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Power and productivity
for a better world™



ABB Marine Academy
Linking people and technology
2016

Power and productivity
for a better world™

Welcome to ABB Marine Academy

Training and competence management are one of the key success factors to our customers. ABB Marine service team has expertise in most vessel segments, such as cruise, LNG carriers, drillships, icebreakers and OSVs. Our areas of competence include commissioning, support, supply of spare parts, planned maintenance, retrofits and upgrades. This extensive competence pool enables us to understand and anticipate the needs of our customers and match these needs with tailored training.

ABB Marine Academy has set itself two targets: first, we want to provide our customers' crew with the right kind of training that enables them to do their job safely and better; and second, we need to support our customers' corporate management in reaching their safety and reliability KPIs, and their targets for cost and growth.

In practice, this means we have improved our training portfolio. We offer more product and system courses, and better options for on-site training and coaching. We have also improved our training material to support trainees after the completion of their course, and we have linked our courses to a clear training path. I hope you will recognize these improvements when using our services.

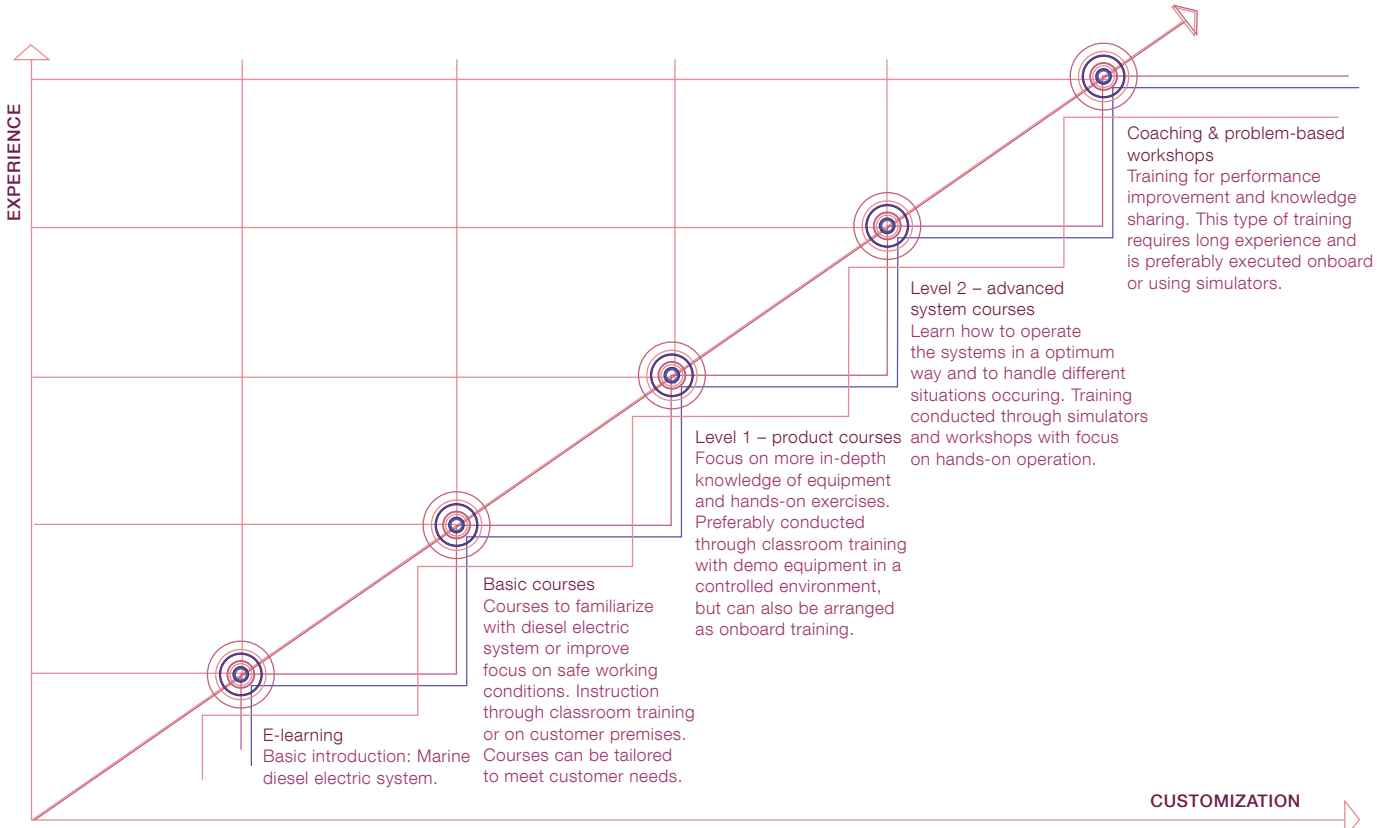
We look forward to hearing from you either by direct contact or via our customer satisfaction surveys, which we follow closely.

Yours sincerely

ABB Marine Academy team



Training paths



Our courses have been designed based on participant experience and level of content customization. This creates a training path for the students.



Contents

1. **Electrical systems.....page 7**
   - H860 - Marine power plant basics for technical staff
   - H861 - General course for deck staff
   - H862 - LNG Electrical Propulsion system
   - H913 - Drilling drive system, advanced

2. **Electrical products courses.....page 13**
   - H863 - ACS6000c NTY cycloconverter
   - H864 - ACS6000 AD/SD marine drive course
   - H865 - SAMI Megastar marine drive course
   - H866 - Operation and maintenace of STADT x-AC-y-z
   - H867 - PSR-cycloconverter marine drive course
   - H911 - Drilling drive system course
   - H868 - HV power distribution system – general course
   - H869 - HV power distribution system – ZS1 Unigear course
   - H870 - LV power distribution system course

3. **Azipod® propulsion.....page 25**
   - H881 - Azipod® V technical training course
   - H880 - Azipod® C technical training course
   - H882 - Azipod® XO technical training course
   - H883 - Azipod® vessel operation, operational level
   - H885 - Azipod® vessel operation, management level

4. **Automation.....page 33**
   - H891 - Master Advant OCS automation training for operators
   - H892 - Master Advant OCS automation training for maintenance
   - H894 - Marine 800xA and AC800M automation training
   - H899 - DEGO II and III electronic governor systems
   - H902 - AC800M applications for LNG, tanker and drilling
   - H895 - Marine 800xA and AC400 automation training

5. **Safety.....page 41**
   - H850 - Azipod space safety course
   - H852 - HV Safety Management STCW - MCA/NMA/ILT approved
   - H853 - HV Safety STCW - US Coast Guard approved



1. Electrical systems

H860 - Marine power plant basics for technical staff..... 8
H861 - General course for deck staff 9
H862 - LNG Electrical Propulsion system 10
H913 - Drilling drive system, advanced 11

H860 - Marine power plant basics for technical staff



Level: Basic

Duration: 3 days (+1 day for Azipod® if required)

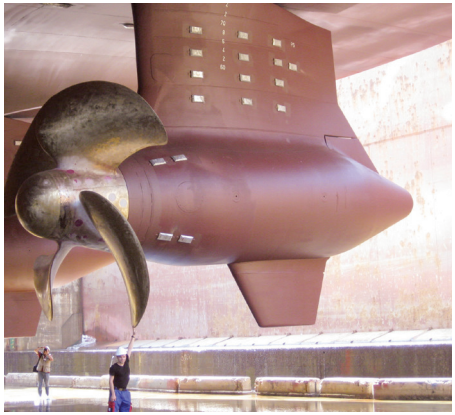
Student profile: Marine engineers and electro-technical personnel at the support and operational level

Prerequisites and recommendations: None

Course objectives: Upon completion of this course the participants will have an understanding of a marine power plant's design and function and an understanding of the ABB propulsion system.

Main topics:
- Marine power plant overview
- Regulation principles
- Frequency converters
- Motors & generators
- Basic electrical occupational safety and risk assessment
- Azipod® system overview (if required)

H861 - General course for deck staff



Level: Basic

Duration: 4 days

Student profile: Deck personnel at the support, operational and management level

Prerequisites and recommendations: None

Course objectives: The goal of the course is to familiarize the participants with ABB diesel electric Azipod® propulsion basic features including remote control system, power plant and distribution to Azipod® units.

Main topics:

- Diesel electric Azipod® propulsion system main components and their functions
- Power generation, distribution and consumers
- Azipod® propulsion system terminology
- Frequency converter propulsion with power plant overview
- Azipod® units technical overview
- Alarm conditions
- Remote control units and operation
- Bridge backup/emergency operation
- Azipod® occupational safety basics

H862 - LNG Electrical Propulsion system



Level: 2 - Advanced

Duration: 4 days

Student profile: Marine engineers and electro-technical personnel at the operational and management level

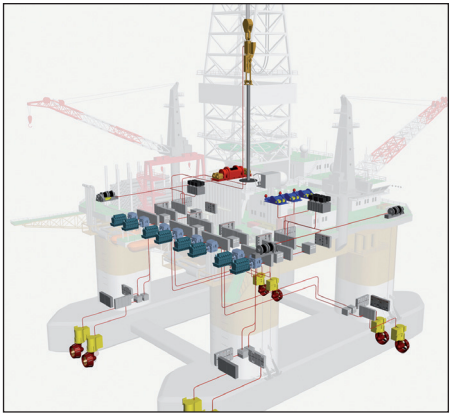
Prerequisites and recommendations: The participant should have fundamental knowledge of vessel operation, and have basic knowledge of Windows XP. Completion of ACS6000 SD/AD marine drive course or similar knowledge is advisable.

Course objectives: Upon completion of this course, students will be able to understand the function of electrical propulsion control systems and operate the maintenance station.

Main topics:
- Electrical propulsion system overview
- Operation of maintenance station
- Software introduction
- Fault tracing and troubleshooting

This course has been certified in accordance with "DNV Standard for Certification of Learning Programmes - 3.201"

H913 - Drilling drive system, advanced



Level: 2 - Advanced

Duration: 4 days

Student profile: Marine engineers and electro-technical personnel at the operational and management level

Prerequisites and recommendations: Drilling drive system course from ABB or similar knowledge is advisable.

Course objectives: Upon completion of this course the participants will be able to explain the ABB drilling system project configuration and functions of different components. The participants will be able to trace alarms from the process panel down to drives and control components. System backup and recovery will also be discussed.

Main topics:

- System structure and project configuration of ABB drilling drive system
- Project download and signal tracing
- Download DSU/BRU/LCU configuration
- Perform DW/MP/TD start/stop simulation and fault tracing
- System backup and recovery

This course has been certified in accordance with "DNV Standard for Certification of Learning Programmes - 3.201"



2. Electrical products courses

H863 - ACS6000c NTY cycloconverter 14
H864 - ACS6000 AD/SD marine drive course 15
H865 - SAMI Megastar marine drive course 16
H866 - Operation and maintenace of STADT x-AC-y-z 17
H867 - PSR-cycloconverter marine drive course 18
H911 - Drilling drive system course 19
H868 - HV power distribution system – general course..... 20
H869 - HV power distribution system – ZS1 Unigear course 21
H870 - LV power distribution system course 22

H863 - ACS6000c NTY cycloconverter



Level: 1 - Product

Duration: 5 days

Student profile: Marine engineers and electro-technical personnel at the operational and management level

Prerequisites and recommendations: Marine power plant basic course for technical staff in ABB propulsion and marine high voltage safety course or similar knowledge is advisable.

Course objectives: Upon completion of this course, students will be able to understand the drive topology and operation. Students will be able to locate the hardware components, test, measure, troubleshoot and replace the drive's parts when needed, and understand the function of propulsion and drive control.

Main topics:

- Overview of cycloconverter operation principle
- Control system and power system hardware
- Operation and different drive modes
- Propulsion control software
- Cooling principle
- Software tools
- Hands-on training
- Preventive maintenance, troubleshooting and repair
- Life cycle information

H864 - ACS6000 AD/SD marine drive



Level: 1 - Product

Duration: 4 days

Student profile: Marine engineers and electro-technical personnel at the operational and management level

Prerequisites and recommendations: Marine power plant basic course for technical staff in ABB propulsion and marine high voltage safety course or similar knowledge is advisable.

Course objectives: Students will be able to understand the drive topology, be able to locate hardware components, to verify and replace the drive's parts, and to perform preventive maintenance. They will understand the function of propulsion and drive control (5 day course).

Main topics:

- Function and operation of ACS6000 AD/SD drive
- Function of DriveWindow software
- Preventive maintenance
- Functional description of the propulsion system (5 day course)

This course has been certified in accordance with "DNV Standard for Certification of Learning Programmes - 3.201"

DNV

H865 - SAMI Megastar marine drive



Level: 1 - Product

Duration: 4 days

Student profile: Marine engineers and electro-technical personnel at the operational and management level

Prerequisites and recommendations: Marine power plant basic course for technical staff in ABB propulsion and marine high voltage safety course or similar knowledge is advisable.

Course objectives: The goal of this course is to teach students to operate, maintain and trouble-shoot Megastar W in marine applications. Students will learn how the Megastar is connected to the vessel automation system. The training covers the following types and constructions:
- SAMI Megastar W – single/parallel drive
- Drives with APC-controller

Main topics:
- Hardware and software overview
- Component and board functions
- Reading and interpreting circuit diagrams and part lists
- Control panel functions
- Preventive maintenance
- Fault tracing
- Replacing HV – components
- Using the PC-tools for the Megastar

H866 - Operation and maintenance of STADT x-AC-y-z



Level: 1 - Product

Duration: 4 days

Student profile: Marine engineers and electro-technical personnel at the support and operational level.

Prerequisites and recommendations: Marine power plant basic course for technical staff in ABB propulsion or similar knowledge is advisable.

Course objectives: Upon completion of this course, students will be able to locate the hardware components, to verify and replace the drive's parts and to perform preventive maintenance.

Main topics:
- In-depth theory of the Stadt x-AC-y-z drive principles
- Hardware description
- Software introduction
- Water cooling system
- Operation
- Fault-tracing and troubleshooting

H867 - PSR-cycloconverter marine drive



Level: 1 - Product

Duration: 4 days

Student profile: Marine engineers and electro-technical personnel at the operational and management level

Prerequisites and recommendations: Marine power plant basic course for technical staff in ABB propulsion and marine high voltage safety course or similar knowledge is advisable.

Course objectives: Students will be able to understand the drive topology and operation. Students will be able to locate the hardware components, test, measure, troubleshoot and replace the drive's parts when needed. They will understand the function of propulsion and drive control.

Main topics:

- Overview of cycloconverter operation principle
- Control and power system hardware
- High speed circuit breakers (operation and maintenance)
- Excitation system (brush/brushless)
- Operation and different drive modes
- Propulsion control software
- Cooling principles
- Software tools
- Hands-on training
- Preventive maintenance, troubleshooting and repair

H911 - Drilling drive system course



Level: 1 - Product

Duration: 5 days

Student profile: Marine engineers and electro-technical personnel at the operational and management level

Prerequisites and recommendations: Basic knowledge of electronics, AC drive, process control system and experience with Microsoft Windows is advisable.

Course objectives: Upon completion of this course the participants will able to locate hardware components, verify and replace ACS800 liquid-cooled supply (if applicable), inverter and cooling units. The participants will also be able to perform basic trouble-shooting of the AC800M drilling drive control system.

Main topics:

- Construction and function of ACS800LC or ACS800AC marine drive
- Function of DriveWindow software
- System function of ABB drilling drive system
- AC800M control system and software
- Preventive maintenance
- System recovery

This course has been certified in accordance with "DNV Standard for Certification of Learning Programmes - 3.201"

H868 - HV power distribution system – general



Level: 1 - Product

Duration: 5 days

Student profile: Marine engineers and electro-technical personnel at operational and management level

Prerequisites and recommendations: Marine power plant basic course for technical staff in ABB propulsion and marine high voltage safety course or similar knowledge is advisable.

Course objectives: Upon completion of this course students will be able to understand the structure and operation of marine power plant and safely operate and maintain diverse marine high voltage switchgears.

Main topics:

- Switchboards
- Functional characteristics and performance of protection system
- Safe operation, maintenance and testing of switchgear (circuit breaker, contactor)
- Basic trouble shooting
- Power plant regulation principle
- Power distribution system overview (transformers, generators and motors)

H869 - HV power distribution system – ZS1 Unigear



Level: 1 - Product

Duration: 4 days

Student profile: Marine engineers and electro-technical personnel at the operational and management level

Prerequisites and recommendations: Marine power plant basic course for technical staff in ABB propulsion and marine high voltage safety course or similar knowledge is advisable.

Course objectives: Participants will be able to understand the basic functioning of marine power distribution as well as safely operate and maintain UniGear switchgear, gas & vacuum circuit breaker, vacuum contactor and protection relay.

Main topics:

- Marine HV distribution system
- Power plant regulation principles
- Functional characteristics and safety features of the UniGear switchboard
- Structure and working principles of gas and vacuum circuit breakers
- Operation of circuit breakers and vacuum contactors
- Operation of protective relays and interfacing to computer software (optional)

This course has been certified in accordance with "DNV Standard for Certification of Learning Programmes - 3.201"

DNV

H870 - LV power distribution system



Level: 1 - Product

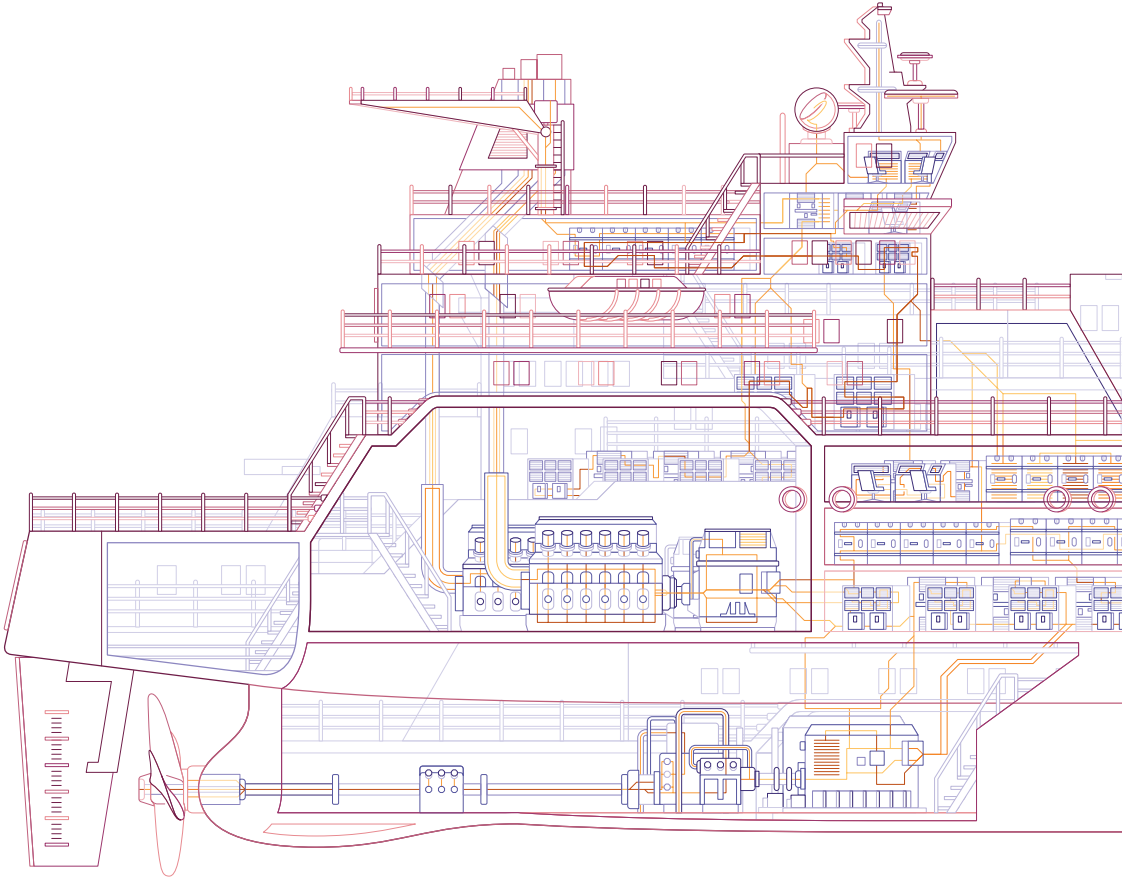
Duration: 4 days

Student profile: Marine engineers and electro-technical personnel at the support, operational and management level

Prerequisites and recommendations: None

Course objectives: Participants will be able to understand the functions of various low voltage protection devices as well as safely operate and maintain switchgear, circuit breakers, protection relays and softstarters. They will also be able to manage the risks of working with electric switchgear and adopt safe working methods in a marine environment.

Main topics:
- General marine power plant
- Generators, motors and transformers overview
- LV switchboard MNS
- Air circuit breakers and molded case circuit breakers
- Softstarters
- Low voltage safety and hazards
- Treatment of electrical injuries and first aid

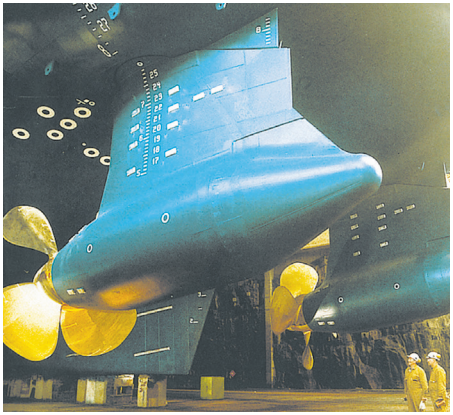




3. Azipod® propulsion

H881 - Azipod® V technical training course 26
H880 - Azipod® C technical training course 27
H882 - Azipod® XO technical training course 28
H883 - Azipod® vessel operation, operational level 29
H885 - Azipod® vessel operation, management level 30

H881 - Azipod® V* technical training



Level: 1 - Product

Duration: 5 days

Student profile: Marine engineers and electro-technical personnel at the operational and management level

Prerequisites and recommendations: Marine power plant basic course for technical staff in ABB propulsion and Azipod® space safety course are advisable.

Course objectives

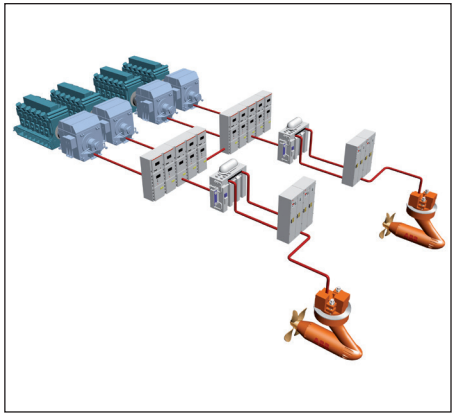
To describe the functions of the sub systems of Azipod® system. Importance of correct maintenance, monitoring possibilities and how to troubleshoot systems and perform adjustments on specific system components.

Main topics:

- Diesel electric Azipod® propulsion system main components and their functions
- Terminology and evolution of Azipod® propulsion
- Slipring unit technology
- Power and data transmission system
- Encoder signal fault tracing
- Hydraulic steering gear and steering angle feedback
- Hydraulic pump & motor fault procedures and adjustments
- The EMRI servo unit settings
- Review of safety aspects inside the Azipod®
- Azipod vessel operation basic

* Previously called “Large Azipod®”

H880 - Azipod® C technical training



Level: 1 - Product

Duration: 5 days

Student profile: Marine engineers and electro-technical personnel at the operational and management level

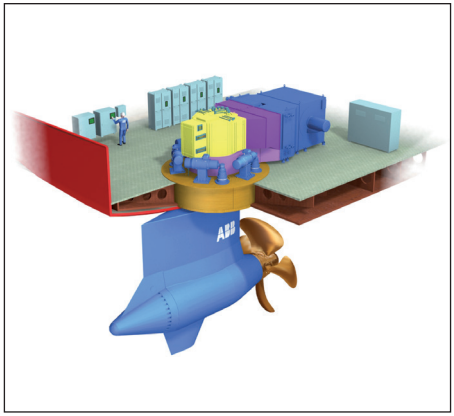
Prerequisites and recommendations: Participants should have attended the marine power plant basic course for technical staff in ABB propulsion.

Course objectives: Upon completion of this course the participants will have advanced knowledge of Azipod® C system, understand the functioning of propulsion and drive control, operate and maintain ACS800 Azipod® C drive systems, and trace and correct basic faults.

Main topics:

- Azipod® C propulsion system structure
- Drive control and electrical steering gear
- Construction and function of ACS800 single drive and ACS800LC drive
- Fault tracing methods, exchanging the parts and modules
- Theory and exercises on the drive and controller PC tool programs

H882 - Azipod® XO technical training



Level: 1 - Product

Duration: 5 days

Student profile: Marine engineers and electro-technical personnel at the operational and management level

Prerequisites and recommendations: Marine power plant basic course for technical staff in ABB propulsion and Azipod® space safety course are advisable.

Course objectives

Participants will be able to describe the functions of the different sub-systems of the Azipod® propulsion system and how they interact. They will understand the importance of correct maintenance, be able to describe the monitoring possibilities and how to troubleshooting systems and perform adjustments on specific system components.

Main topics:

- Terminology and evolution of Azipod® propulsion
- ACS800 steering gear drive programming, adjustment and troubleshooting
- Electric steering gear
- Slipring unit technology
- Power and data transmission system
- Encoder signal fault tracing
- Steering angle feedback assembly
- Review of safety aspects inside the Azipod®
- Azipod vessel operation basics

H883 - Azipod® vessel operation, operational level



Level: 2 - Advanced/coaching

Duration: 3 days

Student profile: Azipod® vessel deck personnel at operational level

Prerequisites and recommendations: Experience of watch keeping on modern, preferably Azipod® vessels, and of bridge simulator training.

Course objectives: Upon completion of this training, the participants will be familiar with the operational principles of diesel-electric (DE) Azipod® propulsion systems taking into account vessel safety, passenger comfort and environmental and economical requirements.

This workshop is run in conjunction with an approved maritime simulation center.

Main topics:

- Azipod® vessel operation with emphasis on pilot voyage and harbor maneuvers
- Azipod® vessel system functionalities and power plant behavior in different conditions
- Effects of power plant and propulsion system malfunctions

H885 - Azipod® vessel operation, management level



Level: 2 - Advanced/coaching

Duration: 5 days

Student profile: Azipod® vessel deck personnel at management level.

Prerequisites and recommendations: Several years experience of Azipod® vessel operations.

Course objectives

Upon completion of this training, the participants will have full understanding of the operational principles of diesel-electric Azipod® vessels taking into account vessel safety, passenger comfort, environmental and economical requirements and operational efficiency and maintenance needs.

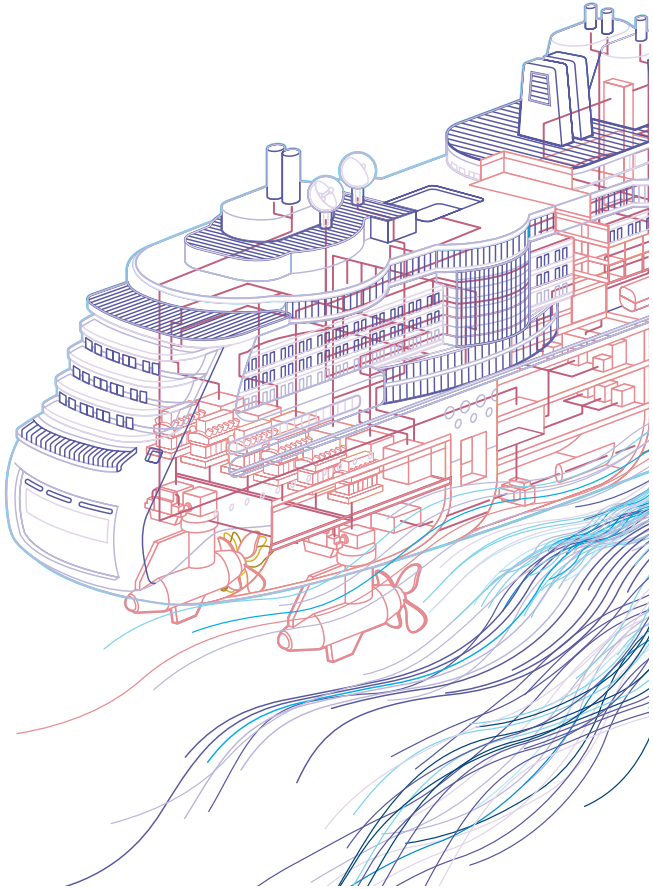
They will be able to utilize the flexibility of the propulsion system and identify potential malfunctions of the propulsion system, and cope with them without sacrificing vessel safety. Clear and concise bridge communication is emphasized.

This workshop is run in conjunction with an approved maritime simulation center.

Main topics:

NOTE: the actual content of each workshop is finalized according to the needs and requests of the company and the participants. Potential main topics include the following:

- Azipod® vessel operation and propulsion system behavior in all conditions
- Azipod® vessel system functionalities, power plant and propulsion system malfunctions
- Azipod® vessel resource management and bridge communication





4. Automation

H891 - Master Advant OCS automation training for operators 34
H892 - Master Advant OCS automation training for maintenance.. 35
H894 - Marine 800xA and AC800M automation training 36
H899 - DEGO II and III electronic governor systems..... 37
H902 - AC800M applications for LNG, tanker and drilling..... 38
H895 - Marine 800xA and AC400 automation training..... 39

H891 - Master Advant OCS automation training for operators - Operation and diagnostic



Level: 1 - Product

Duration: 3 days

Student profile: Marine engineers and electro-technical personnel at the support and operational levels

Prerequisites and recommendations: None

Course objectives: The goal of this course is to learn how to operate the Advant automation system and how to use the Advant operator station, in order to understand the system philosophy and process alarms. The aim is to reduce decision time by using the marine automation process controls properly.

Main topics:

- Advant IAMCS philosophy, products overview
- System layout and basic system configurations and setup
- Connection principles of the input and output signals with an automation system
- Operator stations and X-terminals handling through AdvaCommand suite (mimic displays, trend charts, alarms and events)

H892 - Master Advant OCS automation training for maintenance users - System diagnostic and troublehooting



Level: 2 - Advanced

Duration: 5 days

Student profile: Marine engineers and electro-technical personnel at support and operational level.

Prerequisites and recommendations: Students should know the fundamentals of working with automation control systems. Master Advant OCS automation training for operators - operation and diagnostic is advisable.

Course objectives: Upon completion of this course the participants will be able to understand the philosphy of an up-to-date automation system, fully use all operator functionalities in order to maximize productivity, troubleshoot common issues reducing decision time, perform engineering activities for runtime operations and optimize the process.

Main topics:

- Advant IAMCS philosophy, products overview and life-cycle
- System layout and hardware configurations and setup
- AC400 / MasterPiece PLC programming
- System maintenance
- Engineering, diagnosis and troubleshooting

H894 - Marine 800xA and AC800M automation training - System diagnostic and troublehooting



Level: 2 - Advanced

Duration: 5 days

Student profile: Marine engineers and electro-technical personnel at the support and operational levels

Prerequisites and recommendations: Students should know the fundamentals of working with automation control system. Marine 800xA automation training for operators - Operation and diagnostic is advisable

Course objectives: Upon completition of this course the participants will be able to understand the philosophy of an up-to-date automation system, fully use all operator functionalities in order to maximize productivity, troubleshoot common issuses reducing decision time, performing engineering activities for run-time operations and optimize the process

Main topics:

- 800xA IAMCS philosophy, products overview and life-cycle
- IT architectures on ferry and cruise applications
- Microsoft-based IT devices
- AC800M PLC programming and OPC protocol
- System maintenance
- Engineering, diagnosis and troubleshooting

H899 - DEGO II and III electronic governor systems



Level: 1 - Product

Duration: 3 - 5 days

Student profile: Marine engineers and electro-technical personnel at the operational and management level

Prerequisites and recommendations: Marine power plant basic course for technical staff in ABB propulsion is advisable. Basic electrical knowledge is required.

Course objectives: Upon completion of this course, students will be able to understand and identify abnormal behavior of the DEGO systems, locate faults in the different units, repair by replacement, perform calibrations and make fine tunings to the system. They will also be able to perform basic maintenance and repairs on ASAC actuators.

Main topics:

- Basic theory of electronic governors
- Generator application
- ASAC actuators
- ABB DEGO II and III governor concept
- Trouble shooting techniques and repair
- Practical exercises

H902 - AC800M applications for LNG, tanker and drilling



Level: 1 - Product

Duration: 4 days

Student profile: Electro-technical personnel at the operational level

Prerequisites and recommendations: Students should know the fundamentals of working with automation control systems and Microsoft Windows. Knowledge of ABB drives or similar is advisable.

Course objectives: Upon completion of this course, the participant shall be able to conduct troubleshooting as well as performing backup and recovery of the AC800M control system used in the Marine environment.

Main topics:

- System function of AC800M in Marine application
- AC800M system structure and the function of different components
- Exchange AC800M hardware
- Connect to Process Panel HMI
- Connect to ABB drive units
- System backup and recovery

H895 - Marine 800xA and AC400 automation training - System diagnostic and troubleshooting



Level: 2 - Advanced

Duration: 5 days

Student profile: Marine engineers and electro-technical personnel at the support and operational level

Prerequisites and recommendations: Students should know the fundamentals of working with automation control systems. Marine 800xA automation training for operators - operation and diagnostic is advisable.

Course objectives: Upon completion of this course the participant will be able to understand the philosophy of an up-to-date automation system, fully use all operator functionalities in order to maximize productivity, troubleshoot common issues to reduce decision time, perform engineering activites for run-time operations and optimize the process.

Main topics:

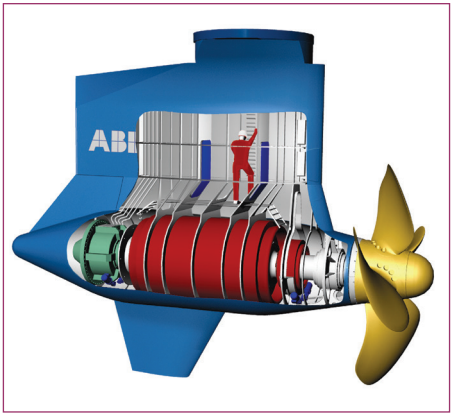
- 800xA IAMCS philosophy, product overview and life-cycle
- IT architectures on ferry and cruise applications
- Microsoft-based IT devices
- Industrial IT suite
- AC400 PLC programming and system connection
- System maintenance
- Mimic pages, alarms, events, trends and historical data


education
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5. Safety

H850 - Azipod space safety course 42
H852 - HV Safety Management STCW - MCA/NMA/ILT approved. 43
H853 - HV Safety STCW - US Coast Guard approved 44

H850 - Azipod® space safety



Level: Basic

Duration: 3 days

Student profile: All deck, engine and electro-technical personnel responsible for Azipod® entry operations and those personnel who conduct Azipod® space maintenance.

Prerequisites and recommendations: Satisfactory health condition to be able to work inside a confined space

Course objectives: Be able to identify the different hazards and possible consequences when working inside the Azipod® space; enter and work safely inside the Azipod® space; understand duties and responsibilities of confined space personnel; assist during an emergency situation.

Main topics:

- Azipod® as an engineering system
- Occupational risks with the Azipod®
- Confined space regulation
- Rescue operations and duties of involved personnel
- Typical Azipod® entries and entry procedures
- Traumatology (first aid in a confined space)
- Use of protective equipment required for safe entry
- Entering and evacuating an injured entrant from the Azipod® space-simulator
- Climbing equipment for Azipod

This course has been certified in accordance with "DNV Standard for Certification of Learning Programmes - 3.201"

DNV

H852 - HV Safety Management STCW - MCA/NMA/ILT approved



Level: Basic

Duration: 5 days

Student profile: Engine personnel at the operational & management levels, and all electro-technical personnel who are dealing with high voltage equipment and systems.

Inspectie Leefomgeving en Transport
Ministerie van Infrastructuur en Milieu

Sjøfartsdirektoratet
Norwegian Maritime Authority

Maritime & Coastguard Agency
Training course approved by the MCA

Prerequisites and recommendations: Prior to the course, trainees must satisfy one of the following conditions:
i. Prior electrical or electro-technical experience in a ship-board environment; or,
ii. Have completed 12 months sea time as EOOW; or,
iii. Part of an initial electro-technical training programme

Course objectives: manage a high voltage installation, trouble shoot and restore marine HV systems to an operating condition.

Main topics:
- Safety rules on marine HV environment according to current regulations and recommendations (STCW, SOLAS, UK HSE etc.)
- Marine HV safety aspects and safe working procedures
- Special considerations for offshore electrical installations
- Dangers of electricity and arc-faults in switchgears
- Personal protective equipment
- Marine Electrical, Propulsion and Distribution Systems
- Protection system of electrical installations
- Accident analysis workshop
- Practical exercises

H853 - HV Safety STCW - US Coast Guard approved



Level: Basic

Duration: 5 days

Student profile: Engine personnel at the operational & management levels, and all electro-technical personnel who are dealing with high voltage equipment and systems.

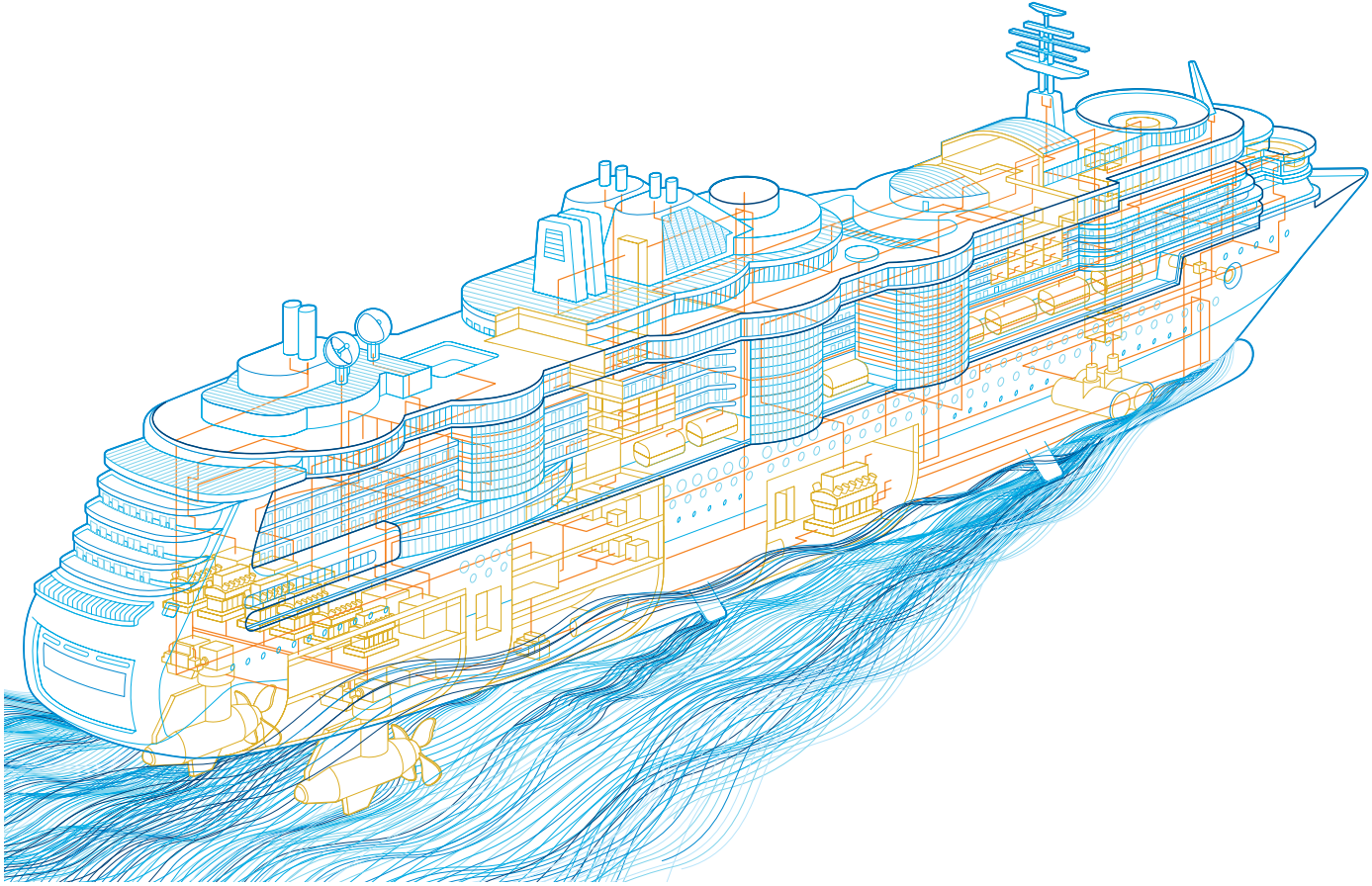
Prerequisites and recommendations: Previous electrical degree or certification is not required; however, a basic level of electrical knowledge is advised.

Course objectives: Manage a high voltage installation, trouble shoot and restore marine HV systems to an operating condition.

Main topics:

- Safety rules on marine HV environment according to current regulations and recommendations (STCW, SOLAS, HSE etc.)
- Marine HV safety aspects and safe working procedures
- Special considerations for offshore electrical installations
- Dangers of electricity and arc-faults in switchgears
- Personal protective equipment
- Marine Electrical, Propulsion and Distribution Systems
- Protection system of electrical installations
- Accident analysis workshop
- Practical exercises

U.S. Department of Homeland Security
United States Coast Guard



General terms and conditions

Course price includes:
- A qualified instructor with up-to-date technical knowledge and teaching experience
- Training room with infrastructure and training equipment
- Lunch, coffee and refreshments
- Training documentation

Application
In order to arrange and supply the scope of the course, the purchase order and time schedule should be confirmed by the customer 4 weeks prior to the starting date of training.

Travel and accommodation costs
Airline tickets, travel time, accommodation, local transportation of the participants and meals except lunch are not included in the price. ABB Marine Academy can assist in handling accommodation and local transport. These expenses will be charged based on costs + 10% administration fee.

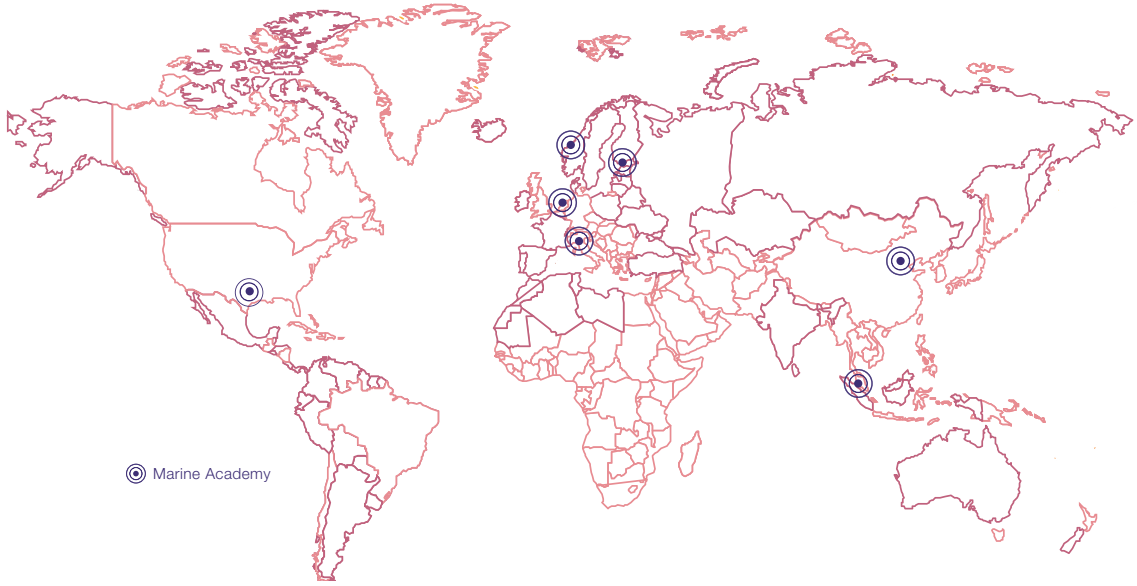
Changes
ABB Marine Academy reserves the right to change names of instructors, and modify the program and contents within scope of the course.

Cancellation
In case of cancellation please advise us as soon as possible. Please note that if a participant is unable to attend the course within the cancellation period the booking can be used by another person within the company.
- Cancellation 7 - 14 working days prior to the course schedule: 50% of course fee will be charged
- Cancellation less than 7 working days prior to the course schedule: 100% of course fee will be charged

Azipod vessel operation courses cancellation clause:
- 4-6 weeks before scheduled course: 50% of course fee will be charged
- Less than 4 weeks before scheduled course: 100% of course fee will be charged

Requirements for training in locations other than ABB Marine Academy premises
Please see ABB Marine Academy Guidelines sent together with quotation for more details.

ABB Marine Academy current locations



Marine service centers:

North America
Miami
Houston (Academy)

South America
São Paulo
Rio de Janeiro

North Europe
Oslo
Ulsteinvik (Academy)
Helsinki (Academy)
Copenhagen
Aberdeen
Murmansk

Central Europe
Rotterdam (Academy)
Hamburg

Mediterranean
Genoa (Academy)
Marseille
Madrid
Athens

India, Middle East & Africa
Abu Dhabi
Bangalore
Durban

Asia & Oceania
Singapore (Academy)
Shanghai
Beijing (Academy)
Osaka
Busan