

# Sensor Bulletin

## Definitions

All Series

**CSK:** Current sinking output, also referred to as Open Collector output.

**Differential:** The field difference between the Operate Point and the Release Point.

**Electrical Offset:** The inherent imbalance of the bridge expressed in differential voltage output.

**HBM:** Human Body Model for ESD specifications.

**Hysteresis:** The maximum deviation in volts between the output with increasing field and the output with decreasing field, where the applied field is unipolar (applied in either a positive or negative direction, without crossing the zero field point), divided by Voltage Span. Expressed as a percentage.

**Input Voltage Range:** The voltage range that can be applied across the bridge.

**I<sub>OL</sub> (Current Output Low):** The output current in the low (logic 0) state (output stage switched on).

**Max Output:** A specification given in millivolts per applied voltage. This is the maximum output voltage possible. This output condition is achieved when one set of resistors is in magnetic saturation (have achieved the maximum resistance change possible) while the other pair are at zero applied magnetic field.

**Nonlinearity:** The maximum deviation from a linear fit taken over the Field Range divided by the Voltage Span. Expressed as a percentage.

**Off-axis Characteristic:** A specification that describes the variation in sensor output versus the angle between the applied field direction and the sensitive axis of the GMR sensor with constant electrical and magnetic inputs applied. Applicable to non-integrated bridge sensors. The output will vary as the cosine of the angle rotated.

**Operate Point:** The field level which produces a logical change in state from “0” to “1” in NVE’s digital magnetic field sensors ADXXX-XX.

**Operating Frequency:** Frequency range which will produce a responsive output.

**Output Leakage Current (Current Output High):** The output current in the high (logic 1) state (output stage switched off).

**Output Saturation Voltage (Voltage Output Low):** The output voltage in the low (logic 0) state (output stage switched on).

**RBP:** Reverse Battery Protection.

**Release Point:** The field level which produces a logical change in state from “1” to “0” in NVE’s digital magnetic field sensors ADXXX-XX.

**Resistor Separation:** This is the mean separation between the two pairs of resistors, in a Gradiometer.

**Sensitivity:** A measure of the output magnitude based on electrical and magnetic input conditions. Expressed in millivolts of differential output per applied voltage per oersted.

**Specified Linear Range:** Typically 70% of the field it takes to saturate the part. Field dependent specifications are based upon this range.

**TCOI (Temperature Coefficient of Output at Constant Input Current):** The variation of the output voltage over temperature with a constant input current applied. Expressed as a percentage per unit temperature change.

**TCOV (Temperature Coefficient of Output at Constant Input Voltage):** The variation of the output voltage over temperature with a constant input voltage applied. Expressed as a percentage per unit temperature change.

**TCR (Temperature Coefficient of Resistance):** The variation of the GMR resistors over temperature. Expressed as a percentage per unit temperature change.

**Voltage Span:** The differential output voltage taken from zero to 70% of the saturation field level.

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## CONVERSION FACTORS

| <u>To Convert</u> | <u>Into</u>        | <u>Multiply by</u>     |
|-------------------|--------------------|------------------------|
| $\mu\text{Wb}$    | maxwell            | $10^2$                 |
| A/cm              | Oe                 | 1.256                  |
| A/m               | Oe                 | $1.256 \times 10^{-2}$ |
| At                | Gb                 | 1.256                  |
| G                 | Oe                 | 1 (when $\mu_o=1$ )    |
| G                 | T                  | $10^{-4}$              |
| G                 | mT                 | $10^{-1}$              |
| G                 | nT                 | $10^5$                 |
| G                 | $\text{Wb/cm}^2$   | $10^{-8}$              |
| G                 | $\text{Wb/in}^2$   | $6.452 \times 10^{-8}$ |
| G                 | $\text{Wb/m}^2$    | $10^{-4}$              |
| Gb                | At                 | 0.796                  |
| kA/m              | Oe                 | $1.256 \times 10^1$    |
| maxwell           | Wb                 | $10^{-8}$              |
| maxwell           | $\mu\text{Wb}$     | $10^{-2}$              |
| mT                | G                  | 10                     |
| maxwell           | volt second        | $10^{-8}$              |
| nT                | G                  | $10^{-5}$              |
| nT                | gamma ( $\gamma$ ) | 1                      |
| Oe                | A/cm               | $7.962 \times 10^{-1}$ |
| Oe                | A/m                | $7.962 \times 10^1$    |
| Oe                | kA/m               | $7.962 \times 10^{-2}$ |
| T                 | G                  | $10^4$                 |
| T                 | $\text{Wb/m}^2$    | 1                      |
| volt second       | maxwell            | $10^8$                 |
| volt second       | Wb                 | 1                      |
| Wb                | maxwell            | $10^8$                 |
| $\text{Wb/cm}^2$  | G                  | $10^8$                 |
| $\text{Wb/m}^2$   | G                  | $10^4$                 |