



JAQUET DSD 25

Three & Four Channel Hall Effect Speed Sensor for Railway Applications compliant with EN 50155 from TE Connectivity

Benefits

- Enable the installation of a parallel train control System on existing rolling stock with the same number of sensor heads and cables
- One sensor head that supplies as much information as two unique sensors provides greater value.
- Save Installation time with only one change over instead of two

There are two major trends driving the increased demand on train speed sensors. First, the reduction of costs and weight of rolling stock, and second, the upgrade of train control systems to allow increased train density in saturated lines.

Multi-channel Hall speed sensors address these challenges without the addition of weight and costs related to additional sensors. One sensor with two galvanically separated output stages provides reduced weight, less installation time and greater value.

With over 40 years' experience and more than 250,000 sensors in service, TE Connectivity (TE) is one of the few suppliers who can offer multi-channel Hall speed sensors using differential Hall effect elements with 4 channels containing 8 Hall elements in total. An excellent solution to address these trends

Features

- Multi-channel solution
- 3 or 4 sensor elements
- Rail certified cable and connectors
- Galvanically separated sensor circuits
- ISO - TS 22163 IRIS certified global leader in rail speed sensor

Applications

- WSP
- Bogies
- Propulsion Systems
- Train Control Systems

Technical Information

General	
Function	The speed sensors family DSD 25 are composed of two galvanically separated circuits having each up to two phase-shifted square wave signals proportional to the rotary speed. They have 3 or 4 sensing elements consisting of magnetic biased differential hall-effect semiconductors with static behaviour, so that pulse generation is provided down to a speed corresponding to a frequency of 0 Hz.
Technical data	
Supply voltage V1	9 VDC to 30 VDC, protected against transient over-voltages and reverse polarity (nominal 15V)
Supply voltage V2	9 VDC to 30 VDC, protected against transient over-voltages and reverse polarity (nominal 15V)
Circuit1	2 phase shifted square wave signals, minimum edge shift with an involute gear wheel: phase shift of $90^\circ \pm 45^\circ$ for a gear module 2 between output 1 (S1) and output 2 (S2) - Push-pull outputs : $I_{max} = \pm 30$ mA - Output voltage HI (for $I = I_{max}$): $U_{HI} > U_{supply} - 1.5$ V - Output voltage LO (for $I = I_{max}$): $U_{LO} < 1.5$ V
Circuit 2	1 single channel or 2 phase shifted square wave signals, minimum edge shift with an involute gear wheel module 2: minimal phase shift of 20° between output 1 (S3) and output 2 (S4) - Push-pull outputs : $I_{max} = \pm 30$ mA - Output voltage HI (for $I = I_{max}$): $U_{HI} > U_{supply} - 1.5$ V - Output voltage LO (for $I = I_{max}$): $U_{LO} < 1.5$ V
Current consumption	max. 30 mA (without load) for Circuit1 and two channels max. 30 mA (without load) for Circuit2 and two channels
Frequency range	0 Hz ... 20 kHz (higher frequencies on request)
Electromagnetic compatibility (EMC)	compliant with EN 50121-3-2
Protection class	Sensor head: IP68
Shock & Vibration	compliant with EN 61373 Cat.3
Operating temperature	- Sensor head: $-40^\circ \dots +125^\circ$ C - Cable: -40° C to $+150^\circ$ C for the standard cable type 824L-36808
Requirements for pole wheel	Toothed wheel of a magnetically permeable material (e.g. Steel 1.0036) - Module: 1.5 up to 4 - Optimal performance with involute gear module 2 - Tooth width ≥ 10 mm, Side offset < 1.0 mm, Eccentricity < 0.2 mm
Air gap between sensor housing and pole wheel (depending on pole wheel shape)	Module 1.5 0.5 ... 1.3 mm Module ≥ 2 0.5 ... 1.5 mm
Insulation	- Insulation between electronics and housing: 700 VDC, > 100 MOhm - Insulation between shield and housing: 700 VDC, > 100 MOhm

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Product Identification

DS D 25 — . — — — — H — - — — —
 DS D 25 20 . 7 6 P 1 H R2W - F 300 F

Example of identification

Sensor housing

F: standard straight
 G: 90° angle housing
 S: customized housing design

Cable length in cm

Cable Screen

F: not connected to the sensor housing
 C: connected to the sensor housing (on request)

Output signal characteristics

R2W: 4 channels, 2 galvanically insulated circuits with two channels
 RW: 3 channels, 2 galvanically insulated circuits, one with two channels and one independent channel

Temperature Class

H: High temperature -40°C ... +125°C

Customer specific version number

Connection Method

S: integral cable with open ends
 A: connector integrated in housing
 P: integral cable terminated with a connector
 Q: cable protected with cable sleeve, connector
 M: cable protected with cable sleeve, open ends

Electronic Type 74:

Circuit 1: two channels typ. 90° phase shift
 Circuit 2: two channels typ. > 20° phase shift

Electronic Type 75:

Circuit 1: two channels typ. 90° phase shift, additionally the digitally inverted signals
 Circuit 2: two channels typ >20° phase shift

Electronic Type 76:

Circuit 1: two channels typ. 90° phase shift
 Circuit 2: one channel

Electronic Type 77:

Circuit 1: two channels typ. 90° phase shift, additionally the digitally inverted signals
 Circuit 2: one channel

Electronic Type 78 (on request):

Circuit 1: two channels 90° phase shift
 Circuit 2: channels with frequency division (f/2)

Target module

xy: module multiplied by 10 (xy > 20)
 p. ex. 20: module 2.0

Related to diameter of the sensor housing 24.5 mm

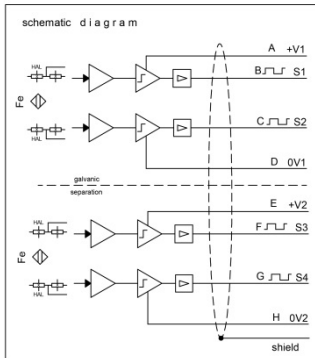
Sensor Technology

D: differential Hall-effect sensor

Signal Patterns, Electronic Type

74: Circuit 1: two channels typ.90° phase shift,

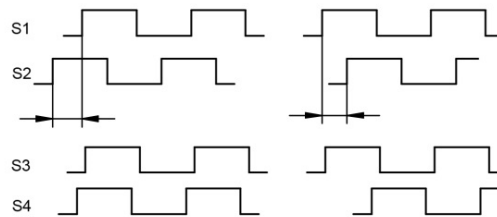
Circuit 2: two channels >20° phase shift



pulse diagram

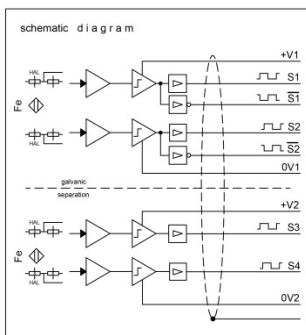
direction of rotation A

direction of rotation B



75: Circuit 1: two channels typ. 90° phase shift, add itionally the digitally inverted signals,

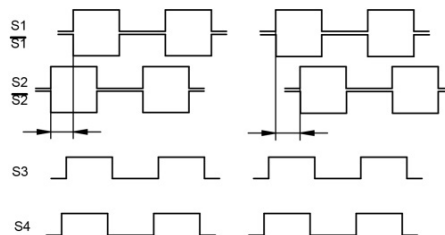
Circuit 2: two channels typ >20° phase shift



pulse diagram

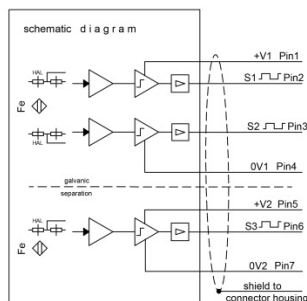
direction of rotation A

direction of rotation B



76: Circuit 1: two channels typ. 90° phase shift,

Circuit 2: one channel

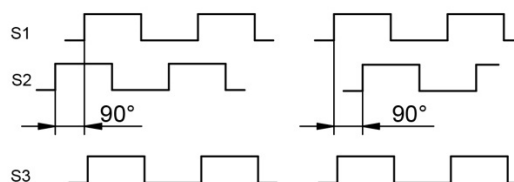


pulse diagram

(tolerances indicated in the data-sheet)

direction of rotation A

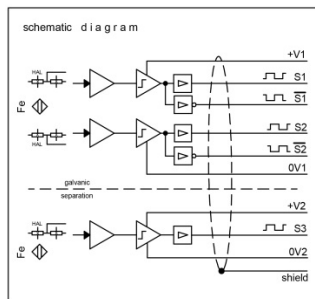
direction of rotation B



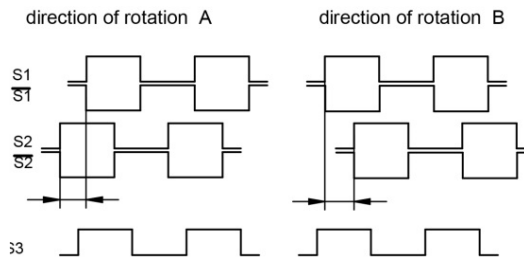
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77: Circuit 1: two channels typ. 90° phase shift, additionally the digitally inverted signals, Circuit 2: one channel

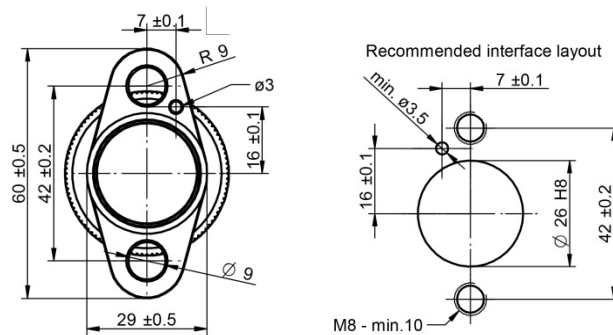


pulse diagram



Dimensions

Sensor housing basic dimension



Recommended interface layout

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 the drawing.

F: straight

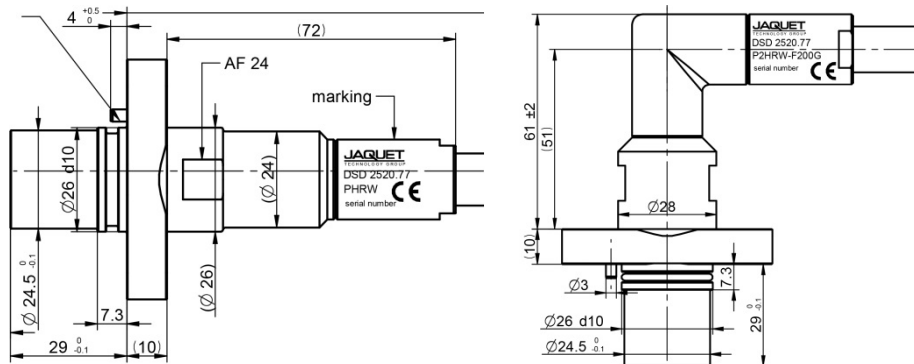
G: 90° angle

S: special housing design

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Examples of Sensor Heads



F: straight

G: 90° long

Cable & Connection Method

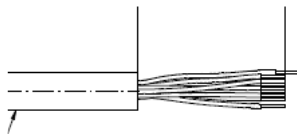
JAQUET cable type: 824L-36808

Properties

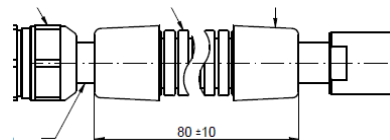
Armoured cable: 8-wire, 0.6 mm² (AWG 20), PEIC insulated, fire retardant, low smoke, PVC and halogen free, oil-proof, waterproof, outer-Ø max. 13.0 mm, min. bending radius = 30 mm (static) and 65 mm (dynamic), screened (metal net), black casing (silicone)

Operating temperature: -40°C to +150 °C. Other cable types on request

Examples of connection method



S: open wire ends

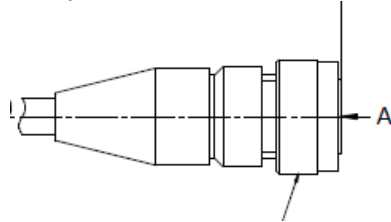


Q: straight with flexible cable sleeve

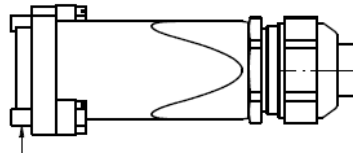
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Examples of connectors



P: round connector



P: rectangular connector

P: other connectors on request

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Version # 12/2021

