

Differential Hall Effect Speed Sensor

DSD 18xx.19 SxHW



Product ID

Type #	Product #	Drawing #
DSD 1810.19 SHW	374Z-04837	112354 / 3-112341A
DSD 1813.19 SHW	374Z-05878	115815
DSD 1813.19 S1HW	3742609940	122223
DSD 1813.19 S2HW	3742610036	122223
DSD 1820.19 S16HW	374Z-05890	115813
DSD 1820.19 S21HW	3742608149	119729
DSD 1820.19 S22HW	3742608632	120404
DSD 1820.19 S26HW	3742608690	120498
DSD 1820.19 S27HW	374Z-03848	111320
DSD 1820.19 S28HW	3742608821	120719
DSD 1820.19 S38HW	20004042-00	132825

General

Function

The sensors DSD 18xx.19 SxHW are suitable, in conjunction with a pole wheel, for generating two phase shifted square wave signals with a pulse frequency proportional to the rotary speed. They have a static behaviour, so that pulse generation is guaranteed down to a speed corresponding to a frequency of 0 Hz. The monitoring element consists of two magnetically biased differential Hall semiconductors. The differential structure requires that the sensor must be oriented. The sensors differ mainly in the pole wheel which they are optimised for and in housing and cable length.

Technical data

Supply voltage	9 VDC to 30 VDC, protected against reverse polarity and transient overvoltage
Current consumption	Max. 30 mA (without load)
Signal output	<ul style="list-style-type: none"> • 2 phase shifted square wave signals, minimum edge shift with an involute gear wheel: minimal 20° between output 1 (S1) and output 2 (S2) if operated with: <ul style="list-style-type: none"> ○ DSD 1810.19 SxHW: module 1 ○ DSD 1813.19 SxHW: module 1.25 ○ DSD 1820.19 SxHW: module 2 • Push-pull outputs : $I_{max} = \pm 20$ mA <ul style="list-style-type: none"> ○ with pull-up resistor (for $I = I_{max}$): $U_{low} < 2.5$ V, $U_{high} > 0.95 * U_{supply}$ ○ with pull-down resistor (for $I = I_{max}$): $U_{low} < 0.1$ V, $U_{high} > U_{supply} - 4.0$ V • The outputs are short circuit proof and protected against reverse polarity.
Frequency range	0 Hz ... 20 kHz

Electromagnetic compatibility (EMC):

With the cable shield connected to GND:

- Electrostatic discharge according to IEC 61000-4-2
 - Up to ± 15 kV air discharge
 - Up to ± 8 kV contact discharge
- Radiated electromagnetic field according to IEC 61000-4-3
 - Up to 30 V/m, 80% AM, 1 kHz in the range of 80 MHz ... 1000 MHz
 - Up to 20 V/m, 80% AM, 1 kHz in the range of 900 MHz ... 2700 MHz
- Electrical fast transients/bursts according to IEC 61000-4-4 coupled to sensor cable with a capacitive coupling clamp
 - Up to ± 2 kV peak
- Surges according to IEC 61000-4-5
 - ±2 kV on DC power ports
- Radio frequency injected current according to IEC 61000-4-6
 - Up to 15 V, 80% AM, 1 kHz, 1000 ms in the range of 0.15 MHz ... 80 MHz with 50 Ohm load and 560 Ohm pull up resistance
- Power frequency magnetic field according to IEC 61000-4-8
 - 100 A/m tested with 16 2/3 Hz, 50 Hz, 60 Hz in each axis

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.

Cable

Sensor	Cable [Jaquet part no.]	Cable length [mm]
DSD 1810.19 SHW	824L-36622	3000
DSD 1813.19 SHW	824L-36808	710
DSD 1813.19 S1HW	824L-36808	2000
DSD 1813.19 S1HW	824L-36808	3000
DSD 1820.19 S16HW	824L-36808	930
DSD 1820.19 S21HW	824L-36808	1430
DSD 1820.19 S22HW	824L-36222	6000
DSD 1820.19 S26HW	824L-36622	580
DSD 1820.19 S27HW	824L-36222	6000
DSD 1820.19 S28HW	824L-36622	5000
DSD 1820.19 S38HW	8242612610	6000

Cable type:

- 824L-36622:
Armoured cable: 6-wire, 0.6 mm² (AWG 20), PEIC insulated, fire retardant, low smoke, PVC and halogen free, oil-proof, waterproof, outer-Ø max. 13.0 mm, min. bending radius = 30 mm (static) and 65 mm (dynamic), screened (metal net), black casing (silicone)
Operating temperature: -40°C to +150 °C
- 824L-36222:
FEP cable, 4-wire (white wire is not connected), 0.6 mm² (AWG 20), outer-Ø max. 4.7 mm, bending radius min. 24 mm, screened (metal net), white
Operating temperature: -60°C to +150 °C
- 824L-36808:
Armoured cable: 8-wire, 0.6 mm² (AWG 20), PEIC insulated, fire retardant, low smoke, PVC and halogen free, oil-proof, waterproof, outer-Ø max. 13.0 mm, min. bending radius = 30 mm (static) and 65 mm (dynamic), screened (metal net), black casing (silicone)
Operating temperature: -40°C to +150 °C
- 8242612610:
Radox GWK-LW 600V MM S, 4x0.75mm²
Huber&Suhner 12 556 630
Test voltage 3.5kVac, min. bending radius: 18mm
Operating temperature: -50°C to +120°C

Cable fitting

Sensor	Cable Fitting
DSD 1820.19 S16HW	822S-37945
DSD 1820.19 S26HW	822S-37945

Jaquet code	Properties
822S-37945	Brass body with polyamide insert, IP 68 (up to 10 bar), M20 x 1.5, SW 24 Operating temperature: -30°C to +100°C continuous,

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	The sensors are optimized for different modules: <ul style="list-style-type: none"> • Module 1.0 DSD 1810.19 SxHW : 0.1 ... 0.5 mm • Module 1.25 DSD 1813.19 SxHW : 0.1 ... 0.8 mm • Module 2.0 DSD 1820.19 SxHW : 0.1 ... 1.5 mm
Insulation	Housing and electronics galvanically separated (500 V/50 Hz/ 1 min)
Protection class	IP68 (head) and IP67 (cable outlet)
Vibration immunity	300 gn (peak) 5 Hz ... 500 Hz random noise for 5 hours per axis according to EN 61373 category 3
Shock immunity	100 g for 6 ms according to EN 61373 category 3
Climatic resistance	Sensor function for 21 days damp heat, according to IEC 60068-2-3, test Ca and storage for 1000 hours at +125°C, according to IEC 60068-2-2, test Ba
Temperature	Operating temperature of entire sensor: -40° ... +125°C Reduced temperature range for cable fitting (see 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. Within the air gap specified the amplitude of the output signals is not influenced by the 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 spurious noise to the signal.</p> <p>The sensors are insensitive to oil, grease etc. and can be installed in arduous conditions.</p>
Operation	The sensor is designed for normal use in its dedicated environment. The manufacturer cannot take responsibility for any abnormal use that might lead to a reduced lifetime of the sensor.
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.