

# English Training RTU / Substation Automation MicroSCADA Courses 2012

ABB DEPSNM-T (3.1.2012)

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**New 03.11.2011: Scheduled dates changed for courses 7570E, 7581E and 7591E**

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## Standard Training

The Training Center of ABB AG / PSN offers product- and project-related courses for different target groups within the scope of a modular training program.

**This brochure contains the English course program for remote terminal units (RTUs).**

Our aim is to impart the basic know-how and a general overview of our system to the participants of the training courses on the one hand, and to familiarize them with those details, which ensure safe handling and practical application of the equipment on the other hand. Therefore our instructors are people of practice, experienced both as technical specialists and as teachers. For your best success the persons per training place are limited to 1-2 participants per place. If you prefer to work on your company's laptop, feel free to take it along. You may also work with your laptop and you may parameterize the RTU in the training room with it if you like. You should have administrator rights at your laptop. If you attend an RTU560 course, please plug the CD-ROM-drive into your laptop. For RTU560 courses you need Windows 2000 or XP. Just Microsoft DOS is sufficient for RTU200/232 courses.

### Picture 1

Training place in  
Mannheim/Germany  
with RTU, simulator desk, personal  
computer, training file, CDs



ABB PSN is the ABB competence center for RTU development. Specialists in Mannheim can find the answer to difficult customer questions also.

The learning rooms are equipped exemplary for the benefit of the participants: Several RTU560 of several types, several RTU200/232, RTU211.

The full range of protocols can be trained: IEC60870-5, DNP3, RP570/71, MODBUS, SPABus, IEC61850.... A process simulator for single and double point informations, for single and double point commands, for counter values and for analogue inputs and outputs belongs to each RTU. There are 16 PCs including LAN connection to RTUs.

The training courses are subdivided into theoretical and practical sections. Extensive and continually updated instruction documents are available for all training courses and will be issued to the students at the beginning of the course. Their cost is included in the course fees.

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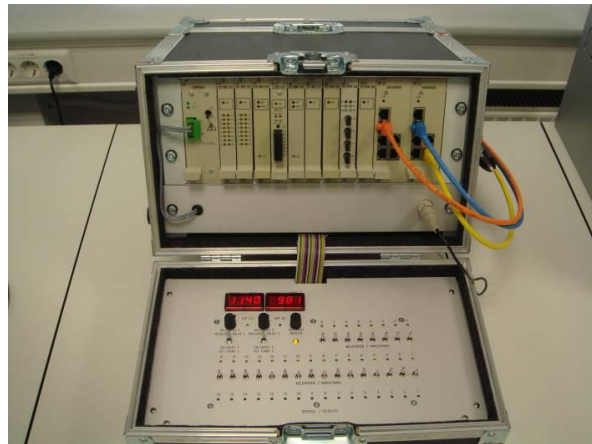
## General

### Dates

The dates of the courses are listed in the enclosed course schedule.

### Training Location for courses in Germany

ABB Learning Center  
Kallstadter Str. 1  
D 68309 Mannheim



Picture 2 RTU demo box for onsite training

### Time

The training schedule is part of the course program. On the first day lesson starts at 9:00 am.

### Registration

To guarantee maximum benefit of the courses for the attendees, the number of participants per course is restricted. You are therefore advised to apply early. Immediately after ordering the course a registration confirmation will be sent to you together with a description of how to get there.

### Customized training courses

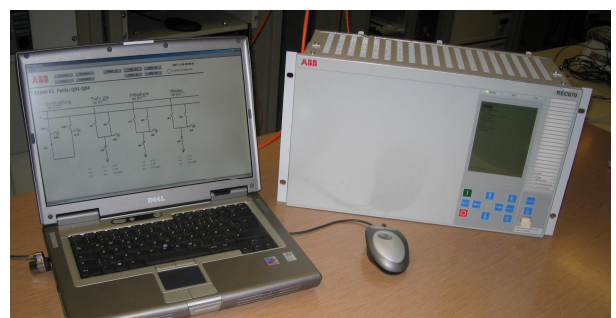
If you are interested in special customized courses to be conducted in our learning center or on your site, please contact us.

### Hotel reservations

Together with the confirmation of your order for one of our training courses we will send you a list of hotels. Please make reservation by yourself as soon as possible.

### Inquiries

ABB PSNM-T Mrs. Silvia Eberle  
Kallstadter Str.1  
D - 68309 Mannheim / Germany  
Phone: +49 621 - 381 - 7490  
Fax: - 2220  
E-Mail: [silvia.eberle@de.abb.com](mailto:silvia.eberle@de.abb.com)



Picture 3 Mobile training place with notebook and REC670 for use either at employer's premises or at ABB Mannheim/Germany

### Cancellation

Please look at chapter Commercial Conditions

### Payment terms

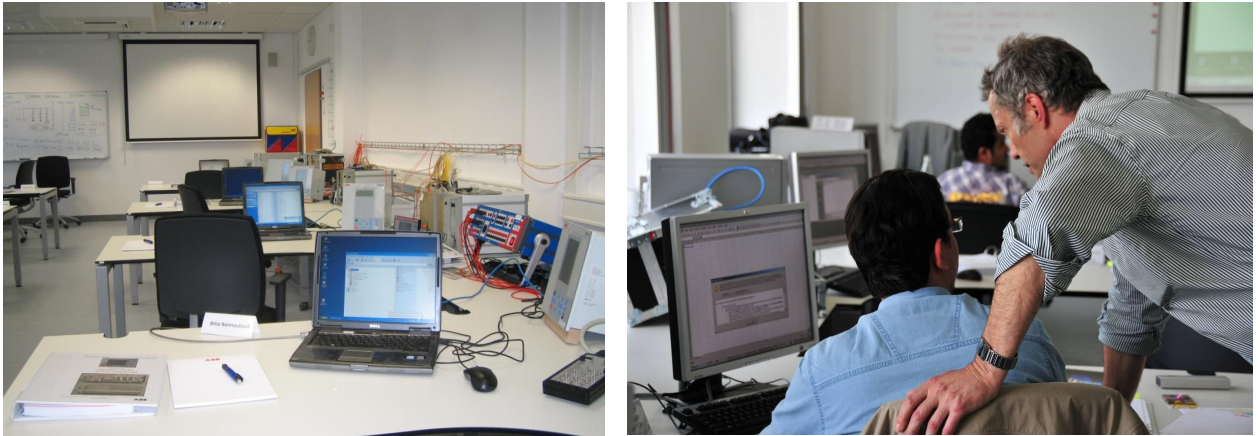
Please look at chapter Commercial Conditions

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## ABB Learning Center Mannheim / Germany



Picture 4 Training room Substation Automation (left) – RTU training (right)



Picture 5 ABB Power Systems Mannheim training facility: red building, fourth floor

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## Curriculum RTU

RTU211 :

7110 Basics

RTU200/232 :

7810 Basics

7830 Local Automation

7840 Advanced Course

RTU560 :

7550 Introduction Data Acquisition and RTU560

7563 Basic Course

758\* Advanced Course

7570 PLC

7590 IEC61850 gateway (Client)

7600 Workshop

7591 IEC61850 Server & Client  
Configuration

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## Introduction Courses

### 7550E Introduction Data Acquisition and RTU560

#### Objectives of the course:

The training course provides a basic introduction into data acquisition and RTU560. The course is proper to be prepared for the RTU560 basic course.

After the course participant will be informed about the basics of data acquisition process and the utilities' secondary process. He knows all actually used means of communication, networks, and usual communication protocols.

He is informed about the actual ABB RTU products, RTU211 and RTU560 family. He knows how to configure PC for using RTU560 and is familiar with RTU demonstration box which is used in the RTU560 courses.

#### Contents:

- Basics of data acquisition and utilities' secondary process (SCADA),
- Communication protocol basics,
- Communication interfaces, networks,
- Introduction into ABB RTU products, RTU211 and RTU560 family,
- PC applications for RTU560; RTUtil560 installation and COMPROTware
- The integrated Webserver of the RTU560
- RTU Demonstration box.

**Participants:** Engineering-, commissioning- and maintenance-personnel

**Prerequisites:** Knowledge of utility process, PC handling (Microsoft Windows) and Internet Explorer experiences.

**Method:** Lessons and Exercises

**Duration:** 3 Days **Course Language:** English

**Start:** 1<sup>st</sup> Day 9 a.m. **End:** 3<sup>rd</sup> Day 12 a.m.

# English Training RTU / Substation Automation MicroSCADA Courses 2012

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## Basic Courses

### 4911E MicroSCADA Rel. 9 System Operation

#### Objectives of the course:

After the course the participant will be familiar with control options of substations or network control function. He will be able to operate a substation using MicroSCADA.

#### Contents:

- Basics of MicroSCADA / System Functions
- Operation (dialogs and menus in MicroSCADA)
- Diagnosis of lines and stations
- Creation of curves and reports

**Participants:** Operators

**Prerequisites:** Basic knowledge of a PC and of Microsoft Windows

**Duration:** 2 days

**Course language:** English

**Start:** First day 9 a. m.

**End:** Second day 4:30 .p m.

# English Training RTU / Substation Automation MicroSCADA Courses 2012

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## 4912E MicroSCADA Rel. 9 Engineering

### Objectives of the course:

After the course the participant will be familiar with architecture, functionality and control options of the substation or network control system MicroSCADA.

He will be able to operate his substation from the MicroSCADA console.

He can make system modifications.

### Contents:

- ✚ Basics of MicroSCADA
  - Creation and modification of exercise displays
  - Creation and modification of command procedures
  - Process Object Definition
  - Measurands
  - Time channels
  - Event channels
  - Data Objects
  - Menue adaption
  - Tool launcher function
  - How to configure an IEC 101 communication line

**Participants:** Engineering-, commissioning- and maintenance-personnel

**Prerequisites:** Participation in 4911E or Basic knowledge of a PC

**Duration:** 5 days

**Course language:** English

**Start:** Monday 9 a. m.

**End:** Friday 12 a. m.



# English Training RTU / Substation Automation MicroSCADA Courses 2012

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## 7110E Remote Terminal Unit RTU211

### Objectives of the course:

The participant is familiar with the system architecture, with the functionality and with the protocols of the Remote Terminal Unit RTU211. He is prepared to work with the PC-based tool for configuration, setting, test and protocol analysis (RP570/71).

### Contents:

- Configuration options
- Hardware modules and housings
- Software structure
- Data acquisition and control functions (SCADA)
- Telecontrol functions based on RP570/RP571
- Tool installation and start at DOS or Windows XP
- Tool RTUtil with the menus Configure-Link-Transfer-Diagnosis-Protocol

**Participants:** Engineering-, commissioning- and maintenance-personnel.

**Prerequisites:** Knowledge of general telecontrol functions and of a personal computer with Microsoft operating system.

**Duration:** 3 days **Course language:** English

**Start:** 1<sup>st</sup> day 9 a. m. **End:** 3<sup>rd</sup> day 5 p. m.

# English Training RTU / Substation Automation MicroSCADA Courses 2012

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## 7563E Remote Terminal Unit RTU560 Basic Course

- IEC 60870-5 Protocol (booking code: 7563/1E)
- DNP3 Protocol (booking code: 7563/2E)

### Objectives of the course:

After the course the participant will be familiar with the system architecture, with the functionality and with the telecontrol protocol options of the Remote Terminal Unit RTU560.

He will be able to install RTUtil 560, a dial-up link and the Internet Explorer. The participant can communicate with the RTU560 by the Internet Explorer, he can download and upload files, he can diagnose the RTU560.

He can listen to telecontrol communication and record it. He can work with telegram filters. He is able to simulate the network control center. He can import data from Excel sheets.

For one day the student class is divided into two groups – one for IEC 60870-5 protocol and one for DNP3 protocol family.

### Contents:

- System concept of the RTU Family RTU211 and RTU560
- Configuration options of RTU560A, RTU560C, RTU560D and RTU560E
- Cabinets, subracks and hardware modules
- Properties of the communication units (CMU)
- Process data acquisition and telecontrol functions (SCADA)
- Exercises with the Windows based tool RTUtil560 for configuration, signal definition and parameterization
- Diagnosis by the Integrated Webserver
- Excel-Import/Export function of RTUtil560
- Process archives for indications, measurements and pulse counter
- Logic Function, and local print out
- **Trainee group 1:** Basics of IEC 60870-5-101 and IEC 60870-5-104
- **Trainee group 2:** Basics DNP3 and DNP3 via LAN/WAN

**Participants:** Engineering-, commissioning- and maintenance-personnel

**Prerequisites:** Course 7550E and knowledge of general telecontrol functions and of Microsoft Windows

**Duration:** 5 days **Course language:** English

**Start:** Monday 9 a. m. **End:** Friday 12 a. m.

# English Training RTU / Substation Automation MicroSCADA Courses 2012

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## **7810E Remote Terminal Unit RTU200/232**

### **Objectives of the course:**

The participant gets familiar with the system architecture, with the functionality and with the telecontrol protocols of the Remote Terminal Unit RTU200/232. He can install the tool RTUtil on a PC. He can use the tool for configuration, setting, test and protocol analysis (RP570/71).

### **Contents:**

- System integration
- Configuration options
- Hardware and software modules
- Control functions
- Data acquisition functions
- Tool RTUtil with the menus selection-configuration-filter-transfer-diagnosis-list-protocol-configuration monitor
- Tool installation and start from DOS or WindowsNT
- Introduction to LAF (local automation functions)

**Participants:** Engineering-, commissioning- and maintenance-personnel

**Prerequisites:** Knowledge of general telecontrol functions and operating of PC

**Duration:** 5 days **Course language:** English

**Start:** Monday 9 a. m. **End:** Friday 12 a. m.

# English Training RTU / Substation Automation MicroSCADA Courses 2012

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## 8420E REF542<sub>plus</sub> – Operation, Maintenance, Engineering

### Objectives of the course:

The attendee becomes acquainted with architecture, functionality and control options of the switchbay protection and control unit REF542<sub>plus</sub>. The course participant can operate the device by the display menus and the front keys. He is prepared to work with the PC-based tools for configuration, setting, test and protocol analysis. He knows how to modify functions and how to implement additional features.

### Contents:

- Hardware REF542(SCU) and REF542<sub>plus</sub>
- Tool SCUconf - installation and menus
- Preparing a single line display with circuit breaker, and disconnectors
- Programming of event and alarm text strings and of LEDs
- Configuring of measurement displays
- REF542 logic programming, interlockings, collective alarm etc.
- Programming of overcurrent protection module
- Programming of fault recorder function
- Program download and test by simulator
- Transfer of a fault record from REF542 to laptop, evaluation by program Reval
- Configuring and test of ABB SPAbus and of the IEC870-5-103-interface
- Principle connection to remote terminal units ABB RTU
- Further protection functions in REF542
- Operating REF542<sub>plus</sub>, menus, key chip switch

**Participants:** Engineering-, commissioning- and maintenance-personnel

**Prerequisites:** General knowledge of medium or high voltage plants and of PCs (Microsoft Windows)

**Duration:** 5 days **Course language:** English

**Start:** Monday 9 a. m. **End:** Friday 12 a. m.

# English Training RTU / Substation Automation MicroSCADA Courses 2012

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## 8670E RE\*650/670 – Operation, Maintenance, Engineering

### Objectives of the course:

The attendee becomes acquainted with architecture, functionality and control options of a switchbay protection or control units RE\*650/670 of the family RELION. He is prepared to work with the PC-based tools for configuration, setting, test and diagnosis.

The attendee can test protection functions and will be able to modify them. He will be familiar with event lists and will be able to evaluate fault recordings.

### Contents:

- Operating RE\*6xx, display menus, LEDs
- Hardware Hardware
- Tool PCM600
  - Connectivity packages
  - Graphical Subtool „Application Configuration“
    - Standard modules
    - Logic
    - Interlocking
    - Fault recording module
    - Four step phase overcurrent protection (PTOC, 51\_67)
  - Display Editor
    - Engineering of the bay single line
    - Measurement
    - Indication text
  - Signal Matrix
  - Parameter Setting
  - Upload and Download
  - Signal Monitoring
  - Event list
  - Reading and evaluation of fault recording
  - Creation and use of Templates
- Logical nodes
- Principal configuration of interfaces (ABB SPAbus, IEC870-5-103, 61850-8)
- Principal connection of remote terminal unit ABB RTU560
- Presentation of selected protection functions
- Commissioning and test by Omicron or similiar equipement

**Participants:** Engineering-, commissioning- and maintenance-personnel

**Prerequisites:** General knowledge of medium or high voltage plants and of PCs (Microsoft Windows)

**Duration:** 5 days **Course language:** English

**Start:** Monday 9 a. m. **End:** Friday 12 a. m.

# English Training RTU / Substation Automation MicroSCADA Courses 2012

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## **8700E Busbar Protection REB500 – Operation, Maintenance, Engineering**

### **Objectives of the course:**

The attendee becomes acquainted with architecture, functionality and control options of the busbar protection system REB500. He is prepared to work with the PC-based tools for configuration, setting, test and protocol analysis. He knows how to modify functions and how to implement additional features.

### **Contents:**

- Principle of busbar protection
- Centralized and decentralized applications
- Hardware of the REB500 family
- Display menus and their structure
- Tool: Installation of REBWIN
- Training example
- Programming of event and alarm text strings
- Measurement displays
- Logic programming, collective alarm etc.
- Parameterizing of protection modules
- Programming of fault recorder function
- Program download and test by simulator
- Transfer of a fault record from REB500 to notebook and evaluation by program
- Configuring and test of bus interface
- Principle connection to remote terminal units RTU or to gateway COM581
- Further protection functions in REB500

**Participants:** Engineering-, commissioning- and maintenance-personnel

**Prerequisites:** General knowledge of medium or high voltage plants and of PCs (Microsoft Windows)

**Duration:** 5 days **Course language:** English

**Start:** Monday 9 a. m. **End:** Friday 12 a. m.

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## Extension Courses

### **7581E Remote Terminal Unit RTU560 Advanced Course, IEC60870-5**

#### **Objectives of the course:**

The participant, who has already worked with RTU560, RTU560 and Webserver, refreshes his RTU knowledge. He extends his skills especially concerning configuration, extensions and trouble shooting.

The Redundancy Concept of the RTU560 concerning power supplies, communication lines and communication units will be discussed, and the participant will be informed about properties and limits.

The "System Data Interface" is explained. In chapter 'File Transfer' the participant will learn the possibilities to transfer (transparent) data and fault records from and to the RTU560.

He knows the features and possibilities of the 'Integrated Human Machine Interface', and will be trained in making his own station picture, to control a substation.

The participant will know about RTU nodes and subordinated devices (IED).

Workshop 7600E provides the possibility for a more detailed training of issues. It is possible to discuss individual requirements, which can be tested on the RTU560 training system.

#### **Contents:**

- System integration of subordinated RTUs, Master- and Slave function
- Transfer of files from and to the RTU560
- RTU560 Redundancy Concept for power supplies, communication lines and -units
- RTU560 System Data Interface (System Events)
- Properties of the 'Integrated Human Machine Interface' (HMI)
- Creation of a single line diagram for switchgear by using the 'Integrated HMI'
- Fault tracing and eliminating in an operating RTU560 by the Webserver
- Analyzing telecontrol protocols based upon protocol family IEC60870-5-101, IEC60870-5-103, IEC60870-5-104 and SPAbus
- Exercises with subordinated devices
- Gateway Functions and Backplane Routing
- The training can be modified according to the requirements of the participants

**Participants:** Maintenance-, commissioning- and planning-personnel

**Prerequisites:** Attendance of the basic course 7563/1E

**Duration:** 5 days **Course language:** English

**Start:** Monday 9 a. m. **End:** Friday 12 a. m.

# English Training RTU / Substation Automation MicroSCADA Courses 2012

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## 7582E Remote Terminal Unit RTU560 Advanced Course, DNP3

### Objectives of the course:

The participant, who has already worked with RTU560, RTU560 and Webserver, refreshes his RTU knowledge. He extends his skills especially concerning configuration, extensions and trouble shooting.

The Redundancy Concept of the RTU560 concerning power supplies, communication lines and communication units will be discussed, and the participant will be informed about properties and limits.

The "System Data Interface" is explained. In chapter 'File Transfer' the participant will learn the possibilities to transfer (transparent) data and fault records from and to the RTU560.

He knows the features and possibilities of the 'Integrated Human Machine Interface', and will be trained in making his own station picture, to control a substation.

The participant will know about RTU nodes and subordinated devices (IED).

Workshop 7600E provides the possibility for a more detailed training of issues. It is possible to discuss individual requirements, which can be tested on the RTU560 training system.

### Contents:

- System integration of subordinated RTUs, Master- and Slave function
- Transfer of files from and to the RTU560
- RTU560 Redundancy Concept for power supplies, communication lines and -units
- RTU560 System Data Interface (System Events)
- Properties of the 'Integrated Human Machine Interface' (HMI)
- Creation of a single line diagram for switchgear by using the 'Integrated HMI'
- Fault tracing and eliminating in an operating RTU560 by the Webserver
- Analyzing telecontrol protocols based upon protocol family DNP3 and MODBUS
- Exercises with subordinated devices
- Gateway Functions and Backplane Routing
- The training can be modified according to the requirements of the participants

**Participants:** Maintenance-, commissioning- and planning-personnel

**Prerequisites:** Attendance of the basic course 7563/2E

**Duration:** 5 days **Course language:** English

**Start:** Monday 9 a. m. **End:** Friday 12 a. m.



# English Training RTU / Substation Automation MicroSCADA Courses 2012

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## **7591E Remote Terminal Unit RTU560 IEC61850 Client and Server Configuration**

### **Objectives of the course:**

After the course the participant will be familiar to configure RTU560 IEC61850 as client (gateway) and server (IED Proxy). In exercises the engineering is done for common configuration together with REx670 or 615, 630, REF542plus... The participant will have a basic knowledge and practice of necessary tools for configuration and protocol analysis. He is able to commission RTU560 in IEC61850 client, server and GOOSE configuration.

### **Contents:**

- Introduction in IEC61850 standard structure - used protocol elements
- RTU560 as IEC61850 server
- RTU560 as IEC61850 client
- RTU Server (IED) configuration
- RTU client (gateway) configuration
- GOOSE configuration
- Data flow: EXCEL import of IEC61850 configuration into RTU560
- Usage of tools (RTUtil560, RTUtil61850, ITT600)
- Create SCD files
- Integrated Human Machine Interface
- Configuration of NCC protocols (e.g. IEC60870-5-101)
- Protocol analysis tool
- Commissioning of a IEC61850 configuration

**Participants:** Engineering-, commissioning- and maintenance personnel

**Prerequisites:**

- Attendance of the basic course 7563E
- Basic knowledge of standard IEC61850
- Basic knowledge of IEC61850 devices is recommended

**Method:** Lectures, Exercises

**Duration:** 5 days

**Course Language:** English

**Start:** Monday, 9 a. m.

**End:** Friday, 1 p. m.

**For trainees, who already have participated in the course “7590 RTU560 IEC61850 gateway” course, server and GOOSE amendment workshops are conducted on request.**

# English Training RTU / Substation Automation MicroSCADA Courses 2012

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## 7600E Remote Terminal Unit RTU560 Workshop

### Objectives of the course:

The Workshop gives the possibility to address certain topics, which are not the subject of the other courses, or which would like to be studied more in detail. In particular it is possible to treat individual topics from 756\*E and 758\*E.

In addition it is possible to discuss special actual problems and try to reproduce it on a training system.

### Contents:

Contents are specified according to agreement.

**Participants:** Engineering-, commissioning- and maintenance personnel

**Prerequisites:** Attendance of the RTU560 basic course 7563E

**Method:** Workshop

**Duration:** by agreement

**Language:** English

**Start:** by agreement

**End:** by agreement

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## **7840E Remote Terminal Unit RTU200/232 - Advanced Course**

### **Objectives of the course:**

The participant, who has already worked with RTU200/232 and RTUtil at Microsoft DOS, refreshes his RTU knowledge. He extends his skills especially concerning trouble shooting, router RTUs and planning and extending RTU systems.

### **Contents:**

- System integration
- Functionality
- Planning
- Changing of boards, extension of racks and cabinets, configuration and parameters
- Fault tracing and eliminating
- Proper engineering and diagnostic with the tool RTUtil at operating system DOS or WindowsNT
- parameterising and working with Line Couplers
- Exercises with modems, RTUs and Sub-RTUs, protocol listening and simulation (RP570/71)

**Participants:** Maintenance-, commissioning- and planning-personnel

**Prerequisites:** Attendance of the basic course RTU200/232 7810E

**Duration:** 5 days **Course language:** English

**Start:** Monday 9 a. m. **End:** Friday 12 a. m.

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## **8460E      REF542<sub>plus</sub> – SPAbus/IEC60870-5-103 – RTU**

### **Objectives of the course:**

After successful participation in the course you are familiar with the configuration options and with the functions of the remote terminal unit RTU560 and of the bay control and protection unit REF542<sub>plus</sub>, both by compressed lessons.

The participant works with tools for configuring, parameterizing, test and diagnosis.

He configures and checks the RTU560 by the Internet Explorer.

He once uses all operator menus of REF542.

The participant gets familiar with the basics of SPAbus- and IEC870-5-103-communication. He can send test commands via the RTU to REF542 and can release interrogations for the opposite direction.

### **Contents:**

- REF542 hardware
- Tool SCUconf: installation, modification of bay mimic and of text and of measurement displays
- REF542 logic programming
- RTU560-REF542-system incorporation
- RTU560 configuration options
- RTU560 hardware
- RTU560 functions and process data parameter
- Tool RTUtil560: installation, project evaluation by network tree, signal tree and hardware tree
- RTU560 diagnosis via browser
- Telecontrol: basics of IEC 60870-5-101 and of IEC 60870-5-103, interoperability, basics of SPAbus, telegram tools for line listening and for simulation

**Participants:** Maintenance-, commissioning- and planning-personnel

**Prerequisites:** Knowledge of general telecontrol functions and of Microsoft Windows

**Start:** Monday 9 a. m.                      **End:** Friday 12 a. m.

# English Training RTU / Substation Automation MicroSCADA Courses 2012

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## 8470E REF542<sub>plus</sub> – IEC61850 – RTU

### Objectives of the course:

After successful participation in the course you are familiar with the configuration options and with the functions of the remote terminal unit RTU560 and of the bay control and protection unit REF542<sub>plus</sub>, both by compressed lessons.

The participant works with tools for configuring, parameterizing, test and diagnosis.

He configures and checks the RTU560 by the Internet Explorer.

He once uses all operator menus of REF542.

The participant gets familiar with the basics of IEC61850-communication.

### Contents:

- REF542 hardware
- Tool SCUconf: installation, modification of bay mimic and of text and of measurement displays
- SCL-Tool
- REF542 logic programming
- RTU560-REF542-system incorporation
- RTU560 configuration options
- RTU560 hardware
- RTU560 functions and process data parameter
- Tool RTUtil560: installation, project evaluation by network tree, signal tree and hardware tree, Excel import
- CCT-tool, 61850 file types \*.SCD, \*.ICD, \*CID
- RTU560 diagnosis via browser
- Telecontrol: basics of IEC 60870 and IEC61850

**Participants:** Maintenance-, commissioning- and planning-personnel

**Prerequisites:** Knowledge of general telecontrol functions and of Microsoft Windows

**Start:** Monday 9 a. m.                      **End:** Friday 12 a. m.

# English Training RTU / Substation Automation MicroSCADA Courses 2012

ABB DEPSNM-T (3.1.2012)

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## 8473E RE630 – IEC61850 – RTU

### Objectives of the course:

The attendee becomes acquainted with the configuration options and with the functions of the remote terminal unit RTU560 and of a bay control or protection unit of the ABB Relion family RE630, both by compressed lessons.

The participant works with tools for configuring, parameterizing, test and diagnosis.

He configures and checks the RTU560 by the Internet Explorer.

He once uses all operator menus of REF630.

The participant gets familiar with the basics of IEC61850-communication.

### Contents:

- RE630-Hardware
- Tool PCM600, Installation, Connectivity Packages
- Creation of a project structure according to IEC61850
- Add IED type REF630 either in on-line or in off-line mode
- Read configuration in on-line mode
- Application Configuration, Parameter Setting, Signal Matrix
- Modify the configuration
- Tool Rtutil560, Installation
- Creation of a project with network tree, signal tree and hardware tree
- RTUutil Excel-export and import
- RTU-RE630 system integration
- Tool CCT (Communication Configuration IEC61850)
- Creation of a project tree in CCT
- Import/Export of SCD-files
- IEC61850 Data Engineering
- Report Control Engineering
- RTU-Diagnosis by WEB-browser
- Basics of IEC60870 und IEC61850

**Participants:** Maintenance-, commissioning- and planning-personnel

**Prerequisites:** Knowledge of general telecontrol functions and of Microsoft Windows and Excel.

In case the participant wants to use his own PC instead of ABB training room PCs, this is required: WindowsXP SP3, administrator right, license ABB PCM600 Engineering Pro, LAN-RJ45-plug

**Start:** Monday 9 a. m.

**End:** Friday 12 a. m.

# English Training RTU / Substation Automation MicroSCADA Courses 2012

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## 8473E RE650 – IEC61850 – RTU

### Objectives of the course:

The attendee becomes acquainted with the configuration options and with the functions of the remote terminal unit RTU560 and of a bay control or protection unit of the ABB Relion family RE650, both by compressed lessons.

The participant works with tools for configuring, parameterizing, test and diagnosis.

He configures and checks the RTU560 by the Internet Explorer.

He once uses all operator menus of RE650 relay.

The participant gets familiar with the basics of IEC61850-communication.

### Contents:

- RE650-Hardware
- Tool PCM600, Installation, Connectivity Packages
- Creation of a project structure according to IEC61850
- Add IED type RE650
- Read configuration
- Application Configuration, Parameter Setting, Signal Matrix
- Modify the configuration
- Tool Rtutil560, Installation
- Creation of a project with network tree, signal tree and hardware tree
- RTU Util Excel-export and import
- RTU-RE650 system integration
- Tool CCT (Communication Configuration IEC61850)
- Creation of a project tree in CCT
- Import/Export of SCD-files
- IEC61850 Data Engineering
- Report Control Engineering
- RTU-Diagnosis by WEB-browser
- Basics of IEC60870 und IEC61850

**Participants:** Maintenance-, commissioning- and planning-personnel

**Prerequisites:** Knowledge of general telecontrol functions and of Microsoft Windows and Excel.

In case the participant wants to use his own PC instead of ABB training room PCs, this is required: WindowsXP SP3, administrator right, license ABB PCM600 Engineering Pro, LAN-RJ45-plug

**Start:** Monday 9 a. m.

**End:** Friday 12 a. m.

# English Training RTU / Substation Automation MicroSCADA Courses 2012

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## 8477E RE670 – IEC61850 – RTU

### Objectives of the course:

The attendee becomes acquainted with the configuration options and with the functions of the remote terminal unit RTU560 and of a bay control or protection unit of the ABB Relion family RE670, both by compressed lessons.

The participant works with tools for configuring, parameterizing, test and diagnosis.

He configures and checks the RTU560 by the Internet Explorer.

He once uses all operator menus of a RE670 relay.

The participant gets familiar with the basics of IEC61850-communication.

### Contents:

- RE670-Hardware
- Tool PCM600, Installation, Connectivity Packages
- Creation of a project structure according to IEC61850
- Add IED type RE670
- Read configuration
- Application Configuration, Parameter Setting, Signal Matrix
- Modify the configuration
- Tool Rtutil560, Installation
- Creation of a project with network tree, signal tree and hardware tree
- RTUutil Excel-export and import
- RTU-RE670 system integration
- Tool CCT (Communication Configuration IEC61850)
- Creation of a project tree in CCT
- Import/Export of SCD-files
- IEC61850 Data Engineering
- Report Control Engineering
- RTU-Diagnosis by WEB-browser
- Basics of IEC60870 und IEC61850

**Participants:** Maintenance-, commissioning- and planning-personnel

**Prerequisites:** Knowledge of general telecontrol functions and of Microsoft Windows and Excel.

In case the participant wants to use his own PC instead of ABB training room PCs, this is required: WindowsXP SP3, administrator right, license ABB PCM600 Engineering Pro, LAN-RJ45-plug

**Start:** Monday 9 a. m.

**End:** Friday 12 a. m.



# English Training RTU / Substation Automation MicroSCADA Courses 2012

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## Courses Local Automation Functions (LAF/PLC)

### Remark:

“Local Automation Function“ (LAF) is the term formerly used by the RTU community, “Programmable Logic Controller“ (PLC) is the present term in the world of industrial controlling systems, defined by IEC61131, used for programs which may run optionally on an RTU, besides of the standard remote control application.

### **7570E Remote Terminal Unit RTU560, Integration PLC Local Automation Functions**

#### **Objectives of the course:**

The participant is able to extend the configuration of an RTU560 by a PLC program. Programs which were created by using the tool MULTIPROGwt can be loaded into the RTU560 and be tested by the participant

He is able to navigate within the project tree in MULTIPROGwt. He is able to expand signal tree and hardware tree for virtual data points and PLC programs in RTU 560.

#### **Contents:**

- Basics of function block diagram programming according IEC61131-3: project tree, library types, program organization units, global and local variables, tasks, functions, instances, busIOs
- Libraries and their modules
- Cyclic tasks and system tasks
- Extension of a project in RTU 560 by a PLC-program
- MULTIPROGwt – handling of the tool
- Exercise program concerning binary and analog processing and command handling

**Participants:** Engineering-, commissioning- and maintenance-personnel

**Prerequisites:** Course No. 7563E,  
basic knowledge in PLC programming and standard function blocks

**Duration:** 3 days **Course language:** English

**Start:** 1<sup>st</sup> day 9 a.m. **End:** 3<sup>rd</sup> day 3 a.m.

# English Training RTU / Substation Automation MicroSCADA Courses 2012

ABB DEPSNM-T (3.1.2012)

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## **7830E Remote Terminal Unit RTU200/232, Local Automation Functions LAF/PLC**

### **Objectives of the course:**

The participant will be able to program, test and integrate local automation functions (LAF/PLC) by the tool PTS (Program and Test System) using function block diagrams (FBD).

### **Contents:**

- Basics of function plan programming
- Typical applications
- Benefits and limits of LAF programs
- Cycle times
- Real and virtual data points
- Data types bit - word - double word
- Library of function elements
- Installation and start of the tool PTS
- Working with PTS and the data base editor DBL
- Usage of subplans
- Creation of small example programs (adding indications to a collective alarm – usage of timers – analogue value calculations)
- Loading and testing of programs
- At the last day the participant may write a program of his special interest, load it into the training equipment and test it

**Participants:** Engineering, commissioning and maintenance personnel

**Prerequisites:** Course No. 7810E

**Duration:** 3 days

**Course language:** English

**Start:** 1<sup>st</sup> day 9 a. m.

**End:** 3<sup>rd</sup> day 4 p. m.

# English Training RTU / Substation Automation MicroSCADA Courses 2012

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## Commercial Conditions

### General

"Client" is the contractor, in the name of which the registration for a training course is applied for.

"Participant" is the natural person, who is registered to the training course or participates in it, respectively.

As far as delegations for the participants are assigned within these conditions provide for obligations of the participant, the client, which the participant is attending, or is to attend, the course for, guarantees their complete fulfillment.

The client is aware, that without the requirements specified in the training program it will be difficult or impossible to reach the course objectives. The client will take care of it, that the nominated participant fulfills these conditions.

### Registration for Training Courses

Due to organizational reasons the registration has to be done by use of our registration form. With registration (enrolment) these General Commercial Conditions are accepted as a part of the contract.

### Confirmation

We will confirm the receipt of your course registration (confirmation of receipt) but reserve for the decision on final acceptance (confirmation of registration).

It is agreed by you, that we send all our correspondence directly to the registered participants.

### Training Prices

For prices please refer to our actual price list. The prices are net prices, are valid per participant and taxes as VAT, customs duties and other duties are not included (training price).

Included in the training price are the training documentation for the participants, the costs for the use of the technical equipment, refreshments and lunch for the participant during the training days.

Other costs in connection with the training course and the course participation (especially travel and hotel charges) will be borne by the participant. A part time participation of a training course does not justify a price reduction. In case of delay of payment we are authorized without prejudice to other or further rights and claims to charge annual interest rates of 8 % higher than the basic rate of interest (§ 247 of the German Civil Code "BGB").

### Terms of Payment

Germany:

If the client is domiciled in Germany, the training price is due, without deduction, after 30 days after the performance of the training course and receipt of an invoice.

Abroad:

If the client is not domiciled in Germany, the training price is due without deduction before the performance of the training course within 30 days after receipt of a request for payment. A confirmation of registration will be issued by us under the reservation of an on-time and complete payment (without deduction) of the training price.

When doing the payment, the purpose of it has to be indicated: Training course title, date, client and the name of the participant.

### Withdrawal

The withdrawal of a training course has to be done in writing. In case of a withdrawal up to three weeks before the date of the training course (the date of receipt by us will be decisive) the client will incur no obligations towards us. If the withdrawal is done in a time less than three weeks up to four days before the date of the training course, 50 % of the training price is due. If a withdrawal is done later, the total training price will be invoiced. The payable amount will be due as the genuine training price.

The client may nominate a substitute participant; we may reject the substitute participant, if the substitution is not acceptable for us (e.g. because certain qualifications/requirements have to be satisfied by the participant). If the substitute participant is acceptable for us, no additional costs will be generated for the client.

# English Training RTU / Substation Automation MicroSCADA Courses 2012

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In case of a withdrawal/nomination of a substitute participant the client will be liable for obligations to third parties, e.g. for hotel reservations (no-show costs, etc.).

## **Cancellation and Postponement by us**

ABB reserves the right - also after confirmation of registration - to postpone or to cancel offered training courses due to low demand, low numbers of participants, non-availability of the lecturer, force majeure or important reasons, which ABB is not responsible for. The concerned participants will be informed without undue delay and, if possible, alternatives will be offered. An additional information to the client is not required.

If the minimum number of participants is not reached the participants will be informed two weeks before the training date and we will offer, if possible, an alternative training date. In case of any cancellation or postponement of the training course due to the afore cited reasons ABB shall not be liable.

## **Exclusion of Liability**

### **1.**

The information given in the training courses and in the training documentation - including data carriers - are prepared by ABB didactically and professionally using its best efforts. For eventual mistakes ABB cannot be kept liable. We shall not be liable for damages resulting from such mistakes, in particular for any consequential damages or losses.

### **2.**

Independent of clause 1. claims for damages and reimbursement of expenses (together: claims for damages) of the client, based on whatever legal reason, including infringement of duties arising in connection with the contract or tort, shall be excluded.

The above shall not apply in the case of mandatory liability, e. g. under the German Product Liability Act ("*Produkthaftungsgesetz*"), in the case of intent, gross negligence, injury of life, body or health, or breach of a condition which goes to the root of the contract ("*wesentliche Vertragspflichten*"). However, claims for damages arising from a breach of a condition which goes to the root of the contract shall be limited to the foreseeable damage which is intrinsic to the contract, unless caused by intent or gross negligence or based on liability for injury of life, body or health. The above provision does not imply a change in the burden of proof to the detriment of the client.

### **3.**

Furthermore we shall not be liable for unprofessional handling of the training facilities and equipment at the training location and/or systems owned by the client. The liability for consequential damages caused by faulty or negligent handling by the trainer and/or participant shall be excluded in any case.

The client shall hold harmless and indemnify us from and against any third party claims which are put forward in connection with the afore cited damages, and shall fully reimburse ABB costs and expenses so incurred.

## **Training Documentation**

The training documents represent the state at the time of training. We do not assume any guarantee or liability that the data/instructions stay valid without modification.

We reserve all our rights in the training documentation and training equipment which must not be used - even partly - in Germany or abroad without our written approval.

## **Other**

If the client is a businessperson, soie venue for all disputes arising directly or indirectly out of the contract shall be ABB's place of business. However, ABB may also bring an action at the client's place of business.

Legal relations existing in connection with this contract shall be governed by German substantive law, to the exclusion of the United Nations Convention on Contracts for the International Sale of Goods (CISG).

The legal invalidity of one or more provisions of this contract shall in no way affect the validity of the remaining provisions. This shall not apply if it would be unreasonable for one of the parties to continue the contract.

# English Training RTU / Substation Automation MicroSCADA Courses 2012

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## Course Schedule and Price List Release 03.01.2012

No. Booking Code	Course (English) Location: Mannheim Germany	D	Jan Feb	Mar Apr	May June	July August	Sept Oct	Nov Dec
4911E	MicroSCADA pro Operator Course	2	26.- 27.01.		03.- 04.05.	28. – 29.06.		
4912E	MicroSCADA pro Engineering Course	3	30.01.- 03.02.		07.- 11.05.	02.- 06.07.		05 - 19.11.

7550E	Introduction Data Acquisition and RTU560	3	01.- 03.02.	11.- 13.04.		04.- 06.07.	05.- 07.09.	07.- 09.11.
7563E/1	RTU560 Basic Course IEC 60870-5	5	06.- 10.02.	16.- 20.04.	07.- 11.05.	09.- 13.07.	10.- 14.09.	12.- 16.11.
7563E/2	RTU560 Basic Course .....DNP3	5	on request					
7570E	RTU560 PLC - Local Automation Functions IEC61131-3	3	20.- 22.02.	<del>23.-</del> <del>25.04</del>	<b>14.-</b> <b>16.05.</b>		24.- 26.09.	
7581E	RTU560 Advanced IEC 60870-5 Protocol	5	13.- 17.02.		<b>21.-</b> <b>25.05.</b>	16.- 20.07.	17.- 21.09.	19.- 23.11
7582E	RTU560 Advanced DNP3 Protocol	5	on request					
7591E	RTU560 IEC61850 Client & Server Configuration	5	20.- 24.02.		21. - 25.05.	<b>20.-</b> <b>24.08.</b>	24. - 28.09.	26.- 30.11.
7600E	RTU560 Workshop	5	Date and price on request					

8420E	REF542plus – Operation, Maintenance, Engineering	5				13.- 17.08.		
8460E	REF542plus – SPAbus/IEC60870-5-103 – RTU	5	on request					
8470E	REF542plus – IEC61850 – RTU	5						
847*E	RE6* - IEC61850 - RTU	5						
8670E	RE*650/670 – Operation, Maintenance, Engineering	5						
8700E	Busbar Protection REB500 – Operation, Maintenance, Engineering	5						

7110E	RTU 211 Basic Course	3	Date and price on request					
7810E	RTU 200/232 Basic Course	5						
7830E	RTU 200/232 Local Automation Functions	3						
7840E	RTU 200/232 Advanced Course	5						

	<b>Training on-site</b>		<b>on request</b>					
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<b>At ABB Mannheim/Germany course no.</b>	<b>Price class</b>	<b>Duration (Days)</b>	<b>Price per participant VAT, Hotel excluded</b>
4912,756*,758*, 84*, 8670, 8700	a	5	2.700 €
7591	b	5	2.900 €
755*,757*,	a	3	1.800 €
711*	b	3	2.000 €
4911	b	2	1.300 €
<b>Requested Courses (At ABB Mannheim)</b>			<b>Price per day VAT, Hotel excluded</b>
Requested courses up to 8 participants	a		2.960 € / day
Requested courses up to 8 participants	b		3.260 € / day

<b>Requested Courses on customersite</b>	<b>Price class</b>	<b>Price per day VAT, Hotel excluded travelling expenses have to be added</b>
Up to 6 participants	a	2.680 € / day
	b	2.840 € / day
Jeder weitere Teilnehmer	a / b	40 € / day

Our prices do not include any profit taxes and custom duties, which may be imposed in Purchaser's country on ABB's supplies and services. Should ABB nevertheless be charged with such levies, these shall be borne by the Purchaser and directly be paid by him to the respective Authorities.

# English Training RTU / Substation Automation MicroSCADA Courses 2012

ABB DEPSNM-T (3.1.2012)

ABB AG  
PSNM-T  
Silvia Eberle  
Kallstadter Str.1

68309 Mannheim  
Germany

**E-Mail:** [silvia.eberle@de.abb.com](mailto:silvia.eberle@de.abb.com)  
Telefax: +49 621 - 381 2220  
Telefon: +49 621 - 381 7490

## We enrol for following course:

<b>Course-No.:</b> _____ <b>Title:</b> _____	
<b>Date</b>	from: _____ to: _____
<b>Location</b>	Mannheim/Germany <b>or</b> _____
<b>Participant(s):</b>	<b>Company and address: (OEM Partner YES / NO)</b>
Male / female _____	_____
Male / female _____	_____
Male / female _____	_____
Male / female _____	_____
<b>E-Mail:</b> _____	<b>Phone:</b> _____
<b>Ordered by:</b>	<b>Confirmation to:</b>
Name: _____	_____
Dept: _____	_____
Phone: _____	_____
E-Mail: _____	_____
	<b>Invoice to:</b>
	to: _____
<b>Date:</b> _____	_____
<b>Signature:</b> _____	_____