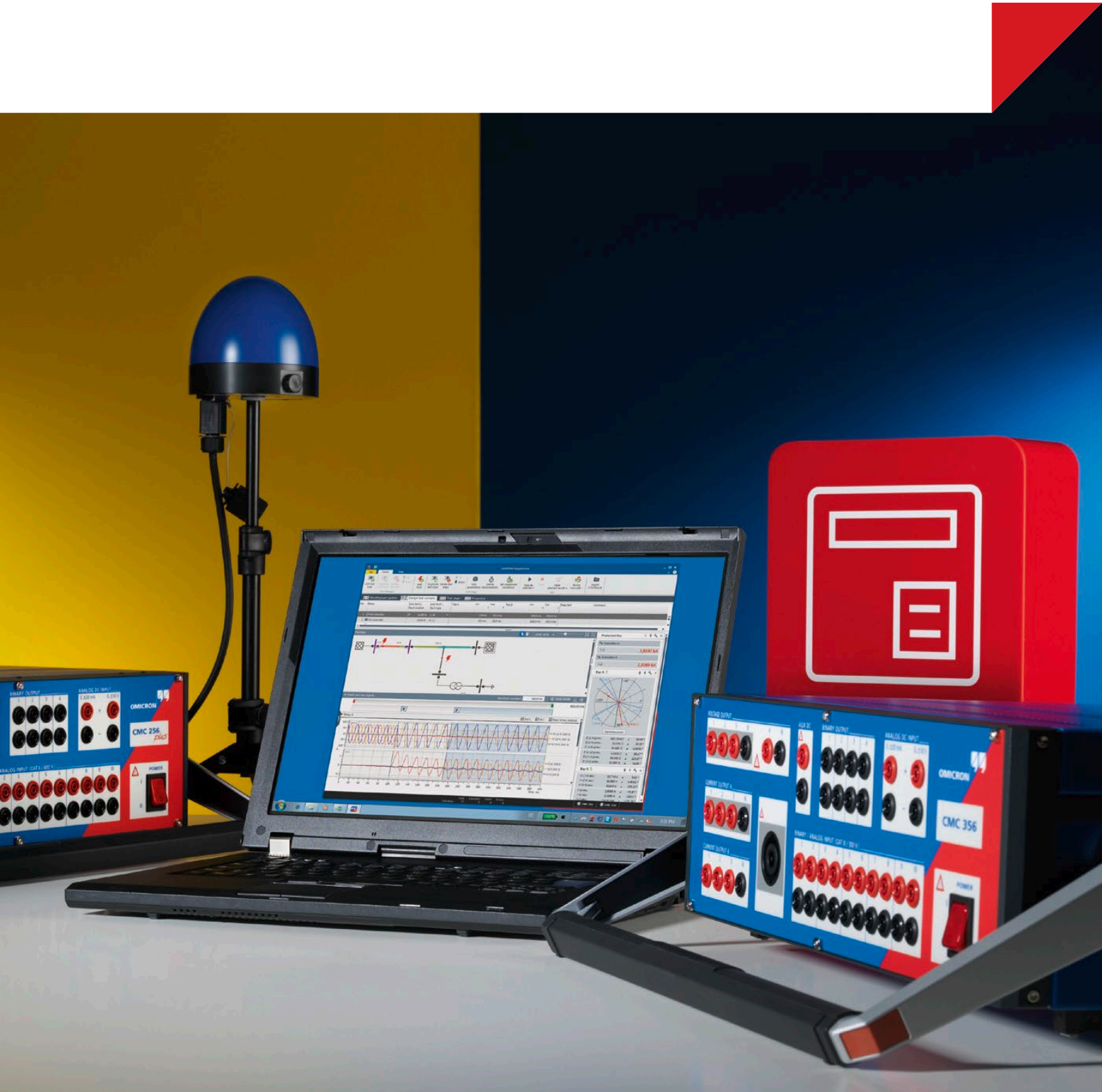


RelaySimTest

Easy to use software for system-based protection testing with CMC test sets



RelaySimTest – Test the whole system



System-based testing

RelaySimTest is a software for system-based protection testing using one or more CMC test sets.

Its unique approach can reveal failures created during calculations as well as during the setup of the relay or a protection scheme, requiring only a minimum amount of test steps.

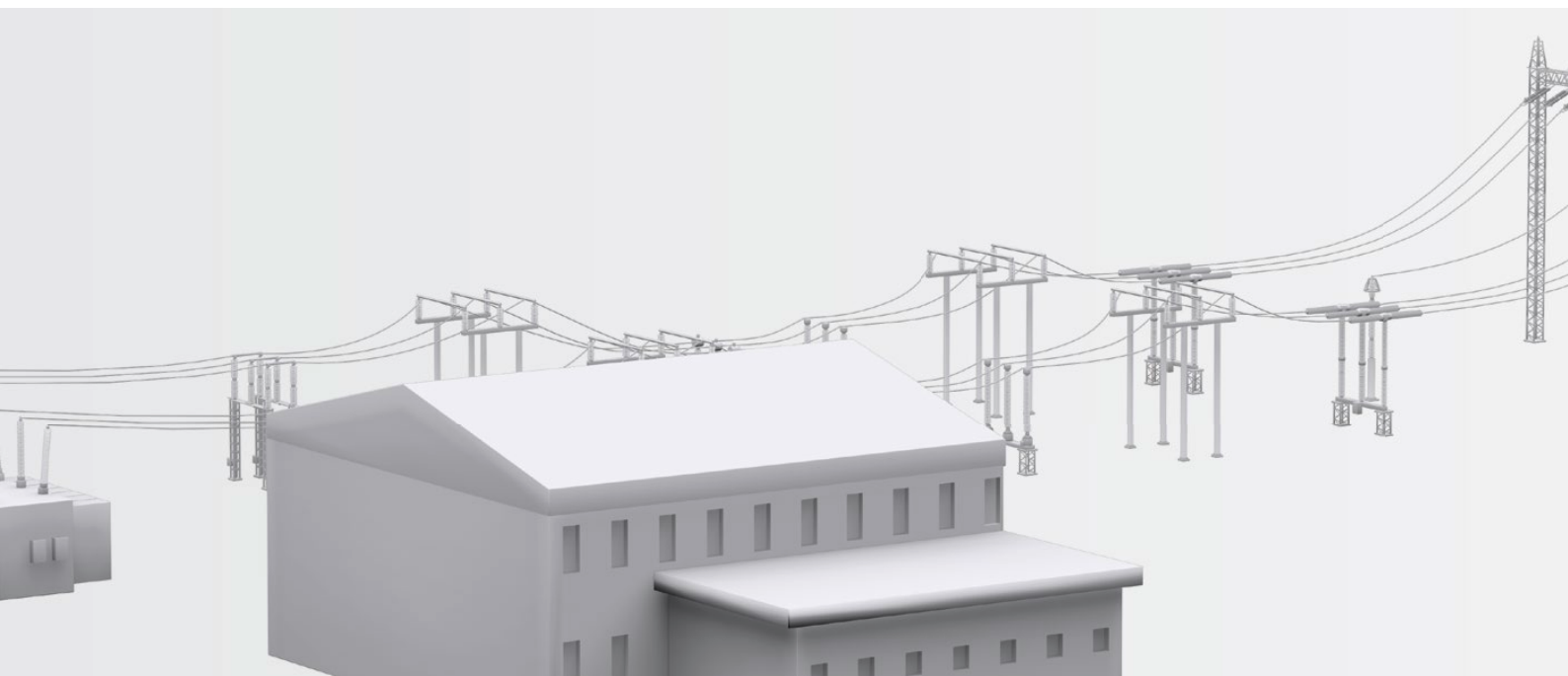
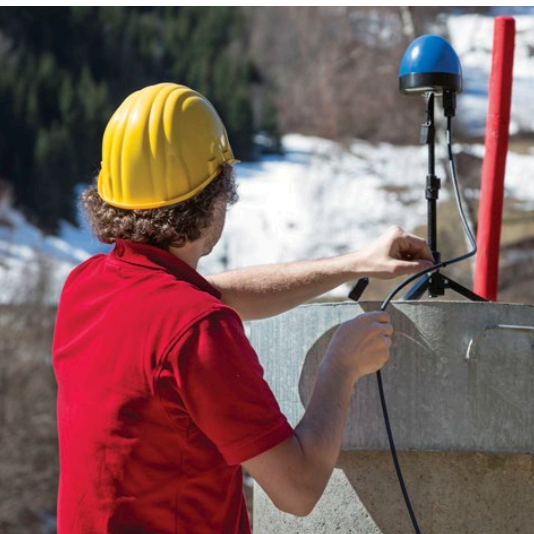
Modern protective relays use complex algorithms that adapt to networks and failures. Simple function tests are often not sufficient for testing such relays.

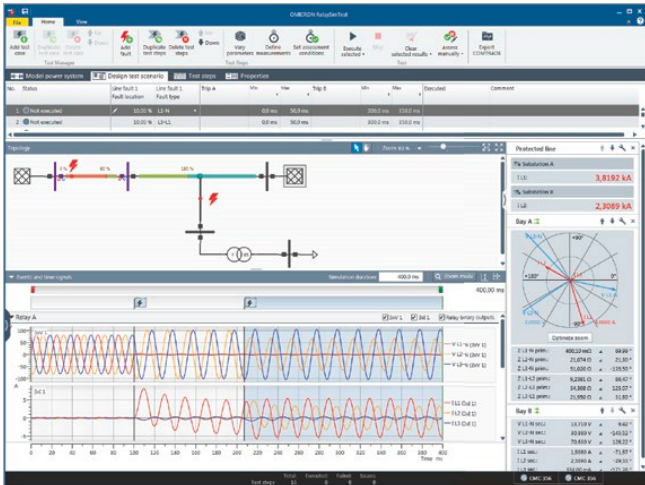
RelaySimTest covers these new demands with a transient simulation of the primary power system.

System-based tests are independent from relay type, manufacturer and detailed parameters. The protection behavior is the only thing that counts.

Test devices supported

- > CMC 356, CMC 353, CMC 256plus, CMC 850, CMC 256-6 (with NET-1 hardware and Power over Ethernet capability)
- > CMGPS 588 for time synchronized testing





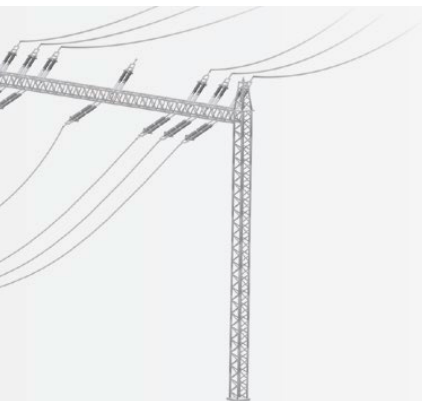
Easy to work with from predefined protection systems to more complex networks. The more you need, the more choices you have.

Easy and flexible

Predefined templates make starting fast and easy in standard testing situations. With the flexible grid editor even more complex power networks and fault scenarios can be modeled conveniently.

To test the relay, you can do a single shot or create multiple shots with varied parameters (for example, fault type, fault location, etc.). Afterwards, test results can be automatically assessed according to a simple time grading of the protected lines.

RelaySimTest is perfectly capable of simulating steady-state values and transient signals without even being connected to a CMC.



Your benefits

- > System-based testing of the protection system independent of relay type and manufacturer.
- > Distributed testing made easy by controlling multiple CMCs from one PC – direct or via Internet.
- > Testing of advanced applications made easy.

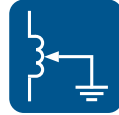
RelaySimTest – Test the whole system

Substation



Busbar protection

Modeling of any type of busbar topology possible. Simultaneous injection to any number of field units. Fault simulation possible on every node including dead-zone faults in the coupling field.



Insulated and compensated networks

Simulate networks with insulated and compensated star-point grounding. Test behavior of the protection system for earth faults and resulting two phase faults.



Breaker-and-a-half

Test 1 ½ breaker relays with six current-inputs. No need to re-wire during test. Check coordination of both relays e.g. for breaker-failure protection.



Transformer differential protection

Simulation of different transformer vector groups. Validating the configuration of transformer differential protection or distance protection that overreaches the transformer.

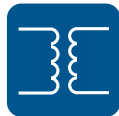
Combined applications

Examples of how RelaySimTest can be adapted flexibly for almost every application



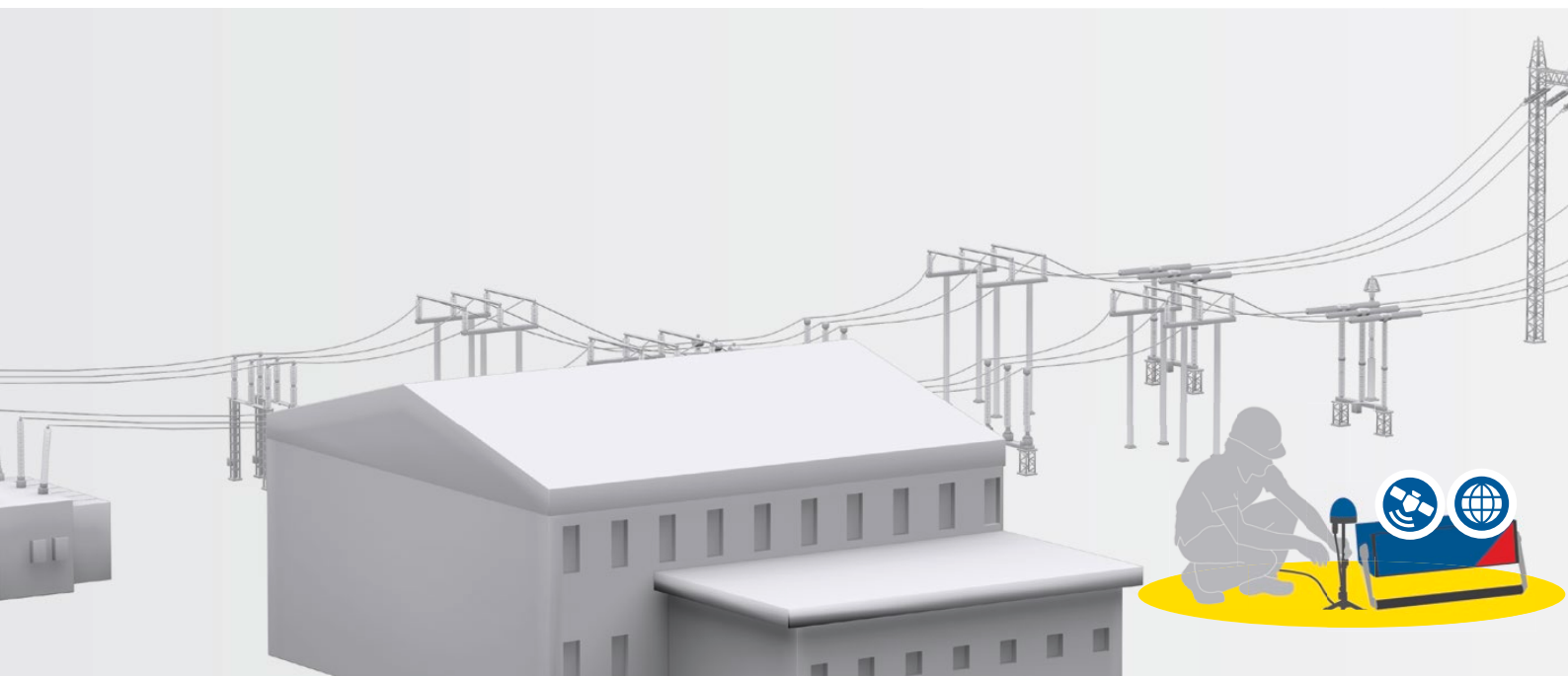
Teleprotection with auto-reclosing

Simultaneous coordination testing for the reclosing cycles of multiple distributed relays. Testing for weak infeed scenarios and current reversal.



Teleprotection with transformer

Testing distributed line protection containing a transformer inside its protected zone. Transformer model is taking care of vector group and transformer ratio automatically.



Transmission



Teleprotection and line differential

Testing the protection including its communication channels. Controlling the test setup from one end without coordinating each test over the phone. Independent of the teleprotection scheme being used.



Auto-reclosing

Simple testing of auto-reclosing sequences independent of the amount of cycles, single or three pole tripping. Simultaneous coordination testing for the reclosing cycles of multiple relays.



Three-terminal lines

Controlling each test set from three or more terminals on one end without having to coordinate each test on the phone.



Power-swing & out-of-step

Testing the tripping & blocking of the protection under out-of-step and power-swing condition. Combine power-swings with fault and breaker events.



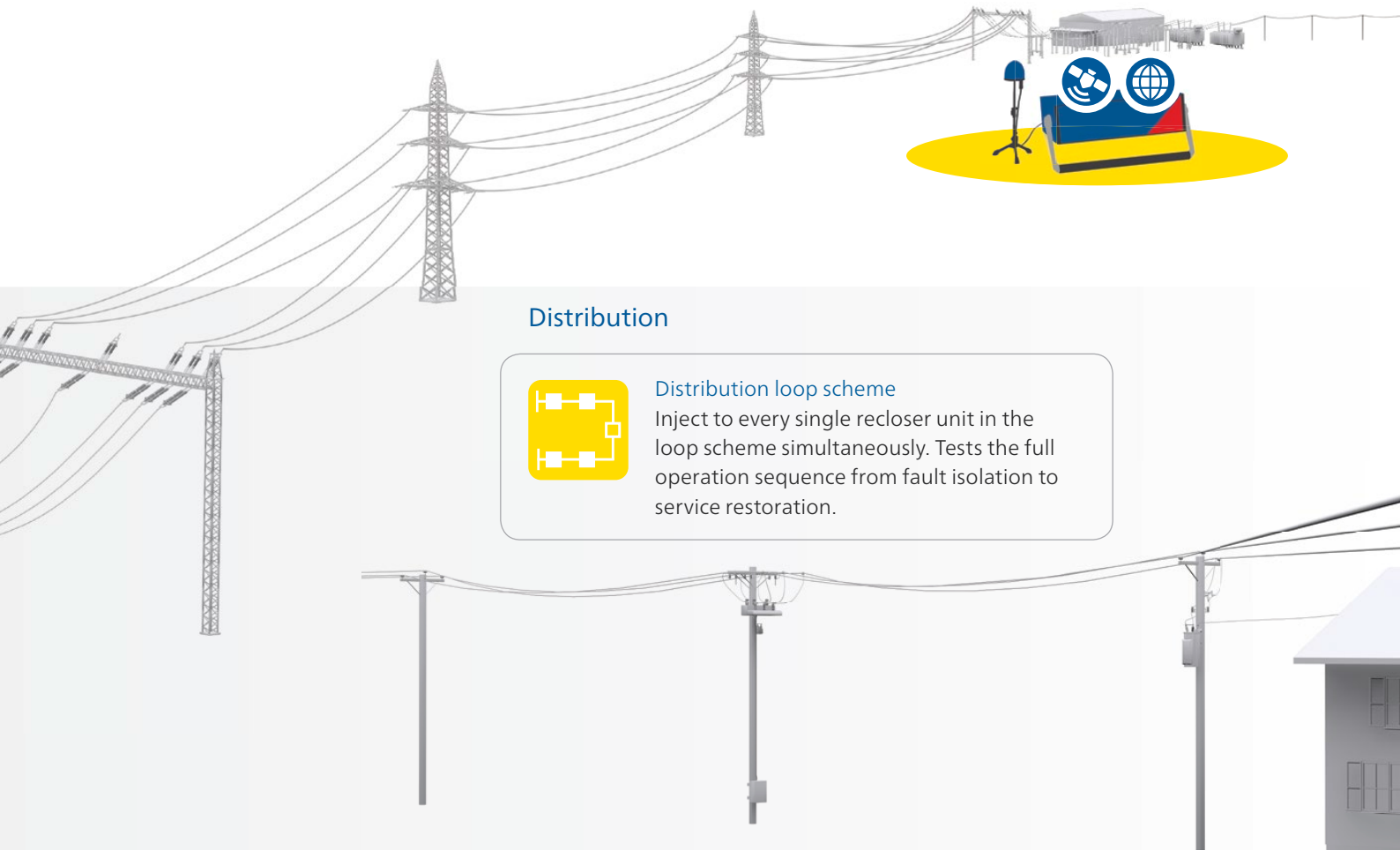
Series-compensated lines

Testing complex zone coordination on series compensated lines including how they are effecting time grading.

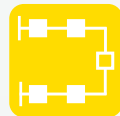


Parallel lines with mutual coupling

Simulating mutual coupling between line segments as they occur in your real world topology. Testing for over- and underreach when parallel lines are in operation or grounded.



Distribution



Distribution loop scheme

Inject to every single recloser unit in the loop scheme simultaneously. Tests the full operation sequence from fault isolation to service restoration.

RelaySimTest – Distributed testing

With RelaySimTest you can control all of the CMCs connected for the test via one PC. Remote CMCs can simply be controlled via an internet connection.

This results in the simplest distributed testing possible for systems such as teleprotection or line differential protection, regardless of how many CMC test sets are used.

Automatically synchronized

Perform distributed tests the same way you perform single-end shots, using the CMGPS 588 Grandmaster Clock – our plug-and-play solution for synchronizing distributed injections.

Then everything runs smoothly: RelaySimTest calculates the required injection signals for all ends automatically, making it much easier to troubleshoot the network.

Having all CMCs controlled from one application, makes testing much easier. Comprehensive reports can be generated from a single location across the entire test, covering all relays.

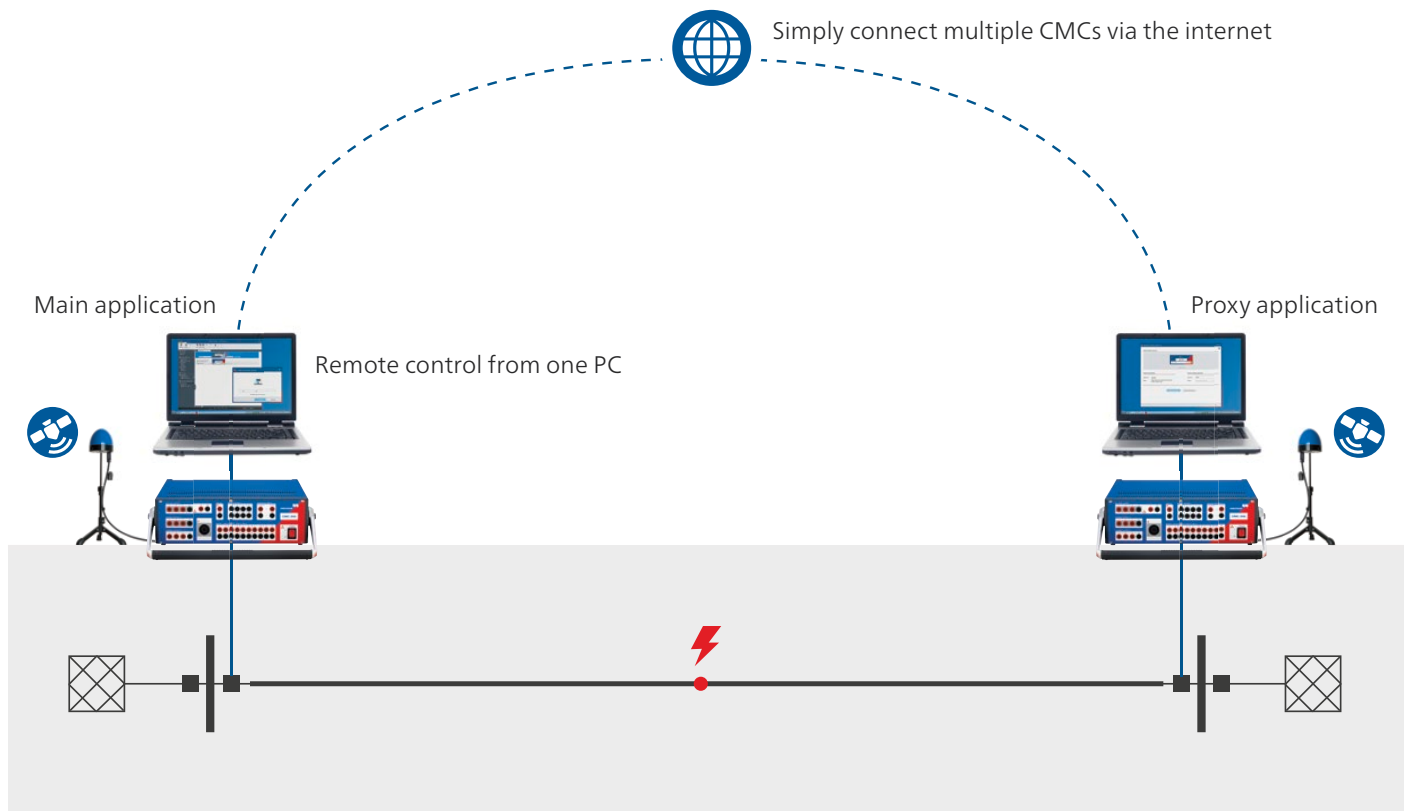
Furthermore, RelaySimTest simulates relay-controlled breaker operations. Iterative Closed-Loop simulation makes testing auto-recloser functions possible – even in distributed protection systems.



Remote control
Operate multiple CMCs remotely – no matter where you are. Our solution makes it easy to control the devices via the Internet.

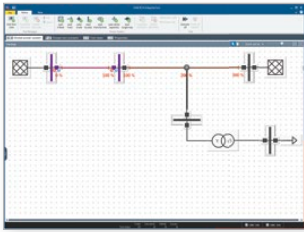


GPS synchronized
Synchronizing multiple CMCs is easy using the CMGPS 588 Grandmaster Clock.



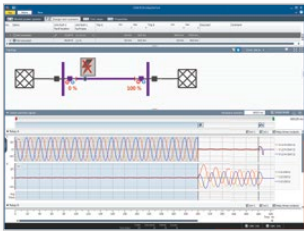
Test procedure

1 Model network



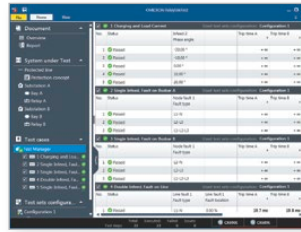
With the flexible grid editor, complex power networks can be modeled intuitively. Elements for lines, busbars, infeeds, loads, two-winding transformers, and more are available.

2 Define tests



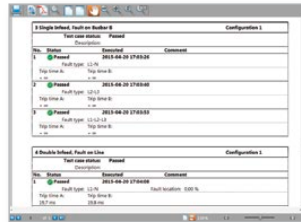
RelaySimTest supports testing with extensive fault scenarios. This allows the simulation of realistic operating conditions for comprehensive tests.

3 Execute tests



All test steps are executed one after the other automatically, even with multiple distributed CMCs. The trip times can be auto-assessed based on the time grading of the protection system.

4 Create report



No.	Status	Description	Comment
1	Failed	2013-04-24 17:45:20	
2	Failed	2013-04-24 17:45:20	
3	Failed	2013-04-24 17:45:20	
4	Failed	2013-04-24 17:45:20	
5	Failed	2013-04-24 17:45:20	
6	Failed	2013-04-24 17:45:20	
7	Failed	2013-04-24 17:45:20	
8	Failed	2013-04-24 17:45:20	
9	Failed	2013-04-24 17:45:20	
10	Failed	2013-04-24 17:45:20	
11	Failed	2013-04-24 17:45:20	
12	Failed	2013-04-24 17:45:20	
13	Failed	2013-04-24 17:45:20	
14	Failed	2013-04-24 17:45:20	
15	Failed	2013-04-24 17:45:20	
16	Failed	2013-04-24 17:45:20	
17	Failed	2013-04-24 17:45:20	
18	Failed	2013-04-24 17:45:20	
19	Failed	2013-04-24 17:45:20	
20	Failed	2013-04-24 17:45:20	
21	Failed	2013-04-24 17:45:20	
22	Failed	2013-04-24 17:45:20	
23	Failed	2013-04-24 17:45:20	
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25	Failed	2013-04-24 17:45:20	
26	Failed	2013-04-24 17:45:20	
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45	Failed	2013-04-24 17:45:20	
46	Failed	2013-04-24 17:45:20	
47	Failed	2013-04-24 17:45:20	
48	Failed	2013-04-24 17:45:20	
49	Failed	2013-04-24 17:45:20	
50	Failed	2013-04-24 17:45:20	

RelaySimTest automatically generates protocols for all tests performed. Furthermore, you can decide which parts are included in the test report.

Key features

- > Integrated transient network model for simulation of realistic fault signals
- > Ready-to-use templates for networks with up to two relays, and flexible editor for more complex test cases
- > Models for lines, busbars, infeeds (sources), loads, two-winding transformers, and more
- > Modeling of isolated and compensated networks (transient ground fault scenarios)
- > Relay-controlled breaker operation for trip (3-phase and 1-phase) and close
- > Iterative Closed-Loop simulation (for example, for auto-reclose functions)
- > Control of remote CMCs via a safe Internet connection from your PC (only out-going HTTP traffic required)
- > Leverage available Internet access of mobile computers in the fields (for example, UMTS, mobile hotspot feature of Smartphones, ...)

Simulations

- > Line capacitances, stray capacitances and series capacitances
- > Mutual coupling of lines
- > L-N, L-L, L-L-N, L-L-L and L-L-L-N faults with variable arc resistances
- > Complex scenarios with multiple, evolving, and cross-country faults
- > Stable and unstable power-swing scenarios
- > Circuit breaker auxiliary contacts (CB52a and CB52b), breaker-failure simulation
- > CT saturation based on CT Analyzer import

Software packages

	Order no.
One license for RelaySimTest	VESM6007
Package for distributed testing, including two licenses for RelaySimTest plus two CMGPS 588	VESM6009

OMICRON is an international company serving the electrical power industry with innovative testing and diagnostic solutions. The application of OMICRON products allows users to assess the condition of the primary and secondary equipment on their systems with complete confidence. Services offered in the area of consulting, commissioning, testing, diagnosis and training make the product range complete.

Customers in more than 140 countries rely on the company's ability to supply leading-edge technology of excellent quality. Service centers on all continents provide a broad base of knowledge and extraordinary customer support. All of this together with our strong network of sales partners is what has made our company a market leader in the electrical power industry.

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