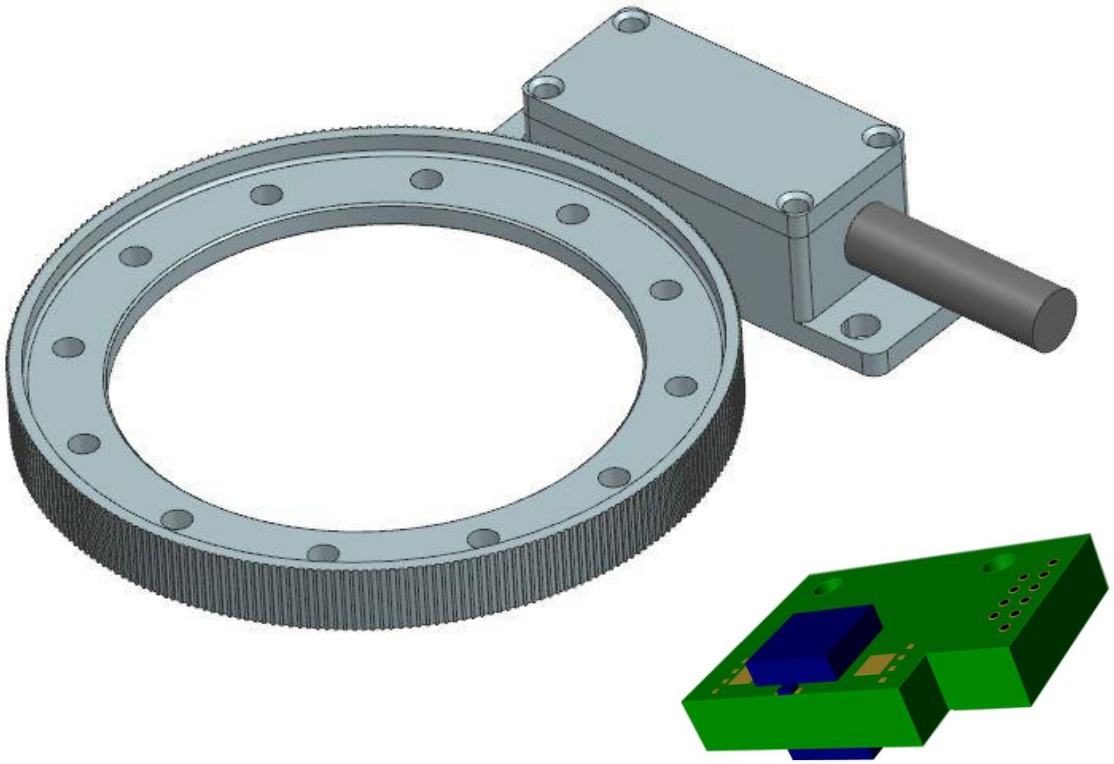
nanoTRONIC Space Encoder System

Rotary / Linear Encoder

for Space and Hi-rel Applications

Preliminary



The nanoTRONIC Space Encoder is a position encoder system for space and hi-rel applications. It is available in absolute and incremental variants to measure either rotary or linear positions.

The system consists of an encoder scale, a read head, and an optional interface electronics. The position is measured contactless using the GMR effect (Giant Magnetoresistance). There are no components which are subject to wear, which drastically increases the lifetime compared to e.g., potentiometers. The encoder scale is a toothed wheel (or track) with teeth similar to those of miniature precision gears. Magnetized pole rings or bars are also possible. The pitch of the encoder system is 1 mm, resulting in teeth as small as 0.5 mm. Different types of steel can be used for the scale, but due to the measurement principle the material must be ferromagnetic.

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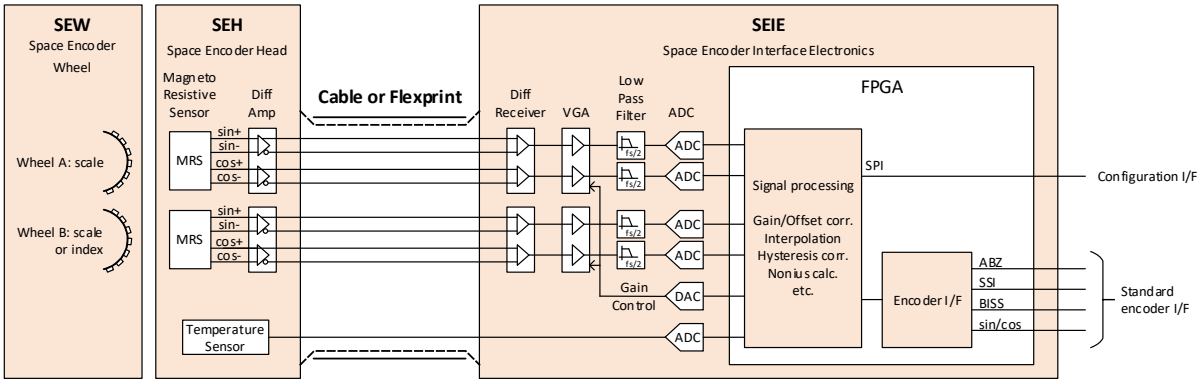
System Overview



The nanoTRONIC space encoder system consists of three major components:

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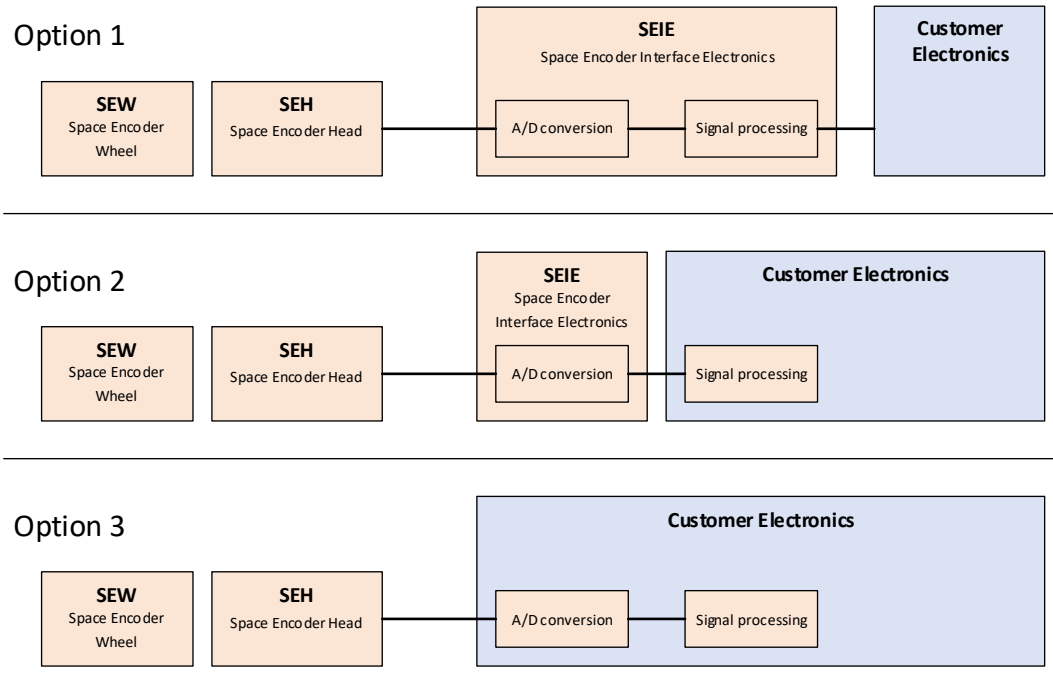
Digital Signal Correction

To achieve a good interpolation result, the sensor signals need to be conditioned.

Modular Design

Thanks to its modular design, the nanoTRONIC Space Encoder System supports different levels of integration into the customer's system. While the scale and the read head must be procured as individual parts, there are three options for the interface electronics:

- **Option 1:** The interface electronics is a self-contained part. The interface to the customer electronics consists of a configuration interface and a position interface (e.g., a standard encoder interface).
- **Option 2:** When there is already an FPGA or microprocessor on the customer's electronics with available resources, then the signal processing part of the space encoder system can be integrated into the customer's FPGA or microprocessor. The signal processing part will be delivered as netlist (FPGA) or compiled library (microprocessor).
- **Option 3:** All functions of the interface electronics are integrated into the customer's electronics. For the A/D conversion, schematics are provided, while the signal processing is handled as in option 2.

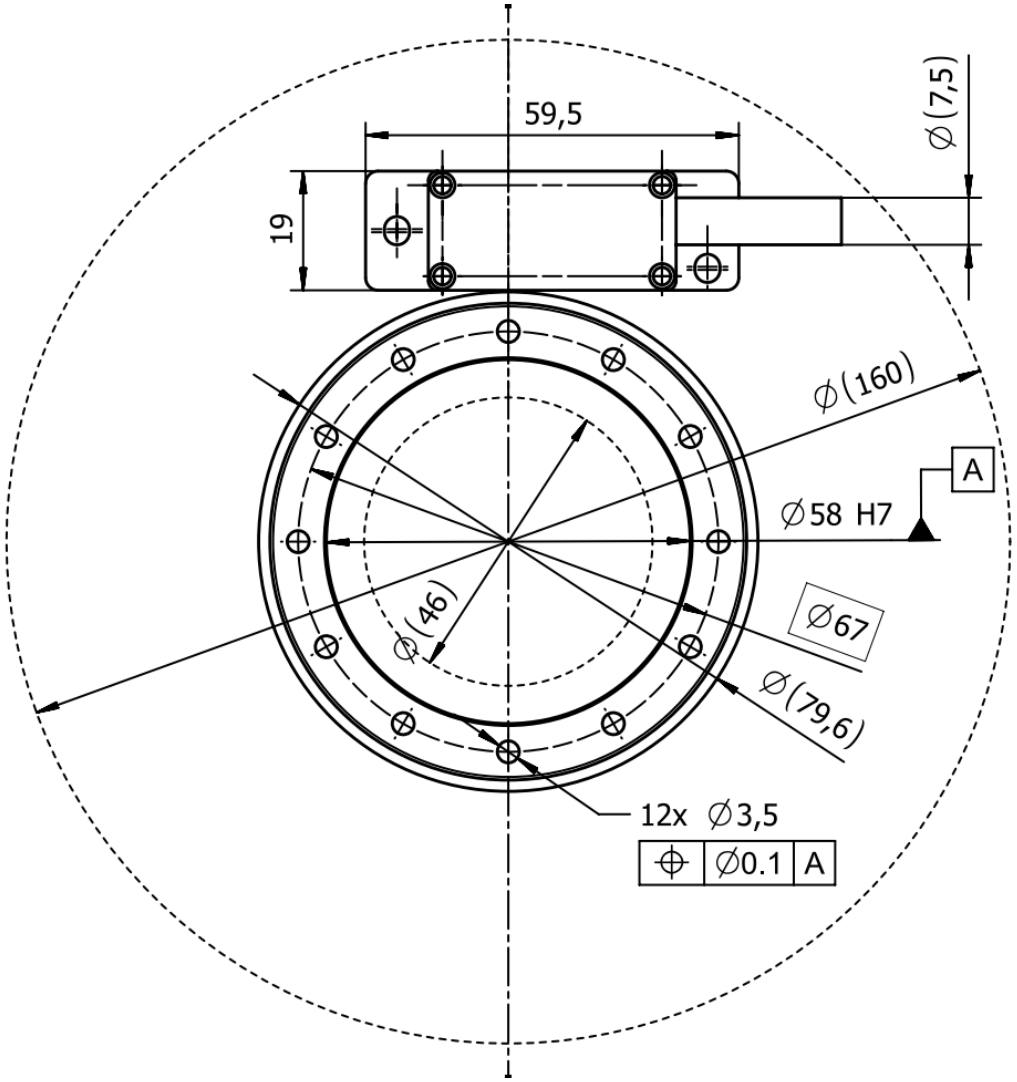


Specifications

System Properties		
Principle		Absolute or Incremental
Angular range		Infinite (absolute values only for 0-360°)
Encoder wheel		250 periods / revolution
Resolution		Depending on interpolation factor, < 0.036°
Linearity		TBD
Repeatability		TBD
Mechanical Properties		
Mass	Encoder Head	35 g
	Encoder Wheel	69 g
Quasi-static load		> 31g
Vibration loads		TBD grms
Shock loads		TBD g
Electrical Properties		
Supply voltage		5 V DC, <50mA (TBC)
Power consumption		<0.25W (TBC)
Sensor signal		Analog sin/cos, differential, <1Vpp (uncorrected)
Temperature sensor		PT1000
Connection		Pigtail, Connector of flexible PCB
Temperature		
Non-op.		[-60°C; +110°C]
Operating		[-50°C; +100°C]
Radiation		
Total Ionizing Dose (TID)		>300 kRAD (TBC)

Example: RSE-250 (Rotary Encoder with 250 teeth)

Preliminary



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