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Calibration Report

Calibration of Kuhlman Standard Potential Transformer, Model PTT-150 Serial number 0241561-1

for


**ABB/Kuhlman Electric
101 Kuhlman Drive,
Crystal Springs, MS, 39601
U.S.A.**

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Client Order Number:

NRC Order Number: **518069**

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The Kulman Electric voltage transformer, Model PTT-150, S/N 0241561-1, was calibrated at ambient conditions (temperature $22^{\circ}\text{C} \pm 1^{\circ}\text{C}$), in the high voltage laboratory of NRC, according to the ISO 17025 compliant quality procedure EPM 512: AC Potential Transformer Calibration using an NRC current comparator based capacitance bridge. Measurements were made between 2015-06-30 and 2015-07-02. Following calibration, the transformer was marked with a calibration label numbered EPM-2015-0005 dated 7-2015. Measurements were made at 60 Hertz at the burdens, ratios and voltage test points as indicated in Table 1.

The transformer was received at the NRC high voltage laboratory on 2015-06-12 and inspected upon receipt. It was found that it was in operational condition.

The calibration results are traceable to the SI through current-comparator-based measurement standards maintained within the Electrical Power Measurements Group at Measurement Science and Standards, NRC.

The Ratio Correction Factor is defined as the actual ratio divided by the nominal ratio and the Phase Error as the phase-angle displacement between the primary and secondary voltages. The Phase Error is positive when the secondary voltage from the marked to the unmarked terminal leads the corresponding primary voltage.

The total estimated uncertainties quoted in this report encompass the Type A uncertainty (2 sigma of the average of the three sets of measurements) and the Type B uncertainty of the NRC calibration system, which is 10×10^{-6} for the Ratio Correction Factor and $10 \mu\text{rad}$ for the Phase Error. The total uncertainty (coverage factor $k = 2$) of the test results is estimated to be not more than 20×10^{-6} for the Ratio Correction Factor and $20 \mu\text{rad}$ (~ 0.07 minutes) for the Phase Error. The confidence level that the true values of the Ratio Correction Factor and Phase Error are within the quoted uncertainties is estimated at approximately 95%.

The reported Ratio Correction Factor and Phase Error and the associated uncertainties apply at the time and under the conditions specified. These uncertainties are primarily due to the repeatability characteristics of the voltage transformer under test and are not an indication of its long-term stability, nor the effect of temperature.

Table 1
Calibration Results for Kuhlman Standard Potential Transformer Model PTT-15
Serial Number 0241561-1

Secondary Winding	Ratio	Burden	Secondary Voltage (V)	Ratio Correction Factor	Phase Error	
					($\times 10^{-5}$)	(minutes)
X1-X3	60:1	0	108	0.99739	86	2.96
			120	0.99740	87	2.99
			132	0.99741	88	3.03
		Z	108	1.00243	-74	-2.54
			120	1.00244	-73	-2.51
			132	1.00245	-72	-2.46
X2-X3	70:1	0	108	1.00021	88	3.03
			120	1.00024	90	3.10
			132	1.00029	94	3.22

