Variable Reluctance Speed Sensor
DSE 1810.01 AHZ

Product ID

Type #	Product #	Drawing #
DSE 1810.01 AHZ	304Z-03776	3-111.039 Rev.000

General

Function

The DSE 1810.01 AHZ series variable reluctance (VR) speed sensors consist of an iron core, an inductive coil, and a permanent magnet. A ferrous pole wheel passing the sensor face changes the magnetic field strength, resulting in an AC voltage being induced in the coil. The frequency of the output signal is proportional to the speed of the moving target. The amplitude of the signal depends on speed, air gap, geometry of target, magnetic properties of target material, and the electrical load. VR sensors, also known as passive or electromagnetic sensors, do not require an external supply.

Technical data

Coil properties

Inductance @ 1 kHz: 200mH ± 15%
Resistance @ 25℃: 1'150 Ohm ± 15%
Magnet polarity: north pole towards front face
Pole piece: diameter 2.7 mm

Signal output

Using a sensor together with a toothed wheel having an involute gear form will generate a sinusoidal signal. Analysing the frequency will determine the rotational speed. The signal amplitude is proportional to the rate of change of magnetic flux generated by the pole wheel. In principle, it depends on the following parameters:

- Circumferential velocity of the toothed wheel
- Module of the toothed wheel
- Air gap between toothed wheel and sensor's front surface
- Load impedance applied to the sensor (recommended is at least 10 kOhm)

Minimal voltage for 5 m/s circumferential speed, module 2 gear, 0.4 mm air gap and 10 kOhm load resistance: 9.2 Vpp

Frequency range

Up to 30 kHz, lower limit depending on application

Housing

Stainless steel 1.4305, front side sealed hermetically and resistant against splashing water, oil, conducting carbon- or ferrous dust and salt mist. Electronic components potted in chemical and age proof synthetic resin.
Dimensions according to drawing.

Connector

Jaquet connector type	Manufacturer code
820E-36087	3-pol. CA02COM-E10S-3P-B

Requirements for pole wheel

Toothed wheel of a magnetically permeable material (e.g. Steel 1.0036)
Optimal performance with

- Involute gear
- Tooth width > 10 mm
- Side offset < 0.2 mm
- Eccentricity < 0.2 mm

Air gap between sensor and pole wheel

Depending on lowest circumferential speed which has to be detected and on trigger level.

Insulation

Housing and electronics galvanically separated (500 V/50 Hz/ 1 min)

Protection class

IP68 (head)

Further Information

Safety	All mechanical installations must be carried out by an expert. General safety requirements have to be met.
Connection	The sensors must be connected according to the sensor drawing. Sensor wires are susceptible to radiated noise. Therefore, the following points have to be considered when connecting a sensor: The sensor wires must be positioned as far as possible from large electrical machines. They must not run in the vicinity of power cables. It is advantageous to keep the distance between sensor and instrument as short as possible. If the signal requirements are met, the sensor cable may be lengthened via a terminal box located in an IP20 connection area in accordance with EN 60529.
Installation	The sensor has to be aligned to the pole wheel according to the sensor drawing. A deviation in positioning may affect the performance and decrease the noise immunity of the sensor. The amplitude of a VR sensor decreases with increasing air gap. The smallest possible pole wheel to sensor gap should be set, however, the gap should be set to prevent the face of the sensor from touching the pole wheel. The sensor should be positioned such that the center of the sensor face corresponds to the middle of a pole wheel tooth. For larger teeth a misalignment of the sensor center to the middle of a tooth is permissible, however, the center of the sensor must be at a minimum of 3 mm from either edge of the pole wheel under all operating conditions. A solid and vibration free mounting of the sensor is important. Sensor vibration relative to the pole wheel may add extranious and/or spurious noise to the signal. The sensors are insensitive to oil, grease etc. and can be installed in arduous conditions.
Maintenance	Product cannot be repaired.
Transport	Product must be handled with care to prevent damage of the front face.
Storage	Product must be stored in dry conditions. The storage temperature corresponds to the operation temperature.
Disposal	Product must be disposed of properly, it must not be disposed as domestic waste.