

The industrial and automotive worlds are constantly pushing the boundaries of precision. One key area where this need is acute is in high-accuracy analog applications. Here's where Hall effect magnetic sensors come in, but there's a constant demand for them to be even better in terms of range, resolution.

A Hall plate is a device which is used to detect magnetic fields. This effect states that when an electric current passes through the Hall plate's terminals within a magnetic field, it generates a voltage across the perpendicular terminals, known as the Hall voltage. These plates have diverse applications for magnetic field detection.

The Hall plate, with its finite output impedance, plays a crucial role in establishing the noise floor, thereby directly impacting the resolution of the magnetic sensor. To achieve optimal resolution from the magnetic sensor, it's essential for the noise floor to be primarily influenced by the Hall plate's noise. This necessitates the inclusion of a high gain amplifier at the initial stage of the signal chain. However, employing a high gain amplifier poses a limitation on the range, as it risks saturation. To address this challenge, we've devised a signal chain that effectively mitigates this issue.

Another challenge with Hall plates is the presence of an inherent offset voltage, which restricts the accuracy of measured magnetic field magnitudes. This limitation arises because the induced Hall voltage must significantly surpass the intrinsic offset to yield meaningful readings. To address this issue, the spinning current technique (SCT) is employed to dynamically nullify the offset of the Hall element. By utilizing SCT, it becomes feasible to measure magnetic fields that produce Hall voltages substantially lower in magnitude than the intrinsic offset of the plate.