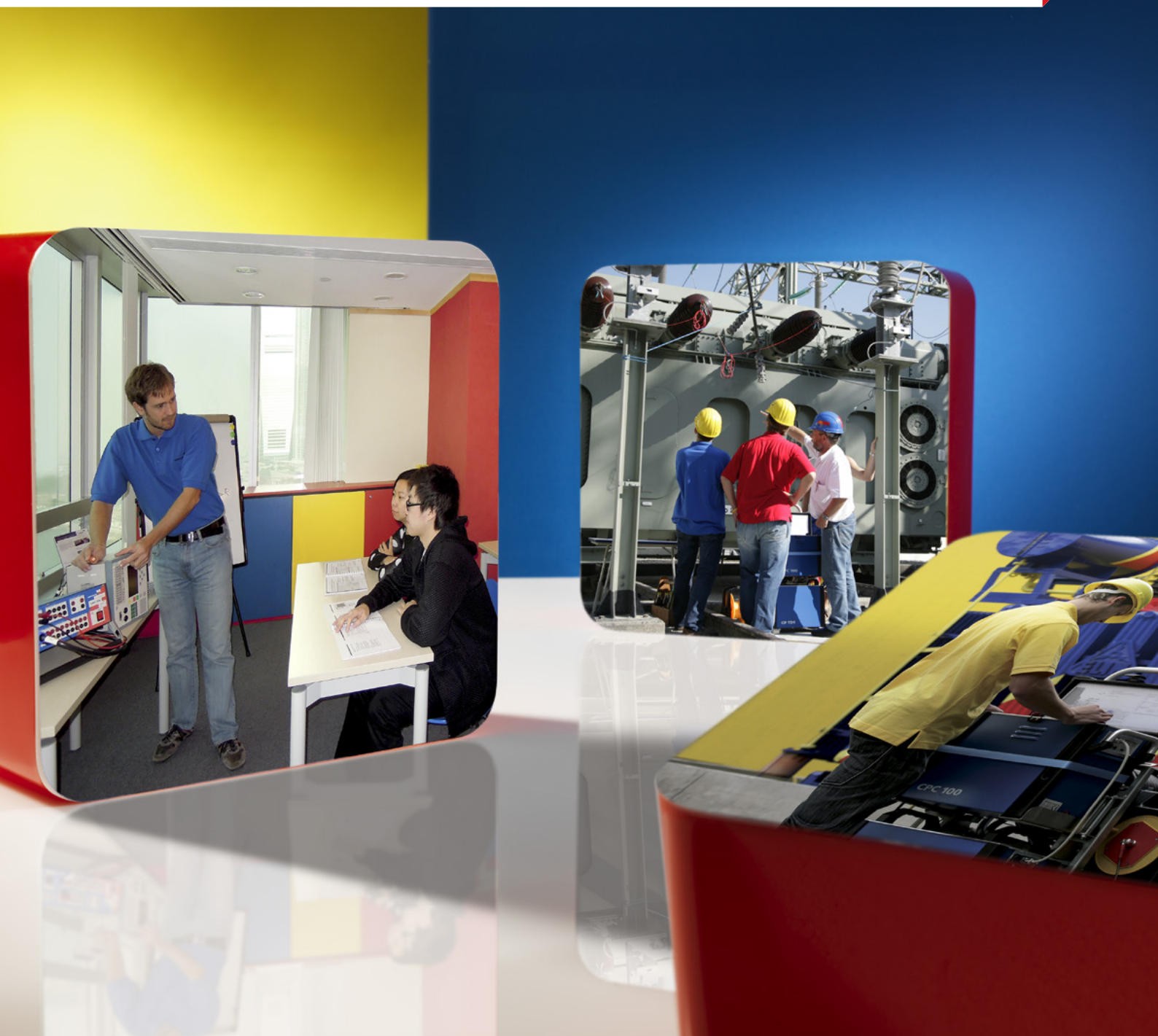
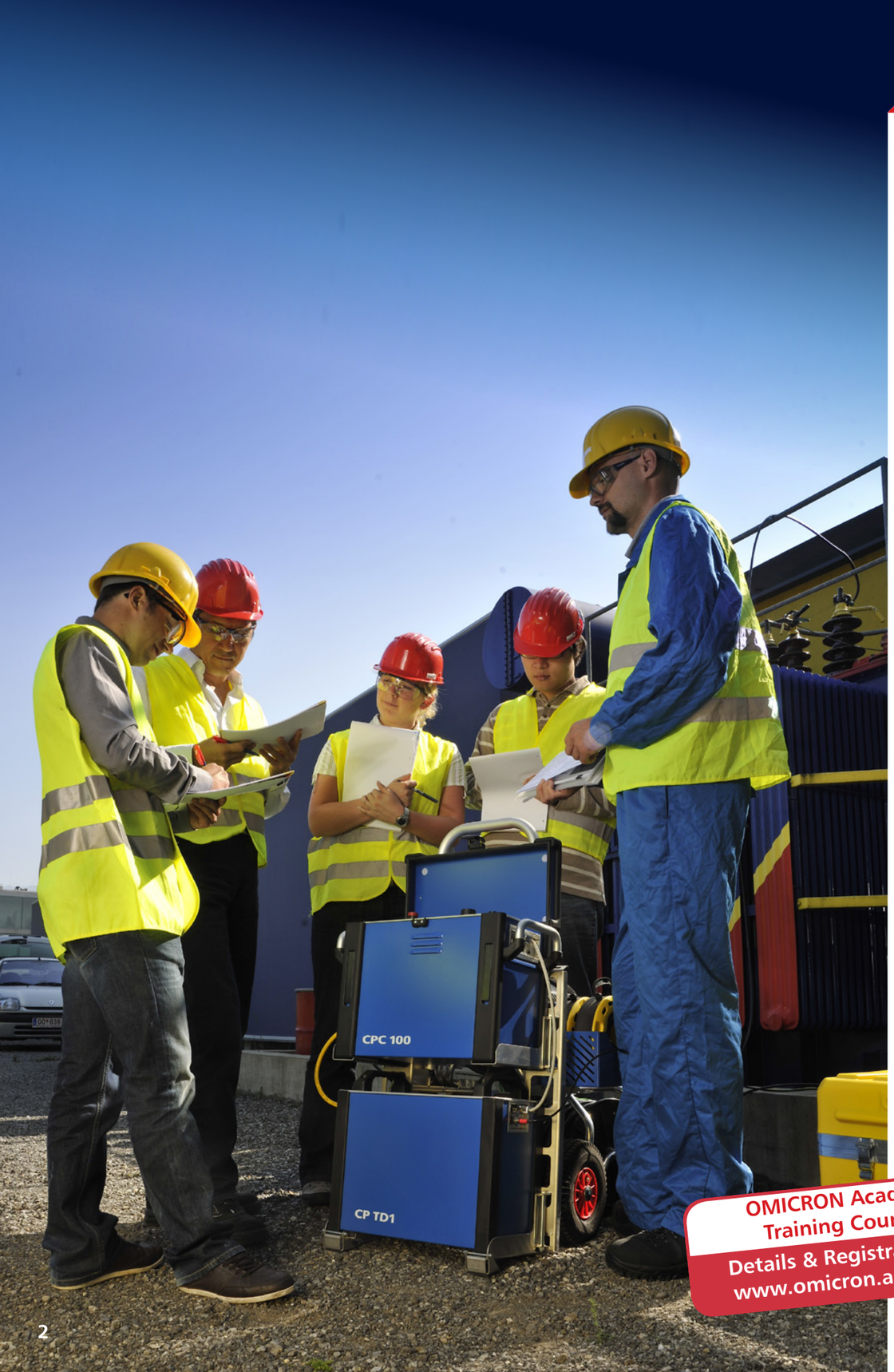
OMICRON Academy

OMICRON Academy Hong Kong

Excellence through Education





OMICRON Academy
Training Courses
Details & Registration at
www.omicron.academy

OMICRON Academy

Excellence through Education

Effective equipment maintenance action begins with successful testing and diagnosis. For this, a deep understanding of both the test application and the usage of the related test equipment are paramount.

The OMICRON Academy aims at providing you with this knowledge - ultimately empowering you to being able to utilize your OMICRON test set to its full potential in order to get the most out of your testing.

Our experienced trainers guide you through a range of hands-on courses on commissioning and testing of protection relays as well as diagnostic measurements and maintenance tests on various primary assets.

Types of Training

OMICRON Academy Hong Kong offers training at our Training Center in Hong Kong, at your premises and online for remote attendance.

- Scheduled Training
  These courses take place regularly at the OMICRON Academy on fixed dates. You will benefit from exchanging experiences with other students and from working with the Academy's dedicated training equipment.
- Customized Training
  These courses are planned specifically for you and are tailored to your requirements. They can take place at a variety of locations, including the Hong Kong Training Center, customer premises or a location of your choice.
- Webinars
  Our webinars are short interactive online courses. To participate, only a computer, a microphone, a fast Internet connection and speakers or headset are necessary.

Who Should Attend

Our professional training courses cover multiple levels ranging from fundamental through advanced topics. Areas covered include: how to efficiently use the equipment, different applications of the equipment, and theoretical understanding. Built around real testing situations, they are ideal for technicians and engineers from electrical utilities, industrial plants, equipment manufacturers and service companies.

Convenient Location

Hong Kong is a multicultural city situated in the heart of Asia. Excellent geographic location and business environment help bolster its position as the premier hub in the Asian region. Perfect transport connections also enable convenient arrival by airplane.

- Bangkok, Thailand: less than 3 hours
- Jakarta, Indonesia: around 4.5 hours
- Kuala Lumpur, Malaysia: around 4 hours
- Manila, Philippines: less than 3 hours
- Singapore: around 4 hours
- Hanoi, Vietnam: less than 2 hours

Contact OMICRON Academy

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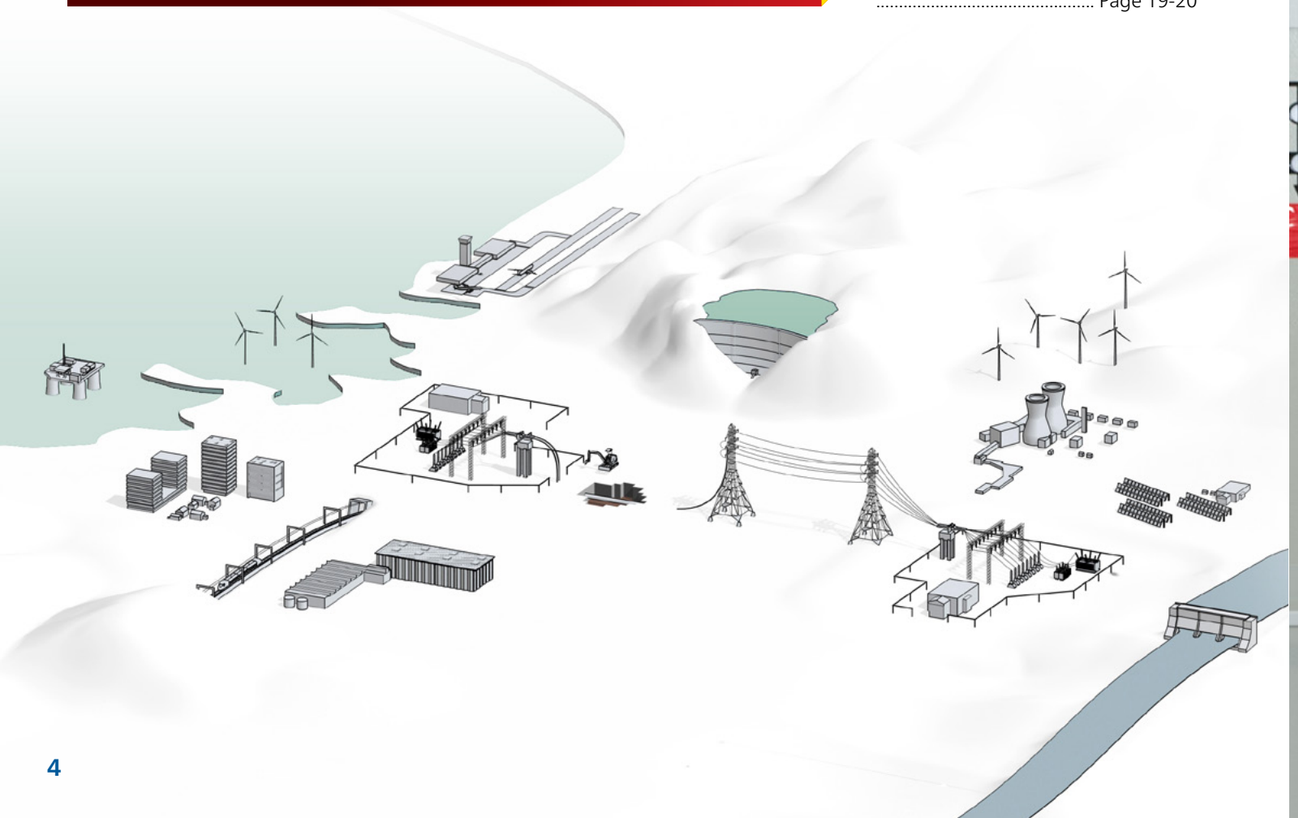
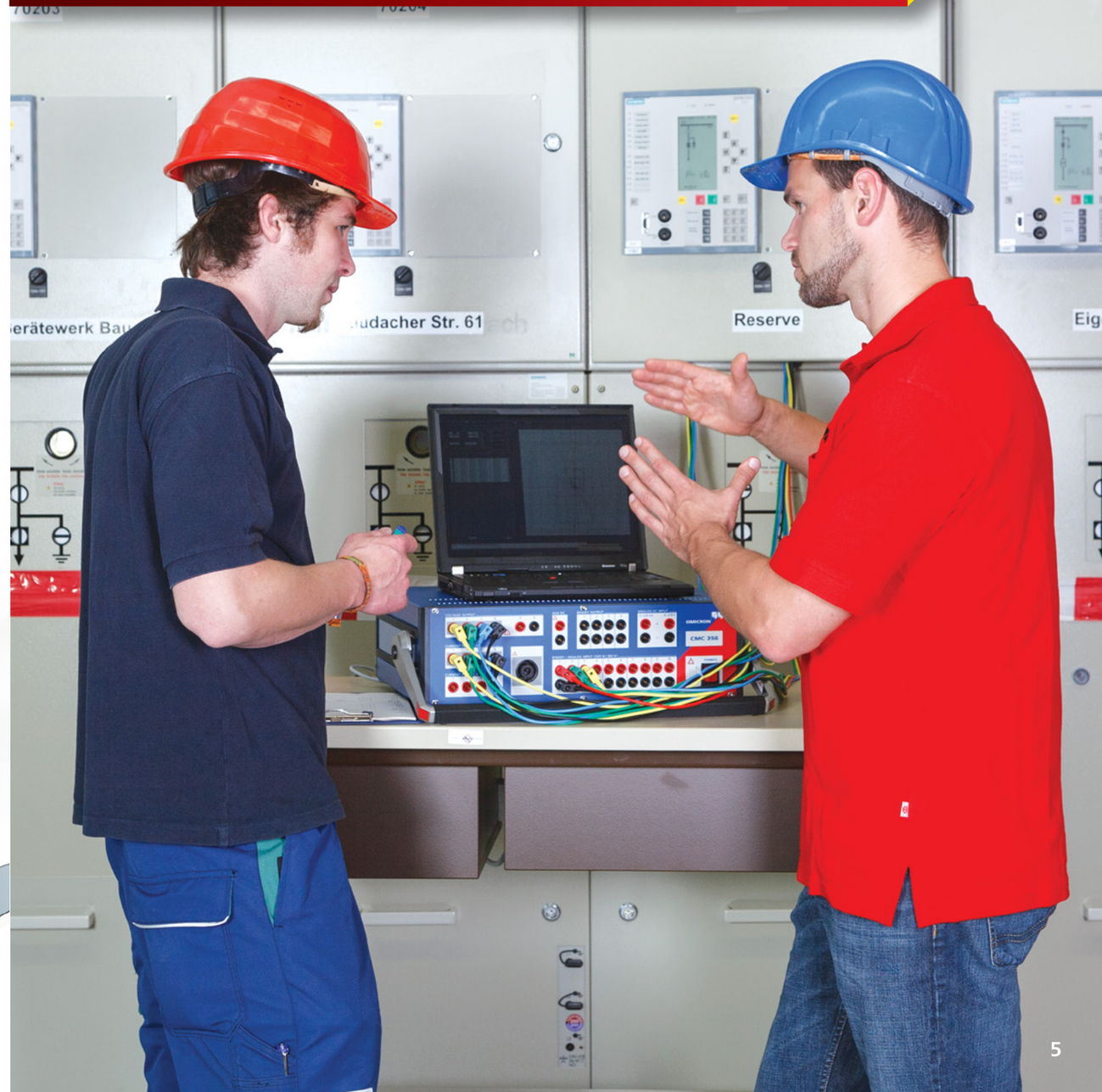
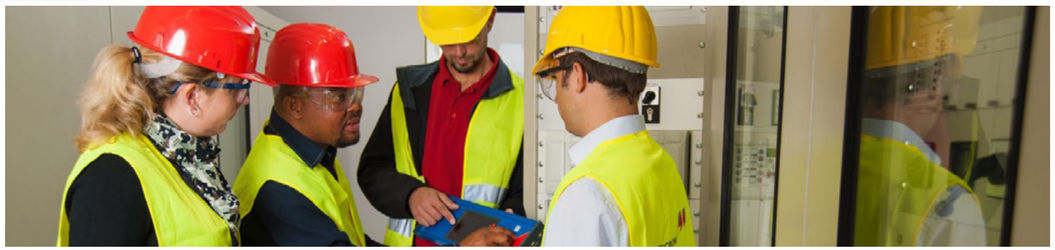
Further information will be made available upon registration.



Protection Testing



Automated overcurrent protection testing with CMC



1 day | English | Cprs01en

Learn how to efficiently test overcurrent relays with the OMICRON Test Universe. Get familiar with the test procedure in hands-on and theoretical sessions.

Objectives

> Get to know the best practice test procedures for common protection tests
> Test overcurrent relays with the OMICRON Test Universe
> Create and modifying automated test plans and customized test reports
> Use the OMICRON Test Universe from scratch

Content

> Quick current and voltage output for easy wiring tests
> Configuration of the test object parameters and the test hardware
> Creating test plans which adapt automatically to newly entered relay settings
> Creating a flexible test plan for overcurrent relays including testing pick-up values and trip times
> Hands-on testing of the overcurrent protection function

Solutions

Control Center, QuickCMC, Ramping, Pulse Ramping, Overcurrent
CMC-Family

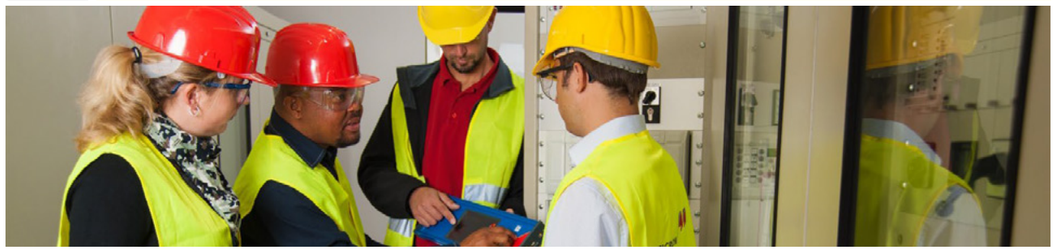
Audience

Technical staff from utilities, transmission and distribution networks, railway grids, service companies and manufacturers involved in protection testing

Prerequisites

Basic knowledge of power system protection

Automated distance and differential protection testing with CMC



2 days | English | Cprs02en

Learn how to efficiently test distance and transformer differential relays with the OMICRON Test Universe. Get familiar with the test procedure in hands-on and theoretical sessions. Fully exploit the benefits of automated testing, reusable test templates and enjoy the consistent test quality.

Objectives

> Performing commissioning, trouble-shooting and periodic tests of protection relays
> Testing distance and transformer differential relays with the OMICRON Test Universe
> Creating and modifying automated test plans and customized test reports
> Using the OMICRON Test Universe from scratch

Content

> Configuration of the test object parameters and the test hardware
> Creating test plans which adapt automatically to newly entered relay settings
> Theory and testing of directional overcurrent protection
> Theory on distance protection and creating a flexible test plan for distance relays including testing the trip times and zone reaches as well as switch on to fault (manual close) and auto-reclosing
> Hands-on testing of distance relays
> Hands-on testing of transformer differential relays

Solutions

Control Center, XRIO, Overcurrent, Advanced Distance, State Sequencer, Autoreclosure, Advanced Differential
CMC-Family

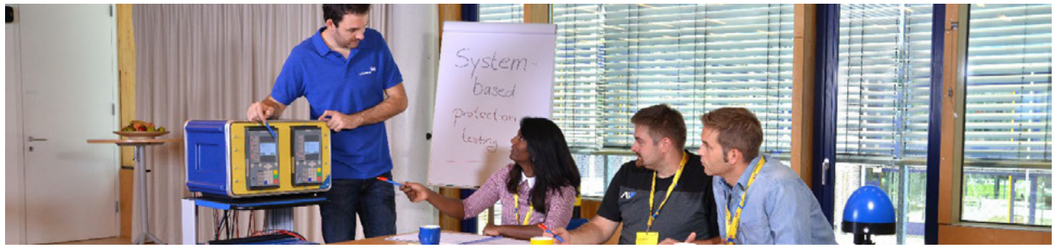
Audience

Technical staff from utilities, transmission and distribution networks, railway grids, service companies and manufacturers involved in protection testing

Prerequisites

Basic knowledge of power system protection

System-based protection testing with CMC



2 days | English | Cprs05en

Learn how to efficiently create system-based protection tests with RelaySimTest. Explore a comfortable way of end-to-end testing using the TestSetRemoteAgent. Get familiar with the test procedure in hands-on and theoretical sessions.

Objectives

> Exploring the benefits of system-based testing in comparison to parameter testing
> Designing different grid scenarios to create realistic fault conditions
> Simulating faults to test the behavior of your protection systems
> Using RelaySimTest from scratch

Content

> Introduction to system-based testing
> Definition of suitable test cases for different protection schemes
> Modelling of test grid topologies in RelaySimTest
> System-based distance protection testing
> Iterative closed loop testing of the autoreclosure function
> Easy end to end testing of distance teleprotection and line differential protection
> Testing of the power swing blocking function of a distance protection relay
> Easy end to end testing of line differential protection taking CT saturation into account
> Short introduction to further test applications (e. g. busbar protection testing)
> Synchronized injection with TestSetRemoteAgent and CMGPS588

Solutions

RelaySimTest,
TestSetRemoteAgent,
CMC-Family

Audience

Technical staff from utilities, transmission and distribution networks, service companies and manufacturers involved in protection testing or grid simulation

Prerequisites

Basic knowledge of protective relaying and protection testing

Automated recloser control testing with ARCO 400

1 day | English | Cprs06en

Learn how to test all kinds of recloser and sectionalizer controls quickly and reliably with ARCO 400. Get familiar with the software guided workflow of ARCO Control and learn how to prepare reusable test plans for standardized testing. Work with different recloser controls to gain immediate testing experience.

Objectives

> Become familiar with the theory of reclosers and their application in the distribution system
> Perform easy and efficient tests of all kinds of recloser and sectionalizer controls
> Practice three-phase testing of recloser controls with ARCO Control
> Learn about voltage based distribution system restoration and how to test it
> Prepare reusable test plans with ReCoPlan for standardized and time-saving tests

Content

> Theoretical background of reclosers and sectionalizers, their protective functions and automated distribution restoration schemes
> Getting to know the easy test setup of ARCO 400 and its smart controller adapters
> Performing simple manual trip and close checks just with the ARCO hardware
> ARCO Control overview
> Performing wiring checks
> Determining pick-up values of overcurrent curves
> Testing the reclosing sequence of recloser controls under various conditions
> Testing overcurrent operating characteristics
> Getting to know the testing principles of voltage based restoration schemes
> Testing harmonic inrush restraint and blocking functions
> Creating test plans with ReCoPlan and executing them with ARCO Control
> Lots of hands-on practice with recloser controllers from different manufacturers

Solutions

ARCO 400
Different controller adapters
ARCO Control
ReCoPlan

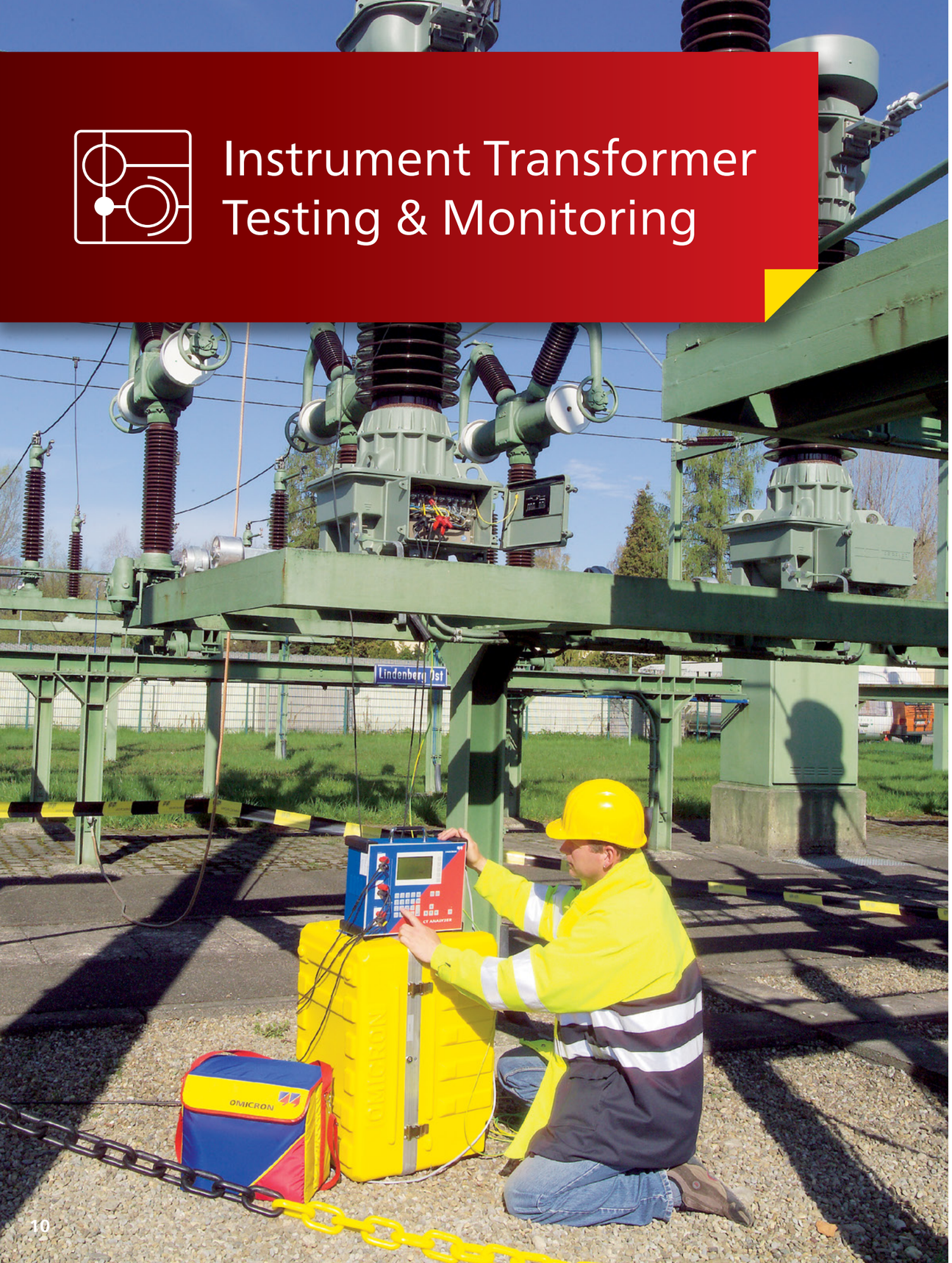
Audience

Technical staff from electric utilities, service companies and manufacturers involved in recloser maintenance, installation and testing

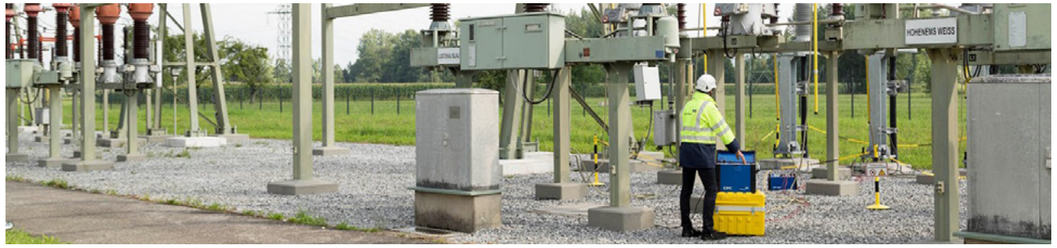
Prerequisites

Basic knowledge about distribution systems and protective devices

Instrument Transformer Testing & Monitoring



Instrument transformer diagnostics with CPC 100



1 day | English | Citr01en

Get to know the wide scope of applications and operation of the CPC 100. Learn how to efficiently test CTs and VTs in hands-on and theoretical sessions using Primary Test Manager (PTM). Work with CTs and VTs to gain experience with this application.

Objectives

- Perform commissioning, troubleshooting and periodic tests of CTs and VTs
- Create asset specific test plan including wiring diagram
- Automatic assessment according to industry standards
- Comprehensive reporting, including templates for all standard and advanced tests

Content

- Measure the CT and VTs ratio or ratio error as functional test of the ITs' performance as part of commissioning tests
- Evaluate the excitation current and the CT's knee-point to define its error and performance
- Background about winding resistance measurement to find possible electrical damage in windings or contact problem
- Perform burden measurement to determine the influence of cables and connections on the burden impedance
- Check the polarity check between the primary and secondary windings of an IT to prevent maloperation of connected protection devices
- How to efficiently perform all relevant commissioning test using Primary Test Manager (PTM)
- Automated generation of test reports with Primary Test Manager (PTM)

Solutions

CPC 100, CP SB2, CPOL2
Primary Test Manager (PTM)

Audience

Technical staff involved in transformer testing in utilities, transmission, distribution and generation networks, railway grids, service companies and manufacturers.

Prerequisites

Knowledge of electrical engineering

Time-optimized instrument transformer diagnostics with CT Analyzer & VOTANO 100

1 day | English | Citr02en

Learn how to assess the performance of instrument transformers utilizing CT Analyzer and VOTANO 100. Get familiar with various measurement approaches, effective report generation, instrument transformer class assessment according to international standards as well as special application examples.

Objectives

- Perform commissioning, troubleshooting and periodic tests of CTs & VTs
- Fast, simple and safe instrument transformer testing according to the relevant international standards (IEC and IEEE)
- Test and verify the fulfillment of the CT/VTs' specifications as well as the class accuracy and CT/VT ratio
- Perform automated result assessment of CT & VTs with values defined in selected IEEE, ANSI, or IEC standards
- Generate automated test reports with CTA Suite and VOTANO Suite

Content

- Typical IT failure sources vs. testing and corrective measures
- Types, design and construction of different CTs and VTs
- Comparison of conventional (CPC 100) vs. model-based testing of CTs (with CT Analyzer) and VTs (with VOTANO 100)
- Relevant definitions in standards for testing and assessment of CTs and VTs
- Performing time-efficient instrument transformer tests with CTA Suite and VOTANO Suite
- Evaluation of the CT and VT measurement results by means of practical examples

Solutions

CT Analyzer
CTA Suite
VOTANO 100 + VBO2
VOTANO Suite

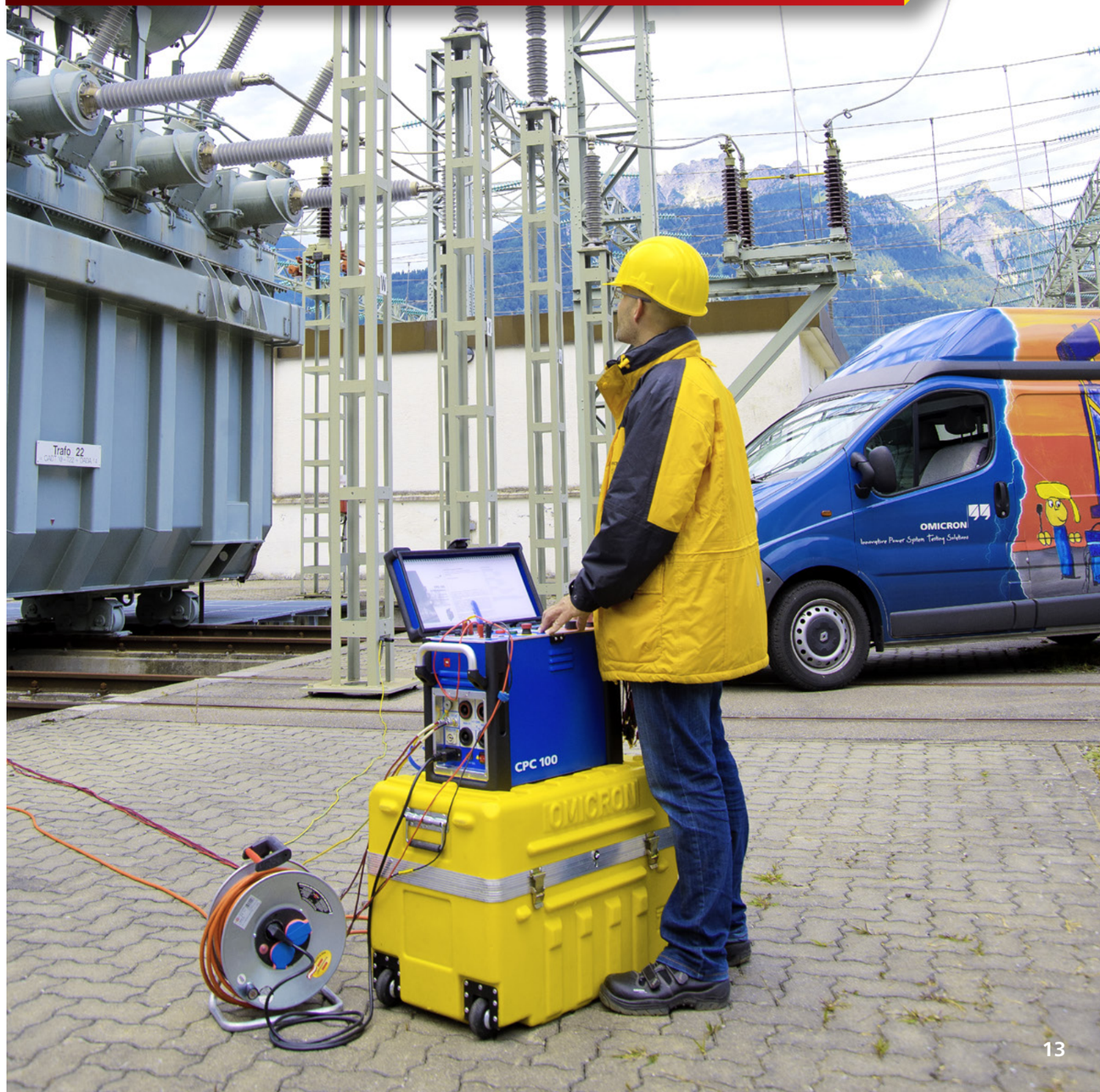
Audience

Technical staff involved in instrument transformer testing in utilities, transmission, distribution and generation networks, railway grids, service companies and manufacturers.

Prerequisites

Knowledge of electrical engineering

Power Transformer Testing & Monitoring



Fundamentals and applications of partial discharge diagnostics with the MPD series

2 days | English | Cpdm01en

Become familiar with the basic principles of partial discharge measurements using the MPD system. Learn to set-up and measure according to IEC 60270 in hands-on sessions on special training equipment. Get a systematic introduction to the interpretation of test results.

Objectives

> Measure partial discharges on high voltage devices with the MPD according to IEC 60270
> Monitor the quality of the production process by performing measurements on assembled parts
> Perform measurements to determine the insulation condition and identify fault types and fault location

Content

> Getting to know the MPD system
> Understanding how partial discharges are measured
> Connecting the MPD to high voltage devices, such as power transformers, generators, motors, cables
> Getting to know the MPD software for efficient measurements
> Performing partial discharge tests according to IEC 60270 and the IEC standard of the test object
> Performing real partial discharge measurements in hands-on sessions
> Getting to know PRPD, Q(V), trend analysis
> Interpreting partial discharge test results
> Handling interferences

Solutions

MPD 600 and accessories

Audience

Technical staff from electric utilities, railway and service companies as well as manufacturers to be involved in partial discharge testing

Prerequisites

Knowledge of electrical engineering

Power transformer diagnostics with the CPC family

2 days | English | Cptr01en

After an introduction to the maintenance of transformers, you will expand your knowledge of transformer diagnostics and applications in theory and practice. You will get familiar with the CPC 100 and CP SB1 functions for turns ratio, winding resistance and using the CP TD1 for capacitance or power/dissipation factor measurements. Practical measurements will enable you to gain immediate testing experience.

Objectives

> Get a comprehensive overview of the structure of the transformer insulation, the bushings and the tap-changer
> Analyze the condition of power transformers to fully exploit the lifetime of your asset
> Carry out time-optimized tests and diagnostics in the substation, power station or workshop
> Perform fast, simple and safe condition assessment of your power transformer

Content

> Negative influences on the expected lifetime of a transformer
> Overview of frequent defects in transformer components and their fault patterns
> Construction of the transformer insulation, the bushings and the tap-changer
> Common conventional measurement methods such as turns ratio, winding resistance, short-circuit impedance and demagnetization of the transformer
> Theoretical background to capacity and dissipation/power factor measurements of winding and bushing insulation
> Automatic execution of three-phase measurements using the Primary Test Manager (PTM) software
> Evaluation of the measurement results by means of practical examples
> Assessment of diagnostic measurements and recognize possible defects and influences
> Analyzing case studies of most common defects on various power transformers

Solutions

CPC 100, CP SB1, CP TD1
Primary Test Manager (PTM)

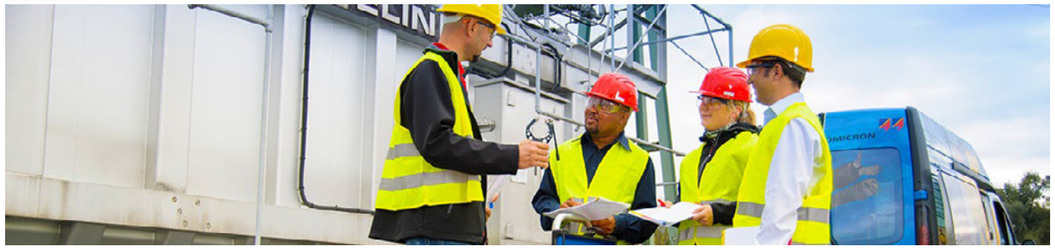
Audience

Technical staff involved in transformer testing in utilities, transmission, distribution and generation networks, railway grids, service companies and manufacturers.

Prerequisites

Knowledge of electrical engineering

Time-optimized power transformer diagnostics with TESTRANO 600



2 days | English | Cptr02en

After an introduction to the maintenance of transformers, you will expand your knowledge of transformer diagnostics and applications in theory and practice. You will get familiar with the TESTRANO 600 functions for turns ratio, winding resistance and capacitance or dissipation/power factor measurements. Practical measurements will enable you to gain immediate testing experience.

Objectives

> Get a comprehensive overview of the structure of the transformer insulation, the bushings and the tap-changer
> Analyze of the condition of power transformers to fully exploit the lifetime of your asset
> Carry out time-optimized tests and diagnostics in the substation, power station or workshop
> Perform fast, simple and safe condition assessment of your power transformer

Content

> Negative influences on the expected lifetime of a transformer
> Overview of frequent defects in transformer components and their fault patterns
> Construction of the transformer insulation, the bushings and the tap-changer
> Common conventional measurement methods such as turns ratio, winding resistance, short-circuit impedance and demagnetization of the transformer
> Theoretical background to capacity and dissipation/power factor measurements of winding and bushing insulation
> Automatic execution of three-phase measurements using the Primary Test Manager (PTM) software
> Evaluation of the measurement results by means of practical examples
> Assessment of diagnostic measurements and recognize possible defects and influences
> Analyzing case studies of most common defects on various power transformers

Solutions

TESTRANO 600
Primary Test Manager (PTM)

Audience

Technical staff involved in transformer testing in utilities, transmission, distribution and generation networks, railway grids, service companies and manufacturers.

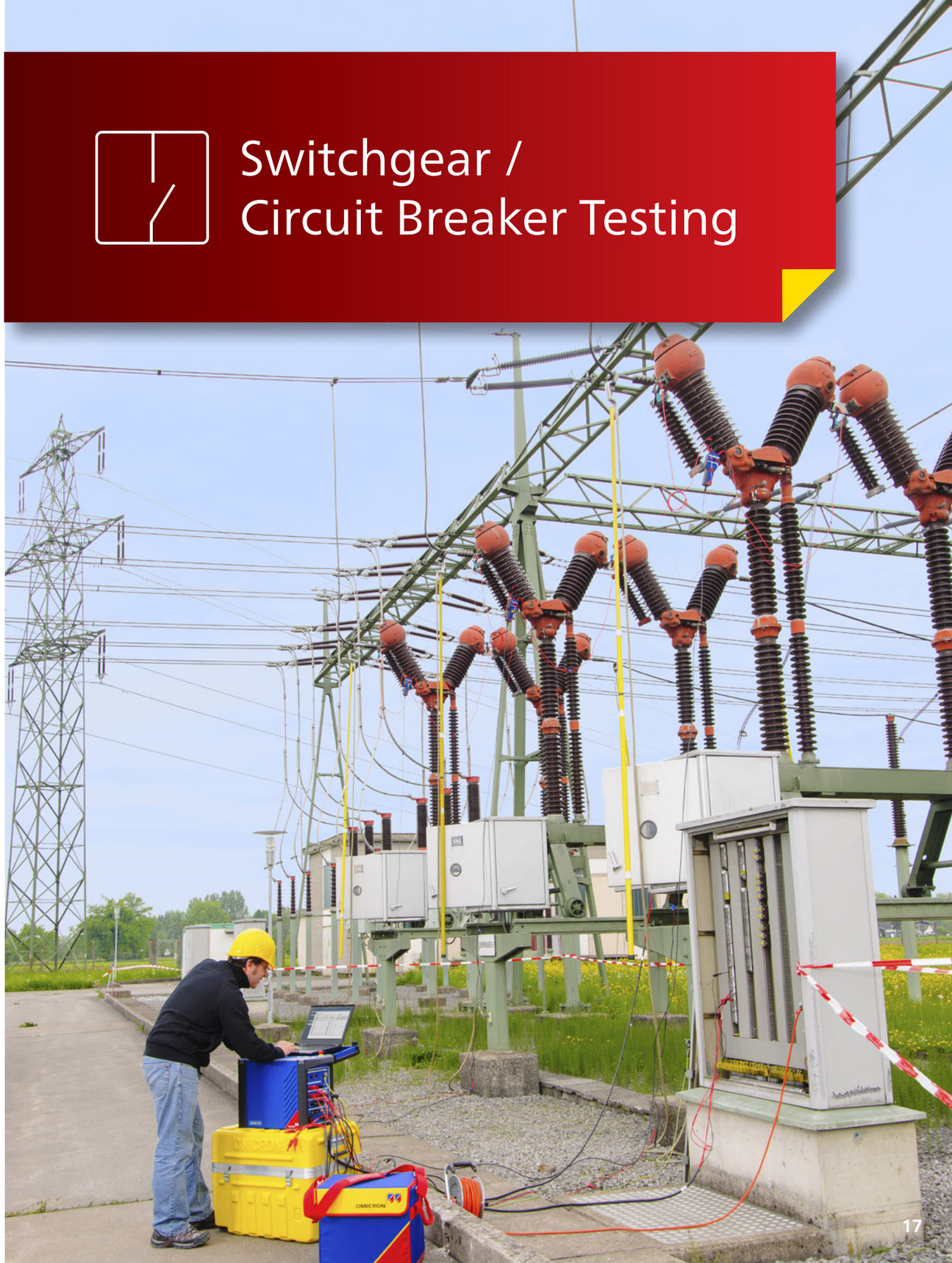
Prerequisites

Knowledge of electrical engineering

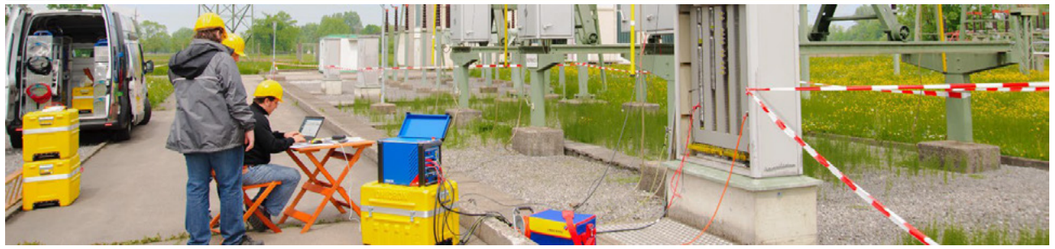
Join our training courses and get registered on www.omicron.academy

OMICRON Academy

Switchgear / Circuit Breaker Testing



Time-optimized circuit breaker diagnostics with CIBANO 500



1 day | English | Ccbr01en

Get to know the CIBANO 500 and the measurement principles for circuit breakers. Learn how to perform efficient circuit breaker tests in hands-on and theoretical sessions. Simplify your tests with the PTM (Primary Test Manager).

Objectives

> Perform commissioning, troubleshooting and periodic tests of different types of circuit breakers
> Carry out all relevant circuit breaker tests with one single test setup by using optional accessories
> Perform straightforward assessment circuit breaker parameters with reference results

Content

> Typical reasons for failure of circuit breakers
> Reasons for maintenance and testing of different MV and HV circuit breakers
> Overview about different types of MV and HV (live-tank, dead-tank and GIS) breakers and its components
> Comparison of conventional vs. time-efficient circuit breaker testing with CIBANO 500
> Typical tests on MV and HV circuit breakers such as static contact and dynamic resistance measurement (DRM), timing tests for main/auxiliary contacts and pre-insertion resistors, minimum pick-up tests, coil and motor current, contact travel (motion) of main contacts
> Safely perform timing tests on Gas Insulated Switchgears (GIS) with both-sides grounded using Current Sensor Measurement (CSM) method
> Automatic test execution of comprehensive circuit breaker tests with CIBANO 500 and Primary Test Manager (PTM)
> Evaluation of the measurement results by means of practical examples
> Analyzing case studies of most common defects on various circuit breakers

Solutions

CIBANO 500
CB MC2, CB TN3 and accessories
Primary Test Manager (PTM)

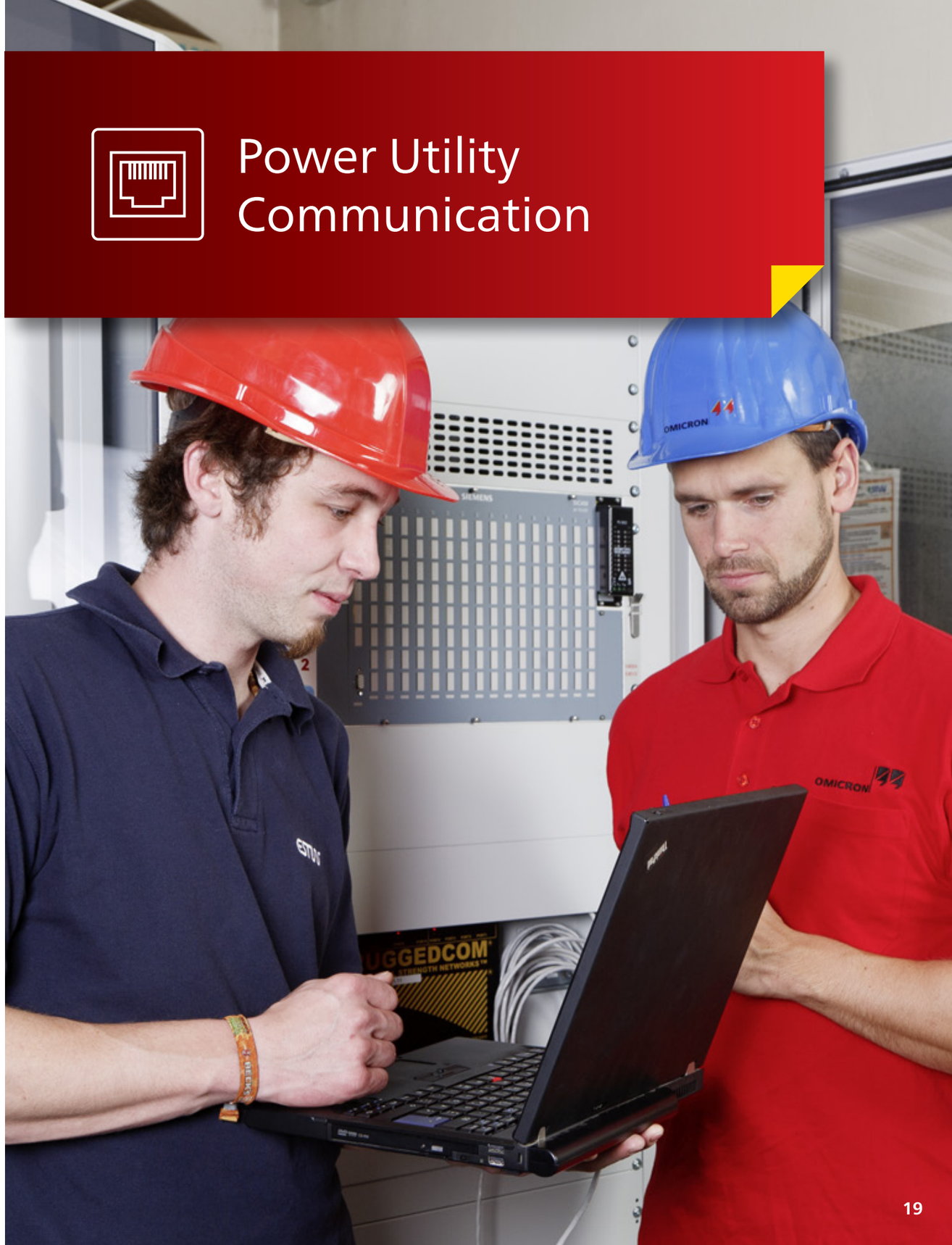
Audience

Technical staff involved in circuit breaker testing in utilities, transmission, distribution and generation networks, railway grids, service companies and manufacturers.

Prerequisites

Knowledge of electrical engineering

Power Utility Communication



IEC 61850 fundamentals, application and testing in digital substations

3 days | English | Cpuc01en

Get a thorough introduction to the IEC 61850 standard in a combination of theoretical and hands-on sessions. Work in a digital substation environment with IEDs from different vendors and redundant network architecture for station and process bus. Learn how to efficiently test all aspects of IEC 61850 substations, like IEDs, communication services, protection functions and time synchronization with all OMICRON IEC 61850 testing solutions.

Objectives

> Understand all parts of the IEC 61850 standard and know its applications
> Use the Client/Server, GOOSE and Sampled Values services for power utility automation
> Know the benefits of configuring the substation communication with the help of the Substation Configuration Language (SCL)
> Performing commissioning and functional testing of IEC 61850 based IEDs and systems

Content

> Basics of IEC 61850
> Data models and services
> Specific communication mappings
> Client/Server communication for SCADA applications
> GOOSE analysis and applications
> Sampled Values on the digital process bus
> Configuration and engineering based on the SCL
> Basic aspects of communication networks
> Analyze IEC 61850 based communication systems
> Hands-on testing of IEC 61850 IEDs and systems in the environment of a fully digital substation

Solutions

IEDScout, StationScout
GOOSE Configuration Module, Sampled Values Configuration Module, IEC 61850 Client/Server
ISIO 200, DANEO 400
CMC test sets with Ethernet adapter

Audience

Technical staff from electric utilities or companies involved in project planning, commissioning or maintenance of IEC 61850 systems

Prerequisites

Basic knowledge of electrical engineering

OMICRON Academy

OMICRON is an international company that works passionately on ideas for making electric power systems safe and reliable. Our pioneering solutions are designed to meet our industry's current and future challenges. We always go the extra mile to empower our customers: we react to their needs, provide extraordinary local support, and share our expertise.

Within the OMICRON group, we research and develop innovative technologies for all fields in electric power systems. When it comes to electrical testing for medium- and high-voltage equipment, protection testing, digital substation testing solutions, and cybersecurity solutions, customers all over the world trust in the accuracy, speed, and quality of our user-friendly solutions.

Founded in 1984, OMICRON draws on their decades of profound expertise in the field of electric power engineering. A dedicated team of more than 900 employees provides solutions with 24/7 support at 25 locations worldwide and serves customers in more than 160 countries.

For more information, additional literature, and detailed contact information of our worldwide offices please visit our website.

www.omicronenergy.com