

# MAXIMUM EFFICIENCY

A combination of well thought-out features and the use of automation make testing solutions incredibly efficient

8 h

7 h

6 h

5 h

4 h

3 h

2 h

1 h

Typical testing time

SAVE AT LEAST

**50%**

SAVE UP TO

**66%**



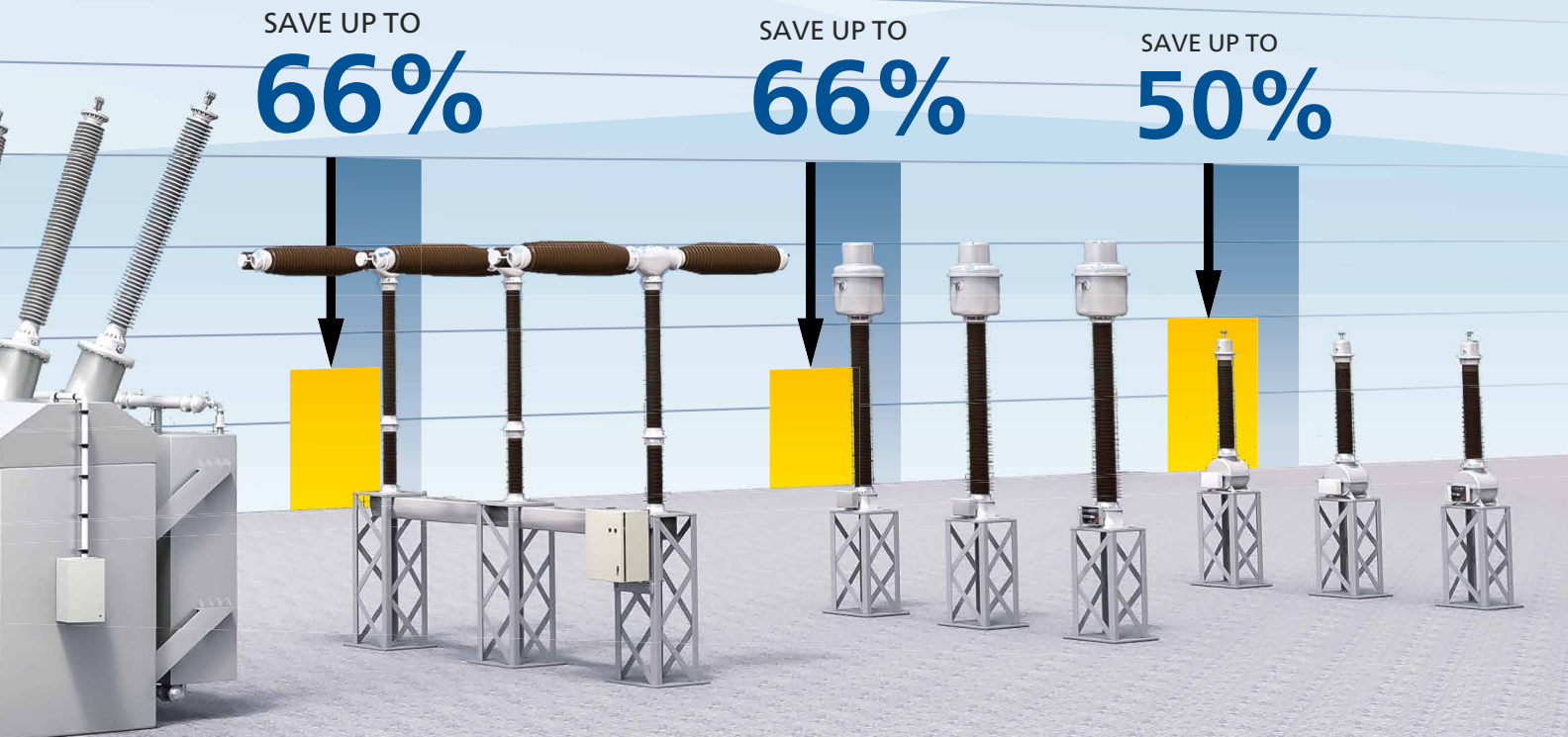
When it comes to testing assets in substations and performing comprehensive condition assessments, efficiency is king. All the relevant test data has to be collected quickly in order to ensure downtimes that are as short as possible and to allow informed conclusions about the correct operation and condition of the tested asset to be made. The safety of the asset, the test engineers and the immediate surroundings must be guaranteed at all times. All of these factors need to work together as smoothly as possible in order to achieve maximum efficiency.

Our developer teams are passionate about developing solutions that fulfill these demands and make the procedure as efficient as it can be. ▶

*«With smart testing solutions you can reduce the number of steps in a procedure, resulting in easier, faster and safer testing.»*



**Christian Enk**  
Area Sales Manager &  
Regional Training Manager,  
OMICRON



### Testing power transformers

Due to the complex design of transformers, there are a number of parameters that need to be checked. This often requires multiple devices and wires that need to be connected and disconnected repeatedly. Testing individual phases and tap changer positions not only increases the workload, but it also extends the transformer's downtime. Testing transformers is the most time-consuming form of equipment testing in a substation – on average, a comprehensive test takes an entire working day.

TESTRANO 600 is the world's first three-phase, multifunctional and easily portable testing system (thanks to its weight of only 20 kg / 44 lbs). Its three powerful amplifiers minimize testing time while also ensuring a high level of measurement accuracy. Intelligent algorithms provide fully automatic, simultaneous testing of all three phases, thus, TESTRANO 600 needs just a third of the time that it takes to run tests with conventional single-phase testing solutions.

In addition, a number of standard electrical tests can be carried out with just one test setup, such as measuring the transformer turns ratio, winding resistance, dynamic resistance, short-circuit impedance, as well as frequency response of stray losses. Combined with an intuitive connection technique, the probability of errors in the test setup and execution is minimized and leads to a significant reduction in testing time.

Once the test is complete, the results can be evaluated automatically in accordance with international standards or user-defined limit values. The results can then be saved in the Primary Test Manager™ database, where they can be managed and stored for future reference.



### Testing circuit breakers

A broad spectrum of mechanical and electrical errors can occur in circuit breakers due to their design. For this reason a number of diagnostic tests must be carried out, which until now required multiple devices and a time-consuming wiring effort. Another important factor is the power supply being used during the test. Normally, the substation battery is used to supply power for these tests, resulting in a volatile test voltage and less reliable test results.

CIBANO 500 has revolutionized medium-voltage and high-voltage circuit breaker testing by combining a micro-ohmmeter, timing analyzer, and a coil and motor supply in a single device. A number of parameters such as switching times, static and dynamic contact resistance, motion sequences, coil and motor current, and undervoltage condition and minimum pick-up tests, can all be tested with one single test setup. Testing times with CIBANO 500 are up to two thirds shorter than that of conventional solutions.

Its integrated power supply also guarantees safe and independent operation, as well as reliable and reproducible measurement results. Having the ability to perform tests with a circuit breaker that is grounded on both sides increases the safety of all on-site personnel.

The included Primary Test Manager™ software and its new Circuit Breaker Testing Library (CBTL) also support testing engineers on site with useful features such as test templates with pre-filled asset data, automatic assessment and test logging. In addition, all of the data can be collected, stored and managed in a single central database.





### Testing instrument transformers

Testing and calibrating current and voltage transformers, comprehensively, requires either complex on-site testing or their complete dismantling and transport to a testing laboratory.

In order to meet the relevant standards, all cores, windings and taps must be tested, which constitutes a considerable amount of effort. For instance, the actual testing of different measurement points at nominal frequency can take several hours.

In order to make this task as efficient as possible, CT Analyzer was developed to test current transformers and VOTANO 100 was developed to test voltage transformers. Both testing solutions can be used to measure a number of parameters, such as the ratio, phase displacement, ratio errors, burden, polarity, excitation characteristics, or the transient performance parameters. Furthermore, it is also possible to assess the accuracy and class under different load, current, and voltage conditions. The integrated switching matrix reduces the wiring effort to a minimum. This means that CT Analyzer can test up to six taps and VOTANO 100 can test up to five windings at the same time without the test setup needing to be changed.

Tests conducted using CT Analyzer and VOTANO 100 are also very safe, as CT Analyzer's maximum test voltage output is 120 V. Regarding VOTANO 100, the necessary 4 kV test voltage is generated by the separate VBO2 voltage booster. For security reasons VBO2 is situated close to the test object but far away from the tester.

### Testing protection relays and measuring instruments

For electromechanical and digital protection relays – as well as measuring devices – functionality, response times, and accuracy must be checked regularly. Testing numerous relay parameters without optimized tools is very time-consuming. CMC devices provide users with a wide range of test sets that meet all of the relevant requirements in relation to functions and features, output power, and accuracy. In order to meet individual demands regarding scope and completeness (testing depth), a range of different control options and testing concepts are available for CMC test sets.

The modular Test Universe software suite offers the most comprehensive and complete solution for parameter-based tests. The flexible software environment from the OMICRON Control Center (OCC), technologies such as XRIO and test templates from the Protection Testing Library (PTL) allow various test functions to be combined into a single test plan. Furthermore, they support extensive test automation, and continually updated and improved test plans.

Test plans that are used during initial commissioning can easily and efficiently be used again during maintenance and re-commissioning. Test Universe not only covers the whole range of protection testing, but it also saves a lot of time, especially when it comes to tests which have to be carried out repeatedly.

Conversely, the innovative, system-based testing approach of the RelaySimTest software is independent of the relay type and the broad range of relay parameters. Instead, RelaySimTest focuses entirely on the proper behavior of the protection system. Having the ability to automatically adapt the test signals to the response of the protection system (Iterative Closed-Loop) considerably simplifies the logic testing procedure. Tests that require multiple test sets, such as end-to-end tests, can be controlled from just one PC, which also reduces downtimes significantly. ■

