2-channel speed sensor
GEL 2471
Sensor for electrically conducting target wheels

Technical information ***Version 02.10***

Description

- Application approved speed sensor based on the principle of eddy current (non-magnetic)
- Maintenance- and wear-free operation due to non-contact measurement of rotation
- Suitable for electrically conduting target wheels
- Safe detection of slow rotation from 0 Hz without pulse loss and for high-speed rotation up to 25 kHz
- Two channels shifted by 90° provide the direction of rotation
- Robust and compact stainless steel housing suitable for harsh application
- Simple flange mounting
- Customized cable fittings

Features

- Module of target wheel 2.00 to 3.00
- Measuring range 0 Hz to 20 kHz
- Temperature range -40 °C to +120°C
- Protection class IP 68
- Type test according to EN 50155

Advantages

- Weight-saving construction due to light-weight target wheels made of e.g. Aluminium
- Maintenance-free as measuring surface does not attract magnetical paritcles such as ferric powder or swarf
- Ideal for operation in presence of ferric particles due to non-magnetic measuring system

Fields of application

- Rail vehicles
  - Traction control
  - Anti-slip
  - Motor speed
  - Anti-skid
- Automation
  - Measurement of speed and positions at gears, motors and roller

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Technical Data

Signal pattern	E	F	S	G	V	X
Electrical data						
Supply voltage V_S (reverse polarity protected)	10 to 20 V DC					
Current consumption per channel I_S (without load)	≤ 40 mA					
Output signal (short circuit-proof)	Square-wave signals					
Output signal level high (1)	≥ V_S - 1.8 V					
Output signal level low (1)	≤ 1.5 V					
Output current per channel	≤ 20 mA					
Input frequency (target wheel)	0 to 20 kHz					
Output frequency	0 to 20 kHz					
Duty (depends on measuring scale and air gap)	50 % ± 25 %					
Phase shift	—				typ. 90°	
Slew rate (2 m cable)	≥ 10 V/µs					
Electromagnetic compatibility(2)	Rail vehicles (EN 50121-3-2) Industrial applications (EN 61000-6-1 to 4)					
Insulation	500 V AC (EN 60439-1)					
Mechanical data						
Module m of target wheel	2.00 / 3.00					
Permissible air gap (for module m) m = 2.00 (D.P. = 12.7) m = 3.00 (D.P. = 8.47)	 typ. 0.7 mm typ. 0.8 mm					
Width of target wheel	≥ 10 mm (smaller ones on request)					
Form of target wheel	Involute gear as per DIN 867, rectangular gear 1:1 or slotted disk (on request)					
Material of target wheel	Steel, aluminium (others on request)					
Operating and ambient temperature	-40 °C to +120 °C					
Storage temperature	-40 °C to +120 °C					
Protection class	IP 68					
Vibration resistance	EN 61373 cat. 3					
Shock resistance	EN 61373 cat. 3					
Type test	EN 50155					
Housing material of sensor	Stainless steel					
Weight of sensor (2 m cable)	500 g					
Electrical connection						
Cable	Cable halogen free and screened (specification on request), cable outlet straight or lateral					
Cable length	≤ 100 m					
Cable diameter	8.2 mm					
Cable cross section	6 x 1.0 mm^2					
Cable type	LK1069					
Bending radius static / dynamic	24 mm / 41 mm					

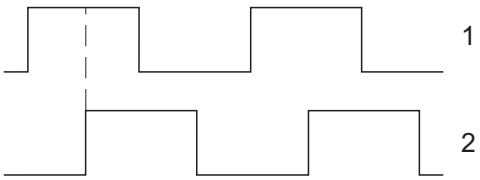
(1) Output signal level depends on output current and temperature

(2) Test according to EN 61000-4-3: In some cases strong electromagnetic fields can inherently affect the sensor's HF-oscillator when the sensor is mounted in the open. Sensors installed in a casing are generally sufficiently screened from such fields.

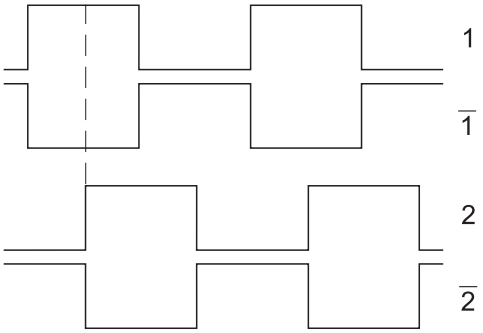
Signal pattern, Signal level

Signal pattern

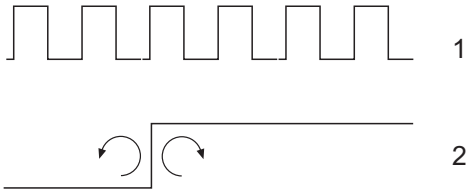
E (V_S: 10 ... 20 V DC) only channel 1
V (V_S: 10 ... 20 V DC)



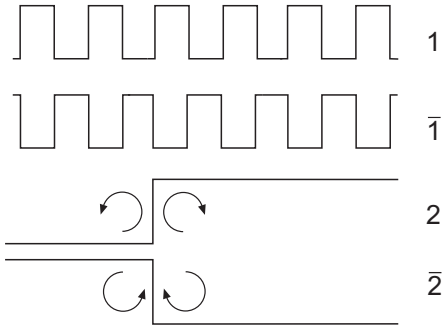
F (V_S: 10 ... 20 V DC) only channel 1 and $\overline{1}$
X (V_S: 10 ... 20 V DC)



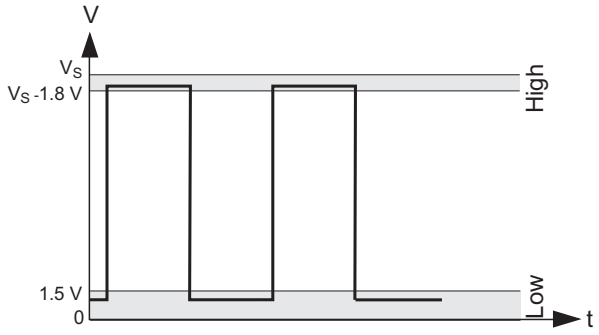
S (V_S: 10 ... 20 V DC)



G (V_S: 10 ... 20 V DC)



Voltage output



Explanations

1, 2 = Channel 1, Channel 2

$\overline{1}$, $\overline{2}$ = Channel 1 inverse, Channel 2 inverse

V_S = Supply voltage

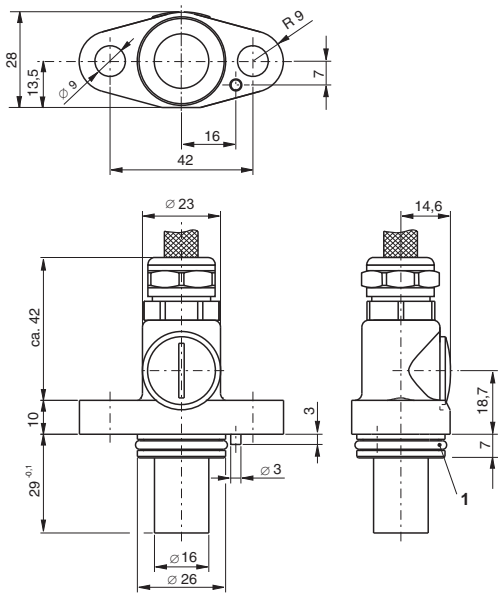
Electrical connection, Dimensions

Electrical connection

Signal	E	F	S	G	V	X
Channel 1	yellow	yellow	yellow	yellow	yellow	yellow
Channel 2			white	white	white	white
Channel $\overline{1}$		black		black		black
Channel $\overline{2}$				brown		brown
GND (0 V)	blue	blue	blue	blue	blue	blue
$+V_S$ (10 ... 20 V DC)	red	red	red	red	red	red
Cable / Screen	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1

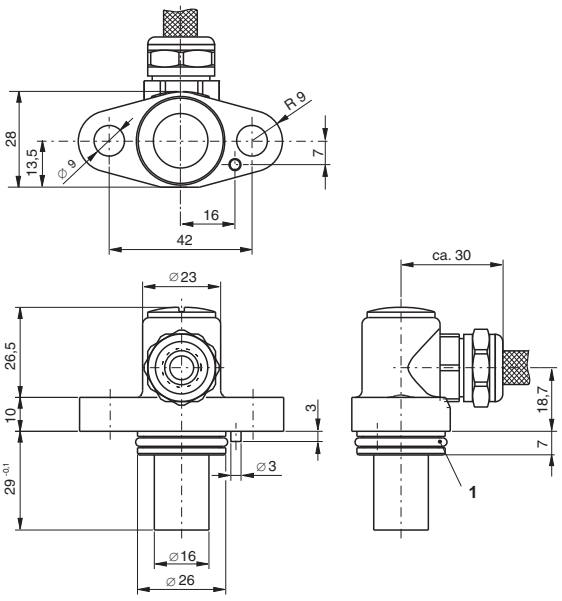
Dimensions
(Straight cable outlet)

1 Sealing ring
(21 x 2,5 mm, NBR)



Dimensions
(Lateral cable outlet)

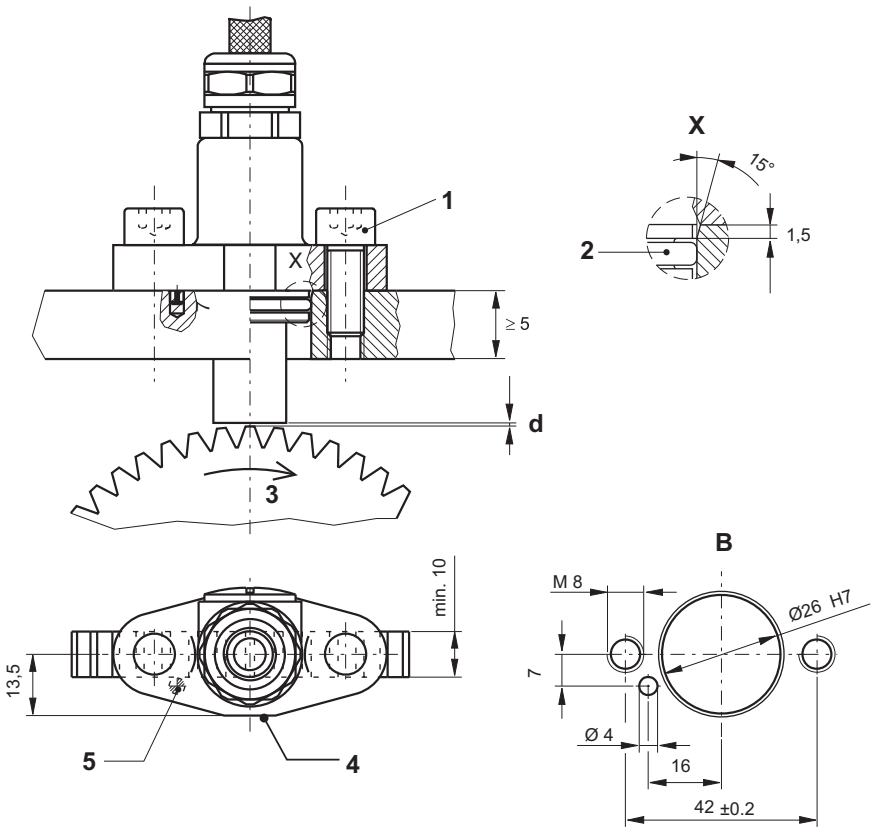
1 Sealing ring
(21 x 2,5 mm, NBR)

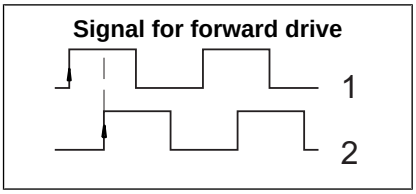


Assembly Drawing

Assembly drawing

B	Drilling plan (top view)
X	Bevelling
d	Permissible air gap 0.7 mm
1	Mounting screw (recommended: M8 x 20, EN ISO 4762)
2	Sealing ring (21 x 2.5 mm; NBR)
3	Direction of rotation of the target wheel (forwards)
4	Visible surface (target wheel rotating forwards)
5	Index pin





Please observe the EMC-reference into the operating instruction!

Type code

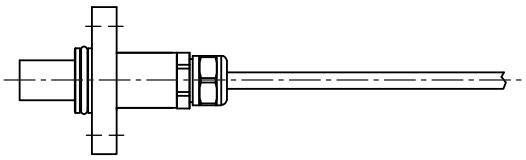
Type code GEL 2471

	Signal pattern						
	E	1-channel square-wave signals					
	F	1-channel square-wave signals and their inversed signals					
	S	1-channel square-wave signals with direction signal					
	G	1-channel square-wave signals with direction signal and their inversed signals					
	V	2-channel square-wave signals shifted by 90°					
	X	2-channel square-wave signals shifted by 90° and their inversed signals					
		Module m					
		200	module 2.00				
		300	module 3.00				
			Material and form of target wheel				
			A	aluminium, involute gear			
			B	steel, involute gear			
			C	aluminium, rectangular gear			
			D	steel, rectangular gear			
			S	other on request			
				Cable screen			
				L	connected to sensor housing		
				P	not connected to sensor housing		
					Cable outlet		
					F	straight	
					G	lateral	
						Cable length L	
						xxxx	cable length in cm
							Customising
							N standard version
							S special version
2471	_	_ _ _	_	_	_	_ _ _ _	_

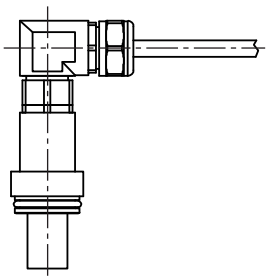
Notes: For a special customized version a Y-No. will be created. A special version 2471Yxxx is manufactured according to a drawing or application description and could differ from the technical standard specification.

Example for customized cable connections

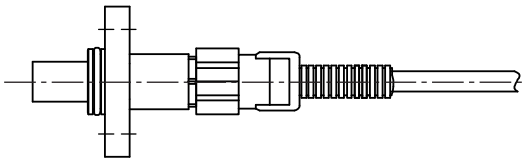
Encoder end



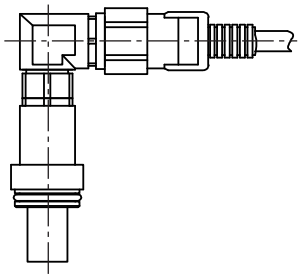
standard, straight outlet



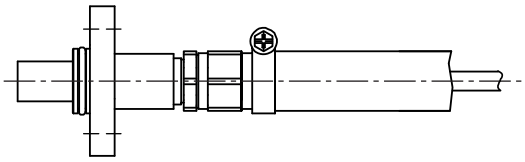
cable output, side outlet



flexible conduit, straight outlet

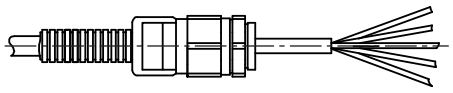


flexible conduit, side outlet

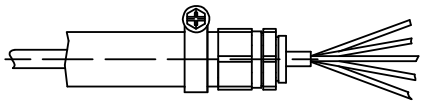


rubber conduit, straight outlet

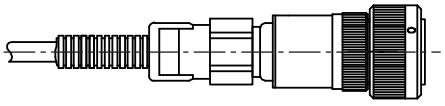
Cable end



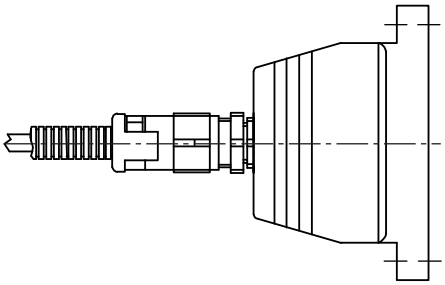
flexible conduit connection and cable end open



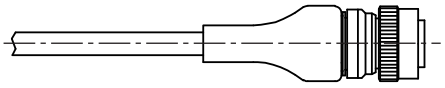
rubber conduit and cable end open



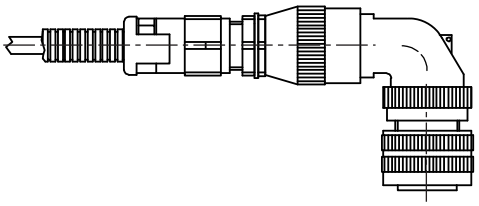
round connector with flexible conduit



HTS connector with flexible conduit



connector with shrink moulded sleeve



round connector, 90° elbow with flexible conduit

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