GE VERNOVA

TRAINING CATALOGUE 2024

Drives and Automation Systems

Introduction

Our seminars offered include

- Basic seminars (Fundamentals)
- Drive systems
- High performance digital control systems

The basic seminars are dealing with drive systems, power electronics and control theory. The seminar includes comprehensive practical and theoretical knowledge supported by calculation exercises and for some seminars practical exercises at Beuth University of applied science.

The seminars on drive systems are product-related and are meant for operators, service personnel and commissioning engineers. The participants get knowledge about the principles and functions of the systems and learn adjustment and optimizing as well as fault finding.

The seminars on the control systems and engineering with P80-HMI are meant for project and development engineers as well as for commissioning, service and maintenance personnel.

The single seminars are intended to enable the participants to do small design modifications and fault finding and to independently design digital open-loop and closed-loop control (control and regulation) systems. Our standard seminars are also offered as in-house seminars. Please refer to section 3 of the general information and terms of participation.

Besides standard seminars listed in this seminar program, we also offer - on special request – special seminars on project-specific drive and control systems.

Standard seminars can be held in English or German language. The training documentation is prepared accordingly.

Seminars in other language based on the German or English training documentation are subject to the availability of an interpreter with an adequate technical knowledge. The customer is responsible for obtaining the services of an interpreter.

Location:

GE Energy Power Conversion GmbH

Global Technical Learning Center Berlin

Culemeyerstraße 1, 12277 Berlin

Tel.: +49 (0) 30 / 76 22 - 44 42

E-Mail: learning.center@ge.com

GE VERNOVA

Fundamentals – Motors and drive systems in theory and practices

Seminar No : 101

AC Drives system

Purpose

Basic knowledge on AC variable speed drives and their application.

Target audience

Design, commissioning, Operator and development engineers.

Prerequisite

- Fundamental knowledge of basic electrical engineering
- Fundamental knowledge of electronics.

Duration: 5 days

Lecturer : Prof. Dr. Hambrecht

Fees/ Dates:

See price list and time schedule.

Location

Global Technical Learning Center Berlin / Beuth-Hochschule für Technik/University of Applied Sciences.

Time	
8:30 am	Approx 5:00 pm each day
Start	1st day 10:00 am
End	5th day 3:00 pm

Content

Motives and arguments for selection of drive systems

Basics of mechanical motions for drive system engineering

Basics models of DC, induction machines and synchronous electrical machines.

Inverters with thyristors for DC and AC Motors

IGBT converters for AC machines

Practical approach for control systems design

Drive systems: brushless motor, cyclo converter, frequency converter for variable speed drives, DC drives

GE VERNOVA

Fundamentals – Motors and drive systems in theory and practices

Seminar No : 102

AC Drives system

Purpose

Basic knowledge on AC variable speed drives and their application.

Target audience

Design, commissioning, Operator and development engineers.

Prerequisite

Fundamental knowledge of basic electrical engineering.

Duration: 3 days

Lecturer : Prof. Dr. Hambrecht

Fees/ Dates:

See price list and time schedule.

Location

Global Technical Learning Center Berlin / Beuth-Hochschule für Technik/University of Applied Sciences

Time	End time
8:30 am	5:00 pm

Content

Introduction in drive systems

Fundamentals of squirrel cage and doubly fed asynchronous machines and synchronous electrical machines

Fundamentals of electrical machine operation and control

Power electronic components and circuits

Variable 3-phase voltage source (puls pattern generators)

Voltage source inverter

Variable 3-phase current source

Current source inverter

Control of AC variable speed drives

Fundamentals – Motors and drive systems in theory and practices

Seminar No : 103

Power electronics

Purpose

Basic knowledge on AC variable speed drives and their application.

Target audience

Design, commissioning, Operator and development engineers.

Prerequisite

Fundamental knowledge of basic electrical engineering

Duration: 5 days

Lecturer : Prof. Dr. Hambrecht

Fees/ Dates:

See price list and time schedule.

Location

Global Technical Learning Center Berlin / Beuth-Hochschule für Technik/University of Applied Sciences

Content

Introduction into converter technology

Power electronics components

AC and DC circuit switching in Power electronic application

Single phase and 3-phase converters

Diode rectifiers and thyristor converters

IGBT 2 and 3 level inverters

IGBT inverters as front end and motor converter

Pulse pattern generator

Motor and active front end control

EMC and harmonics, Filte

Time	
8:30 am	Approx 5:00 pm each day
Start	1st day 10:00 am
End	5th day 3:00 pm

GE VERNOVA

Fundamentals – Motors and drive systems in theory and practices

Seminar No : 104

Oscillation in drives system

Purpose

Basic Knowledge in dealing with oscillations.

Target audience

Design, commissioning, Operator and development engineers.

Prerequisite

Fundamental knowledge of basic electrical engineering

Duration: 1 days

Lecturer : Prof. Dr. Hambrecht

Fees/ Dates:

See price list and time schedule.

Location

Global Technical Learning Center Berlin

Content

Drive trains oscillation analysis (two mass oscillators) design of drive trains

Oscillation compensation

Torsion oscillation

Bending oscillation

Mechanical stimulated periodical noise and oscillations

Torque impulse caused by mechanical blocking or electrical short circuit

Design of control loops

Filter and damping networks for oscillations

Oscillation in control loops with back lash

Multi mass system

Modern control approach for oscillation damping (state space control)

Time	End time
8:30 am	5:00 pm

GE VERNOVA

Fundamentals – drive technology in theory and practices

Seminar No : 120

Drive technology for strip systems and rolling mills

Purpose

Basic knowledge of drive technology for strip systems and rolling mills.
Basic knowledge of mechanics, design calculations, calculation models , drive technology, Antriebstechnik, regulation methods and control strategies.

Target audience

Design, commissioning, Operator and development engineers.

Prerequisite

Fundamental knowledge of basic electrical engineering

Duration: 5 days

Lecturer : Prof. Dr. Hambrecht

Fees/ Dates:

See price list and time schedule.

Location

Global Technical Learning Center Berlin

Content

- Basic mechanics
- Basic drive technology – electrical machinery/frequency converters
- Basic control technology, regulation of drive technology
- Basic metals (mass flow, storage, belt tension model, rolling gap)
- example coupling strip tandem mills
- Overview drive technology in metals
- Component parts of strip processing lines and rolling mills
- Regulation and control of strip processing lines and rolling mills

Time	
8:30 am	Approx 5:00 pm each day
Start	1st day 10:00 am
End	5th day 3:00 pm

GE VERNOVA

Drive Systems

Seminar No : 261

LV7000 Standard Software, All in One"

Purpose

Handling and optimization of LV7000.

Target audience

Commissioning engineers, Commissioning technicians and service personnel.

Prerequisite

- Use of a PC with MS-Windows
- Knowledge of 3-phase technology and asynchronous machines

Duration: 5 days

Number of participants : max. 8

Fees/ Dates:

See price list and time schedule.

Location

Global Technical Learning Center Berlin

Content

Introduction to the fundamentals of frequency converter. Product number LV7000.

Briefing in the control panel/keypad

Explanation of "ALL IN ONE" application software.

Training for NC-Drive and NC-Load. Service CANBUS for the LV7000. Faults and warnings for NC-Drive and NC-Load. Explanation of the reference cascade. parameterization and software interface fieldbus profibus

Teamwork: exercises for the parameter tree structure and the keypad operation.

exercises for the use of NC-Drive and NC-Load software exercises for the use of several "ALL IN ONE" applications

Time	
8:30 am	Approx 5:00 pm each day
Start	1st day 10:00 am
End	5th day 3:00 pm

GE VERNOVA

Drive Systems

Seminar No : 272

ProWind and MD2000: WPU

Purpose

Independent commissioning and fault finding.

Target audience

Electrical personnel for service, commissioning and maintenance on WPU.

Prerequisite

- Use of a PC with MS-Windows
- Knowledge of 3-phase technology and asynchronous machines.

Duration: 5 days

Number of participants : max. 8

Fees/ Dates:

See price list and time schedule.

Location

Global Technical Learning Center Berlin

Content

3-phase drives: introduction to the fundamentals of 3-phase technology with constant voltage link circuit.

Principles of operation of ProWind and MD2000 in Wind Power Units

Teamwork: fault finding and trouble shooting, Re-commissioning

Handling of PC Drive Software

Time	
8:30 am	Approx 5:00 pm each day
Start	1st day 10:00 am
End	5th day 3:00 pm

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Drive Systems

Seminar No : 272A

ProWind and MD2000: WPU Refresher

Purpose

Independent commissioning and fault finding.

Target audience

Electrical personnel for service, commissioning and maintenance on WPU.

Prerequisite

Seminar-Nr. 272

Duration: 3 days

Number of participants : max. 8

Fees/ Dates:

See price list and time schedule.

Location

Global Technical Learning Center Berlin.

Content

Principle of the double-fed asynchronous machine

Hardware skills to different types of frequency converters

Teamwork: fault-finding and trouble shooting, Recommissioning

Handling of PC Drive Software

Time	
8:30 am	Approx 5:00 pm each day
Start	1st day 10:00 am
End	3ed day 3:00 pm

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Drive Systems

Seminar No : 274

ProWind with PECe: WPU

Purpose

Independent commissioning and fault finding.

Target audience

Electrical personnel for service, commissioning and maintenance on WPU.

Prerequisite

- Use of a PC with MS-Windows

- Knowledge of 3-phase technology and asynchronous machines.

Duration: 5 days

Number of participants : max. 6

Fees/ Dates:

See price list and time schedule.

Location

Global Technical Learning Center Berlin.

Content

3-phase drives: introduction to the fundamentals of 3-phase technology with constant voltage link circuit.

Principles of operation of ProWind with PECe-Control in Wind Power Units

Teamwork: fault finding and trouble shooting, Re-commissioning

Handling of PECe-Control Software

Inspection and Maintenance of the Power Circuit Breaker

Time	
8:30 am	Approx 5:00 pm each day
Start	1st day 10:00 am
End	5th day 3:00 pm

![GE VERNOVA logo]

Drive System

Seminar No : 275

ProSolar

Purpose

Handling, Diagnostic, Maintenance.

Target audience

Electrical personnel for service, commissioning and maintenance on WPU.

Prerequisite

Electrical education. Knowledge of 3-phase technology and solar generators. Usage of a PC with MS-Windows.

Duration: 4 days

Number of participants : max. 6

Fees/ Dates:

See price list and time schedule.

Location

Global Technical Learning Center Berlin.

Content

Fundamentals and Principles of operation of the Converter.

Get familiar with structure and hardware components.

Basic Principles of HDM. Handling, operational characteristics and maintenance. Safety.

Group work:

Working with the HPCi Data Manager.Fault detection and diagnosis

Time	
8:30 am	Approx 5:00 pm each day
Start	1st day 10:00 am
End	4th day 3:00 pm

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Drive System

Seminar No : 276

MV3000 (available in English only)

Purpose

Independent fault finding and troubleshooting.

Target audience

- Electrical education

- Knowledge of Mv3000 technology

- Usage of a PC with MS-Windows.

Prerequisite

Electrical education. Knowledge of 3-phase technology and solar generators. Usage of a PC with MS-Windows.

Duration: 4 days

Number of participants : max. 8

Fees/ Dates:

See price list and time schedule.

Location

Global Technical Learning Center Berlin.

Content

Interactive training with hands-on exercises focusing on control software and troubleshooting

Participants will be able to

• Explain the hardware components and fundamentals of the converter

• Perform basic operation and maintenance tasks

• Navigate through the parameters and control programs

• Use the diagnostic tools

• Conduct fault-finding and troubleshooting

Time	
8:30 am	Approx 5:00 pm each day
Start	1st day 10:00 am
End	4th day 3:00 pm

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Drive System

Seminar No : 285

LV8000

Purpose

Independent working with HDM-Manager-Software, fault tools and fault-finding.

Target audience

Maintenance personnel.

Prerequisite

- Usage of a PC

- MS- Windows – Knowledge.

Duration: 5 days

Number of participants : max. 6

Fees/ Dates:

See price list and time schedule.

Location

Global Technical Learning Center Berlin.

Content
Training in English language is not available at present.

Time	
8:30 am	Approx 5:00 pm each day
Start	1st day 10:00 am
End	5th day 3:00 pm

Drive System

Seminar No : 291

MV7000 (Medium Voltage converter)

Purpose

Independent fault finding and maintenance.

Target audience

Maintenance personnel.

Prerequisite

- Usage of a PC with MS-Windows

- Knowledge of 3-phase technology and asynchronous machines

- HPCi-basic knowledge.

Duration: 5 days

Number of participants : max. 8

Fees/ Dates:

See price list and time schedule.

Location

Global Technical Learning Center Berlin

Content

3-phase drives: introduction to the fundamentals of 3-phase technology with voltage link circuit.

Principles of operation of MV7000 Handling with medium voltage technology

Download/Backup of drive software HPCi fault finding and trouble shooting Maintenance

Time	
8:30 am	Approx 5:00 pm each day
Start	1st day 10:00 am
End	3rd day 3:00 pm

![GE VERNOVA logo]

Drive System

Seminar No : 350

SEMIPOL – Start-up Frequency Converter – Operation and Maintenance Training

Purpose

Independent fault finding and maintenance.

Target audience

Commissioning engineers, commissioning technicians and service personnel.

Prerequisite

• Usage of a PC with MS-Windows,

• Knowledge of SFC/ SEE technology

• Electrical education.

Content

AC-Load Commutated Inverter Drive Technology (SFC) and DC-Exciter Technology for Synchronous Generators (SEE): Introduction into the technology of current Source converters including digital control and working principles as well as for the DC Exciter of the Semipol system

• Introduction in tools
• Introduction in Software
• Introduction in Hardware
• Working with the documentation
• Operation of the system
• Maintenance
• General functions
• General safety
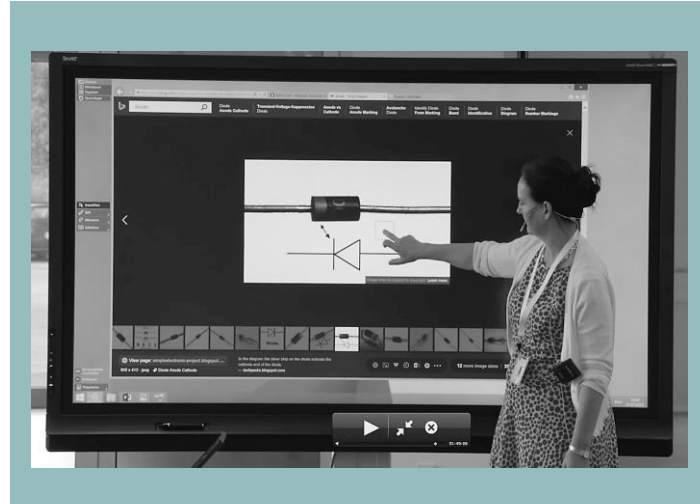
Duration: 5 days

Number of participants : max.8

Fees/ Dates:

See price list and time schedule.

Location

Global Technical Learning Center Berlin.

Time	
8:30 am	Approx 5:00 pm each day
Start	1st day 10:00 am
End	5th day 3:00 pm

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Drive System

Seminar No : 513

Digital control and regulation system Logidyn D2 with LogiCAD

Purpose

Participants learn to use the graphic engineering system LogiCAD, and are able to implement and maintain solu-tions to complex control and regulation (open-loop and closed-loop control) problems using a Logidyn D configuration consisting of hardware and software

Prerequisite

- Basic knowledge of analogue and digital control systems for automation projects in the field of industrial plants

- Basic PC and Windows knowledge

Duration: 5 days

Number of participants : max. 8

Fees/ Dates:

See price list and time schedule.

Location

Global Technical Learning Center Berlin.

Content

System structure, concept and usage of the control and regulation (open-loop and closed-loop control) system (Logidyn D2. Engineering of a control and regulation (open-loop and closed-loop control) system on a PC using the graphic engineering interface LogiCAD.

Commissioning and maintenance of control and regulation (open-loop and closed-loop control) structures on the basis of Logidyn D systems, Applications. Backup and version control. Operation and exercises on the PC. Configuration and operation of an engineering network system (ENS)

Configuration of the communication manager CM

Connection of Logidyn D2 systems to CC100- Connection of Logidyn D2 systems to the RTDB

Time	
8:30 am	Approx 5:00 pm each day
Start	1st day 10:00 am
End	5th day 3:00 pm

Drive System

Digital control and regulation system Logidyn D2 with LogiCAD: Maintenance

Purpose

Participants can operate and maintain Logidyn D2.

Prerequisite

- Basic knowledge of analogue and digital control systems for automation projects in the field of industrial plants

- Basic PC and Windows knowledge

- Seminar No. 513

Duration: 3 days

Number of participants : max.8

Fees/ Dates:

See price list and time schedule.

Location

Global Technical Learning Center Berlin.

Content

System structure, concept and usage of the control and regulation system Logidyn D2

Simple Change of a control and regulation system on a PC using the graphic engineering interface LogiCAD

Commissioning and maintenance of control and regulation structures on the basis of Logidyn D2 systems

Configuration of the communication manager CM/Connection of Logidyn D2 systems to the RTDB

Checks: Message-Logger, LogiSCOPE, measuring channels

Planned maintenance: parametrization of signals, backup and version control, change of an Engineering Network System (ENS).

Maintenance in case of error: forcing, error identification and repair, change of hardware.

Time	
8:30 am	Approx 5:00 pm each day
Start	1st day 10:00 am
End	5th day 3:00 pm

![GE VERNOVA logo]

Drive System

Seminar No : 560

Digital control and regulation system HPCi with P80i

Purpose

Participants learn to use the graphic engineering system P80i Tool case and are able to implement and maintain solutions to complex control and regulation (open-loop and closed-loop control) problems using a HPCi configuration consisting of hardware and software.

Prerequisite

- Basic knowledge of analogue and digital control system of automation projects in the field of industrial plants

- Basic PC and Windows knowledge.

Duration: 5 days

Number of participants : max.8

Fees/ Dates:

See price list and time schedule.

Location

Global Technical Learning Center Berlin.

Content

System structure, concept and usage of the control and regulation (open-loop and closed-loop control) system HPCi. Engineering of a control and regulation (open loop and closed-loop control) system on a PC using the graphic engineering interface P80i.

Commissioning and maintenance of control and regulation (open-loop and closed-loop control) structures on the basis of HPCi systems (VME and PCI).

Applications: Backup and version control. Operation and exercises on the PC Configuration and operation of an engineering network system (ENS). Connection of HPCi systems to CC100. Connection to EtherCAT.

Time	
8:30 am	Approx 5:00 pm each day
Start	1st day 10:00 am
End	5th day 3:00 pm

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Drive System

Seminar No : 564

Digital control and regulation system HPCi with P80i: Maintenance

Purpose

Participants learn to use the graphic engineering system P80i, and are able to implement and maintain solutions to complex control and regulation (open-loop and closed-loop control) problems using a HPCi configuration consisting of hardware and software

Prerequisite

- Basic knowledge of analogue and digital control system of automation projects in the field of industrial plants

- Basic PC and Windows knowledge.

- Seminar No. 560

Duration: 3 days

Number of participants : max. 8

Fees/ Dates:

See price list and time schedule.

Location

Global Technical Learning Center Berlin.

Content

System structure, concept and usage of the control and regulation (open-loop and closed-loop control) system HPCi

Engineering of a control and regulation (open-loop and closed-loop control) system on a PC using the graphic engineering interface P80i

Commissioning and maintenance of control and regulation (open-loop and closed-loop control) structures on the basis of HPCi systems

Applications. Backup and version control

Operation and exercises on the PC

Time	
8:30 am	Approx 5:00 pm each day
Start	1st day 10:00 am
End	5th day 3:00 pm

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General information and terms of participation

Registration

Please send your written registration for our training courses - usually on our registration form - to the Training Center in good time.

Registrations and cancellations by telephone must be confirmed in writing immediately if they are to be considered.

The registration will be considered in order of her receipt. Registration (invitation to the seminar) is usually confirmed in writing, and is always subject to the applicable terms and conditions. Any deviations are subject to the explicit approval of the Training Center.

Fees for standard seminars

The fees are quoted on a participant basis and cover fees for teaching, the seminar documentation, as well as the costs for the use of technical practice equipment and machines.

Participant's travelling costs, board and lodging must be paid by the customer.

No fees are refunded if a participant does not attend the full course. The statutory rate of value-added tax will be charged in addition to the fees quoted.

Cancellation of participant's registration must be communicated in writing. In the event of cancellation, the following cancellation fees apply:

- Up to 4 weeks – 25% of seminar fee

- Up to 3 weeks – 50% of seminar fee

- Up to 2 weeks – 75% of seminar fee

- Up to 1 week – 100% of seminar fee.

The weeks mentioned above are to be understood as number of weeks before the starting date of the seminar.

In the event of cancellation earlier than 4 weeks of the starting date of the seminar, no cancellation fees apply. Should the customer be able to name an alternative participant, no cancellation fees will apply.

Customer and exclusive seminars

In special cases Power Conversion GmbH can offer seminars as customer specific courses. Such seminars are subject to separate agreements with the Training Center. Fees are quoted on a case-by-case basis. In the event that seminars are held outside the organizing Training Center, Power Conversion GmbH will charge for any additional travel expenses incl. flight ticket and travelling time, daily allowances and accommodation costs incurred by the lecturer(s). The provision of practice equipment (models) and operating units (PCs, printers, etc.) will be decided upon from case to case.

Invoicing

The obligation to pay fees and any surcharges arises when Power Conversion GmbH declares its binding confirmation of participation and in no case later than the end of the seminar. Invoices are sent to the specified customer. In case that the fee is to be paid by any party other than the participant's employer or the party filling the participant's registration, we assume that such third party's approval has been given. In the event that no party is named as the payer of the fee, invoices will be sent to the participant's employer.

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