Variable Reluctance Speed Sensor
DSE 1610.15 AHZ & DSE 1810.35 SHZ

Product ID

Type #	Product #	Drawing #
DSE 1610.15 AHZ	3042607017	117617 Rev.001
DSE 1810.35 SHZ	3042608902	120816 Rev.000

General

Function

The DSE 1610.15 AHZ and DSE 1810.35 SHZ 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: 50 mH ± 10%
Resistance: 230 Ohm ± 10%
Magnet polarity: north pole towards front face
Pole piece: diameter 3 mm

Polarity

According to drawing.

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 10 kOhm)

Minimal voltage for 5 m/s circumferential speed, module 2 gear, 1 mm air gap and 10 kOhm load resistance: 3.6 Vpp

Frequency range

Up to 30 kHz, lower limit depending on application

Housing

M16x1.5, tightening torque: max. 35 Nm

Connection

Type #	Connection [Jaquet part number]
DSE 1610.15 AHZ	385E-73612 (connector)
DSE 1810.35 SHZ	824L-35053 (cable)

Cable

Jaquet cable type	Properties
824L-35053	FEP Teflon cable, 4-wire (brown wire is not connected), 0.2 mm² (AWG 24), outer-Ø max. 4.2 mm, bending radius min. 60 mm, screened (metal net), white Operating temperature: -100℃ to +150 ℃

Connector	<table><tr><th>Jaquet connector type</th><th>Manufacturer code</th></tr><tr><td>385E-73612</td><td>Connector mates with straight plug MS3106A-10SL-4S, 2 pins</td></tr></table>
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)
Temperature	Operating temperature of entire sensor: -40°... +125°C

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 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 laid as far as possible from large electrical machines. They must not run parallel 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. Deviations in positioning may affect the performance and decrease the noise immunity of the sensor. During installation, the smallest possible pole wheel to sensor gap should be set. The amplitude of sensor's output signal depends on decreases with increasing air gap. Hence, the gap should however be set to prevent the face of the sensor ever touching the pole wheel. A sensor should be mounted with the middle of the face side over the middle of the pole wheel. Dependent upon the wheel width, a certain degree of axial movement is permissible. However, the middle of the sensor must be at minimum in a distance of 3 mm from the edge of the pole wheel under all operating conditions. A solid and vibration free mounting of the sensor is important. Eventual sensor vibration relative to the pole wheel can induce additional output pulses. 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.