



# Technical Training Course Descriptions (e)

effective from 2017



ENGINEERED SUCCESS





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# 1 PROTECTION

## 1.1 HIPASE-P GENERATOR AND TRANSFORMER PROTECTION

Duration	2 days
Prerequisites	Relevant practice in electrical protection because general principles of the generator and transformer protection are not part of this training.
Objective	This training covers protection of generators and transformers using the protection device HIPASE-P. It is especially for engineers who will use HIPASE-P protection devices as part of their application field.
Content	<ul style="list-style-type: none"> <li>▫ Protection system HIPASE-P <ul style="list-style-type: none"> <li>Hardware- and software concept</li> <li>Structure of configuration files</li> <li>Structure of protective functions</li> </ul> </li> <li>▫ Protection device HIPASE-P <ul style="list-style-type: none"> <li>Technical features</li> <li>Configuration code and license code</li> <li>Available hardware modules</li> <li>Interfaces</li> </ul> </li> <li>▫ HIPASE Engineering <ul style="list-style-type: none"> <li>Introduction to PC software and touch panel</li> </ul> </li> <li>▫ HIPASE-P operation <ul style="list-style-type: none"> <li>Measured values, disturbance recorder and alarm list</li> <li>Online features</li> <li>Test of hardware interface</li> <li>Test of serial interface</li> </ul> </li> <li>▫ HIPASE-P parameterization <ul style="list-style-type: none"> <li>Protection parameterization via touch panel and PC software</li> <li>Parameterization of serial interface to SCADA</li> <li>Parameterization of hardware modules</li> </ul> </li> <li>▫ HIPASE-P maintenance <ul style="list-style-type: none"> <li>Device fault analysis</li> <li>Software update</li> <li>Check of calibration</li> <li>Replacement of modules or devices</li> <li>Handling of spare parts</li> </ul> </li> <li>▫ HIPASE-P configurations <ul style="list-style-type: none"> <li>Application examples generator / transformer protection</li> <li>Modification and extension of existing configuration</li> <li>Modification and extension of existing process display (touch panel)</li> </ul> </li> </ul>



## 1.2 DRS GENERATOR AND TRANSFORMER PROTECTION

Duration	1 day
Prerequisites	Relevant practice in electrical protection because general principles of the generator and transformer protection are not part of this training.
Objective	<p>This training covers protection of generators and transformers using protection family DRS-COMPACT and DRS-LIGHT.</p> <p>It is especially for engineers who will use DRS protection devices as part of their application field.</p>
Content	<ul style="list-style-type: none"> <li>▫ Protection system DRS <ul style="list-style-type: none"> <li>Hardware- and software concept</li> <li>Structure of configuration files</li> <li>Structure of protective functions</li> </ul> </li> <li>▫ Protection devices DRS-COMPACT and DRS-LIGHT <ul style="list-style-type: none"> <li>Technical features</li> <li>Configuration code</li> <li>Available hardware configurations</li> <li>Interfaces</li> </ul> </li> <li>▫ DRS-WIN and local operation <ul style="list-style-type: none"> <li>Introduction to PC software and local keypad</li> <li>Installation and default settings</li> </ul> </li> <li>▫ DRS operation <ul style="list-style-type: none"> <li>Measured values</li> <li>Disturbance recorder and alarm list</li> <li>Online features</li> <li>Test of hardware interface</li> <li>Test of serial interface</li> </ul> </li> <li>▫ DRS parameterization <ul style="list-style-type: none"> <li>Protection parameterization via local keypad and PC software</li> <li>Parameterization of serial interface to SCADA</li> <li>Parameterization of hardware modules</li> </ul> </li> <li>▫ DRS maintenance <ul style="list-style-type: none"> <li>Device fault analysis</li> <li>Software update</li> <li>Check of calibration</li> <li>Exchange of modules or devices</li> <li>Handling of spare parts</li> </ul> </li> <li>▫ DRS configurations <ul style="list-style-type: none"> <li>Application examples generator / transformer protection</li> </ul> </li> </ul>



### 1.3 DRS-BB BUSBAR PROTECTION

Duration	1 day
Prerequisites	Relevant practice in electrical protection because general principles of the generator and transformer protection are not part of this training.
Objective	This training covers busbar protection in general and provides practical training using protection system DRS-BB or DRS-C2BB. It is especially for engineers who will specialize in the field of busbar protection and have DRS-BB or DRS-C2BB protection devices as part of their application field..
Content	<ul style="list-style-type: none"> <li>▫ Protection system DRS <ul style="list-style-type: none"> <li>Hardware- and software concept</li> <li>Structure of parameter files</li> <li>Structure of protective functions</li> <li>Logic of signals and basics of device operation</li> </ul> </li> <li>▫ Technical basics of busbar protection</li> <li>▫ DRS-BB: features and technical data</li> <li>▫ Protection devices DRS-MBB, DRS-CBB, DRS-LBB, DRS-C2BB <ul style="list-style-type: none"> <li>Technical features and configuration code</li> <li>Available hardware configurations</li> <li>Interfaces</li> <li>Available hardware alarms and serial alarms</li> </ul> </li> <li>▫ DRS-WIN and local operation <ul style="list-style-type: none"> <li>Introduction to PC software and local keypad</li> <li>Installation and default settings</li> </ul> </li> <li>▫ DRS operation <ul style="list-style-type: none"> <li>Measured values, disturbance recorder and alarm list</li> <li>Online features</li> <li>Test of hardware interface and test of serial interface</li> </ul> </li> <li>▫ DRS parameterization <ul style="list-style-type: none"> <li>Protection parameterization via local keypad and PC software</li> <li>Parameterization of serial interface to SCADA</li> <li>Parameterization of hardware modules</li> </ul> </li> <li>▫ DRS maintenance <ul style="list-style-type: none"> <li>Device fault analysis at FO-Ring failure or at field unit (FU) failure</li> <li>Hardware failure central unit (CU)</li> <li>Exchange of modules of CU, exchange of a FU</li> <li>Handling of spare parts</li> </ul> </li> <li>▫ DRS-BB configurations <ul style="list-style-type: none"> <li>Application examples generator / transformer protection</li> </ul> </li> </ul>



## 1.4 BASICS OF GENERATOR- AND TRANSFORMER PROTECTION

Duration	1 day
Prerequisites	Basic knowledge of electrical engineering
Objective	<p>This training covers the fundamentals of electrical protection methods.</p> <p>Overview:</p> <ul style="list-style-type: none"> <li>▫ Protection principles</li> <li>▫ Protection of generators</li> <li>▫ Protection of transformers</li> </ul> <p>It is especially for engineers who are not protection experts but use protection devices in their installations - connected to the process control and automation system.</p>
Content	<ul style="list-style-type: none"> <li>▫ What are the tasks of protection equipment?</li> <li>▫ Sources of faults and kind of faults</li> <li>▫ Assembling of complete protection system</li> <li>▫ Primary devices, measuranc &amp; protection transducers</li> <li>▫ Important protection functions and their effectivity</li> <li>▫ Communication with process control systems</li> <li>▫ Overview protection relay family DRS</li> <li>▫ Historical development of electrical protection equipment</li> <li>▫ Regional characteristic forms and protection philosophy</li> <li>▫ Spare protection concepts and redundancy concepts</li> <li>▫ Basic calculation methods, symmetric components</li> <li>▫ Neutral point handling of generator and transformer</li> <li>▫ Block circuit and bus bar circuit</li> <li>▫ Recommendations for protection adjustment</li> <li>▫ Interaction with other equipment (excitation, control technology, turbine controller)</li> <li>▫ Typical setup procedure, protection tests</li> <li>▫ Operation management, operation, maintenance, test</li> </ul>



## 2 EXCITATION

### 2.1 HIPASE-E EXCITATION

Duration	2 days
Prerequisites	Relevant practice in electrical excitation systems.  General principles of generators, machines and excitation are not part of this training.
Objective	This training contains engineering, operation, parameterization and maintenance of HIPASE-E.
Content	<ul style="list-style-type: none"> <li>▫ General introduction of the excitation system               <ul style="list-style-type: none"> <li>Setup</li> <li>Tasks and requirements</li> <li>Voltage regulation</li> <li>Generator diagrams</li> </ul> </li> <li>▫ HIPASE-E - Engineering               <ul style="list-style-type: none"> <li>Introduction to the engineering and maintenance tool</li> <li>Overview touch panel and operating philosophy</li> </ul> </li> <li>▫ HIPASE-E operation               <ul style="list-style-type: none"> <li>Curve records, event lists</li> <li>Forcing values</li> <li>Onlinetest</li> </ul> </li> <li>▫ HIPASE-E parameterization               <ul style="list-style-type: none"> <li>Parameter changes via HIPASE engineering tool</li> <li>Parameter changes via touchpanel</li> <li>Store parameter settings</li> </ul> </li> <li>▫ HIPASE-E - Maintenance               <ul style="list-style-type: none"> <li>Diagnostics</li> <li>Fault analysis</li> <li>Replacement of boards or devices</li> <li>Loading of application software</li> </ul> </li> <li>▫ HIPASE-E modification               <ul style="list-style-type: none"> <li>Make minor changes to the program</li> <li>Adaption of pictures</li> </ul> </li> </ul>





## 2.2 THYNE1 COMPACT EXCITATION

Duration	4 days
Prerequisites	Basic knowledge of electrical engineering
Objective	<p>Autonomous work with the compact excitation system THYNE1 - from design to commissioning.</p> <p>In addition, this training will also cover the required fundamentals of excitation and the synchronous machine.</p>
Content	<ul style="list-style-type: none"> <li>▫ General introduction of the excitation system <ul style="list-style-type: none"> <li>Principle function</li> <li>Machine arrangements</li> <li>Supply variants</li> </ul> </li> <li>▫ General introduction of the synchronous machine <ul style="list-style-type: none"> <li>Simplified equivalent circuit</li> <li>Open circuit, short circuit characteristic</li> <li>Phasor diagram</li> <li>Load diagram</li> </ul> </li> <li>▫ Engineering design and dimensioning of THYNE1 <ul style="list-style-type: none"> <li>Type code</li> <li>Excitation transformer</li> <li>Field flashing</li> <li>Interface</li> </ul> </li> <li>▫ Control and operation with THYNE1 <ul style="list-style-type: none"> <li>Parameterization, control and operation via touch panel and PC Software</li> <li>Optimization of the regulator</li> <li>Alarms</li> </ul> </li> <li>▫ Commissioning of THYNE1 <ul style="list-style-type: none"> <li>Preparation</li> <li>Calibration</li> <li>Optimization</li> </ul> </li> </ul>



## 2.3 BASICS OF EXCITATION

Duration	1 day
Prerequisites	Basic knowledge of electrical engineering
Objective	<p>This training covers the fundamentals of excitation methods.</p> <p>It is especially for engineers who are not excitation experts but use excitation devices in their installations - connected to the process control and automation system.</p>
Content	<ul style="list-style-type: none"> <li>▫ For what do we need excitation?</li> <li>▫ What does excitation mean?</li> <li>▫ Tasks of excitation</li> <li>▫ Different variants of excitation (static or with exciter)</li> <li>▫ Differences (advantages/disadvantages) between this variants</li> <li>▫ Main components of excitation equipment (switch cabinets, excitation transformer)</li> <li>▫ Cohesion between generator voltage, reactive power and active power</li> <li>▫ Parallel operation of generators</li> <li>▫ Different kinds of operations (automatic, manual, reactive power/cosphi-controlling, brake operation)</li> <li>▫ Interaction between excitation and other equipment (excitation, control technology, turbine controller)</li> <li>▫ Design principle of excitation equipment: redundancy in controller and/or power part</li> <li>▫ Typical setup procedure and adjustment possibilities</li> </ul>



### 3 CONTROL

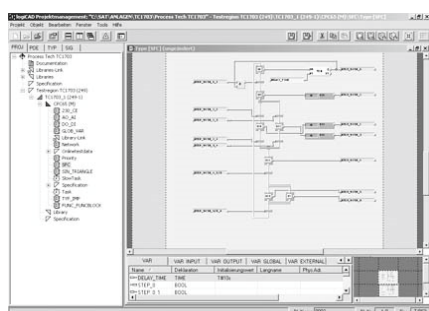
#### 3.1 SICAM RTUS & OPM II COMBI-TRAINING

Duration	5 days
Prerequisites	Knowledge of the most important terms in telecontrol technology Windows usage
Objective	Knowledge of autonomous expansion and diagnosis for the scalable automation system SICAM RTUs, usage of the object-oriented data point manager and engineering tool OPM II.
Content	<ul style="list-style-type: none"> <li>▫ SICAM RTUs product family in an overview</li> <li>▫ Features of AK 1703 ACP, ACP TM 1703, TM 1703 mic</li> <li>▫ Operation - from data acquisition to data output</li> <li>▫ Configuration and engineering based on pre-configured templates</li> <li>▫ Communication with other components</li> <li>▫ Addressing concept (IEC 60870)</li> <li>▫ Automatic dataflow mapping</li> <li>▫ Creation of process variables and preparation for usage in functional plans</li> <li>▫ Parameterization of SICAM RTUs communication with other units or the control center 250 SCALA</li> <li>▫ Diagnosis and test</li> <li>▫ Possibilities for test and simulation with the TOOLBOX II</li> <li>▫ Parameter administration with the TOOLBOX II: Import/Export/Backup</li> <li>▫ OPM II feature list - overview</li> <li>▫ signal-oriented engineering with the OPM II</li> <li>▫ Working with predefined OPM II libraries</li> <li>▫ Handling large amounts of data with the OPM II</li> <li>▫ Reuse of existing project data with the OPM II</li> <li>▫ Use of formulas and references</li> <li>▫ Data import and export</li> <li>▫ Creation of higher aggregated objects in the OPM II</li> <li>▫ Overview parameter of OPM II handling for control center systems</li> <li>▫ Practical exercises with TOOLBOX II and OPM II on the example of a TM 1703 ACP</li> </ul>



### 3.2 CAEX PLUS FOR SICAM RTUS

Duration	3 days
Prerequisites	Basic knowledge of digital technology, Basic knowledge on the SICAM RTUs automation system, Basic knowledge of the OPM II
Objective	Knowledge of the tool CAEx plus for creation of a control task in the target system SICAM RTUs.  Training of the IEC 61131 programming language with the focus FBS (functional component language) and their use.
Content	<ul style="list-style-type: none"> <li>▫ Overview of the standard IEC 61131</li> <li>▫ Handling of the functional component language CAEx plus</li> <li>▫ Create and structuring of a control task</li> <li>▫ Loading to the target system SICAM RTUs</li> <li>▫ Application of the test options (OFFLINE, ONLINE oscilloscope)</li> <li>▫ Create a documentation with CAEx plus</li> <li>▫ Practical exercises</li> </ul>



### 3.3 250 SCALA OPERATION & ENGINEERING

Duration	3,5 days
Prerequisites	Windows knowledge OPM II Basic course or similar knowledge
Objective	<p>The participants master the process-specific adaptation of the pre-configured 250 SCALA control centre computer system. In accordance with the preset goals they can integrate:</p> <ul style="list-style-type: none"> <li>▫ New plant displays</li> <li>▫ Additional process data representations</li> </ul> <p>The participants know whether and how new requirements can be implemented. They know the capabilities and constraints of the system.</p>
Content	<ul style="list-style-type: none"> <li>▫ Operation</li> <li>▫ Creating pictures</li> <li>▫ Creating process variables</li> <li>▫ Object orientated parameterization of picture elements</li> <li>▫ Alarms</li> <li>▫ Reports and logs</li> <li>▫ Graphs: function and operation</li> <li>▫ Data security</li> <li>▫ Interfacing with MS Excel</li> <li>▫ Configurations</li> <li>▫ Short overview of more complex functions</li> <li>▫ Practical exercises</li> </ul>

# 250 SCALA

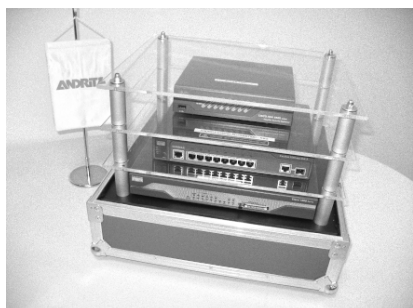


## ANDRITZ

## 4 NETWORK

### 4.1 LAN AND WAN FOR AUTOMATION NETWORKS

Duration	2 days
Prerequisites	Windows basics Basic IT- and communication knowledge
Objective	In this training practice oriented employment and use of networks in automation are imparted. Network technology plays a major role for data transmission, data analyzing and monitoring as well as maintenance of plants. This training should not be missed in the training program of an automation engineer.  It is aligned for user, who are increased faced with usage and maintenance of networks.
Content	<ul style="list-style-type: none"> <li>▫ Basics (OSI-model)</li> <li>▫ Overview network protocols</li> <li>▫ Differences TCP / UDP</li> <li>▫ IP addressing</li> <li>▫ Network products</li> <li>▫ Security <ul style="list-style-type: none"> <li>▪ Physical Security</li> <li>▪ Network Security</li> <li>▪ Awareness of external access of networks</li> </ul> </li> <li>▫ Remote Control</li> </ul> <p><i>Not covered in this training are:</i> RTU protocols like e.g. IEC 60870-5-104, IEC 61850, Modbus IP etc.</p>
Practical exercises	<ul style="list-style-type: none"> <li>▫ Setup of network with TCP/IP protocol</li> <li>▫ Building of network connections</li> <li>▫ Configuration of most important router parameter</li> </ul>



## 4.2 SECURITY OF AUTOMATION NETWORKS

Duration	2 days
Prerequisites	Basic knowledge of networking (TCP/IP)
Objective	<p>This training covers the usage of firewalls und network protection techniques especially in the range of process-automation and SCADA system infrastructure.</p> <p>High secure and high available networks for process-automation and SCADA systems can only be achieved by careful design and implementation of network security concepts.</p> <p>The seminar is dedicated to technicians who already have experience in networking and want to go on with their expertise towards network security.</p>
Content	<ul style="list-style-type: none"><li>▫ OSI Model</li><li>▫ TCP / UDP</li><li>▫ IP Addressing</li><li>▫ Targets for attacks</li><li>▫ Kinds of assaults</li><li>▫ Firewall technology</li><li>▫ Firewall &amp; DMZ concepts</li><li>▫ ASA (Cisco Firewall)</li><li>▫ Router /Switches</li><li>▫ Monitoring</li><li>▫ Attacking the ASA (Cisco Firewall)</li></ul>
Practical exercises	<ul style="list-style-type: none"><li>▫ Basic configuration of ASA (Cisco Firewall)</li><li>▫ Setup of the network with ASA (Cisco Firewall)</li><li>▫ Setup of a VPN site-to-site connection with ASA (Cisco Firewall)</li></ul>



## 5 CONTACT & REGISTRATION

### 5.1 CONTACT

Visit us on the internet at [www.andritz.com/training-hydro](http://www.andritz.com/training-hydro) or let us provide you with individual advice.

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**Tel.: +43 50805 56812**

**Karin.Binder@andritz.com**

ANDRITZ HYDRO GmbH  
Eibesbrunnnergasse 20  
A-1120 Vienna



## 5.2 REGISTRATION

We kindly request that you send a written registration by e-mail or mail using our registration form (see last page).

Further information you can find in our conditions of training.

## 5.3 CONDITIONS OF TRAINING

### 1. Registrations

We request that you send a written registration by mail or e-mail to our training department. Unfortunately we can not accept telephone registrations. Registrations will be accepted in the order that they are received. If your desired training program is already full, you will automatically be placed on the wait list for this date. We will not reregister you for a different training date. If you would like a different training date, please notify us in writing.

### 2. Registration Confirmation

You will receive a registration notification within 14 days of the receipt of your registration. This notification is not yet definite. Please keep this fact in mind when booking tickets, hotel rooms, etc. Since we require a minimum of 4 participants for our courses, we cannot confirm your registration until 14 calendar days before the beginning of the training program. This registration confirmation will contain all details concerning the training program. In the event that you haven't received notification/confirmation within the above given time frames, please contact our training department.

### 3. Cancellation by the Course Participant

In the event that a course participant drops out, you may nominate a replacement at no extra cost. If this is not an option, cancellation is possible. Cancellations should be carried out in the same way as the registrations (see 1. Registrations). Cancellation may be made at no charge for up to 21 calendar days before the beginning of the training course. Beyond this deadline up to 7 calendar days, we charge 50%, and beyond 7 calendar days, the full price of the training. In case, as a result of your cancellation, hotel cancellation fees arise as the result of reservations made by us in your name, we will be forced to pass these costs on to you. The cancellation fees defined here are valid even when the training date is rescheduled.

### 4. Changes and Cancellations by ANDRITZ HYDRO GmbH

If we are forced to cancel a training course for justifiable reasons (for example cancellation by a lecturer, too few course participants), we will not be obligated to pay any remunerations beyond refund of course fees which have already been paid to us. In particular, we are not obligated to pay for possible cancellation fees of hotels, flights, etc. In the case of illness of a course lecturer, we reserve the right to postpone or cancel a training session at any time.

### 5. Training Location

ANDRITZ HYDRO GmbH  
Eibesbrunnengasse 20  
A-1120 Vienna

### 6. Hotel

Hotel costs are not included in the course price. Should you require assistance with a hotel reservation, please inform us when registering. Please settle accounts directly with the hotel.

### 7. Prices

All prices are given without the addition of VAT. Please transfer the invoice amount to the given account within the payment deadline.

#### 7.1. Course Prices:

Course prices are for one participant and given without the addition of VAT.

### 7.2. Workshop Prices

Workshop prices cover the entire workshop and are given without the addition of VAT. A maximum of 6 participants may be sent to a workshop for this price. In the case of more than 6 participants, the workshop price will be calculated on an individual basis.

Should a workshop be held at an agreed upon location other than the "training location" specified in section 5, then we will add the extra costs of meals, transportation, and overnight accommodations of the instructor in the workshop price (hotel, airplane, train, car, taxi, etc.). We will not be able to provide infrastructure such as PCs, training facilities, etc. at remote locations.

### 8. Services

Small groups allow for intensive supervision by our instructor during the training sessions. Every participant receives a set of training materials for his/her personal use. If required in the context of the training exercises, a PC with English installation or target system—at least one workstation for every 2 participants—will be made available at the "training location" specified in section 5. Beverages and lunch are also included in the price. Upon successful completion of the training course, you will receive a training certificate.

All other services such as parking charges, arrival and departure, hotel, breakfast, transportation from the hotel to the training location, taxi costs, etc., are not included in the price and must be paid on location.

### 9. Security and Data Protection

The participants' personal information will be entered in our IT system for preparation, organizational and billing purposes. By registering for the training course, you give your implied consent to the usage of your data. The data will neither be stored collateral nor circulated to third parties.

The equipment used as part of the training course is equipped with the commercially available security measures. For reasons of security, the course participants may neither install programs or data onto the equipment nor establish connections between personal equipment and the training workstations. In particular, the use of a training workstation to establish an internet connection during the training course is explicitly forbidden.

### 10. Liability

We are not liable for damages caused by the application of skills acquired in the training or by the usage of training materials. We are not liable for the personal property of the participants or for any articles brought to the training course.

### 11. Copyrights

The training documents may not be reproduced, translated, or used for purposes other than the personal use of the participants without the written consent of ANDRITZ HYDRO GmbH. Software, licenses, activation and access codes used as part of the training course may not be copied or used for any other purposes.

### 12. Coverage, Written form, Law, Place of Jurisdiction

These conditions apply to all training courses offered by ANDRITZ HYDRO GmbH. All other agreements must be made in writing. The place of jurisdiction is Vienna. These conditions are governed exclusively by Austrian law.

# Seminaranmeldung / Registration



## Trainingsort / Training Location

ANDRITZ HYDRO GmbH  
Abt. RD1  
Eibesbrunnnergasse 20  
1120 WIEN  
AUSTRIA

Bitte senden Sie das Formular an / Please submit this form to [contact-hydro.train@andritz.com](mailto:contact-hydro.train@andritz.com)

Vorname / First Name \* ..... Zuname / Last Name \* .....

Firma / Company \* .....

Rechnungsadresse / Invoicing Address \* .....

.....

UID-Nr. / VAT Number . .....

Telefonnr. / Phone number .....

E-Mail \* .....

Seminarname / Title of Training *	Termin / Date *	TeilnehmerInnen / Participants
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\* erforderlich / required

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Datum / Date

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Unterschrift / Signature

