- Application Note -

Using TRT to prove transformer core is demagnetized

Residual magnetism, usually caused by DC current flowing through transformer windings, can be source of many problems. It can slow down testing, it can cause incorrect measurement readings, and finally, it can be dangerous to the testing personnel if trying to demagnetize incorrectly. Therefore, demagnetization is very important process and can be safely performed using DV-Power equipment. Knowing that transformer is successfully demagnetized completes this process and provides additional safety. This is exactly what TRT devices can do.

TRT devices, besides turns ratios and phase displacements, also measure excitation currents of a transformer under test. Excitation currents can tell us a lot about transformer. We can detect possible short turns in windings, as well as defects in magnetic core.

Excitation current is the current that magnetizes transformer core. The more energy is needed to magnetize the transformer, the higher this current will be. This principle is used when determining if transformer core is successfully demagnetized. We simply measure excitation currents before and after demagnetization, and compare it. Here are two examples.

First, we tested 100 MVA transformer, 110/36,75 kV, YNyn0. After the winding resistance test, we measured excitation currents with TRT device. Then we used RMO40TD device to demagnetize the transformer. After demagnetization, excitation currents were measured with the same TRT device and under the same conditions (100 V test voltage). Both results, before and after demagnetization, are given in the table below.

Excitation currents (mA)	Before demagnetization		After demagnetization	
	Single phase test	Three phase test	Single phase test	Three phase test
Phase A	11,3	17,2	8	6
Phase B	8,2	14,1	6	3,5
Phase C	9,4	14,2	8	6,4

Second transformer under test was 12,5 MVA transformer, 35/10,5 kV, Dyn5. The similar procedure was applied as in the first case – DC test of the phase A, excitation current test, demagnetization, and then excitation current test. The results of both excitation current tests are given in the table below.

Excitation currents (mA)	Before demagnetization		After demagnetization	
	Single phase test	Three phase test	Single phase test	Three phase test
Phase A	10,9	12,3	4,8	6
Phase B	5	10	3,9	4
Phase C	5,7	5,1	5	4,6

We can see that excitation currents are significantly lower after demagnetization and symmetrical. This shows us that the demagnetization was successfully performed.