# Dual Channel Hall Effect Speed Sensor with Differential Output

## DSD 1615.73 xHW

## Product ID

| Type # | Product # | Drawing # |
|---|---|---|
| DSD 1615.73 SHW-F150F | 3742612298 | 125348 |
| DSD 1615.73 S3HW-F100F | 3742614311 | 129192 |
| DSD 1615.73 SHW-F200F | 20005051-00 | 133271 |
| DSD 1615.73 SHW-F300F | 20001408-00 | 131047 |
| DSD 1620.73 S4HW-C300F | 20006053-00 | 133481 |

## General

**Function**

The speed sensors DSD 16xx.73 xHW are suitable, in conjunction with a pole wheel, for generating two phase-shifted differential square wave signals proportional to rotary speeds. They have a static behaviour, so that pulse generation is guaranteed down to a speed corresponding to a frequency of 0 Hz. The monitoring elements consist of two magnetically biased differential Hall effect semiconductors. The internal dual channel structure requires that the sensor must be oriented. The sensor has a flange for proper installation. Sensor types with DSD16xx.73 SxHW-**C**xxx have the shield connected to the sensor housing.

## Technical data

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| Supply voltage | 9 VDC to 30 VDC, protected against transient overvoltages and reverse polarity |
| Nominal supply voltage | 15 V |
| Current consumption | Max. 20 mA (without load) |
| Signal output | • 2 phase shifted square wave signals, minimum edge shift with an involute gear wheel: minimal phase shift of 20° for gear of the specified module between output 1 (S1) and output 2 (S2). The signal */*S1 is digitally inverted to the signal S1. The signal */*S2 is digitally inverted to the signal S2.<br>• Push-pull outputs: $I_{max}$ = ± 30 mA<br>  ○ Output voltage HI (for I = $I_{max}$): $U_{HI} > U_{supply} - 1.5$ V<br>  ○ Output voltage LO (for I = $I_{max}$): $U_{LO} < 1.5$ V<br>• The output stages are current limiting and short-circuit proof due to a temperature shutdown mechanism:<br>  ○ Thermal shutdown threshold: 145 … 175°C<br>  ○ Thermal re-start threshold: 135 … 165°C<br>  ○ Hysteresis: 5 … 20°C |
| Frequency range | 0 Hz … 20 kHz |

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| Electromagnetic compatibility (EMC) | Electrostatic discharge according to IEC 61000-4-2<br>• Up to ± 8 kV air discharge<br>• Up to ± 6 kV contact discharge<br>Radiated electromagnetic field according to IEC 61000-4-3<br>• Up to 30 V/m, 80% AM, 1 kHz in the range of 80 MHz … 1000 MHz<br>• Up to 10 V/m, 80% AM, 1 kHz in the range of 1400 MHz … 2500 MHz<br>Electrical fast transients/bursts according to IEC 61000-4-4 direct coupling<br>• Up to ± 2 kV peak, 5/50 ns, 5 kHz<br>Surges according to IEC 61000-4-5<br>• ± 2 kV 1.2/50 µs (common mode)<br>• ± 1 kV 1.2/50 µs (differential mode)<br>Radio frequency injected current according to IEC 61000-4-6<br>• Up to 10 V, 80% AM, 1 kHz, 1000 ms in the range of 0.15 MHz ... 80 MHz with 50 Ω load and 560 Ω pull up resistance<br>Power frequency magnetic field according to IEC 61000-4-8<br>• 300 A/m (1 min) tested with 16 2/3 Hz, 50 Hz in each axis<br>• 1000 A/m (3 s) tested with 16 2/3 Hz, 50 Hz, 60 Hz in each axis<br>Radiated emission (at 3 m)<br>• 30 MHz …230 MHz: 50 dB mV/m<br>• 230 MHz … 1 GHz: 57 dB mV/m |
| 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.<br>Dimensions according to the drawing. |
| Cable | |

| Type # | Cable [Jaquet part #] | Cable length [mm] |
|---|---|---|
| DSD 1615.73 SHW-F150F | 8242611785 | 1500 |
| DSD 1615.73 S3HW-F100F | 8242611785 | 1000 |
| DSD 1615.73 SHW-F200F | 8242611785 | 2000 |
| DSD 1615.73 SHW-F300F | 8242611785 | 3000 |
| DSD 1620.73 S4HW-C300F | 8242611785 | 3000 |

| Jaquet cable type | Properties |
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| 8242611785 | Tyco Raychem Zerohal 100G / EPD 97489B<br>Max. operating temperature: -55°C to +125°C (20'000h) |

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| Requirements for pole wheel | Toothed wheel of a magnetically permeable material (e.g. Steel 1.0036)<br>Optimal performance with<br>• Involute gear<br>• Tooth width ≥ 10 mm<br>• Side offset < 1.0 mm<br>• Eccentricity < 0.2 mm<br>• Sensors are optimized to operate with an involute gear of a module 1.5 |
| Air gap between sensor housing and pole wheel | Module 1 0.5 … 0.7<br>Module 1.5 0.5 … 1.3<br>Module >=2 0.5 … 1.5 |
| Insulation | • Insulation between electronics and housing: 700 VDC, > 100 MΩ<br>• Insulation between shield and housing: 700 VDC, > 100 MΩ |
| Protection class | Sensor head: IP68 |
| Vibration immunity | IEC 61373, Cat. 3, with 300 m/s$^2$ for all axes, for 8 h |
| Shock immunity | IEC 61373, Cat. 3 |

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| Operating temperature | • Sensor head:<br>Continuous operation: -40°C … +125°C<br>Short term exposure according to test report **T120541**: down to -60°C<br>• Cable: according to cable specification (see above) |

## Additional Information

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| 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.<br>Sensor wires are susceptible to radiated noise. Therefore, the following points have to be considered when connecting a sensor:<br>• The sensor wires must be positioned as far as possible from large electrical machines.<br>• They must not run in the vicinity of power cables.<br>• 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 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. Within the air gap specified the amplitude of the output signals is not influenced by the air gap.<br>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 4mm from either edge of the pole wheel under all operating conditions.<br>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.<br>The sensors are insensitive to oil, grease etc. and can be installed in arduous conditions. |
| 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. |