

INTERNATIONAL TRAININGS 2018

Megger[®]
Power on

Relay protection

Cable fault location

Transformer testing

Circuit breaker testing



INTRODUCTION

New technologies and instruments make our work not only easier and more effective but also safer. Training and continuous update of knowledge is important in today's world. We need to stay ahead in order to proceed. This is not as hard as it sounds. We focus on efficient and well prepared training classes to pass on this knowledge.

As manufacturer of measurement instruments it is our aim that our customer get best benefit out of our products. This we can support by offering a complete training program. We know that training should be a good combination of exchanging know-how as well as practical hands-on exercises, now and in the future. Our trainers have years of experience, passion for the topics and are used to adapt to special applications as they might be unique in some areas of the world. We are prepared and happy to receive our customers at our training locations in Germany or meet at local site of our customers.

A comprehensive training is also a good time to meet with other users and exchange experiences. This will open the mind and show new solutions that were not known before. There's no better way of learning than trying it out for yourself – or at least talk with someone who did!

Hoping to meet you in one of our training classes around the world,

Gernot Pakleppa,
Manager Seminars



TABLE OF CONTENTS

Protective relay testing	04
Cable fault location	05
Transformer testing	06
Power circuit breaker testing	07



PROTECTIVE RELAY TESTING

A seminar offering participants theoretical and practical knowledge for testing protective relays

Topics

- **Basics of protective relay fundamentals and theory**
 - Power system basics, components and calculations
 - Overcurrent protection
 - Differential protection
 - Line distance / impedance protection
- **Testing methods**
 - Manual single phase testing
 - Manual three phase testing
 - Automated three phase testing
- **Testing tools**
 - Ramps, sequencer, trip characteristic testing, harmonic testing, fault calculators, timers and more
- **Practical exercises**
 - Single-phase testing with SVERKER 750/780
 - Multi-phase testing with SVERKER 900
 - Automated testing with SMRT/FREJA



Prerequisites

General technical knowledge of electrical power systems.



Duration	Baunach	Code	Fee in Euro plus VAT of 19%
3 days	20.03.-22.03.2018 09.10.-11.10.2018	PRT0118 PRT0218	960,- ^{1) 2) 3)}

¹⁾ Hotel costs are not included

²⁾ Participant limit: 20 persons

³⁾ Language: English

CABLE FAULT LOCATION

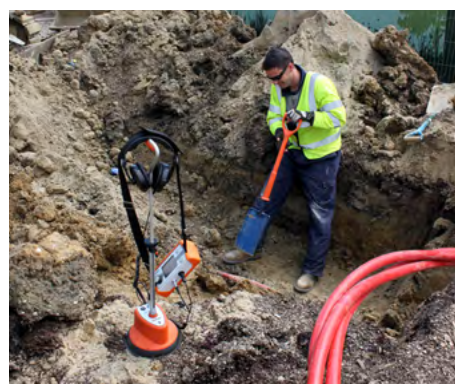
A seminar offering participants theoretical and practical knowledge for cable fault location

Topics

- **History and construction of cables**
- **Fault types, electrical and physical characteristics**
- **Analyzing the fault**, series or shunt fault, flashover fault, open circuit fault, ground contact fault, ingress of moisture
- **Principles of cable fault location**
- **Safety issues about cable fault location**
- **Cable fault prelocation:**
 - Time Domain Reflectometry (TDR)
 - Arc Reflection Method (ARM)
 - Impulse Current Measurement (ICE)
 - Decay measurement
 - other advanced methods and their application
- **Pinpoint location of cable faults**
 - high resistive faults
 - low resistive faults
- **Sheath testing and fault location**
- **Line tracing**
- **Cable and phase identification**
- **Cable test vans and systems**
- **Different maintenance strategies**
- **Cable testing and diagnostic methods for different cable types**
- **Practical exercises**

Prerequisites

General technical knowledge of electrical power systems.



Duration	Baunach	Code	Fee in Euro plus VAT of 19%
3 days	06.03.-09.03.2018 20.03.-23.03.2018 26.06.-29.06.2018 09.10.-12.10.2018 23.10.-26.10.2018	EInt0118 (RU, PL, SE, NO, HU, EN) EInt0218 (CZ, SK) EInt0318 EInt0418 (RU, PL, BG, EN) EInt0518 (SE, NO)	1.610,- ^{1) 2) 3)}

¹⁾ Hotel costs are not included

²⁾ Participant limit: 20 persons

³⁾ Language: English

TRANSFORMER TESTING

A seminar offering participants theoretical and practical knowledge for testing transformers

Topics

- **Basics of Power Transformer design, bushings, tap changer**
- **Routine test procedures**
 - Winding resistance
 - Ratio, vector group
 - Insulation resistance test
 - tanDelta test
 - Oil breakdown and tanDelta test
- **Advanced test methods:**
 - Dielectric Frequency Response - DFR
 - Sweep Frequency Response Analysis - SFRA
 - Dynamic Resistance Measurement - DRM
- **Multifunction instruments vs. test van solutions:**
 - TRAX, TTV: operation
 - Reporting with PowerDB
- **Practical measurements in small groups**

Prerequisites

General technical knowledge of electrical power systems.
Knowledge of power transformers is an advantage.



Duration	Baunach	Code	Fee in Euro plus VAT of 19%
3 days	26.06.-28.06.2018 27.11.-29.11.2018	TRT0118 TRT0218	960,- ^{1) 2) 3)}

¹⁾ Hotel costs are not included

²⁾ Participant limit: 20 persons

³⁾ Language: English

POWER CIRCUIT BREAKER TESTING

A seminar offering participants theoretical and practical knowledge for testing medium and high voltage circuit breakers

Topics

■ Circuit breaker testing theory

- Contact timing
- Contact resistance
- Motion

■ Technologies covered

Static resistance measurement (SRM), dynamic resistance measurement (DRM), dynamic capacitance measurement (DCM), and more

■ Practical exercises

- Medium voltage breaker testing with EGIL
- High voltage breaker testing with TM1700/1800

Prerequisites

General technical knowledge of electrical power systems.



Duration	Baunach	Code	Fee in Euro plus VAT of 19%
3 days	05.06.-07.06.2018 27.11.-29.11.2018	CBT0118 CBT0218	960,- ^{1) 2) 3)}

¹⁾ Hotel costs are not included

²⁾ Participant limit: 20 persons

³⁾ Language: English

INFORMATION

Registration:

Registration requests will be processed in the order they are received, and we will provide written confirmation. The number of participants is limited. Data provided in the registration request will be saved in accordance with data protection regulations.

Hotel:

Unless an alternative request is specifically stated, we will make a hotel reservation for you in Bamberg at your cost. We will provide you with the address approximately one week before the seminar is scheduled to begin.

Liability:

We assume no liability beyond what is legally required and no liability outside of our company premises.

Registration deadline:

After the maximum number of participants have registered, and at the latest, 4 weeks before the seminar begins (received by us).

To bring with:

As our educational seminars include practical training outdoors and on our test course, we definitely recommend that you bring rainwear and sturdy footwear. You are welcome to bring your own test equipment. Otherwise we will provide the necessary practice equipment.

Copyright protection:

All training manuals and documentation are provided for the sole and personal use of the participant.

Modifications:

For important reasons, Megger reserves the right to make changes to the content and structure if necessary.

For further questions regarding our seminars please contact:

Ms. Andrea Tropper

Tel. +49 (0) 95 44 / 68 71 12

Fax: +49 (0) 95 44 / 22 73

E-Mail: andrea.tropper@megger.com