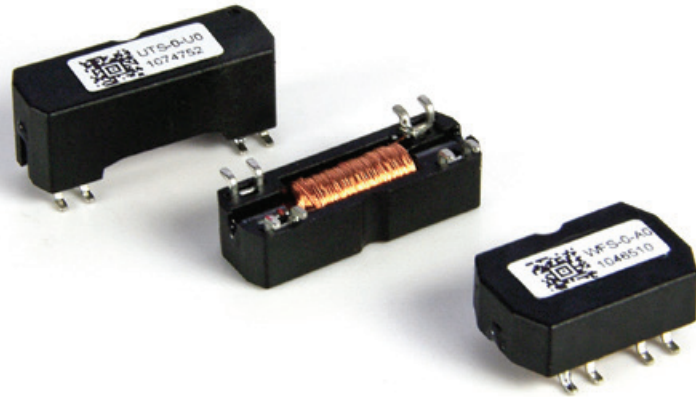


# POSITAL

FRABA

## WIEGAND SENSORS



**WIEGANDSENSOR**  
**POSITAL**

**Self Powered – Magnetic Sensor – Pulse Energy**

## WIEGAND SENSORS



### Self-powered Magnetic Sensing

POSITAL's Wiegand sensors offer bipolar magnetic sensing without the need for any external voltage or current to be applied. The material properties of the sensor mean that consistent pulses are produced every time the magnetic field polarity switches. This makes it the perfect magnetic sensor for low-power and energy-saving applications.

### Pulse Energy Harvesting

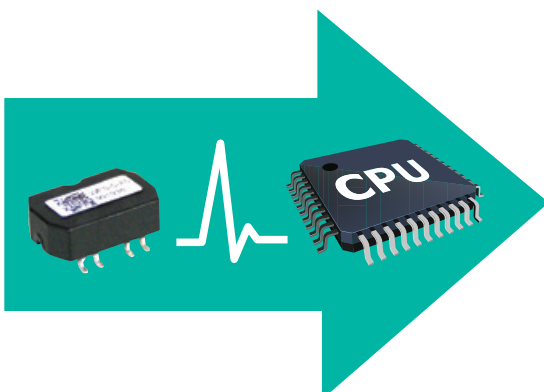
The consistency of the pulses produced by Wiegand sensors can also be used to provide energy for ultra-low power electronics to be operated using a single pulse. In addition, successive pulses to be stored to offset energy demand of low-power energy circuits. Alternatively, the pulses can be used to trigger, or 'wake-up', intermittently powered electronic circuits.

### Or Even Both

It is also possible for applications to exploit both functions of the pulses (magnetic sensing and energy harnessing), using the pulse energy to power ultra-low power circuits which use the timing of the pulses to perform tasks (e.g. count event data).

### Features

- > No External Power Required
- > Non Contact Sensing
- > Long Lifespan
- > No Mechanical Wear
- > Consistent Reliable Pulses
- > Energy Saving



## APPLICATIONS / USE CASES



### For Pulse Generation

As a reliable source of consistently timed pulses, POSITAL Wiegand sensors are effectively implemented in industrial and commercial flow-metering applications (e.g. water and gas), and also to calculate rotation speed in tachometers (e.g. high-speed trains).

### For Power Transmission

In combination with low frequency electro-magnetic fields, POSITAL Wiegand sensors can be used to provide energy for low power applications in environments where high frequency transmission is challenging (e.g. transcutaneous power for medical devices).



### For Pulse Generation & Energy Harvesting

POSITAL Wiegand sensors are widely used in 'batteryless' multiturn encoder technology. By harnessing both the timing of the pulses and the pulse energy, these encoders provide reliable multi-turn counting even in the absence of external power or batteries.

### What's Next?

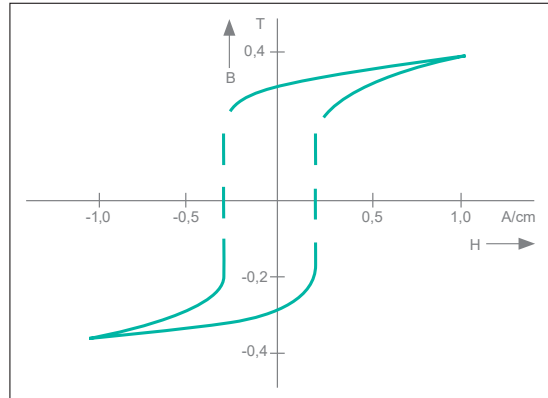
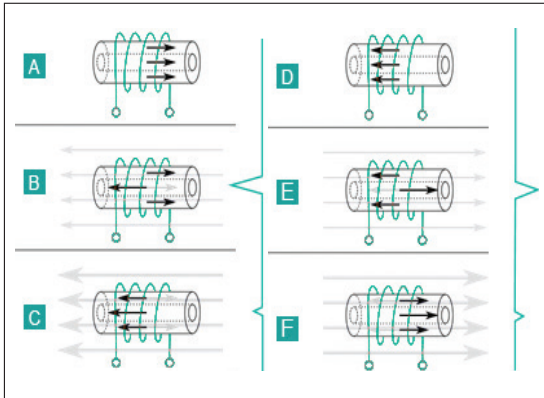
With the growth of Industry 4.0 and the need for remote IoT sensors, POSITAL's next product portfolio expansion will include Wiegand sensors capable of producing enough energy to power wireless communication and even other sensing technologies.



# POSITAL

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### WIEGAND EFFECT AND FUNCTIONALITY



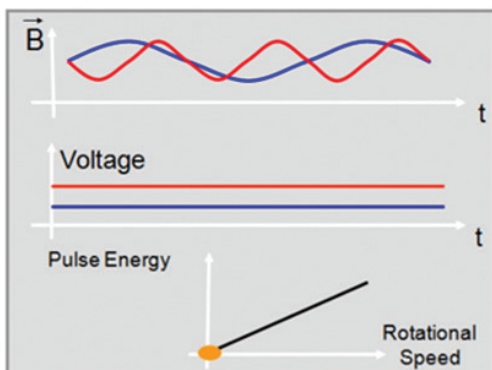
#### Wiegand Effect

The “Wiegand effect” is a physical phenomenon discovered in the 1970’s by John Wiegand. Wiegand found that when a specially prepared piece of ferromagnetic alloy (the Wiegand wire) is subject to a reversing external magnetic field, it will retain its magnetic polarity up to a certain point, then suddenly ‘flip’ to the opposite polarity. This change in magnetic polarity takes place within a few microseconds. This sudden change of magnetic polarity can generate a pulse of current in a copper coil positioned close to the Wiegand wire. This event is often referred to as the Wiegand effect.

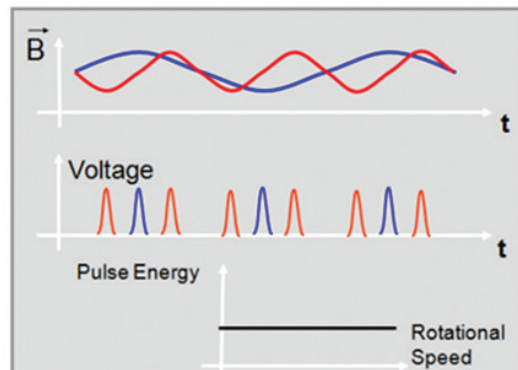
#### Wiegand Functionality

The strength and duration of the resulting pulse is independent of the rate at which the external magnetic field changes. This is what makes the Wiegand effect interesting to engineers: simple dynamos convert rotary motion into electrical energy, but their output power depends on the rotation speed; when the shaft of a dynamo turns very slowly, power levels are too low to be of much use. However, with a Wiegand wire system, the amount of electrical energy generated with each ‘flip’ of the magnetic field remains constant, however quickly – or slowly – the magnetic field changes. In POSITAL rotary encoders this reversal is generated by rotating a magnet.

#### Dynamo Principle



#### Wiegand Principle



## POSITAL FRABA – THE WIEGAND EXPERTS



### Experience and Expertise

Since 2006, POSITAL have been successfully implementing Wiegand technology into rotary encoders. In 2012, the main supplier of Wiegand wire in the world at that time discontinued their wire production. POSITAL completed the purchase of two wire production lines, technical documentation and expert consultation contracts from them in 2013. Shortly after, the Wiegand Technology Centre was opened in Aachen and the assembly of POSITAL Wiegand sensors was entirely in-sourced.

### Supply Chain Management

POSITAL carefully manage the entire production chain all the way from the smelting of Vicalloy through to the final production of Wiegand sensors and assemblies with integrated Wiegand technology. The many processes necessary to create the highest-quality Wiegand wire sensors

and assemblies are controlled and optimized by our engineering and logistics teams. Currently, POSITAL has Wiegand wire production lines in Europe and the US and has Wiegand sensor assembly lines in Europe and Asia.

### Technology Development

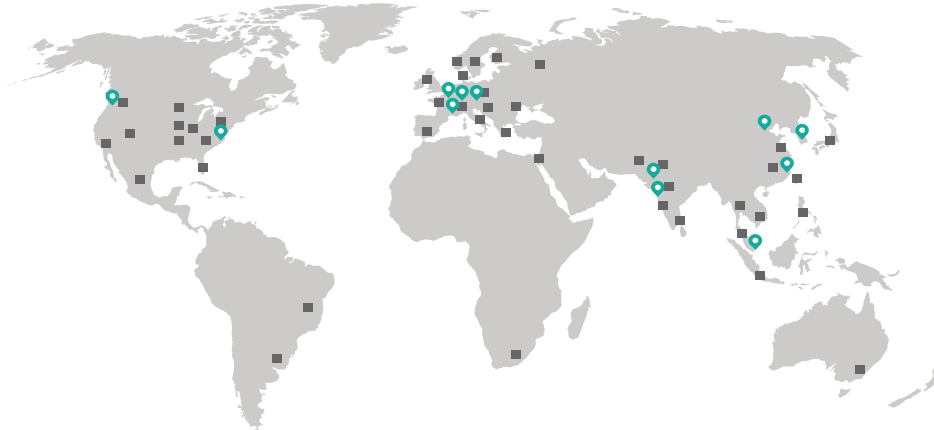
POSITAL's Wiegand Technology Centre in Aachen was established to develop Wiegand sensor product development, production methods and related applications. A continuous commitment of investment into the centre has allowed POSITAL to improve product quality and production efficiencies and push the possibilities of the technology. The team at the centre are constantly developing new products and applications and providing technological advice to customers and partners with the implementation of Wiegand sensor technology.



# POSITAL

## FRABA

OVER 50 YEARS EXPERIENCE WITH POSITION SENSORS



### FRABA Group

FRABA is a group of enterprises focused on providing advanced products for the motion control and industrial automation markets. POSITAL has been a leading manufacturer of industrial rotary encoders for over 50 years and has expanded its business to include tilt and linear motion sensors. Other FRABA Group subsidiaries include VITECTOR which focuses on protection sensors to guard doors and production machine covers. FRABA group is also an innovator in product design and manufacturing processes and a pioneer of Industry 4.0.

### History

FRABA Group dates back to 1918, when its predecessor, Franz Baumgartner elektrische Apparate GmbH, was established in Cologne/Germany to manufacture relays. In 1973 FRABA introduced one of the first non-contact, absolute Multiturn encoders. Since then, the company has played a trend-setting role in the development of rotary encoders and other sensor products.

### Service and Production

POSITAL has a global reach with subsidiaries in Europe, North America and Asia – and sales and distribution partners around the world. Products are manufactured in advanced production facilities. The computer-guided semi-automated production system tracks each device from order, through assembly and testing, to final delivery.

### Wiegand Sensor Business

Since 2013, POSITAL has been the world's main source for Wiegand wire and Wiegand-powered rotation counter systems. In addition to their use in the popular IXARC multiturn rotary encoders, POSITAL also provides Wiegand sensors and developmental support to other manufacturers who successfully implement Wiegand-based systems. To date, more than 800,000 Wiegand sensors have been manufactured and sold. With its expanded production facilities, POSITAL has the capacity to manufacture a further million devices annually, with material secured for the next 10 million sensors.



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