



Tekniska rapporter och IEC 61850 guidelines

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Anders Johnsson

Svensk representant i Cigré B5 Protection and Automation



Vad är Cigré?



A collaborative global community sharing knowledge and expertise

CIGRE's engine room is its **global community**. Across the world thousands of power system professionals are taking time out from their jobs in the industry and volunteering their time to **collaboratively share their knowledge and experiences** for the greater good of the industry.

This unique community is underpinned by a global network of **60 CIGRE organisations referred to as the National Committees, or NCs**. These on the ground organisations have an in-depth understanding of the local conditions in over 90 countries. NCs also nominate their best local talent for the **250+ Working Groups** participating in CIGRE's global knowledge programme. This wide geographic spread, combined with a **variety of established experts, experienced practitioners and young professionals**, enables CIGRE to offer **the most diverse range of power system perspectives and experiences available** from any organisation. CIGRE's community of professionals give their time and energy with an **authentic desire to draw upon, share and build technical expertise**, ensuring that the knowledge needed to meet the challenges of the power system is accessible to everyone.

An open, non-profit, fact-based culture

CIGRE's open, diverse culture offers a unique parallel career path towards excellence in a chosen power system field. CIGRE's community attracts the very best and CIGRE's prestigious Technical Council features some of the world's leading power system experts.

From problem solving to personal development, CIGRE members draw on this world class expertise at a fraction of its commercial cost.





CIGRE's Studiekommittéer och områden

Group A – Equipment

- **A1 Rotating electrical machines**
- **A2 Power transformers and reactors**
- **A3 Transmission and distribution equipment**

Group B – Technologies

- **B1 Insulated cables**
- **B2 Overhead lines**
- **B3 Substations and electrical installations**
- **B4 DC systems and power electronics**
- **B5 Protection and automation**

Group C – Systems

- **C1 Power system development and economics**
- **C2 Power system operation and control**
- **C3 Power system environmental performance**
- **C4 Power system technical performance**
- **C5 Electricity markets and regulation**
- **C6 Active distribution systems and distributed energy resources**

Group D – New Materials and IT

- **D1 Materials and emerging test techniques**
- **D2 Information systems and telecommunication**



B5 – Protection and Automation Thematic groups

Arbetet är organiserat i tre sk thematic groups:

- B51 - Substation Automation - Systemperspektiv
- B52 - Protection and Monitoring - Funktioner
- B53 - New Network Requirements – Anpassning till nya krav



Exempel på nya arbetsgrupper inom B5

- **WG B5.65 Enhancing Protection System Performance by Optimising the Response of Inverter-Based Sources.**
- **WG B5.66 Cyber Security requirements for PACS and the Resilience of PAC Architectures (Anders Johnsson, Vattenfall Eldistribution)**
- **JWG B5.D2.67 Time in Communication Networks, Protection and Control Applications – Time Sources and Distribution Methods (D2 Andreas Lundin, Svk, Florin Stelea, Sweco och Per-Olof Hedekvist, RISE)**
- **WG B5.68 Optimisation of the IEC 61850 Protection, Automation and Control Systems (PACS) engineering process and tools (Magnus Wennerholm E.ON Energidistribution AB)**
- **WG B5.69 Experience gained and Recommendations for Implementation of Process Bus in Protection, Automation and Control Systems (PACS)**
- **JWG B5.70 Reliability of Protection Automation and Control System (PACS) of power systems – Evaluation Methods and Comparison of Architectures (Lars Messing DNV GL Sweden AB)**



Arbetsgrupper som närmar sig leverans

- **WG B5.50: IEC 61850 Based Substation Automation Systems – Users Expectations and Stakeholders Interactions** (Berkan Kapkac, Vattenfall Eldistribution)
- **WG B5.51: Requirements and Use of Remotely Accessed Information for SAS Maintenance and Operation**
- **WG B5.56: Optimization of Protection Automation and Control Systems**

Broschyrer (TB) publiceras och blir tillgängliga på E-CIGRE

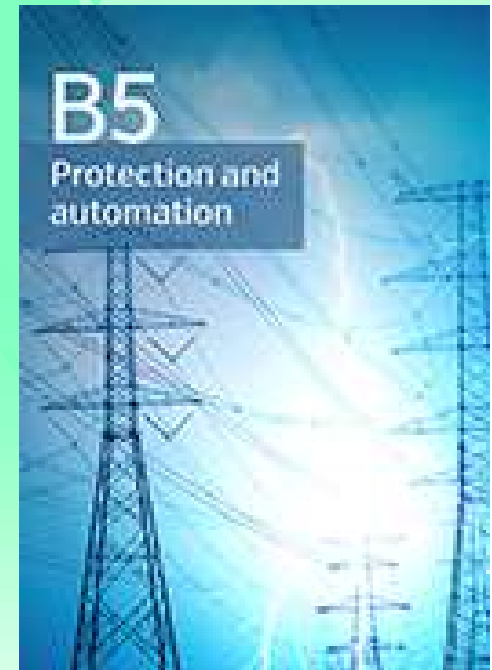


Implications and Benefits of Standardised Protection and Control Schemes

TB584

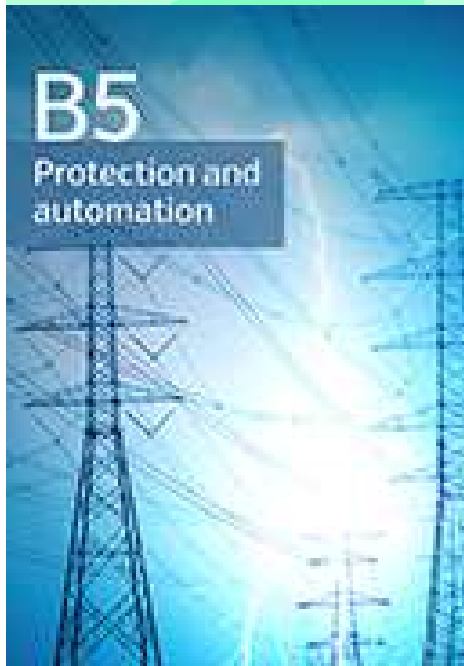
The Technical Brochure identifies what is a standardised design philosophy and what are the current levels of standardisation in utilities, consultants and manufacturers related to IEC 61850.

It investigates what are the main drivers for a utility to adopt a standardised design philosophy, the main drivers for a supplier/contractor to produce/apply standardised solutions, the short-term benefits that can be achieved, and the total lifetime cost of a standard scheme compared with a non-standard design.





TB628



Documentation Requirements Throughout the Lifecycle of Digital Substation Automation Systems

This TB identifies and summarizes the new requirements of the documentation for a digital substation automation system in all the lifecycle steps.

Recognizing that general documentation principles have been established for many decades, it focuses on the differences in documentation requirements due to the "digital" nature of Substation Automation Systems.



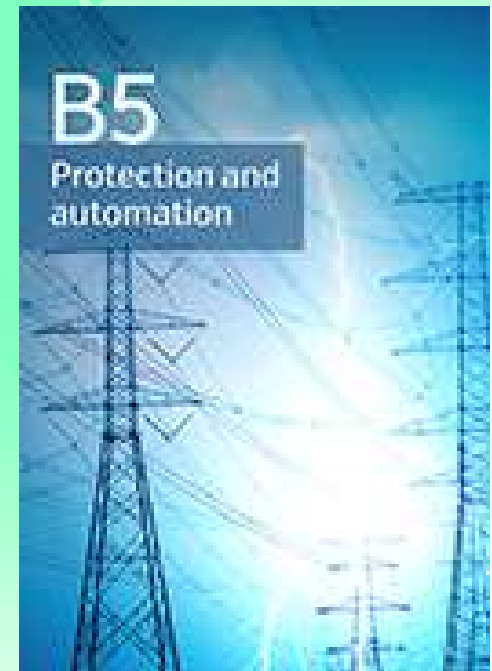
Acceptance, commissioning and field testing techniques for protection and automation systems

TB637

Utilities are facing the challenge to readdress and even adopt new testing approach and strategy for protection and control equipment and systems due to technology advances in numerical relays, systems and test equipment.

The WG studied different testing techniques, tools and strategies that are applied in the industry today.

To achieve attainable benefits, it is proposed to be in compliance with recommended test process, select suitable test methodologies and tools, enforce standardization and repeatability of testing process.





Test strategy for Protection, Automation and Control (PAC) functions in a fully digital substation based on IEC 61850 applications

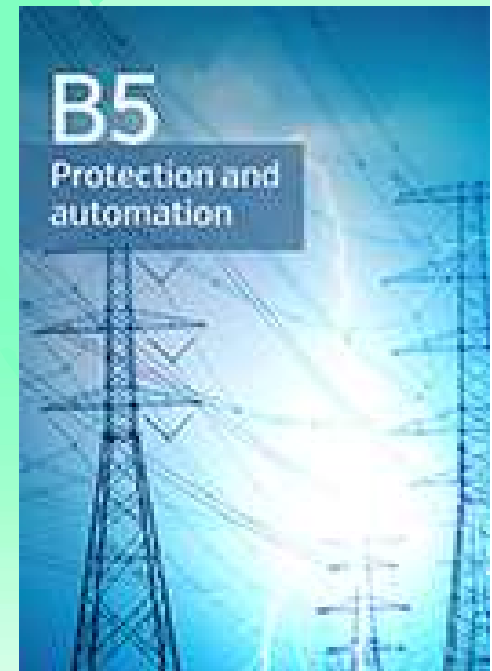
The wide spread development and implementation of IEC 61850 based Substation Protection, Automation and Control Systems (SPACS) using predominantly GOOSE messages and client/server communications has raised the awareness of the industry regarding the benefits of communications based systems.

At the same time, the last years have seen a significant change in the availability of stand-alone and embedded Non-Conventional Instrument Transformers (NCIT) with IEC 61850 sampled values interfaces.

For this reason, the testing of fully digital functional chains has become an important issue with the deployment of IEC 61850-based substations using Stand Alone Merging Units (SAMU), and/or NCIT and featuring both station bus (IEC 61850-8-1) and process bus (IEC 61850-9-2).

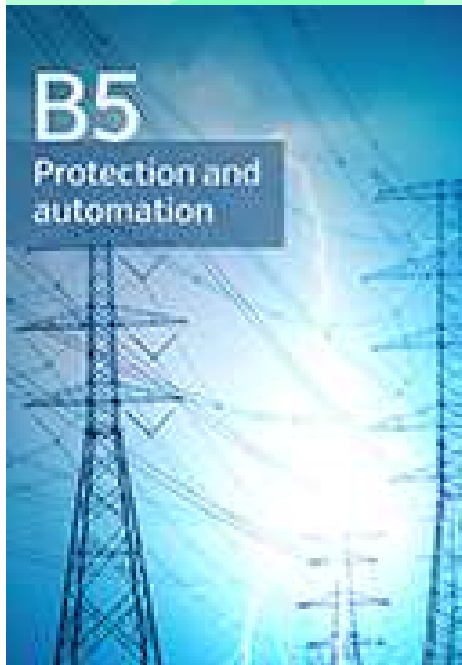
This Brochure covers all test related aspects of a fully digital SPACS and equipment, including NCIT/SAMU Certification tests, SPACS level Interoperability tests, Factory Acceptance Tests, Commissioning and Site Acceptance Tests and Maintenance tests after commissioning.

TB760





TB687



Experience concerning availability and reliability of digital substation automation systems (DSAS)

Nowadays Reliability, Availability, Maintainability and Performance (RAMP) are essential indicators for systems operating in every domain, included digital substation automation systems (DSAS).

In order to collect a feedback from the experience gained by both utility and manufacturers to date, the working group carried out an international survey, investigating the adopted measures to achieve higher level of RAMP, from the concept and definition to the disposal phase of a DSAS lifecycle.

Throughout the Technical Brochure, figures from the survey, collating experiences and common practices from the DSAS user community about DSAS dependability, are presented, analysed and discussed.

Furthermore, meaningful suggestions are given to Users and Vendors, in order to allow them to specify, design and develop the new systems with an improved level of RAMP.

Some numerical evaluation of the availability and reliability of different DSAS architectures are also given.



TB764

B3

Substations and
electrical installations



Expected impact on substation management from future grids

Future developments in the energy landscape will impose changes in substation management affecting the total life cycle management strategy.

The working group reviewed the drivers impacting the management of the existing substations and analysed the expected impact of these changes on future substation management.

The brochure addresses new asset management models, emerging technologies, digitalisation, condition monitoring, data management and skills sets.

The substations will inevitably change in the future!



Remote service security requirement objectives

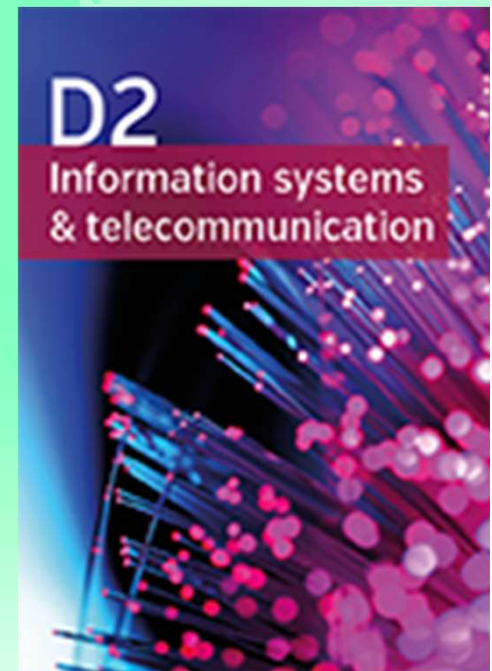
TB762

This Technical Brochure describes the security requirements for remote services to access intelligent electronic devices on an electric power utility's operational network.

A model-based system engineering methodology based on Zachman's lifecycle framework was used to assess the risks and potential means to mitigate these risks.

The analysis stressed the need to combine role-based and attribute-based access control to protect the integrity and confidentiality of the sensitive data.

If sensitive data is compromised, a trusted platform is needed to securely collect and safeguard the evidence needed for forensic analysis.





TB711

Control and automation systems for Electricity Distribution Networks (EDN) of the future

The objective of the Joint Working Group (JWG) C6/B5.25/CIREC is the control and automation systems for the future electric networks with particular reference to the TSO/DSO interface.

The Technical Brochure written by JWG is mainly focused to evaluate the level of automation and control necessary to better manage distribution networks with large penetrations of Distributed Energy Resources (DERs), as seen from both the TSO and DSO perspectives, and to provide services and information about the two level of management (i.e. at TSO and DSO level).





Preferential Subjects for B5 colloquium and sessions

2019 - TROMSÖ

PS1 - LEVERAGING PMU DATA FOR BETTER PROTECTION, AUTOMATION AND CONTROL SYSTEMS

PS2 - TIME IN PROTECTION APPLICATIONS – TIME SOURCES AND DISTRIBUTION METHODS

PS3 - FUTURE TECHNOLOGIES FOR INTER-SUBSTATION COMMUNICATION, MIGRATING DIGITAL TELEPROTECTION CHANNELS TO PACKET-BASED NETWORKS

2020 - PARIS

PS 1 - HUMAN ASPECTS IN PROTECTION, AUTOMATION AND CONTROL SYSTEMS (PACS)

PS 2 - COMMUNICATIONS NETWORKS IN PROTECTION, AUTOMATION AND CONTROL SYSTEMS (PACS) : EXPERIENCE AND CHALLENGES



Frågor?

anders.johnsson@vattenfall.com