

# MEASURING SYSTEMS FOR INSTRUMENT TRANSFORMERS ACCURACY TESTING

Developing and production of measuring systems for accuracy testing of instrument transformers in the Electrical Engineering institute Nikola Tesla (EEINT) have been last for more than 60 years. The measuring systems for accuracy testing and calibration of current and voltage transformers are based on methods and devices that are developed in the EEINT. These systems are used for calibration of high accuracy standard transformers, as well as for ratio and phase displacement measurement of instrument transformers installed in the power and distribution utilities. The concept of these measuring systems fulfils the requirements of international standards: IEC, IEEE, ANSI and CAN/CSA. In the EEINT new generation of various devices and systems for the wide variety of instrument transformers testing application have been developed and built from 2002. to 2020.

## SPECIFICATION

| Standard Current Transformers   | Standard Voltage Transformers   |
|---|---|
| Rated primary currents:<br>from 1 A to 10 000 kA  | Rated primary voltages:<br>from 10 kV to 110 kV   |
| Rated secondary currents:<br>5 A, 1 A and 0.1 A   | Rated secondary voltages: 100V/3, 100V/√3,<br>110V/√3, 110V, 120V, 200/√3, 200V         |
| Best accuracy: $\pm 0.001\%$ (10 ppm) for<br>ratio error and $\pm 0.05\text{min}$ ( $\pm 15$ ppm)<br>for phase displacement | Best accuracy: $\pm 0.05\%$ for ratio error and<br>$\pm 0.2$ min for phase displacement |
| Measuring devices for instrument transformers accuracy testing  |   |
| Measuring range: from 1% to 200% of rated current, and<br>from 20% to 200% of rated voltage                                 |   |
| Best accuracy for ratio error measure-<br>ment: $\pm 0.002\%$ (20 ppm)  | Best accuracy for phase displacement mea-<br>surement: $\pm 0.1$ min ( $\pm 30$ ppm)    |

## SYSTEM COMPONENTS



STANDARD CURRENT TRANSFORMERS



STANDARD CURRENT BURDENS



STANDARD VOLTAGE  
TRANSFORMERS



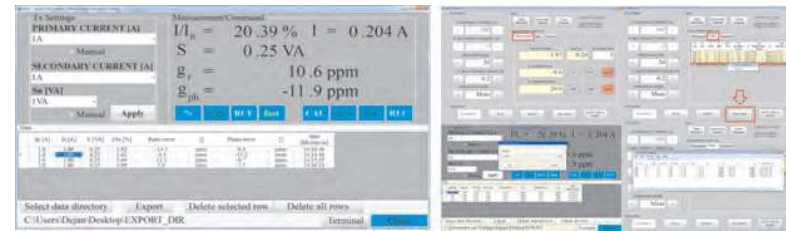
ELECTRONIC MEASURING DEVICES FOR RATIO ERROR  
AND PHASE DISPLACEMENT MEASUREMENT OF  
INSTRUMENT TRANSFORMERS

## MEASURING METHODS

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- D. Numović-Vukovic, S. Skundric, P. Nikolic, D. Belonic, „The Application of Standard Current Transformer up to 10kA for Accuracy Testing of Bushing Generator Current Transformers“, Proc of 34. CIGRE Serbia, R A3 05, ISBN 978-86-82317-85-2, <http://www.cigresrbija.org>

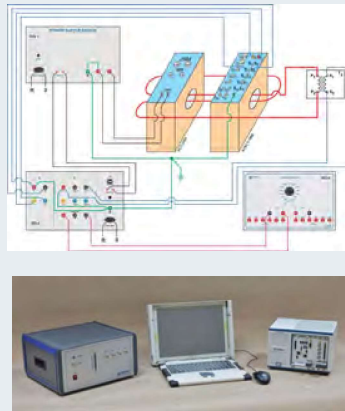
## SOFTWARE

User friendly software that enable acquisition, mathematical processing and various presentation forms of measuring result



## APPLICATION

**HIGH ACCURACY MEASURING SYSTEMS FOR NATIONAL METROLOGY INSTITUTES LABORATORIES** [11, 16]



**ROBOTIZED SYSTEM FOR ROUTINE TEST OF 6 CURRENT TRANSFORMERS IN THE INTERMEDIATE AND FINAL CONTROL – THE MEASURING SYSTEMS FOR ACCURACY TESTING OF CURRENT TRANSFORMERS, MADE BY ELECTRICAL ENGINEERING INSTITUTE NIKOLA TESLA, ARE PART OF IT** [10]



**THREE CHANNEL'S MEASURING DEVICE FOR RATIO ERROR AND PHASE DISPLACEMENT MEASUREMENT, SIMULTANEOUSLY TESTS 3 CURRENT TRANSFORMERS IN THE FINAL FACTORY CONTROL** [12]



**LABORATORY FOR ON SITE ACCURACY TESTING OF INSTRUMENT TRANSFORMERS (HIGHEST VOLTAGE FOR EQUIPMENT OF 110 KV) IN THE POWER UTILITY AND DISTRIBUTED SUBSTATIONS** [1]



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