

Redundant Variable Reluctance Speed Sensor DSE xxxx.xx xHX



Product ID

Type #	Product #	Drawing #
DSE 1520.03 AHX	3042606613	117135 Rev.01
DSE 1520.03 A1HX	3042606615	117135 Rev.01
DSE 1720.00 AHX	3042607845	119261 Rev.00
DSE 1820.12 PHX	3042607067	118041 Rev.01
DSE EH20.11 SHX (2m) L=152	304Z-04812	4-112.282B Rev.1
DSE EH20.11 SHX (2m) L=210	304Z-04830	4-112.333 Rev.1

General

Function	<p>The DSE xxxx.xx xHX variable reluctance (VR) speed sensors consist of an iron core, two inductive coils (bifilar winding), and a permanent magnet. A ferrous pole wheel passing the sensor face changes the magnetic field strength, resulting in AC voltages being induced in the coils – as the inductance of the two coils is equal, the same voltage is induced in both coils. The frequency of the output signals is proportional to the speed of the moving target. The amplitude of the signals 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.</p> <p>The sensors differ in housing geometry and connection.</p>
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Technical data

Coil properties	<ul style="list-style-type: none"> Inductance @ 1 kHz: <ul style="list-style-type: none"> Coil 1: 450 mH \pm 10% Coil 2: 450 mH \pm 10% Resistance: <ul style="list-style-type: none"> Coil 1: 1850 Ohm \pm 10% Coil 2: 1850 Ohm \pm 10% Magnet polarity: north pole towards front face Pole piece: diameter 5 mm 														
Polarity	According to respective drawing.														
Signal output	<p>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:</p> <ul style="list-style-type: none"> 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 10 kOhm) <p>Minimal voltage for 5 m/s circumferential speed, module 2 gear, 1.0 mm air gap and 10 kOhm load resistance:</p> <table border="1"> <thead> <tr> <th>Type #</th><th>Min. output voltage [Vpp]</th></tr> </thead> <tbody> <tr> <td>DSE 1520.03 AHX</td><td>4.0</td></tr> <tr> <td>DSE 1520.03 A1HX</td><td>4.0</td></tr> <tr> <td>DSE 1720.00 AHX</td><td>4.0</td></tr> <tr> <td>DSE 1820.12 PHX</td><td>5.0</td></tr> <tr> <td>DSE EH20.11 SHX (2m) L=152</td><td>5.0</td></tr> <tr> <td>DSE EH20.11 SHX (2m) L=210</td><td>5.0</td></tr> </tbody> </table>	Type #	Min. output voltage [Vpp]	DSE 1520.03 AHX	4.0	DSE 1520.03 A1HX	4.0	DSE 1720.00 AHX	4.0	DSE 1820.12 PHX	5.0	DSE EH20.11 SHX (2m) L=152	5.0	DSE EH20.11 SHX (2m) L=210	5.0
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Frequency range	Up to 30 kHz, lower limit depending on application														
Housing	<p>According to respective drawing.</p> <p>DSE 1520.03 AxHX and DSE 1720.00 AHX sensors can be used to pressures up to 30 bar.</p>														

Connection

Type #	Connection	Jaquet part number
DSE 1520.03 AHX	Connector	820E-36882
DSE 1520.03 A1HX	Connector	820E-36882
DSE 1720.00 AHX	Connector + mating connector	820E-36884 + 8202606726
DSE 1820.12 PHX	Cable + Connector	824L-35023 + 8202607071
DSE EH20.11 SHX (2m) L=152	Cable	824L-36222
DSE EH20.11 SHX (2m) L=210	Cable	824L-36222

Jaquet part number	Properties
8202606726	MS3106A-14S-2S Operating temperature: -55 C to +125 C
8202607071	AMP 1-967325-1 Operating temperature: -40 C to +130 C Plug-and-socket connection: IP67 and IP69K
820E-36882	MS3102A-14S-2P Operating temperature: -55°C to +125°C Plug-and-socket connection: IP67
820E-36884	MS3057-6A-1 with Gi T Operating temperature: -55 C to +125 C
824L-35023	FEP Teflon cable, 4-wire, 1 mm ² (AWG 17), outer-Ø max. 6.4 mm, bending radius min. 100 mm, screened (metal net), white Operating temperature: -55°C to +200 °C
824L-36222	FEP Teflon cable, 4-wire (white wire is not connected), 0.6 mm ² (AWG 20), outer-Ø max. 4.7 mm, bending radius min. 24 mm, screened(metal net), white Operating temperature: -60°C to +150 °C

Requirements for pole wheel	Toothed wheel of a magnetically permeable material (e.g. Steel 1.0036) Optimal performance with <ul style="list-style-type: none"> • 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	Sensor head: -40°C...150°C Connector/Cable: see table above

Further Information

Safety	All mechanical installations must be carried out by an expert. General safety requirements have to be met.
Connection	<p>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:</p> <ul style="list-style-type: none"> • 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	<p>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.</p> <p>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.</p> <p>A solid and vibration free mounting of the sensor is important. Sensor vibration relative to the pole wheel may add extraneous and/or spurious noise to the signal.</p> <p>The sensors are insensitive to oil, grease etc. and can be installed in arduous conditions.</p>
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.