CIGRE Study Committee A1

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP[1]

WG N° A1.61	**Name of Convenor:** André Tomaz de Carvalho (Brazil)
Strategic Directions #[2]: 2	**Technical Issues #[3]: 2**
The WG applies to distribution networks[4]: Yes	
Potential Benefit of WG work #[6]: 5	
Title of the Group: Survey of Partial Discharge Monitoring in Large Motors	

Scope, deliverables and proposed time schedule of the Group:

Background:

The predictive diagnosis of the winding insulation in large motors (more than 800 kW and 1000 V) is of great importance, for both technical and economic reasons. In October 2004 SC A1 published the technical brochure: "Application of On-line Partial Discharge Tests to Rotating Machines", providing guidance on where it is appropriate to apply partial discharge (PD) measurements and providing a proper focus on what results could be expected. Since then IEC/TS 60034-27, IEC/TS 60034-27-2, IEEE Std 1434 concerning the subject of PD measurements on the stator winding insulation of rotating machines have all been updated (in 2006, 2012 and 2014 respectively). The technologies in this field have evolved fast, and new measurement and diagnostic tools are now available, including new kinds of PD sensors and new signal processing tools for noise and disturbance suppression. Simultaneously, the industrial use of converter fed high-voltage machines is steadily growing. Particularly in motors, where the effects of motor drivers on the insulation aging process and in PD monitoring have a significant influence, there is still a lack of information, reference cases and standard procedures.

Scope:

To conduct a survey on state of the art of PD monitoring in large motors, with focus on:

1. Listing motors with power, age and dates of rewinding and significant winding maintenance procedures;
2. Online vs. offline monitoring approaches;
3. Continuous vs. periodic measurements monitoring approaches;
4. Different sensor types;
5. Different measuring techniques (measurement frequency band, noise suppression systems, etc.);
6. Comparison between motors operating with and without converter power drivers;
7. Comparison of PD measurements along with other insulation diagnostic techniques;
8. Relation with other monitored quantities (power, vibration, temperature).

Deliverables:

☒ Technical Brochure and Executive summary in Electra

☐ Electra report

☒ Tutorial[5]

Time Schedule :

- TOR submitted for approval in May 2017
- Forming of team – July 2017
- Presentation of status in Vienna Session – September 2017
- Draft questionnaire 1 –- October 2017
- Comments by members and experts —December 2017
- Draft questionnaire 2 –- February 2018
- Additional comments by members and experts – April 2018
- Final questionnaire – June 2018
- Survey – Answers – July to September 2018
- Presentation of status in Paris Session - August 2018
- Draft report 1 – December 2018
- Comments by members and experts – March 2019
- Draft report 2 – May 2019
- Additional comments by members and experts – July 2019
- Approval of final report – October 2019
- Technical Brochure and Executive summary in Electra – February 2020
- Tutorial – April 2020

Start: **August 2017** Final report: **February 2020**

Approval by Technical Council Chairman: M. Wald

Date: 26/05/2017

Notes: [1] or Joint Working Group (JWG), [2] See attached Table 2, [3]See attached Table 1, [4] Delete as appropriate, [5] Presentation of the work done by the WG, [6] See attached table 3

Table 1: Technical Issues of the TC project "Network of the Future" (cf. Electra 256 June 2011)

1	Active Distribution Networks resulting in bidirectional flows
2	The application of advanced metering and resulting massive need for exchange of information.
3	The growth in the application of HVDC and power electronics at all voltage levels and its impact on power quality, system control, and system security, and standardisation.
4	The need for the development and massive installation of energy storage systems, and the impact this can have on the power system development and operation.
5	New concepts for system operation and control to take account of active customer interactions and different generation types.
6	New concepts for protection to respond to the developing grid and different characteristics of generation.
7	New concepts in planning to take into account increasing environmental constraints, and new technology solutions for active and reactive power flow control.
8	New tools for system technical performance assessment, because of new Customer, Generator and Network characteristics.
9	Increase of right of way capacity and use of overhead, underground and subsea infrastructure, and its consequence on the technical performance and reliability of the network.
10	An increasing need for keeping Stakeholders aware of the technical and commercial consequences and keeping them engaged during the development of the network of the future.

Table 2: Strategic directions of the TC (ref. Electra 249 April 2010)

1	The electrical power system of the future
2	Making the best use of the existing system
3	Focus on the environment and sustainability
4	Preparation of material readable for non-technical audience

Table 3: Potential benefit of work

1	Commercial, business or economic benefit for industry or the community can be identified as a direct result of this work
2	Existing or future high interest in the work from a wide range of stakeholders
3	Work is likely to contribute to new or revised industry standards or with other long term interest for the Electric Power Industry
4	State-of-the-art or innovative solutions or new technical direction
5	Guide or survey related to existing techniques. Or an update on past work or previous Technical Brochures
6	Work likely to have a safety or environmental benefit