



WORKING GROUP FORM

Study Committee: A3

WG number: A3.31	Name of Convener: Farnoosh Rahmatian, CN
Title: Accuracy, Calibration & Interfacing of Instrument Transformers with Digital Outputs	
Terms of Reference	
<p>Background</p> <p>Given the technological progress in the fields of digital components and Information Technology within substations, new generations of instrument transformers with digital output, known as Non Conventional Instrument Transformers (NCIT) and/or Electronic Instrument transformers (EIT) are now becoming attractive for large scale application. These devices (both primary sensors & digital interfaces), which are typically very compact, have already been analysed & described by a WG of SC A3 (publication imminent).</p> <p>However, even though digital communication methods are being used more often for new substations and for the modernisation of existing installations, the interface between high voltage equipment and low voltage equipment (so called "0/1 interface") remains predominantly classical ($100 \text{ V}/\sqrt{3}$, 1 or 5 A). To promote digital communication for this "0/1 interface" and to obtain all the advantages of Information Technology, the development of a "<i>Stand Alone Merging Unit</i>" (SAMU) is under widespread consideration. This new equipment is an essential tool to enable the use of classical magnetic ITs alongside NCITs in the same substation; an essential consideration for the refurbishment of existing substations. The ability to mix conventional & non-conventional devices will also tend to accelerate the development of EITs with digital interfaces.</p> <p>The use of digital output for ITs (magnetic or electronic) requires development & adaptation of the accuracy testing procedures and the development of appropriate methods for in-factory and on-site calibration which may become more frequent with the deregulation of electric power companies. The redundancy of various equipment and links will also need to be considered to achieve the high reliability and availability levels required for a modern electrical network. This accuracy testing & calibration activity is the main focus of this Working Group.</p>	
<p>Scope & Activities</p> <p>Specific activities of the Working Group will include:</p> <ul style="list-style-type: none">• Proposal & analysis of procedures for calibration of the entire measuring chain, both in the factory and on site, for digital output of NCITs or for a SAMU connected to classical ITs and/or EITs.• Description of the practical applications of using flexible EITs for on-site calibration without disconnection or de-energisation.• Consideration and description of the migration of the digitalisation process from low voltage equipments (protective relays, meters, ...) to the high voltage equipments. Overall accuracy of the measurement chain, including transient responses for both protective and measuring classes, and taking into account the work of B5.24, will be proposed for consideration by IEC standardisation committees.• Investigation & proposals for DC accuracy classes and calibration method for HVDC applications.• Proposal & analysis of EMC test methods considering various earthing and shielding techniques for specific application of EITs and SAMU up to 1100 kV. A test	

procedure will be developed & proposed taking into account the requirements of the IEC 60044-8.

- Analysis & discussion of redundancy requirements for EITs and SAMU in the context of protection schemes.
- Proposal and analysis of solutions where control functions using digital signals, e.g. for disconnectors or circuit breakers, are integrated into the NCIT or SAMU hardware.

The group will maintain a close dialogue with the relevant IEC committees via shared membership & mutual reporting.

Deliverables and time schedule:

Deliverables

Technical Brochure, Electra Summary Report, additional papers & presentation at CIGRE events as appropriate.

Workshop/tutorial material will be developed as required as the group progresses.

Time schedule of the WG

The working group will commence work in 2011 and complete the tasks listed within a 3 year period.

Other SCs/ Target Groups concerned by the work:

SC B5 (protection interface especially B5.24), SC B3 (substation integration issues), SC B4 (HVDC issues), IEC standardisation committees especially TC38.

Approval by Technical Committee Chairman: Klaus Fröhlich

Date : 25/07/2011