

1- or 2-channel speed sensor
▶ **GEL 2474**
with increased sensing distance



Technical information

Version 06.11



General information

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

Features

- ▶ Module target wheel 1.00 to 3.50
- ▶ Measuring range 0 Hz to 25 kHz
- ▶ Temperature range -40 to +120 °C
- ▶ Protection class IP 68
- ▶ Type test according to EN 50155

Advantages

- ▶ Low lifecycle costs for end customer due to high reliability
- ▶ Place-saving sensor in a compact design
- ▶ Increased sensing distance (air gap up to 3 mm, depending on module of target wheel)

Fields of application

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

Technical Data

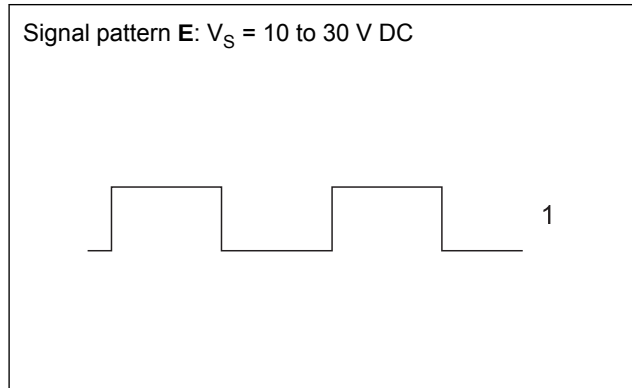
Signal pattern	E-	EI	EM	V-
Electrical data				
Supply voltage V _S (reverse polarity protected)	10 to 30 VDC	10 to 20 VDC		10 to 30 VDC
Current consumption I _S (without load)	≤ 30 mA	–	< 12 mA	≤ 45 mA
Output signal (short-circuit proof)	Square-wave			
Output level high ⁽¹⁾	V _S - 1.0 V	typ. 14 mA	V _S - 1.8 V	V _S - 1.5 V
Output level low ⁽¹⁾	≤ 1 V	typ. 7 mA	≤ 1.5 V ⁽²⁾	≤ 1.5 V
Max. output current per channel	≤ 20 mA	≤ 16 mA	≤ 10 mA	≤ 20 mA
Input frequency target wheel	0 Hz to 25 kHz		1 Hz to 8 kHz	1 Hz to 25 kHz
Duty cycle (depends on measuring scale and air gap)	50% ± 5%		50% ± 10%	50% ± 5%
Phase shift	–			typ. 90°
Slew rate (with 2 m cable)	≥ 10 V/μs	≥ 6 V/μs (R _L = 560 Ω)	≥ 4 V/μs	≥ 10 V/μs
EMC	Rail vehicles: EN 50121-3-2 Industry applications: EN 61000-6-1 to 4			
Insulation strength (DIN EN 60439-1)	500 V			
Mechanical data				
Module m of target wheel:	1.0 to 3.5 (DP: 25.4 to 7.3)		2.0 (DP: 12.7)	
Permissible air gap (for module m) m = 1.00 m = 1.50 m = 2.00 m = 2.50 m = 3.50	0.2 to 1.4 mm 0.2 to 1.8 mm 0.2 to 2.2 mm 0.2 to 2.8 mm 0.2 to 3.0 mm		0.3 to 1.5 mm	0.2 to 2.2 mm
Width of target wheel	≥ 10 mm (smaller ones on request)			
Form of the target wheel	Involute gear as per DIN 867, rectangular gear 1:1 or slotted disk (on request)			
Material of target wheel	Ferromagnetic steel			
Operating and ambient temperature	-40 °C to +120 °C		-40 °C to +85 °C	-40 °C to +120 °C
Storage temperature	-40 °C to +120 °C			
Protection class	IP 68			
Vibration and shock resistance	EN 61373 Cat. 3			
Type testing	EN 50155			
Sensor housing material	Stainless steel			
Weight (with 2 m cable)	650 g			
Electrical connection				
Cable	Cable non halogen and screened (specifications on request), cable outlet straight			
Cable length	≤ 100 m			
Cable diameter	8.2 mm	8.3 mm	6.3 mm	8.2 mm
Cable cross section	6 x 1.0 mm ²	4 x 1.0 mm ²	3 x 0.5 mm ²	6 x 1.0 mm ²
Bending radius static / dynamic	24 / 41 mm	25 / 42 mm	19 / 32 mm	24 / 41 mm

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

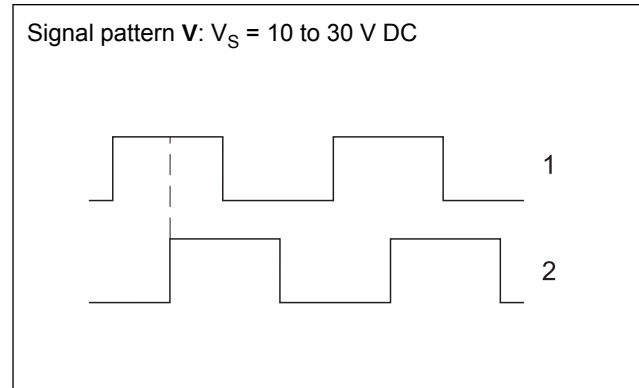
⁽²⁾ 7 V $\pm$ 0.3 V at frequencies < 1 Hz $\pm$ 0.3 Hz

Signal pattern, Electrical connection

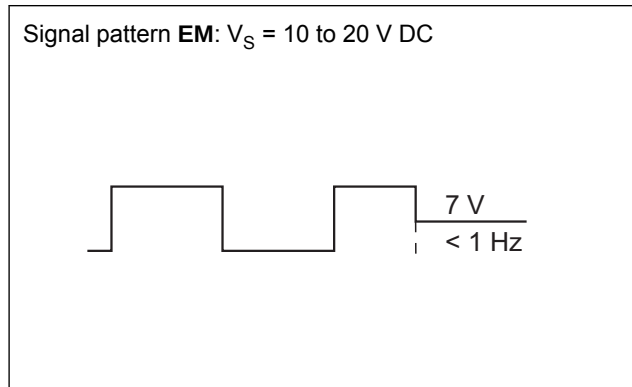
Voltage output (1 channel)



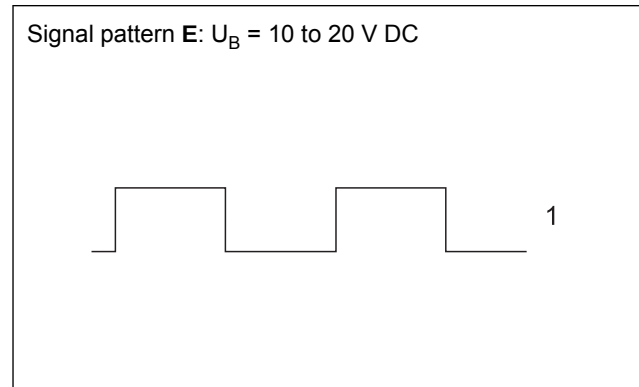
Voltage output (2 channels)



Voltage output with standstill voltage (1 channel)



Current output (1 channel)



Key

1, 2 = channel 1, channel 2

V_S = supply voltage

Electrical connection

Signal	Voltage output		Standstill voltage	Current output
	E	V	EM	EI
Channel 1	yellow	yellow		blue
Channel 2		white	white	
GND (0 V)	blue	blue	black	
+ V_S	red	red	red	red
Cable/screen	1 / 1	1 / 1	1 / 1	1 / 1

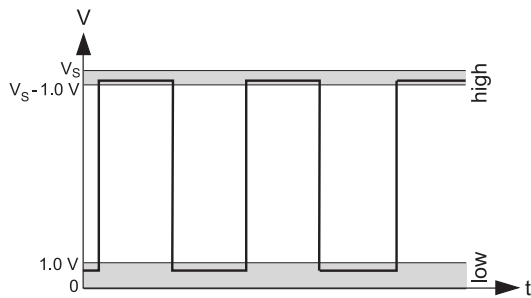
for signal pattern E- / V-: $V_S = 10$ to 30 V DC

for signal pattern EI / EM: $V_S = 10$ to 20 V DC

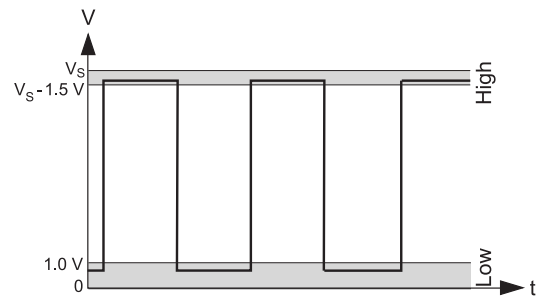
Signal level

Voltage output

for signal pattern E- (without standstill voltage)

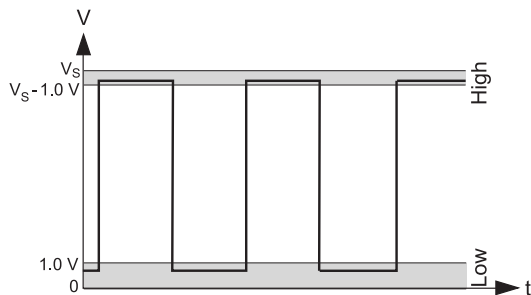


for signal pattern V



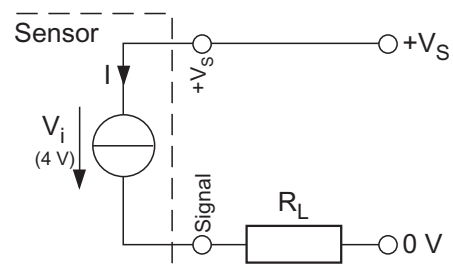
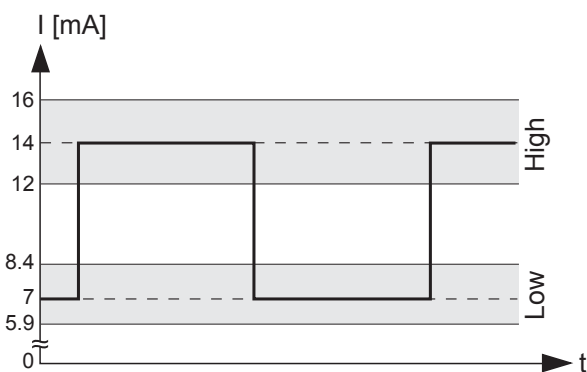
Voltage output with standstill voltage

for signal pattern EM



Current output

for signal pattern EI

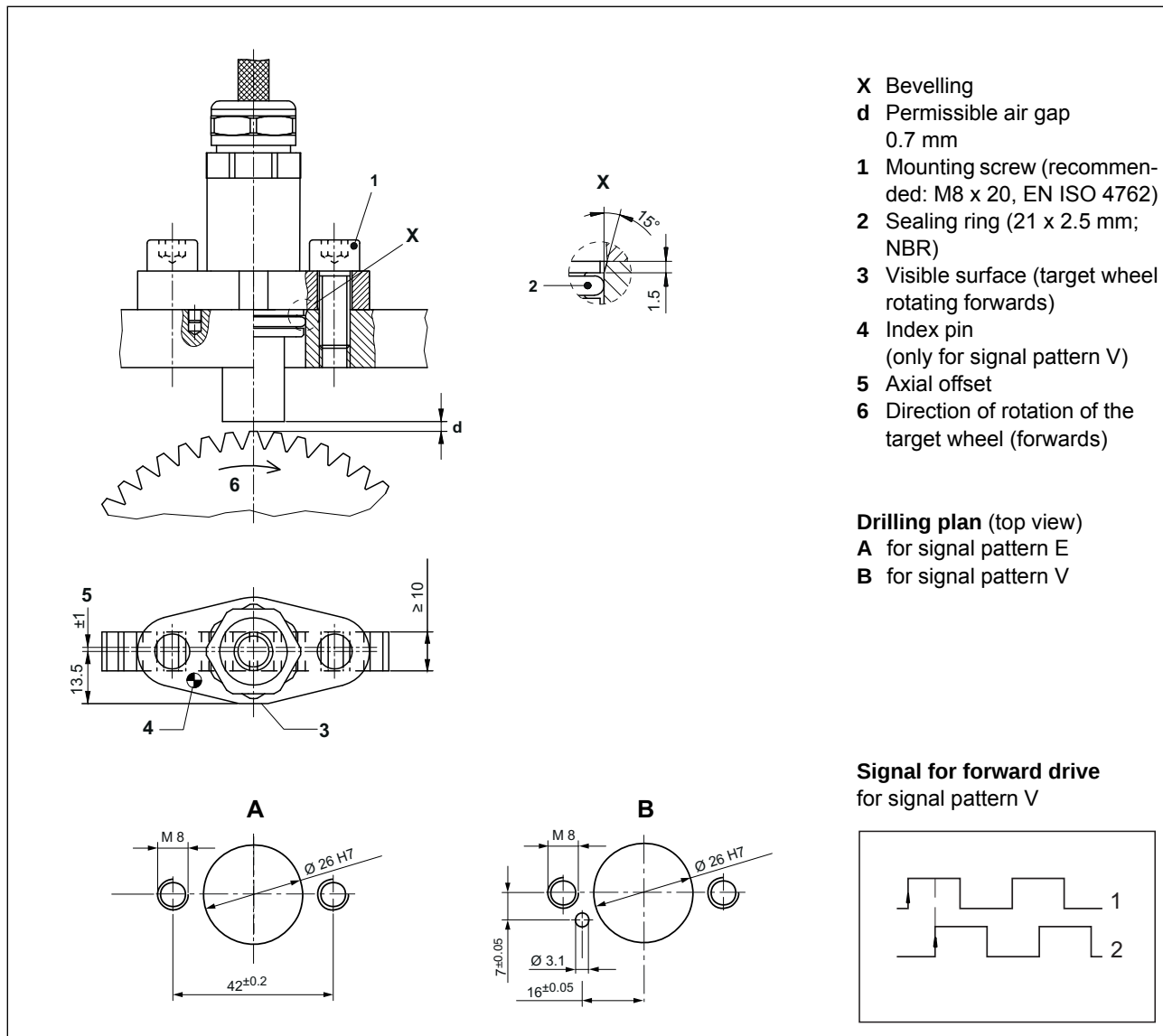


When using the current output, the resistor to be connected must not exceed a specific value:

$$R_{B,max} = (V_S - 4 \text{ V}) / I_{max}$$

with $V_S = 10 \text{ to } 20 \text{ V DC}$ and $I_{max} = 16 \text{ mA}$
 Example for $V_S = 15 \text{ V}$:
 $R_{B,max} = 11 \text{ V} / 16 \text{ mA} = 690 \Omega$

Assembly drawing



Please observe the EMC-reference in the operating instructions!

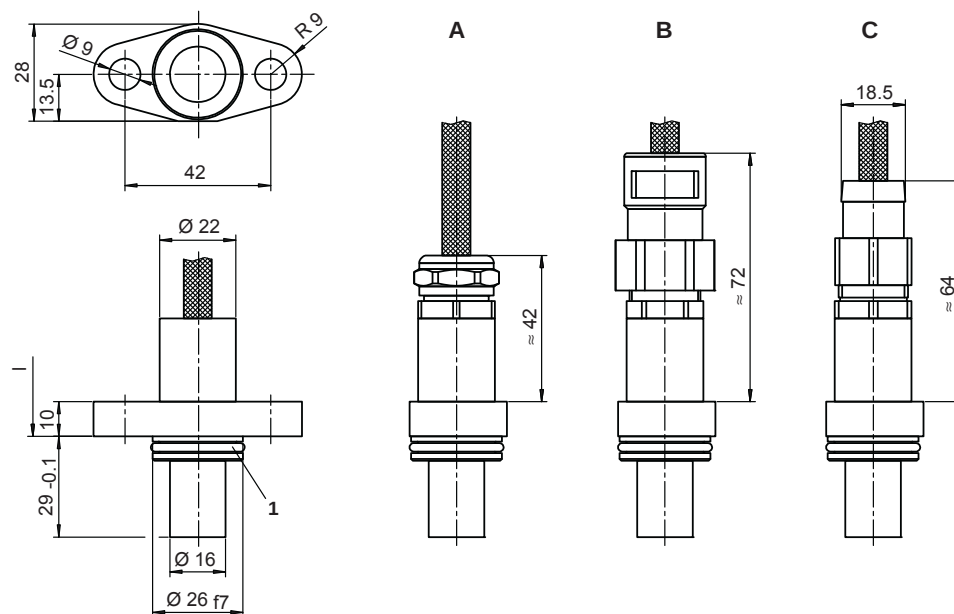
Type code, Dimensions

Type code GEL 2474

2474					Signal pattern
					E 1-channel square-wave signal
					V 2-channel square-wave signals shifted by 90° (only in connection with voltage signal output)
					Signal output
					- Voltage
					I Current (only for signal pattern E)
					M 7 V standstill voltage (only for signal pattern E)
					Cable screening
					L Connected to sensor housing
					P Not connected to sensor housing
					Cable outlet
					K Screwed cable gland
					W Flexible tube fitting
					G Rubber tube adapter
					Cable length L
					xxx Centimetres
				Special assembly	
				N None	
				S Customized (upon request)	

Notes: For a special customized version a Y-No. will be created. A special version 2474Yxxx is manufactured according to a drawing or application description and could differ from the technical standard specification.

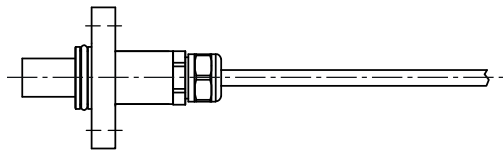
Dimensions GEL 2474



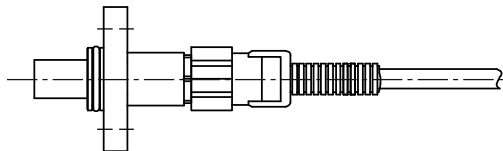
- | | | | |
|---|---|---|--------------------------|
| A | Screwed cable gland M20 x 1.5 | I | Cable length |
| B | Flexible conduit connection with nominal width of 12 mm | 1 | Sealing ring 21 x 2.5 mm |
| C | Hose connector piece with nominal width of 18 mm | ≈ | Approximate dimension |

Example for customized cable connections

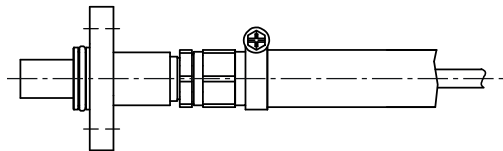
Encoder end



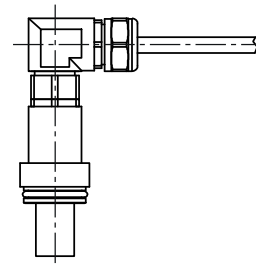
Standard, cable outlet straight



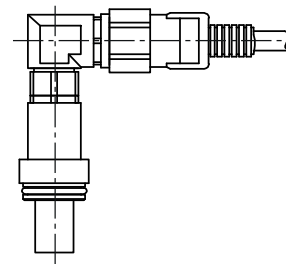
Flexible conduit, cable outlet straight



Rubber conduit, cable outlet straight

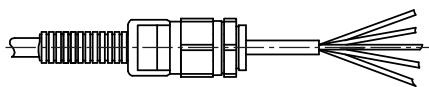


90° angled cable outlet

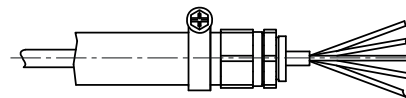


Flexible conduit, 90° angled cable outlet

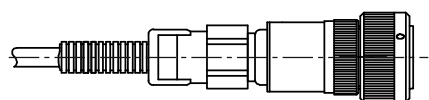
Cable end



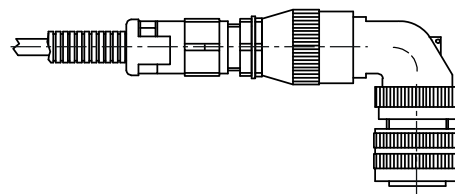
Flexible conduit and open cable end



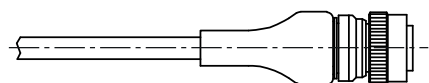
Rubber conduit and open cable end



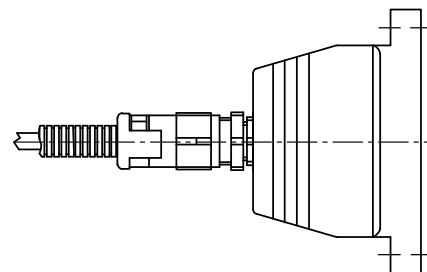
Flexible conduit with round connector



Flexible conduit with round connector, angled



Cable with shrink moulded sleeve



Flexible conduit with rectangular connector (HTS connector)

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Subject to technical modifications and typographical errors.
The latest version can be downloaded at www.lenord.de.

