Veris White Paper

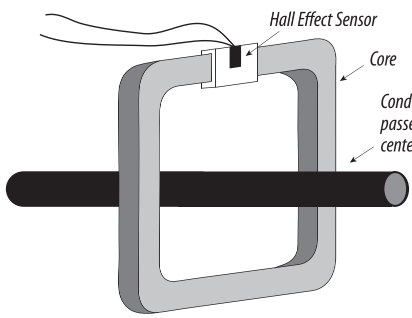
WP14

Pulse Reset Technology™: More Accuracy and Reliability in DC Current Sensing

pulse reset technology™
U.S. Pat. #6,160,697; 6,522,517; 7,242,157

Hall Effect Technology: the Traditional Option for DC Current Sensing

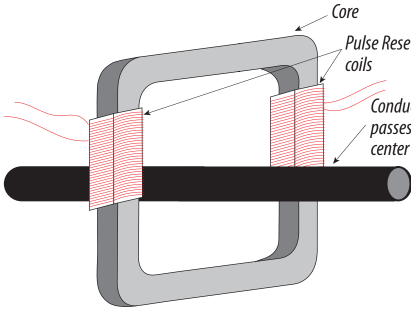
Traditional DC current transducers use Hall Effect technology. In this design, a Hall Effect sensor is placed within a magnetic core. At the time of calibration, the core's baseline magnetic field is evaluated. The current transducer's microprocessor is programmed to accept this as zero current. When in operation, the core is placed around an electrical conductor. The amperage in the conductor causes fluctuations in the core's magnetic field. The Hall Effect sensor detects these fluctuations and sends a signal to the device's microprocessor. The level of fluctuation in the core's magnetic field is proportional to the amperage in the conductor, so the Hall Effect sensor reading is easily translated to an analog output for the current sensor.



The drawback for Hall Effect technology occurs when the core is subjected to a strong current spike, power surge, or external magnetic field. These forces cause the core's magnetic field to be permanently altered, such that the pre-programmed zero level is no longer accurate. Subsequent outputs from the sensor are skewed. It is possible to recalibrate a damaged sensor, but this involves labor and costly downtime.

Pulse Reset Technology™

Pulse Reset technology is a new patented invention that eliminates this concern. Used in the Veris H971 and EA10 DC current transducers, it provides protection against core magnetization, allowing the transducer to withstand stronger external magnetic fields and greater power surges with no core damage or loss of accuracy.

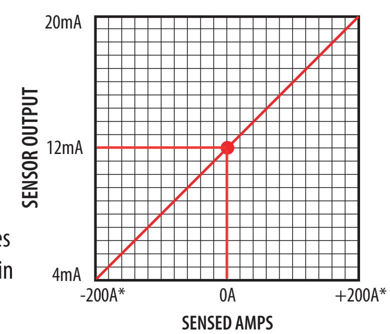


The Pulse Reset coils surround the metal core. As the core's magnetic field fluctuates, the coils periodically demagnetize the core. If a power surge occurs, this frequent neutralization of the magnetic field prevents any lasting effect on the core.

At the time of assembly, the core is characterized to determine its saturation magnetization and the voltage and time required to fully demagnetize it. During operation, the transducer microprocessor is programmed to cycle continually between current sensing mode and demagnetizing mode. In sensing mode, the microprocessor samples the current in the conductor and measures the changes in the core's magnetic field. When the cycle switches to demagnetizing mode, the microprocessor uses the measured flux changes to calculate and apply a voltage pulse that returns the core to a demagnetized state. This measurement cycle occurs at a rate of about 12,000 times per second.

With Pulse Reset coils in place, a current transducer can withstand an amperage surge of up to 25,000 A without altering the zero-magnetization state of the core, maintaining accuracy and repeatability over the long term. This durability makes a Pulse Reset current transducer compatible with applications where power surges are likely, such as solar installations.

Pulse Reset technology also allows bidirectional current sensing. The analog output is calibrated so that the midpoint of the output (12 mA) occurs at a 0 A load. Current flow in one direction through the transducer produces output greater than 12 mA; flow in the opposite direction produces output less than 12 mA. This is useful in applications such as battery chargers, solar installations, and electroplating, where current flow switches direction at intervals.



For more information about DC current sensing applications, see Veris Application Notes VN37 and VN39.