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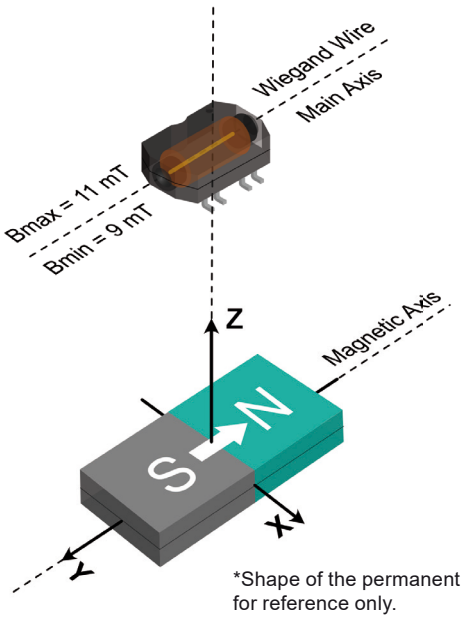
EXPLORATION NOTE

Magnet System

There are many applications which can take advantage of the unique characteristics of a Wiegand sensor. The design of the magnetic system is a key aspect to successful integration and one recommended configuration is defined in the product datasheet. However, other effective designs can also be identified which use different magnets, mechanical solutions and constraints. There are some target criteria/conditions which a successful design will need to achieve which can act as design guidelines. Extensive testing of any design is recommended to check the conformity of pulse performance to the application requirements.



*Shape of the permanent magnet for reference only.

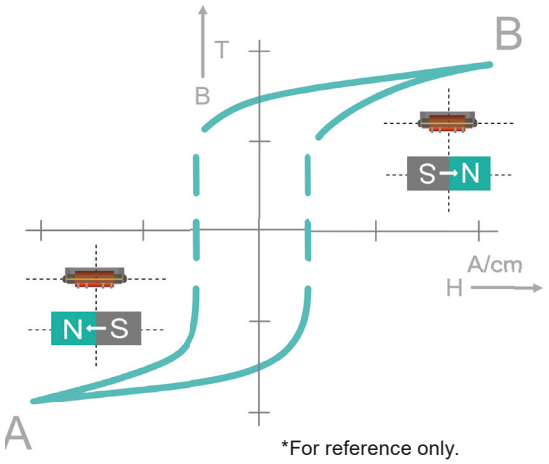
Target Conditions

Under these conditions the Wiegand wire should achieve a stable ‘saturation’ state.

MAX MIN — Optimal magnetic flux density at the center of the Wiegand wire of 9-11 mT

Wiegand wire should be aligned with, and parallel to, the magnetization direction

Wiegand sensor should be positioned centrally relative to the magnetic field



*For reference only.

Hysteresis

For the ideal activation of the Wiegand effect, the Wiegand wire must be exposed to alternating ‘saturation’ states of opposing magnetic polarity. These ‘saturation’ states can be seen on the hysteresis plot at points A and B. The steep dotted lines indicate the point at which the magnetism of the Wiegand wire reverses and a pulse is produced by the Wiegand sensor. Although these reversals occur at a lower flux density than the saturation states, for best pulse performance the Wiegand wire should achieve the opposing saturation state (B) before ‘returning’ (to A).

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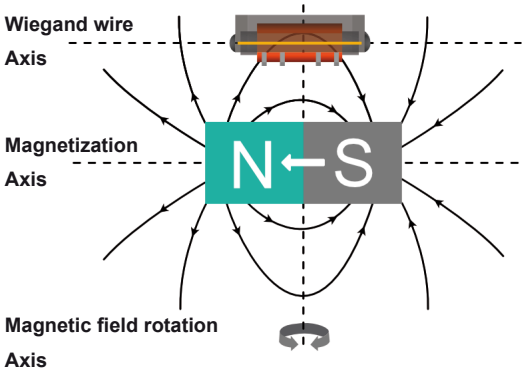
EXPLORATION NOTE

Design Configurations

There are several ways to achieve alternating saturation states and trigger the Wiegand effect. The ideal method will depend on the constraints and requirements of the application. Both mechanical or electromagnetic designs are possible.

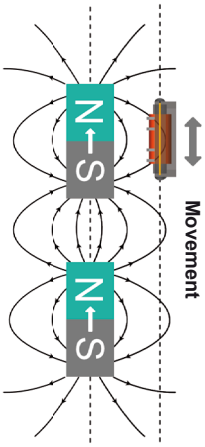
Rotation triggering: Rotational movement causes a change in the magnetization.



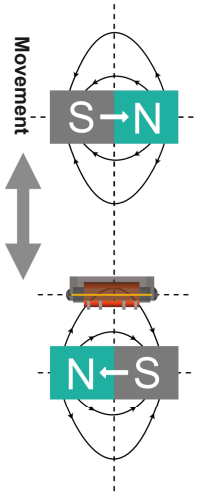
Single pole-pair: Magnetic field rotates around rotation axis (as example)

Multiple pole-pairs: Rotation exposes Wiegand wire to alternating magnetic fields

Linear triggering: Movement along alternating pole pairs.

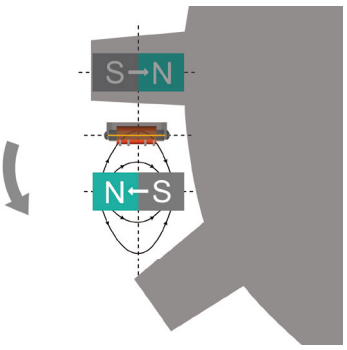


Multiple pole-pairs: Rotation exposes Wiegand wire to alternating magnetic fields



Linear movement of Wiegand wire is towards and away from alternate pole-pairs, or vice versa

Proximity triggering: Wiegand sensor could work as a proximity switch.



Ferromagnetic body.
Gear as example

Fe

Single pole-pair: Magnetic field rotates around rotation axis (as example)

Have a question?
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