COURSE OVERVIEW EE0764
VSD, Motors, SCADA, FAT & Electrical Safety

Course Title
VSD, Motors, SCADA, FAT & Electrical Safety

Course Date/Venue
January 26-30, 2025/TBA Meeting Room, Tower Plaza Hotel, Dubai, UAE

Course Reference
EE0764

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 VSD, Motors, SCADA, FAT and Electrical Safety. It covers the basic principles of VSD and its applications in oil and gas production; the types of motors used in the industry including power ratings and efficiency; the advantages of using VSDs in oil and gas operations; the components of electrical power generation and distribution; the various techniques for optimizing motor power consumption and reducing energy losses in VSD and motor systems; and the maintenance strategies for VSD and motor power systems.

Further, the course will also discuss the VSD for centrifugal pumps, compressors and other equipment; the basic architecture of SCADA systems; the role of SCADA in oil and gas operations; the SCADA communication protocols, data acquisition and control and system security; analyzing SCADA data for performance improvements; the predictive maintenance using SCADA data; the key elements tested during factory acceptance testing (FAT); and developing FAT procedures and checklists.

During this interactive course, participants will learn the testing of transformers, switchgear and motors; the VSD and motor FAT procedures; the FAT procedures for SCADA systems and generating FAT reports and documentation; the electrical safety regulations and standards, hazardous area classifications and equipment safety requirements in hazardous areas; the electrical inspections, safety audits, electrical isolation and lockout/tagout (LOTO) procedures; the personal protective equipment (PPE) for electrical work; the emergency response and electrical incident management; integrating VSD and SCADA for enhanced control; and the electrical system reliability and performance monitoring, fault detection, protection and optimization.

Course Objectives

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

- Apply and gain an in-depth knowledge on VSD, motors, SCADA, FAT and electrical safety
- Discuss the basic principles of VSD and its applications in oil and gas production
- Identify the types of motors used in the industry including power ratings and efficiency
- Recognize the advantages of using VSDs in oil and gas operations and the components of electrical power generation and distribution
- Apply various techniques for optimizing motor power consumption and reduce energy losses in VSD and motor systems
- Troubleshoot motor and apply maintenance strategies for VSD and motor power systems
- Use VSD for centrifugal pumps, compressors and other equipment
- Discuss basic architecture of SCADA systems and the role of SCADA in oil and gas operations
- Carryout SCADA communication protocols, data acquisition and control and system security
- Analyze SCADA data for performance improvements and apply predictive maintenance using SCADA data
- Recognize the key elements tested during factory acceptance testing (FAT) and develop FAT procedures and checklists
- Test transformers, switchgear and motors and apply VSD and motor FAT procedures
- Employ FAT procedures for SCADA systems and generate FAT reports and documentation
- Review the electrical safety regulations and standards, hazardous area classifications and equipment safety requirements in hazardous areas
- Apply electrical inspections, safety audits, electrical isolation and lockout/tagout (LOTO) procedures and personal protective equipment (PPE) for electrical work
- Carryout emergency response and electrical incident management as well as integrate VSD and SCADA for enhanced control
- Employ electrical system reliability and performance monitoring, fault detection, protection and optimization

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, sample video clips of the instructor's actual lectures & practical sessions during the course conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides an advanced overview of VSD, motors, SCADA, FAT and electrical safety for engineers and other technical personnel who are in charge of selection, application, operation, diagnostic testing, protection, control, troubleshooting or maintenance of motors and variable speed drives.

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: -

- 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.

- 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.

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. Ehab Mohamed, BSc, CompEX, ETAP, is a **Senior Electromechanical Engineer** with **30 years** of extensive industrial experience within the **Oil & Gas**, **Refinery**, **Petrochemical** and **Power** industries. He specializes in **Maintenance Management** Best Practices, **Rotating Equipment** Reliability Optimization, Practical **Machinery Vibration**, **Vibration** Techniques, Effective **Reliability Maintenance**, Excellence in **Maintenance & Reliability** Management, **Preventive & Predictive Maintenance**, Machinery Failure Analysis (**RCFA**), **Reliability** Optimization & Continuous Improvement, **Maintenance** Planning, Scheduling & Work Control, **Maintenance Management** Strategy, **Mechanical & Rotating Equipment** Troubleshooting, Preventive Maintenance, Predictive Maintenance, Reliability Cantered Maintenance (**RCM**), Condition Based Monitoring (**CBM**), **FMEA**, **Machinery and Rotating Equipment Troubleshooting**, **Turbines, Bearings, Compressors** and **Pumps**. Further he is also well-versed in **Power System Blackouts**, **Power System During Emergency** and **Blackouts**, **Electric Power System** Operation, Electrical Transient Analysis Program (**ETAP**), **Electrical** Installation & Maintenance, **Electrical** Inspection & Testing, **HV/LV** Equipment, **High Voltage Electrical Safety**, **LV & HV Electrical** System, **HV** Equipment Inspection & Maintenance, **HV Switchgear** Operation & Maintenance, **LV Distribution Switchgear & Equipment**, **Substation** Design & Commissioning, **Substation** Maintenance Techniques, **Switchgear** Operation & Maintenance, **Circuit Breakers & Switchgears** Inspection, **Power System** Control & Stability, Industrial **UPS** Systems & **Battery** Power Supplies, **Power Generation & Transmission**, **Power System Protection & Relaying**, **Electric Power** Calculation, **Power Systems Protection**, Distributed Control System (**DCS**) Applications & Troubleshooting, **SCADA & Industrial Communication**, Process Logic Controller (**PLC**), **Load Flow** Calculation, **Cable** Installation, **Transformer** Maintenance, Short Circuit & Protection Coordination, **Harmonic** Analysis Studies, **Earthing & Grounding**, **Power Factor Correction**, **Power System Protection & Relaying**, **Electric Motors & Variable Speed Drives**, **Power Generation**, **Electrical Fault** Detection & Remedies, Electrical **Control Circuits** & Equipment, **Hazardous Area** Classification, **Electrical Hazards**, **Explosion Proof Ex Equipment**, **Hazardous Area Classification & Intrinsic Safety**, **Motor** Testing & Maintenance, Modern **Power System Protective Relaying**, **Generators**, **Transformer**, Office 365, Outlook 365, Visio, ETAP, AutoCAD, RAMS, HRMS, Microsoft BI for Dashboard and Online Reports, Siemens TIA, ABB Drive, Wizard, Window, Composer Suite, SharePoint, NOV Rig Sense all versions, Cond Master Ruby for Condition Monitoring and OSIsoft Data Analytics. He is currently the **Engineering Manager** (Electrical & Controls) in **Weatherford Drilling International**.

During his career life, Mr. Ehab has gained his expertise and thorough practical experience and handling challenging positions such as being the **Engineering Manager**, **Product Manager**, **Acting Project Manager**, **Lead Operation Engineer**, **Plant Engineer**, **Maintenance Engineer**, **Electrical Project Engineer**, **Project Engineer**, **Field Support Engineer**, **Lead Electrical & Automation Engineer**, **Lead Electrical Engineer**, **Field Support Engineer**, **Application Engineer**, **Allen Bradley Rockwell Engineer**, **Lead Technical Assessor**, **Team Leader**, **Principal Teacher**, **Global Field Support Technician**, **Foreman**, **Technical Consultant**, **Technical Trainer** and **Staff Lecturer** for various companies such as the **Weatherford** Drilling International Inc., Daleel Petroleum Company (**DAPECO**), NDSC Drilling Contractor, NOKHBA Energy, Abraj Drilling, American Standard Polymer and Acrylic Plant, Future Technologies Ltd, Industrial Technical College, Ministry of Higher Education and El-Masria Trading & Technical Services.

Mr. Ehab has a **Bachelor's** degree in **Electrical Engineering**. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership of Management** (**ILM**), a **Certified CompEx Inspector & Installer**, a **Certified Allen Bradley Rockwell Engineer** and a member of the Institution of Engineering & Technology (**IET**). Moreover, he holds a certification in Electrical Power Calculation (**ETAP**) and has delivered numerous trainings, courses, workshops, seminars 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 26th of January 2025***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Introduction to Variable Speed Drives (VSD)*** *Basic Principles of VSD • Applications in Oil & Gas Production*
0930 – 0945	*Break*
0945 – 1030	***Motor Power Basics*** *Types of Motors Used in the Industry (Induction Motors, Synchronous Motors) • Power Ratings & Efficiency*
1030 – 1130	***VSD & Motor Control Systems*** *Working of VSD in Motor Control • Advantages of Using VSDs in Oil & Gas Operations*
1130 – 1215	***Electrical Power Generation & Distribution*** *Overview of Electrical Power Generation Systems in Oil & Gas • Power Distribution Systems & Components (Switchgear, Transformers)*
1215 – 1230	*Break*
1230 – 1330	***Energy Efficiency & Optimization*** *Techniques for Optimizing Motor Power Consumption • Reducing Energy Losses in VSD & Motor Systems*
1330 – 1420	***Troubleshooting Motor & VSD Systems*** *Common Issues & Diagnostic Methods • Maintenance Strategies for VSD & Motor Power Systems*
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 27th of January 2025***

0730 – 0830	***Advanced VSD Applications*** *Use of VSD for Centrifugal Pumps, Compressors & Other Equipment • Case Studies of VSD in Oil & Gas Production*
0830 – 0930	***Basics of SCADA Systems*** *Basic Architecture of SCADA Systems • Role of SCADA in Oil & Gas Operations*
0930 – 0945	*Break*
0945 – 1100	***SCADA Communication Protocols*** *Overview of Industry-Standard Communication Protocols (Modbus, DNP3, IEC 61850)*
1100 – 1215	***SCADA Data Acquisition & Control*** *Data Collection & Remote Control in Oil Field Operations • Integration of SCADA with VSD & Motor Systems*
1215 – 1230	*Break*

1230 – 1330	***SCADA System Security*** *Cybersecurity Challenges in SCADA Systems • Security Measures for Protecting Oil & Gas SCADA Networks*
1330 – 1420	***Real-Time Monitoring & Analytics*** *Analyzing SCADA Data for Performance Improvements • Predictive Maintenance Using SCADA Data*
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 28th January 2025

0730 – 0830	***Factory Acceptance Testing (FAT)*** *Purpose & Importance of FAT in Oil & Gas Projects • Key Elements Tested During FAT*
0830 – 0930	***Preparation for FAT*** *Developing FAT Procedures & Checklists • Role of Project Teams & Third-Party Inspectors in FAT*
0930 – 0945	*Break*
0945 – 1100	***FAT for Electrical Equipment*** *Testing of Transformers, Switchgear & Motors • VSD & Motor FAT Procedures*
1100 – 1215	***SCADA System FAT*** *FAT Procedures for SCADA Systems • Functional & Performance Testing*
1215 – 1230	*Break*
1230 – 1330	***Documentation & Reporting in FAT*** *Generating FAT Reports & Documentation • Acceptance Criteria & Rectification of Defects*
1330 – 1420	***Factory Acceptance Test Case Studies*** *Review of FAT Case Studies in Oil & Gas Electrical Systems • Lessons Learned & Best Practices*
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 29th of January 2025

0730 – 0830	***Electrical Safety Regulations & Standards*** *Overview of Relevant International Standards (IEC, NEC, OSHA) • KOC-Specific Safety Policies*
0830 – 0930	***Hazardous Area Classification & Safety*** *Understanding Hazardous Area Classifications (Zone 0, Zone 1, Zone 2) • Equipment Safety Requirements in Hazardous Areas*
0930 – 0945	*Break*
0945 – 1100	***Electrical Inspections & Safety Audits*** *Conducting Electrical Safety Inspections in Oil Fields • Performing Safety Audits & Ensuring Compliance*
1100 – 1215	***Electrical Isolation & Lockout/Tagout (LOTO) Procedures*** *Safe Isolation of Electrical Systems • Importance of LOTO in Oil & Gas Operations*

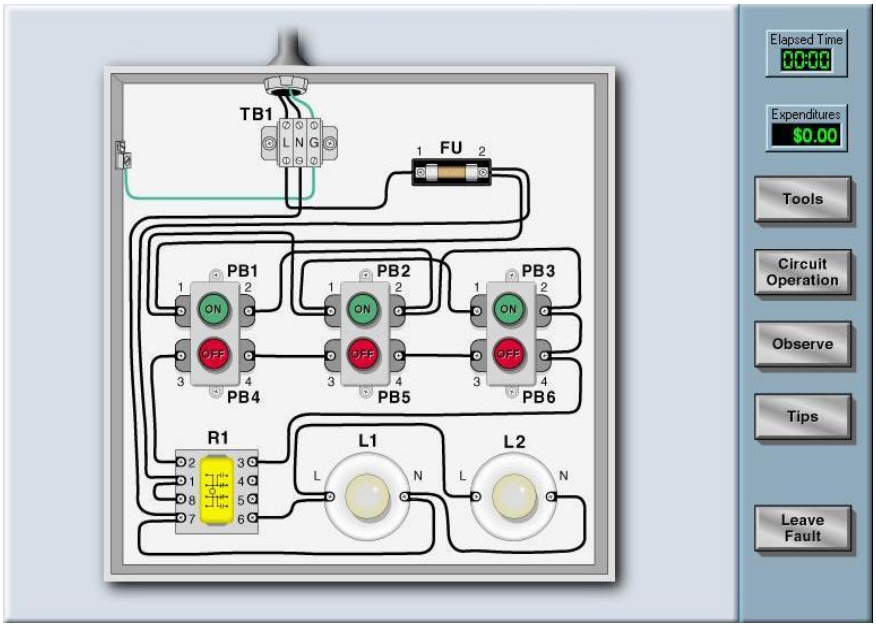
1215 – 1230	*Break*
1230 – 1330	***Personal Protective Equipment (PPE) for Electrical Work*** *Selection & Use of PPE for Electrical Workers • Electrical ARC Flash Protection & Related Equipment*
1330 – 1420	***Emergency Response & Electrical Incident Management*** *Responding to Electrical Incidents & Accidents • Incident Reporting & Investigation Procedures*
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*

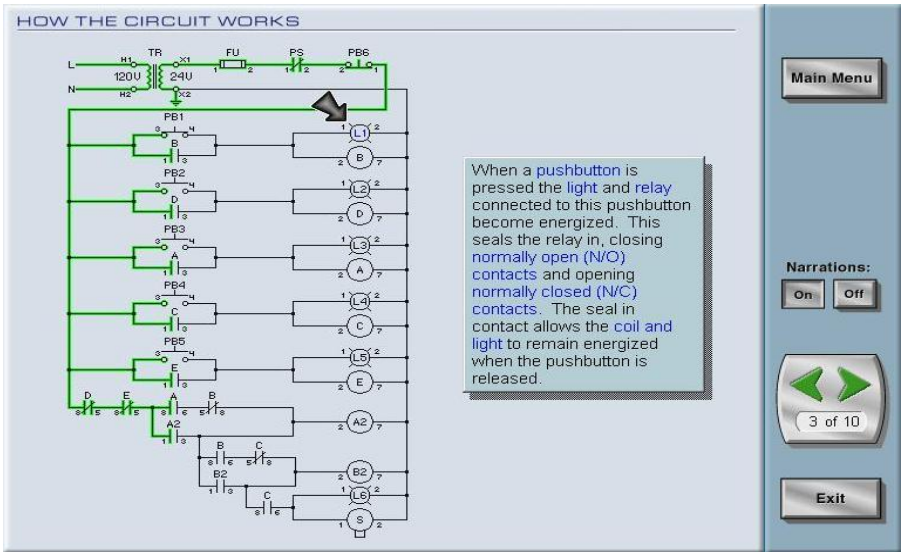
Day 5: ***Thursday 30th of January 2025***

0730 – 0830	***Integrating VSD & SCADA for Enhanced Control*** *How VSD Systems are Monitored & Controlled through SCADA • Case Studies of Successful Integrations in the Oil & Gas Sector*
0830 - 0930	***Electrical System Reliability & Performance Monitoring*** *Tools & Techniques for Monitoring Electrical System Health • Role of SCADA in Predictive Maintenance & System Reliability*
0930 – 0945	*Break*
0945 – 1100	***Electrical System Fault Detection & Protection*** *Fault Types in VSD & Motor Systems • Fault Detection Using SCADA & Protection Devices*
1100 – 1215	***Electrical System Optimization & Future Trends*** *Smart Motor Systems & Future Trends in VSD & SCADA • Innovations in Energy Efficiency & Safety Measures*
1215 – 1230	*Break*
1230 – 1345	***Case Study Review: Best Practices in Electrical Safety, VSD & SCADA Integration*** *Review of Industry Case Studies on Best Practices in Electrical Engineering in Oil & Gas Production*
1345 – 1400	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course*
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Simulators (Hands-on Practical Sessions)

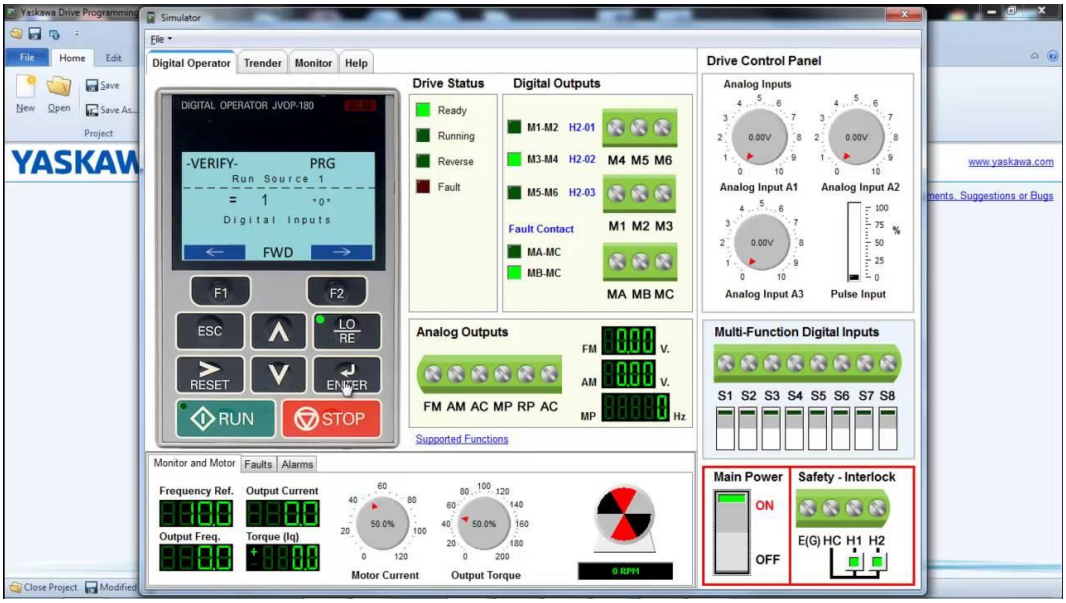
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using our state-of-the-art Simutech Troubleshooting Electrical Circuits V4.1" "Lab Volt Testing Device", Yaskawa Programming Simulator". and "HMI SCADA".



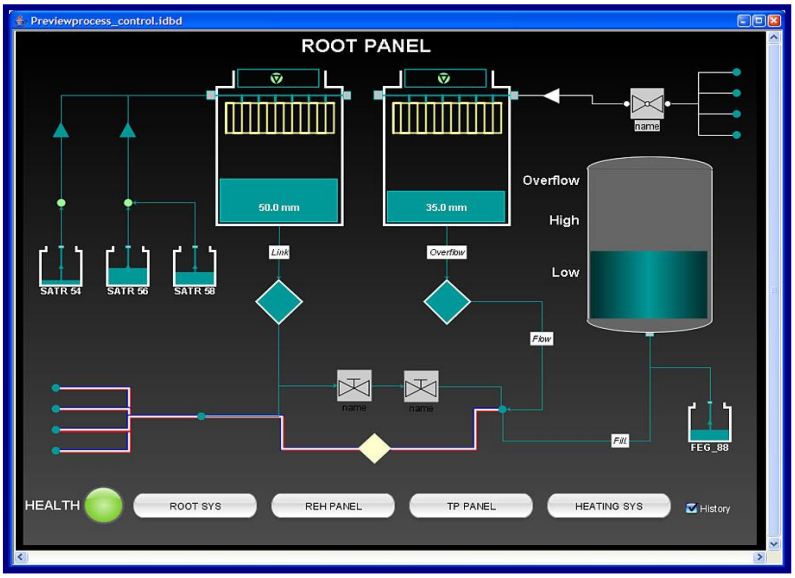


Simutech Troubleshooting Electrical Circuits V4.1

Lab Volt Testing Device



YASKAWA Programming Simulator



HMI SCADA

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