance with international standards

- Synchronize multiple drives and carryout load sharing techniques, master-slave configurations and applications in conveyor systems
- Set-up remote access, use cloud-based monitoring tools and apply real-time performance tracking and alerts and notifications for fault conditions
- Employ drive commissioning best practices through pre-commissioning checklist, on-site testing and adjustments, ensuring stability and performance and documenting the commissioning process
- Integrate ABB 800 ACS drives with PLC and SCADA and apply advanced troubleshooting techniques

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 ABB 800 ACS drives for electrical engineers, technicians and maintenance personnel, system integrators, automation engineers, plant managers, operations teams, consultants and energy efficiency experts and other technical staff.

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.

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.

Accommodation

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

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:

Dr. Ahmed El-Sayed, PhD, MSc, BSc, is a **Senior Electrical & Instrumentation Engineer** with **35 years** of extensive experience within the **Oil**, **Gas**, **Power**, **Petroleum**, **Petrochemical** and **Utilities** industries. His experience widely covers in the areas of **Bently Vibration Rack 3500 Training**, Maintenance & Troubleshooting of **11KV Breaker ABB type VD4**, **Rotork make MOVS** Operation & Maintenance, **Air Compressor "Atlas Copco"**, Advanced Distributed Control System (**DCS**), **DCS** Operation & Configuration, **DCS** Troubleshooting, **DCS Yokogawa** ProSafe-RS Safety Instrumented System, **DCS Yokogawa** Centum VP, **DCS Emerson** DeltaV, **DCS GE Mark VI**, Programable Logic Controller (**PLC**), Supervisory Control & Data Acquisition (**SCADA**) Systems, Siemens **PLC Simatic S7-400/S7-300/S7-200**, **Siemens SIMATIC S7** Maintenance & Configuration, **Siemens WINCC**, SCADA System: Siemens **SIMATIC & WinCC**, **Process Control**, **Control Systems & Data Communications**, **Instrumentation**, **Automation**, **Valve Tuning**, Safety Instrumented Systems (**SIS**), Safety Integrity Level (**SIL**), Emergency Shutdown (**ESD**), **Telemetry** Systems, **Boiler Control & Instrumentation**, Advanced Process Control (**APC**) Technology, Practical **Fiber-Optics** Technology, **Compressor** Control & Protection, **GE Gas Turbines**, **Alarm** Management Systems, **Engine** Management System, **Fieldbus** Systems, **NEC** (National Electrical Code), **NESC** (National Electrical Safety Code), **Electrical Safety**, **Electrical Hazards** Assessment, **Electrical Equipment**, Electrical Transient Analysis Program (**ETAP**), Power **Quality**, Power **Network**, Power **Distribution**, **Distribution Systems**, **Power Systems Control**, **Power Systems Security**, Power **Electronics**, **Power System** Harmonics, **Power System** Planning, Control & Stability, **Power Flow** Analysis, **Smart Grid & Renewable** Integration, **Power System Protection & Relaying**, Economic Dispatch & Grid Stability Constraints in Power Plants, Electrical Demand Side Management (DSM), Electrical **Substations**, **Substation Automation** Systems & Application (IEC 61850), **Distribution Network** System Design, **Distribution Network Load**, Electrical **Distribution** Systems, **Load Forecasting** & System Upgrade (Distribution), **Overhead Power Line** Maintenance & Patrolling, High Voltage **Switching** Operations, Industrial **UPS Systems & Battery** Power Supplies, Electric **Motors & Variable Speed Drives**, **Generator** Maintenance & Troubleshooting, **Generator** Excitation Systems & AVR, **Transformer** Maintenance & Testing, Lock-Out & Tag-Out (**LOTO**), Confined Workspaces and **Earthing & Grounding**, He is currently the **Systems Control Manager** of **Siemens** where he is in-charge of Security & Control of Power **Transmission Distribution** & **High Voltage** Systems and he further takes part in the Load Records Evaluation & Transmission Services Pricing.

During his career life, Dr. Ahmed has been actively involved in different Power System Activities including Roles in Power System Planning, Analysis, Engineering, **HV Substation** Design, Electrical Service Pricing, Evaluations & Tariffs, Project Management, Teaching and Consulting. His vast industrial experience was honed greatly when he joined many International and National Companies such as **Siemens**, **Electricity Authority**, Egyptian Electricity Holding, Egyptian Refining Company (ERC), **GASCO**, Tahrir Petrochemicals Project, and **ACETO** industries as the **Instrumentation & Electrical Service Project Manager**, **Energy Management Engineer**, **Department Head**, **Assistant Professor**, **Project Coordinator**, **Project Assistant and Managing Board Member** where he focused more on dealing with Technology Transfer, System Integration Process and Improving Localization. He was further greatly involved in manufacturing some of **Power System** and **Control & Instrumentation Components** such as Series of Digital Protection **Relays**, MV **VFD**, **PLC** and **SCADA** System with intelligent features.

Dr. Ahmed has **PhD**, **Master's** & **Bachelor's** degree in **Electrical Engineering** from the **University of Wisconsin Madison**, **USA** and **Ain Shams University**, respectively. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/ Assessor/Trainer** by the **Institute of Leadership and Management** (**ILM**), an active member of IEEE and ISA as well as numerous technical and scientific papers published internationally in the areas of Power Quality, Superconductive Magnetic Energy Storage, SMES role in Power Systems, Power System **Blackout** Analysis, and Intelligent Load Shedding Techniques for preventing Power System Blackouts, HV **Substation Automation** and Power System Stability.

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, 06th of July 2025***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0900	***Overview of ABB 800 ACS Drives*** *Introduction to ABB as a Company & Its Drive Solutions • Features & Benefits of 800 ACS Drives • Application Areas of 800 ACS Drives • Importance of Energy Efficiency & Sustainability*
0900 – 0930	***Fundamentals of AC Drive Technology*** *Difference Between AC & DC Drives • Principles of Variable Speed Drives • Motor & Drive Synchronization • Role of Drives in Industrial Automation*
0930 – 0945	*Break*
0945 – 1100	***Hardware Components*** *Power Section: Rectifiers, DC Link, & Inverters • Control Panel & Keypad • Protective Modules & Their Functions • Cooling & Enclosure Design*
1100 – 1230	***Communication Protocols*** *Introduction to Common Industrial Communication Protocols (Modbus, Profibus, Ethernet/IP) • Drive-to-PLC Communication • Parameterization for Communication Setups • Troubleshooting Communication Issues*
1230 – 1245	*Break*
1245 – 1420	***Drive Installation & Setup*** *Safety Precautions During Installation • Mechanical & Electrical Installation • Input/output Wiring & Connections • Environmental Requirements & Considerations*
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, 07th of July 2025***

0730 – 0900	***Basics of Drive Programming*** *Navigating the Drive Interface • Parameter Groups & Settings • Saving & Restoring Parameter Backups • Introduction to Macros & Presets*
0900 – 0930	***Motor & Drive Compatibility*** *Selecting the Right Drive for Motor Specifications • Matching Drive Ratings to Application Requirements • Consideration of Load Types (Constant versus Variable Torque) • Role of Feedback Devices*
0930 – 0945	*Break*
0945 – 1100	***Advanced Parameter Settings*** *Detailed Explanation of Key Parameters • Adjusting Acceleration & Deceleration Times • Torque & Speed Control Settings • PID Controller Integration*

1100 – 1230	***Control Methods*** *Open-Loop versus Closed-Loop Control • Vector Control Principles • DTC (Direct Torque Control) Technology • Benefits of DTC over Traditional Control Methods*
1230 – 1245	*Break*
1245 – 1420	***Fault Diagnostics & Alarms*** *Common Drive Faults & Their Causes • Diagnostic Tools & Techniques • Using Fault Codes for Troubleshooting • Resetting & Resolving Issues*
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, 08th of July 2025

0730 – 0900	***Energy Efficiency Optimization*** *Using Drives for Energy Saving • Analyzing Power Consumption with Drives • Load Profiling & Optimization • Understanding Harmonics & Power Factor Correction*
0900 – 0930	***Practical Hands-On Configuration*** *Real-Time Drive Setup with a Motor • Adjusting Parameters for a Sample Application • Testing Open-Loop & Closed-Loop Controls • Simulating Faults for Practice*
0930 – 0945	*Break*
0945 – 1100	***Applications of ABB 800 ACS Drives*** *Pumps & Fans • Conveyors & Material Handling • Compressors & HVAC Systems • Special Industry-Specific Applications*
1100 – 1230	***Drive Customization Features*** *Custom Macros & Their Usage • Creating Application-Specific Configurations • Introduction to Optional Modules • Firmware Updates & Upgrades*
1230 – 1245	*Break*
1245 – 1420	***Maintenance & Troubleshooting*** *Preventive Maintenance Schedule • Cleaning & Inspection Routines • Wear & Tear Parts (Capacitors, Fans, Etc.) • Recording & Analyzing Operation History*
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, 09th of July 2025

0730 – 0900	***Programming with Drive Composer*** *Introduction to Drive Composer Software • Connecting the Drive to A PC • Modifying Parameters Using Software • Logging & Analyzing Performance Data*
0900 – 0930	***Safety & Protection*** *Electrical & Mechanical Safety Features • Overvoltage, Undervoltage, & Thermal Protection • Safe Torque Off (STO) Functionality • Emergency Stop Integration*

0930 – 0945	*Break*
0945 – 1100	***Case Study & Simulation*** *Real-World Application Scenarios • Simulation Exercises • Problem-Solving & Optimization Challenges • Group Discussion on Solutions*
1100 – 1230	***Harmonics & Filtering*** *Understanding Harmonic Distortion • Drive's Role in Harmonic Mitigation • Active & Passive Filters • Compliance with International Standards*
1230 – 1245	*Break*
1245 – 1330	***Load Sharing & Multi-Drive Systems*** *Synchronizing Multiple Drives • Load Sharing Techniques • Master-Slave Configurations • Applications in Conveyor Systems*
1330 – 1420	***Remote Monitoring & Control*** *Setting Up Remote Access • Using Cloud-Based Monitoring Tools • Real-Time Performance Tracking • Alerts & Notifications for Fault Conditions*
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, 10th of July 2025

0730 – 0900	***Drive Commissioning Best Practices*** *Pre-Commissioning Checklist • On-Site Testing & Adjustments • Ensuring Stability & Performance • Documenting the Commissioning Process*
0900 – 0930	***Integration with PLC & SCADA*** *Basics of PLC & SCADA Systems • Configuring I/O Mapping for Integration • Programming Communication with PLC • Visualizing Drive Data on SCADA*
0930 – 0945	*Break*
0945 – 1100	***Advanced Troubleshooting Techniques*** *Advanced Diagnostic Tools • Identifying Complex Faults • Resolving Intermittent Issues • Case Studies of Troubleshooting Scenarios*
1100 – 1230	***Practical Assessment*** *Hands-On Exercise to Set Up & Program a Drive • Fault Diagnosis & Resolution Simulation • Performance Tuning for an Application • Evaluation by Instructor*
1230 – 1245	*Break*
1245 – 1345	***Future Trends in Drive Technology*** *Latest Developments in Variable Speed Drives • Integration with IoT & Industry 4.0 • Predictive Maintenance with AI • Sustainability & Green Drive Technology*
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Simulators (Hands-on Practical Sessions)

Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using one of our state-of-the-art simulators “Allen Bradley SLC 500”, “Siemens S7-200”, “AB Micrologix 1000 (Digital or Analog)”, “AB SLC5/03”, “AB WS5610 PLC “PLCLogix 5000 Software” and “HMI SCADA”.

Allen Bradley SLC 500 Simulator

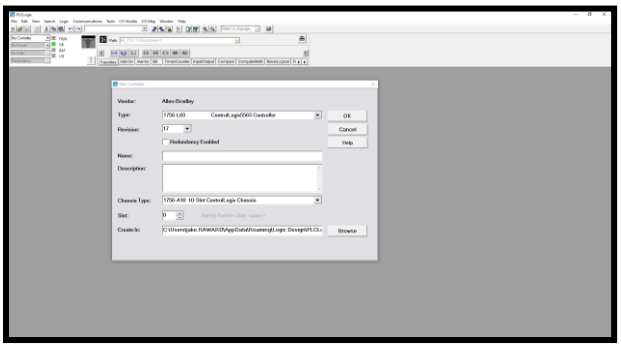
Siemens S7-200 Simulator

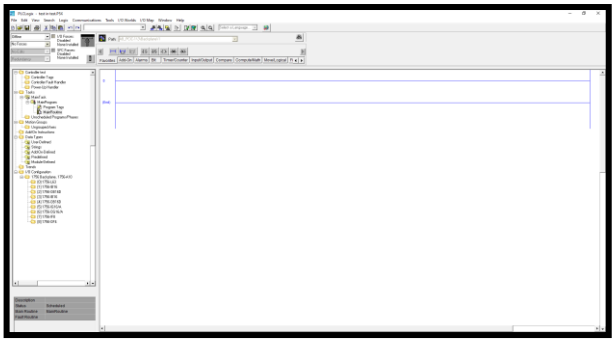
Allen Bradley Micrologix 1000 Simulator (Digital)

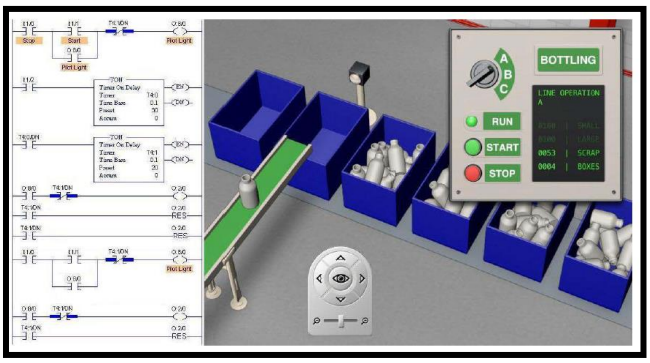
Allen Bradley Micrologix 1000 Simulator (Analog)

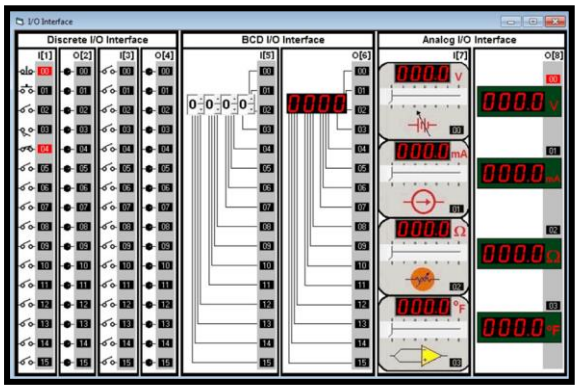
Allen Bradley SLC 5/03

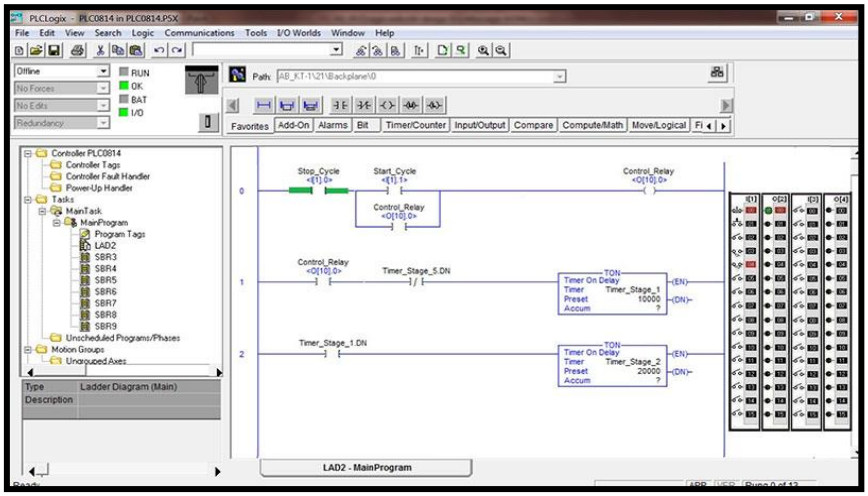
Allen Bradley WS5610 PLC Simulator PLC5



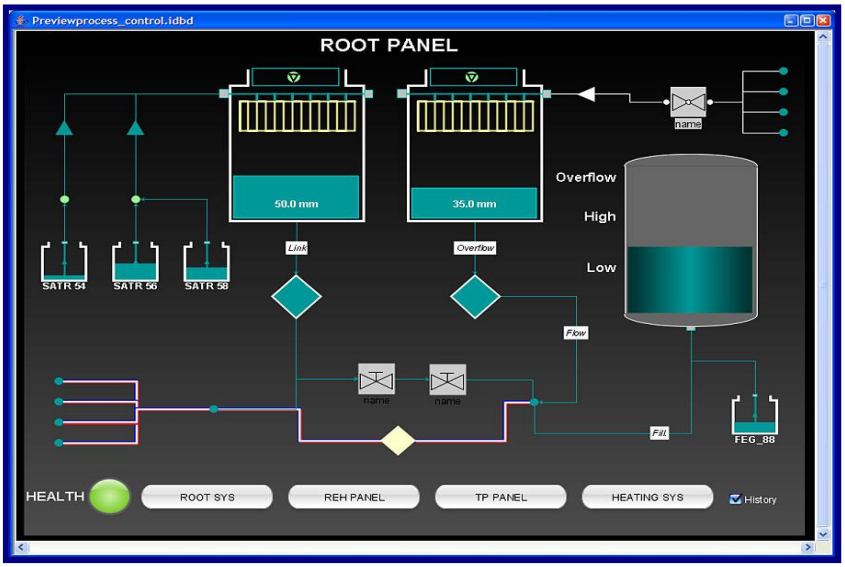








PLCLogix 5000 Software



HMI SCADA

Course Coordinator

Mari Nakintu, Tel: +971 2 30 91 714, Email: mari1@haward.org