



# ABB Training Centre Singapore Appreciation course outlines

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## SGMD1 Efficiency optimization using VSD for fans & pumps

### Synopsis:

With the wide use of variable frequency drive (VFD) in the building, automation and water industries, there are interests in energy saving applications such as pumps and fans. This introductory course will take a look at these various aspects of the VFD applications on its ability to optimize energy consumption for fans and pumps.

### Presentation:

Short presentation and demo of VFD application on pump using a live unit.

### Objective:

At the end of the course, participants shall have some understanding of how to use VFD for energy savings and also what are the technical concerns that come along with the application of the VFD.

### Prerequisite:

Participants who had or has the potential to use VFD in their applications and are interested to know how a VFD saves energy along with other application concerns.

### Contents:

- Typical block diagram & working principle
- Energy savings of a VFD
- Harmonic distortions
- Electro-magnetic compatibility (EMC)
- Practical demonstration with a demo unit

## SGMD2 High performance industrial drives for a low harmonics networks

### Synopsis:

The issue of harmonics have always been linked to the usage of VFD. This course is an introduction to harmonics and various ways to mitigate harmonics in the network. ABB's low harmonic drive products will be presented.

### Presentation:

Short presentation and short demo of VFD selection using catalogue.

### Objective:

At the end of the course, participants shall have some understanding of harmonics and how to choose the right equipment to mitigate harmonics to the required harmonics standards.

### Prerequisite:

Participants who had or has the potential to use VFD in their applications and are interested to know how to mitigate harmonics in the network along with other application concerns.

### Contents:

- Harmonic introduction
- Harmonic mitigation methods
- Indepth look at various harmonic standards
- Case study on harmonic effects
- ABB low harmonic drives

## SGMD3 HVAC system comfort cooling with AC drive

### Synopsis:

With the wide use of variable frequency drive (VFD) in the building for HVAC applications, such as chilled water pumps and AHU fans. Along with that, come the other concerns such like harmonic distortions, EMC etc. This course will take a look at these various aspects of the VFD application specifically for the HVAC application in buildings.

### Presentation:

Short presentation and short demo of VFD selection using catalogue.

### Objective:

At the end of the course, participants shall have some understanding of how to use VFD for HVAC applications and also what are the technical concerns that come along with the application of the VFD.

### Prerequisite:

Participants who had or has the potential to use VFD in their applications and are interested to know how a VFD saves energy along with other application concerns.

### Contents:

- Typical block diagram & working principle of a VFD
- Energy savings with VFD
- Harmonic distortions
- Electro-magnetic compatibility (EMC)
- Different HVAC usage with VFD
- Ways to retrofit an existing building
- Success stories in buildings with VFD installation

## SGMD4 Medium voltage AC drives appreciation course

### Synopsis:

ABB is one of the leading global manufacturers of medium voltage AC drives in the range of 315 kW to 100 MW and is being employed in various industrial applications such as power generations, oil and gas, water, marine, paper, chemical industries and more.

Medium voltage AC drives from ABB are used to control the speed and torque of MV induction and synchronous machines where precise process control accuracy is required despite input power variations or sudden load changes.

Medium voltage drives made by ABB adapt the machine speed to the actual need, thus optimizing energy consumption, significantly contributing to increased productivity and reduced operating costs.

### Presentation:

Short presentation of ABB MV drive product ranges.

### Objective:

At the end of the course, participants shall have some understanding on the applications considerations of AC drives, the advantages, the latest technologies and key features of ABB MV drives.

### Prerequisite:

Participants who had or has the potential to use MV VFD in their applications.

### Contents:

- Over view of ABB Medium Voltage Drives product range
- Typical block diagram & working principle of a MV VFD
- Design Principles
- Protection features

## SGMD5 VFD appreciation course

### Synopsis:

With the wide use of variable frequency drive (VFD) in the building, automation and water industries, there are interests in energy saving applications such as pumps and fans. Along with that, come the other concerns such like harmonic distortions, EMC etc. This course will take a look at these various aspects of the VFD application.

### Presentation:

Short presentation and short demo of VFD selection using catalogue.

### Objective:

At the end of the course, participants shall have some understanding of how to use VFD for energy savings and also what are the technical concerns that come along with the application of the VFD.

### Prerequisite:

Participants who had or has the potential to use VFD in their applications and are interested to know how a VFD saves energy along with other application concerns.

### Contents:

- Typical block diagram & working principle of a VFD
- Energy savings with VFD
- Harmonic distortions
- Electro-magnetic compatibility (EMC)
- Bearing currents
- Practical demonstration with a demo unit

## SGLVP6 Motor starter appreciation course

### Synopsis:

Due to the wide usage, the “first” starters to study or learn the basic designs and technologies of motor starting solutions are the conventional motor starters. The more common conventional motor starters are Direct On Line (DOL), Star/Delta and Auto-Transformer Starter. One starter that offers many advantages is the DOL, it is regarded as the most basic and simple starter. One of its advantages that can offer higher starting torque is still accepted and hard to be replaced. This course will help you to understand and select a cost effective conventional motor starter.

### Presentation:

Covering the basic working principles, types of conventional motor starters, advantages and disadvantages of each starter. Learn to select a cost effective starter for different application. ABB motor starter selection software tool demonstration.

### Objective:

At the end of the course, participants will understand the working principles of each motor starter. Participants will learn to size and select a cost effective starter for each application. Participants can also learn ABB motor starter selection software tool which can help to size and understand the types of contactors, protection and coordination for various applications and more importantly to learn the safety aspects to consider for when designing the starter.

### Prerequisite:

For engineers who are new in conventional motor starting solutions and interested to understand more on each individual motor starter.

### Contents:

- The working principle of conventional motor starters
- Types of motor starters
- Benefits of each individual motor starters
- Learn to use ABB motor starter software tool
- Hands-on connection of DOL and Star/Delta

## SGLVP7 Safety coordination studies course

### Synopsis:

Given with information such as motor data, system information and type of application, engineers are able to design suitable motor starters. However in project-tender documents the safety coordination for the motor starter is often not clearly defined. No risk of catching fire, protection for people, critical load that requires no damage on motor starters are many examples that have been overlooked by engineers in the designing stage or rather not taught in engineering studies. All manufacturers of motor starters (including softstarters) must have types of coordination table to advice designers of the types of components to use, whether it is for type 1 or type 2 coordination (in acc. to IEG 60947-4-1). In this course, you will study and learn the definitions of both types of coordination and understand the types of protection in different situations.

### Presentation:

Presenting the types of protection that is required for motor starter to be coordinated. ABB coordination tables, definitions of IEG 60947-4-1 & CP-5 435-01-01 L.

### Objective:

At the end of the course, participants will understand the importance of having a good coordinated motor starter

for different situation. Learn to use ABB coordination table software which can be downloaded.

### Prerequisite:

For engineers who are interested to learn types of coordination for motor starters and have attended motor starter appreciation course.

### Contents:

- Why motor starter need to be coordinated?
- Types of coordination table for motor starter
- Types of protection (Fuses, Motor breakers, etc)
- What is stated in IEC 60947-4-1 & CP-5 435-01-01L?
- Learn to use ABB coordination tables software tool

## SGLVP8 Softstarter appreciation course

### Synopsis:

Conventional motor starters like DOL, Star/Delta, etc., have their advantages and disadvantages. To overcome the shortfall of conventional starters and improve mechanical performance, soft-starter has gain it's foothold in the motor starter market, thanks to advancement of electronics components and digital solution.

This short training course/sharing session aim to bring up the awareness of the new trend in motor control applications, protections, safety, cost effectiveness, etc., to all users and practice profession whom who like to learn more about this solution

### Presentation:

Covering the basic working principle, types of soft-starter available in the market, how soft-starters can help to reduce electrical and mechanical stress. What are the safety features available? Using of ABB soft-starter software tool, Prosoft presentation.

### Objective:

At the end of the course, participants will understand the benefits and advantages of using soft-starter. Participants will learn to size and select a soft-starter suitable for the application. Participants can also learn ABB soft-starter software tool, "Pro-Soft" which can help to size and

understand the torque / current / time / speed curves for various applications.

### Prerequisite:

For engineers, consultants and end-users who are interested to use soft-starters to provide more options in their motor starting/protection solutions other than conventional starters.

### Contents:

- The working principle of soft-starter
- Types of soft-starter
- Advantages of using soft-starter
- Demonstration of soft-starter vs DOL & Star/Delta
- Learn to use ABB soft-starter software tool – Pro-Soft

## SGLVP9 Earth leakage protection using ELCB, RCBO and ELR

### Synopsis:

This course will provide detail information about the working principle and application of residual current devices (ELCB/ RCCB, RCBO and ELR). It covers the various types of system earthing, the effect of currents passing through human body, the product specification (related IEC standard), the trapping characteristic and the selection.

### Presentation:

A short presentation and demonstration on residual current devices.

### Objective:

At the end of the course, participants shall have a good understanding of the working principle and application of the various types of residual current devices (RCD) and are able to make good product selection for final circuits design.

### Prerequisite:

Participants must have a basic knowledge in electrical distribution system.

### Contents:

- Working principle
- Product specification and application
- System earthing and touch voltage
- Selection
- Case study
- Q & A

## SGLVP10 Final distribution circuit design and component selection

### Synopsis:

This training will be focus on the final distribution circuit design and line protection component selection such as MCB and RCB (RCCB, RCBO). It covers the specification (IEC standard), working principle, trapping characteristic and the applications of the protection devices. Training will also address the circuit design and field installation issues in the case study session.

### Presentation:

Presentation with product demonstration.

### Objective:

At the end of the course, participants shall have a good understanding of the working principle and application of the various line protection devices and are able to make good design and component selection for final distribution circuit.

### Prerequisite:

Participants must have a basic knowledge in electrical distribution system.

### Contents:

- Working principle of MCB and RCD
- Specification
- Application
- Circuit design and component selection
- Case study
- Q & A

## SGLVP11 Green mark energy efficient using KNX/EIB lighting management system

### Synopsis:

Increase energy cost, greater climate awareness and government enforcement in green mark building create greater demand in building home control system for energy saving installation. ABB KNX/EIB lighting management systems have been installed and proven in many green mark award buildings for energy saving features. This training will focus on applications in green mark buildings and smart/intelligent homes.

### Presentation:

Case study on award winning projects will be presented with live demo.

### Objective:

At the end of the course, participants shall have a better understanding of the KNX/EIB system and the area of applications in green mark energy efficiency award project.

### Prerequisite:

Participants who have some knowledge in building management system (IBMS) or smart home system.

### Contents:

- Types of application
- System specification & compliance
- System architecture
- Award winning projects
- Live demo
- System installation
- Q & A

## SGLVP12 Smissline plug-in MCB and distribution system

### Synopsis:

This sharing session will demonstrate the new generation of electrical protective device in a compact plug-in busbar system; it is an eye-opener for those who are familiar with this type of system. This system allow mixture of single and multi-pole MCB, RCCB, RCBO and SPD in the same busbar assemble without the need to cover any unoccupied slots.

### Presentation:

Presentation with product demo and catalogue.

### Objective:

At the end of the sharing session, participants shall be able to appreciate the design of this system and improve their future application of plug-in busbar system for space saving, better flexibility and future expandability while maintaining cost effectiveness.

### Prerequisite:

Participants should have some basic electrical knowledge.

### Contents:

- System architecture and components
- Product specification and application
- Product demo
- Selection
- Q & A

## SGLVP13 Electrical installation standards and software optimization design, DOC Win

### Synopsis:

Fault level calculation is an essential aspect in design of electrical system and selection of equipment. In this course, participants will be informed with the code of practice for electrical installations in terms of safety and equipment selection. Convention fault level calculation and the use of software tools will be illustrated. Doc Win is the design tool provided by ABB SACE to electrical installation engineers and consultants. This training session introduces Doc Win and explains its usage as a tool for installation dimensioning, component selection and project documentation. On screen verification of tripping curve characteristics for different distribution equipment.

### Presentation:

Short presentation highlighting on the electrical standards and proper selection of equipment. ABB DOC Win software demonstration and hands on.

### Objective:

At the end of the course, participants will have a deeper understanding of the electrical installation standards and also on the use of ABB software DOC Win for voltage drops, current & fault calculations, switchboard heat dissipation etc.

### Prerequisite:

With basic knowledge in electrical distribution system.

### Contents:

- General overview on code of practice in electrical installations
- Different fault type and the implications
- Manual calculation of perspective short circuit
- Selection and coordination of equipment
- Introduction of DOC Win software
- Single Line diagram drawing from load to utility
- Current, voltage drops & faults calculation in every branch of electrical installation
- Temperature rise assessment in enclosure
- Verification of tripping characteristic of ABB device with curves

## SGLVP14 Safe and reliable low voltage switchgear design

### Synopsis:

Low voltage switchgear design depends on many aspects, like segregation, IP degree of protection for enclosure, temperature rise and ventilation requirement, busbar sizing with respect to rated current and short time withstand fault current, selectivity and discrimination study etc. This topic covers some of the key aspects like internal separation or segregation, IP Degree of protection for enclosure and temperature rise and ventilation requirement and their interrelation.

### Presentation:

Presentation on internal separation, IP degree of protection and temperature rise requirement.

### Objective:

At the end of the course, participants shall have better understanding on internal separation or forms as described in the standards, IP degree of protection, temperature rise and ventilation requirement and their interrelation.

### Prerequisite:

Participants to have a basic understanding on low voltage switchgear.

### Contents:

- Basic elements of designing a safe and reliable LV switchboard
- Safety of person , separation/segregation and form type
- IP degree of protection
- Ventilation and temperature rise
- Interrelation of separation and IP degree with ventilation and temperature rise



## SGINC15 PLC appreciation course

### Synopsis:

Nowadays, user's requirement in automation control has increase, from purely control to information collection and analysis. Most of the time, integration to 3rd party devices such power meter, flow meter and drives,etc.

Therefore, there is a need to understand how the PLC can control and communicates with them to obtain the information at the same time.

### Presentation:

- 1) Covering the basic working principle of PLC
- 2) Introduction to types of PLC and IOs.
- 3) Types of programming language.
- 4) Types of communication protocol.
- 5) Configuration of ABB PLC.

### Objective:

At the end of the course, participants will understand the working principle of PLC and a understand how to design and implement a control solution.

### Prerequisite:

For engineers, consultants and end-users who are interested to use ABB PLC.

### Contents:

- The working principle of PLC
- Types of PLCs and Ios
- Programming language
- Communication protocol
- Learn to use ABB PLC

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