

DSH 16

Dual Channel Eddy Current Speed Sensor
for Railway Applications, compliant with EN 50155

Technical information

Version: 07.16



| General | |
|---|---|
| Function | The speed sensors DSH 16xx.xx SHx are suitable, in conjunction with an aluminium pole wheel (or other conducting, non-magnetic metal) for generating two nominally 90° phase shifted square wave signals indicating the rotary speeds and the direction of rotation. |
| Technical data | |
| Supply voltage | Nominal 15VDC (8 VDC to 30 VDC), protected against reverse polarity and transient overvoltages |
| Signal output | <ul style="list-style-type: none"> • 2 phase shifted square wave signals, output 1 (S1) and output 2 (S2) and direction output. • Duty cycle 50% ± 25% • Phase shift 90° ± 40° (on request ± 25°; target specification needed) • Push-pull outputs : $I_{max} = \pm 30 \text{ mA}$ <ul style="list-style-type: none"> ◦ Output voltage HI (for $I = I_{max}$): $U_{HI} > U_{supply} - 1.5 \text{ V}$ ◦ Output voltage LO (for $I = I_{max}$): $U_{LO} < 1.5 \text{ V}$ • The outputs are short circuit proof and protected against reverse polarity. |
| Current consumption | Max. 30 mA (without load) |
| Frequency range | Up to 20 kHz |
| Electromagnetic compatibility (EMC) | compliant with EN 50155 |
| Protection class | <ul style="list-style-type: none"> • Sensor head: IP68 |
| Shock & Vibration | compliant with EN 61373 Cat.3 |
| Operating temperature | <ul style="list-style-type: none"> • Sensor head: -40° ... +120°C • Cable: -40°C to +150 °C for the standard cable type 824L-36622 |
| Requirements for pole wheel | Aluminum toothed wheel (other non-magnetic material on request) Optimal performance with <ul style="list-style-type: none"> • Rectangular gear tooth Module 3 • Tooth width ≥ 15 mm • Valley deep ≥ 3 mm • Side offset < 1 mm • Eccentricity < 0.1 mm |
| Air gap between sensor housing and pole wheel (depends on the pole wheel shape) | Module 2 0.2 ... 1 mm Module ≥ 3 0.2 ... 1.5 mm |
| Insulation | <ul style="list-style-type: none"> • Housing and electronics galvanically separated (500 V/50 Hz/ 1 min) |

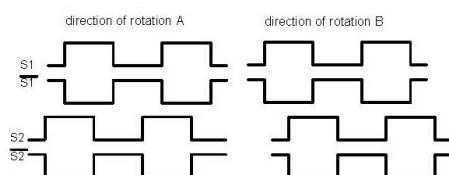
Product identification

| | | | | | | | | | | | | | | |
|---|---|----|----|---|---|---|---|---|---|---|---|---|-----|---|
| DS | H | 16 | — | . | — | — | — | — | H | — | - | — | — | — |
| DS | H | 16 | 30 | . | 0 | 1 | P | 1 | H | W | - | C | 300 | G |
| Example of identification | | | | | | | | | | | | | | |
| Sensor housing | | | | | | | | | | | | | | |
| F: standard straight | | | | | | | | | | | | | | |
| G: 90° angle housing | | | | | | | | | | | | | | |
| S: customized housing design | | | | | | | | | | | | | | |
| Cable length in cm | | | | | | | | | | | | | | |
| Cable Screen | | | | | | | | | | | | | | |
| K: connected to the sensor housing via condenser (under request) | | | | | | | | | | | | | | |
| C: connected to the sensor housing (standard) | | | | | | | | | | | | | | |
| Output signal characteristics | | | | | | | | | | | | | | |
| W: 2 channels with 90° phase shift, push-pull output, no galvanic separation | | | | | | | | | | | | | | |
| V: 1 channel push-pull output | | | | | | | | | | | | | | |
| R2V: 2 channels push-pull output, galvanically separated | | | | | | | | | | | | | | |
| Temperature Class | | | | | | | | | | | | | | |
| Push-pull with galvanic insulation | | | | | | | | | | | | | | |
| H: High temperature -40°C ... +120°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 and connector | | | | | | | | | | | | | | |
| M: open end cable protected with cable sleeve | | | | | | | | | | | | | | |
| Electronic Type | | | | | | | | | | | | | | |
| 00: push-pull 2 channels, no galvanic separation between channels plus 2 channels with the digitally inverted signals | | | | | | | | | | | | | | |
| 01: push-pull 1 channel with square wave signals with direction signal and their inverted signals | | | | | | | | | | | | | | |
| 02: push-pull 2 channels, with galvanic separation between channels | | | | | | | | | | | | | | |
| Target module | | | | | | | | | | | | | | |
| xy: module multiplied by 10 | | | | | | | | | | | | | | |
| p. ex. 30: module 3.0 | | | | | | | | | | | | | | |
| Size of the sensor housing (diameter in mm) | | | | | | | | | | | | | | |
| 16: sensor head diameter 16mm | | | | | | | | | | | | | | |
| Sensor Technology | | | | | | | | | | | | | | |
| H: Eddy current speed sensor | | | | | | | | | | | | | | |

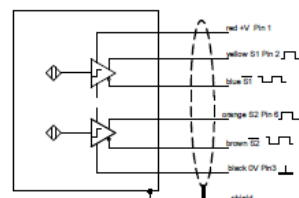
Signal patterns, electronic type

00: push-pull 2 channels, no galvanic separation between channels plus 2 channels with the digitally inverted signals

Pulse diagram

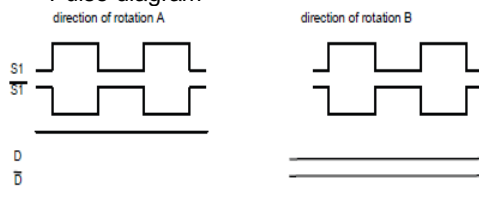


Schematic diagram

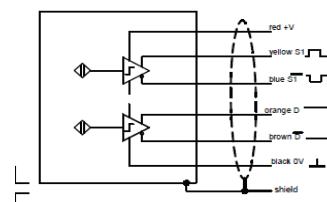


01: push-pull 1 channel with square wave signals with direction signal and their inverted signals

Pulse diagram

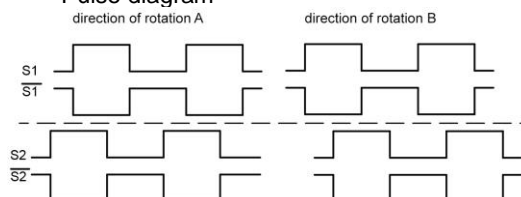


Schematic diagram

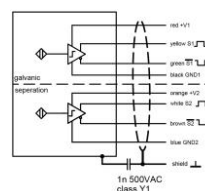


02: push-pull 2 channels, with galvanic separation between channels

Pulse diagram

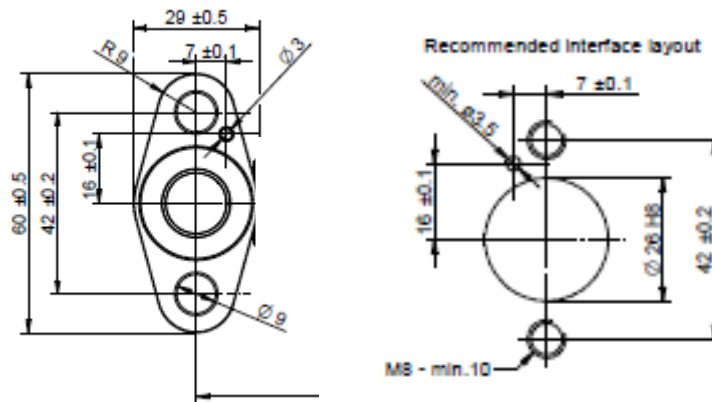


Schematic diagram



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.

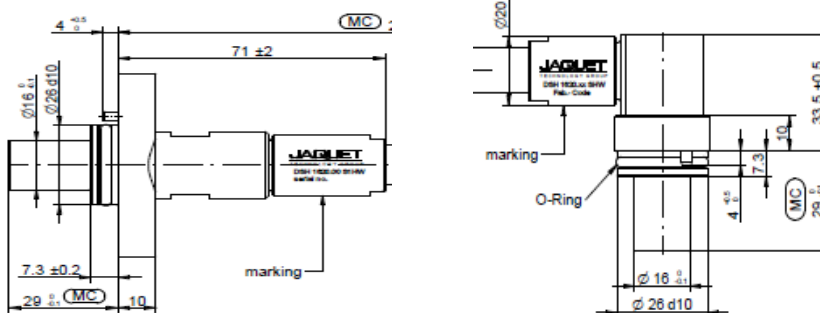
F: straight

G: 90° angle

S: special housing design

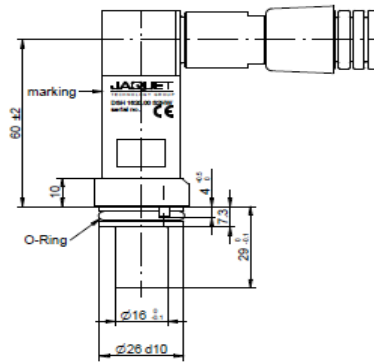
Examples of sensor heads

Examples of sensor heads



F: straight

G: 90° (standard)



GS: 90° long nose

Cable & connection method

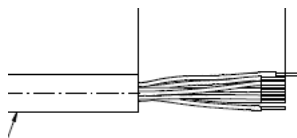
Jaquet cable type: 824L-36622

Properties

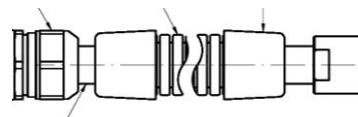
Armoured cable: 6-wire, 0.6 mm² (AWG 20), PEIC insulated, fire retardant, low smoke, PVC and halogen free, oil-proof, waterproof, outer-Ø max. 13.0 mm, min. bending radius = 30 mm (static) and 65 mm (dynamic), screened (metal net), black casing (silicone)

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

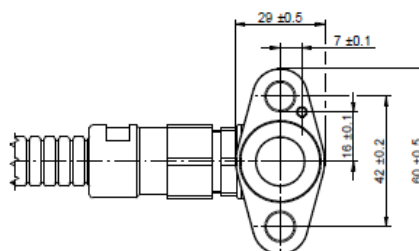
Examples of connection method



S: open wire ends

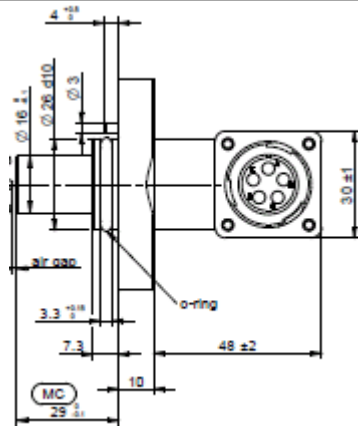


Q: straight with flexible cable sleeve

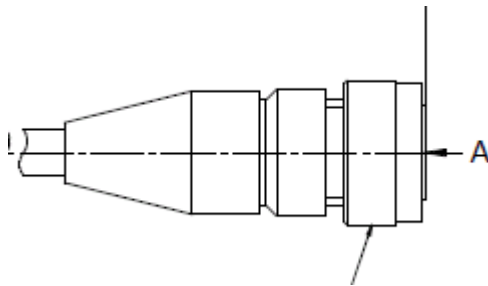


Q: fix cable sleeve and 90°

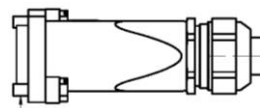
Connection method



A: connector integrated in housing



P: round connector



P: rectangular connector

P: other connectors on request

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