News

Reliable demagnetization of transformer cores

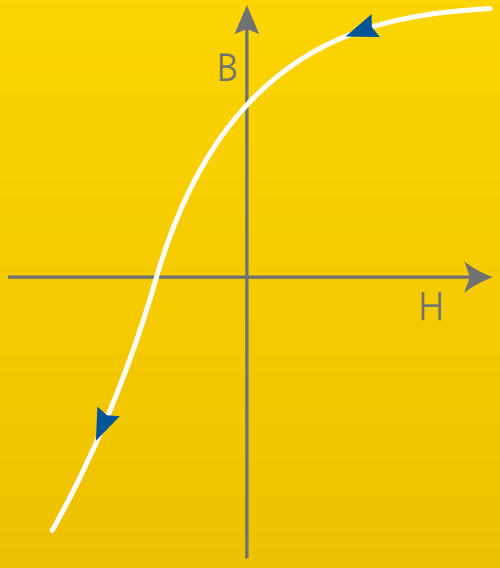
New function for the CPC 100

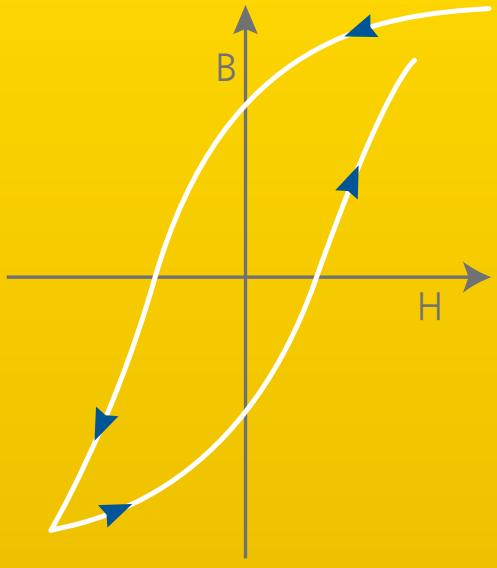
When switching on transformers, currents occur which can significantly exceed the nominal current. If the core of a transformer contains residual magnetism, these currents can even reach the level of the short-circuit current. Such high in-rush currents place a great deal of stress on transformers and can even destroy them. In addition to this, residual magnetism has a negative impact on electrical diagnostic measurements. With the new CPC Toolset 3.10, the scope of testing covered by the CPC 100 has been extended to include the "Demag" test card. This allows you to demagnetize transformer cores both quickly and reliably.

For example, residual magnetism occurs following measurements of the winding resistance and can be as high as 90% of the magnetic flux density during operation. In the event of a malfunction or during routine inspections, the condition of the transformer is analyzed using various electrical testing procedures. However, residual magnetism has such a strong influence on several diagnostic measurements that it renders accurate and reliable analyses virtually impossible. Particularly when determining core faults using exciting current measurements, a magnetic balance test or SFRA, any residual magnetism will have a negative effect, making it impossible to derive any reliable statements. A magnetized leg of the iron core can also have a negative influence on the accuracy of ratio measurements.

Demagnetization

During demagnetization, the core is saturated and the hysteresis parameters are determined. The flux ϕ is then gradually reduced to virtually zero.





A proven approach

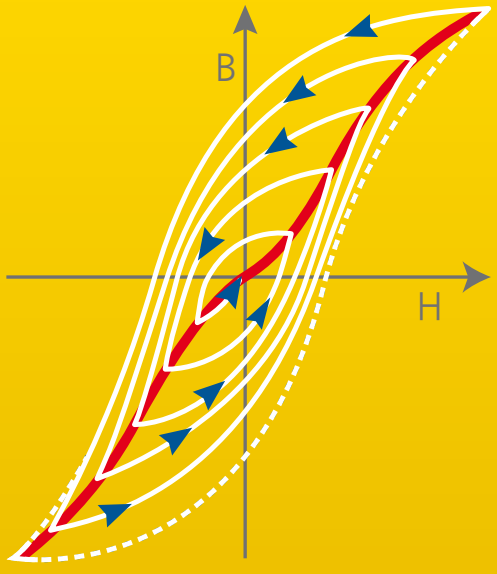
Demagnetizing transformers requires electrical procedures. In the field, however, it is often only possible to perform demagnetization at reduced voltage and frequency levels, since an adjustable voltage source with nominal voltage is generally not available here. When being demagnetized, the core is saturated in both directions. The CPC 100 then determines the hysteresis parameters. Based on these parameters, an iterative algorithm is used to adjust both the voltage and the frequency. While this is happening, the CPC 100 continually measures the flux ϕ in the core. With multiple iterations, the core is then demagnetized to virtually zero. This method can be used to reliably demagnetize both small distribution transformers and large power transformers.

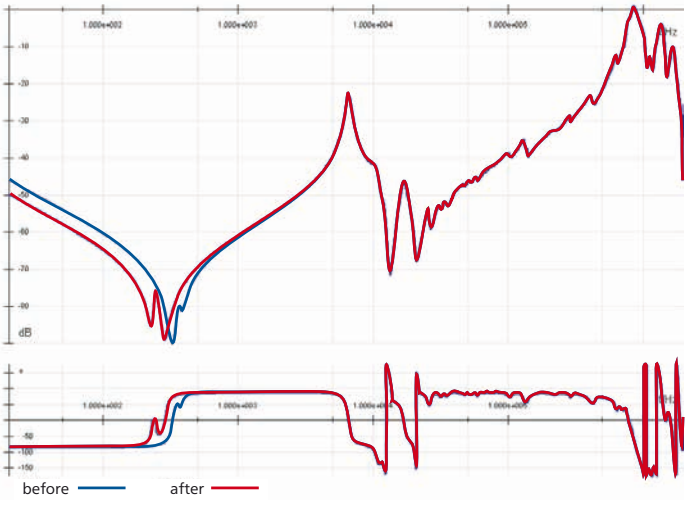
Simple test setup with reliable results

The test setup for demagnetization is very simple: in fact, all that is needed besides the CPC 100 is the CP SB1 switch box. As such, it is not necessary to perform any rewiring after measuring the transformer ratio or winding resistance. After entering the transformer type and the test current in the Demag test card, the procedure is initiated and the residual magnetism is automatically and reliably reduced to virtually zero. This prevents dangerously high in-rush currents and increases the reliability of diagnostic testing.

You can download the CPC Toolset 3.10 from our Customer Area on our website.

www.omicron.at/cpc100





FRA measurement on phase W before and after demagnetization of the iron core.