

SIGUARD® PSA

Solution for protection system performance assessment and improvement

Protection performance assessment
SIGUARD® PSA enables protection engineers to automatically simulate, assess and improve selectivity, sensitivity and speed of the protection system performance for different network and operation conditions. For this purpose SIGUARD® PSA is offered as both software solution and consulting service.

SIGUARD® PSA supports the whole workflow from data collection, network and protection simulation & assessment to setting improvement. The underlying state of the art protection security assessment method is practice-proven and was deployed successfully for protection system reviews in transmission and distribution systems worldwide. The application of the protection security assessment has the following workflow:



Figure 1: SIGUARD® PSA Workflow

Data collection & management
SIGUARD® PSA supports the data collection & management process. Electronically available network & protection data can be directly imported into SIGUARD® PSA. Alternatively, there are easy-to-fill data collection spreadsheets facilitating the data collection process.

The data collection process is complemented with a multi-level data plausibility check tool. The strict elimination of data errors results in high quality network and protection data and thus provides the basis for meaningful protection simulation results.

SIGUARD® PSA helps to optimize both data management and the reliable assessment of network and protection simulation models.

Simulation & performance assessment

Classical protection coordination methods mainly rely on the depiction of setting values, short-circuit currents and network impedances for one operating state.

In contrast, SIGUARD® PSA uses combined power and protection system simulation and assesses the performance of the protection system by visualizing real selectivity. This comprehensive consideration of the complete protection system, consisting of main protection and back-up protection, initially allows the detection of hidden

errors for all possible network and fault scenarios.



Figure 2: SIGUARD® PSA User Interface

As required, the results can be represented aggregated for complete network areas or detailed for each protection object or equipment. The usage of color-coding facilitates identification of incorrect settings, weaknesses and limitations of protection system. If necessary, each step of fault clearing sequence can be analyzed in detail. All currents, voltages and impedances measured by protection devices are reported and explain the protection system behavior.

SIGUARD® PSA assesses a large number of fault scenarios systematically and efficiently. Its clear result visualization allows the precise identification of weaknesses and their reasons in the protection system.

Protection system improvement

False or improvable settings can be corrected rule-based. Alternatively also system-wide optimizations of the protection settings are possible. In order to assure quality new protection settings are verified via simulation before approval.

In case where no selective protection grading can be achieved with improved settings, it is clearly indicated that an adjustment of the protection scheme is necessary.

SIGUARD® PSA facilitates the automated protection relay coordination and minimizes the need for individual manual treatment of special cases.

Practical application

In practical application the first step comprises the construction of a quality tested data base which is then digitally available after first-time application of SIGUARD® PSA.

Through the protection performance assessment of the local system current weaknesses and limitations of the protection systems are indicated.

In order to ensure reliable network operation these weaknesses have to be rectified. This is likewise supported by SIGUARD® PSA.

Optimized and verified by simulation this protection system is the basis for the regular adjustment to future network extension. Thus, for example in the context of the integration of renewable energy it is possible to forecast how long the current protection system is able to satisfy the requirements in regard to selectivity or when a new concept has to be created.

SIGUARD® PSA is offered as pure consulting service, software solution or control center application.

Key benefits

- State of the art technical solution

SIGUARD® PSA is the leading complete solution for protection performance assessment and improvement of protection systems.

- Efficiency

Through close integration of data management, simulation and assessment the fast identification of false and improvable protection settings and both critical and hidden fault scenarios is possible.

- Productivity

Its high degree of automation allows systematic and reliable implementation of comprehensive protection performance assessment and leads to significant time and cost savings.

- Quality

Consistent application of plausibility checks assures highest achievable standards of data quality.

- Flexibility

SIGUARD® PSA service solution and software is scalable and can be customized to specific needs application of plausibility checks assures highest achievable standards of data quality.

- User-friendly software

The practice-proven operation and visualization concepts ensure easy interpretation of the results.

- Interoperability

The data import from other IT systems leads to synergies by using existing data resources.

- Expendability

Its power system model can also be used for other power system studies such as distributed generation grid code compliance, harmonics, etc.

- Higher network utilization

The optimization of settings not only improves the protection system performance, adaptive settings can also help to increase the network utilization.

- Security and reliability

Its regular application helps to prevent avoidable supply interruptions and cascading failure events.

- Measurable benefits

SIGUARD® PSA allows the quality comparison of protection system performance with regard to different settings and network states for selected equipment and entire network areas.

- Cost-effectiveness

The SIGUARD® PSA solution assists during the complete protection system check and its improvement. Thus, it outperforms traditional protection coordination methods regarding technical performance and cost-effectiveness.

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