

Power, Energy / R&D, Testing

Measure the Core Loss of Filters for Commercial Power Supplies

Measure the core loss of reactors with a Memory HiCorder

Importance of Power Converter Efficiency

Power converters such as transformers are widely recognized as one of the necessary components of an electrical distribution system. Similarly, inductors such as coil, choke and reactors used as filters in power supplies play a large role in storing and transferring energy in the power converters. Due to the importance of these devices, researchers and manufacturers have been placing increasingly stringent requirements on power converter efficiency.

Power converters typically consist of magnetic cores because of their high magnetic permeability. However, magnetic cores also have side effects. In AC devices, they cause energy losses, called core losses or iron losses, due to hysteresis and eddy currents, because of the changing magnetic flux field within the material.

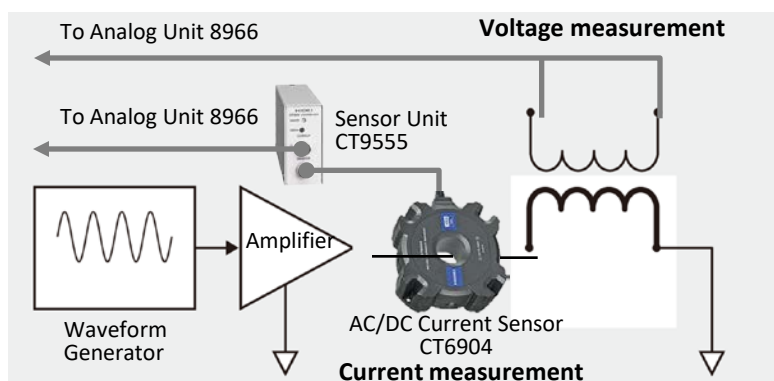
Evaluating core loss of magnetic cores provides a way to identify the eddy-current and hysteresis loss models, and can also be used to evaluate total loss so as to make the converter device as efficient as possible.

How is Core Loss Measured?

Core loss is often measured using the Epstein frame method which comprises a primary and a secondary winding. Although core loss can also be measured by a power meter or power analyzer, a high speed multi-channel data acquisition device such as the Hioki Memory HiCorder MR8847A can also be used to measure the voltage on both the primary and secondary sides.



Memory HiCorder MR8847A

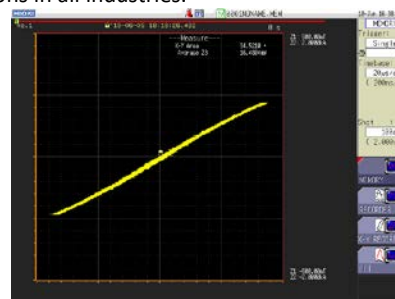


Advantages of Using an Advanced Memory HiCorder

Memory HiCorders are powerful general purpose data acquisition devices that offer simultaneous but completely isolated capture of multiple signals along the same time domain. Paired with the appropriate input modules, current sensors and sensor output devices, you can meet a diverse range of applications in all industries.

To measure core loss, use the MR8847A's powerful waveform calculation function to calculate the magnetic flux density B and the magnetic field H . Specifically:

- Utilize MR8847A's waveform calculation function and X-Y display function to graph the B-H curve
- Utilize the numerical calculation function's X-Y area to calculate core loss from the B-H curve
- In addition, you can use the waveform calculation function to calculate core loss from the primary-side current and secondary-side voltage.



Products used

- Memory HiCorder MR8847A
- Analog Unit 8966
- Sensor Unit CT9555
- AC/DC Current Sensor CT6904

*You will need a waveform generator and amplifier.

*Please contact your Hioki distributor for more information about how to configure the instrument.

Information valid as of June 2019. Specifications are subject to change and revision without notice.