

## 2-channel speed sensor

### ▶ GEL 2470

Sensor with aluminium housing



#### **Description**

- ▶ Speed sensor based on magnetic measurement principle
- ▶ Maintenance- and wear-free operation due to non-contact measurement of rotation
- ▶ Suitable for ferromagnetic target wheels
- ▶ Output signals are two square-wave voltage signals shifted by 90°
- ▶ Direction detection by evaluation of both channels
- ▶ Robust and compact aluminium housing suitable for harsh application
- ▶ Simple flange mounting
- ▶ Customised cable fittings

#### **Features**

- ▶ Module target wheel 1.00 to 3.50
- ▶ Measuring range 0.4 Hz to 20 kHz
- ▶ Air gap up to max. 4 mm
- ▶ Temperature range -40 °C 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

#### **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

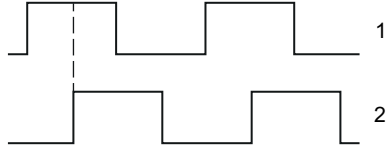
Signal pattern	V
<b>Electrical data</b>	
Supply voltage $V_S$ (reverse polarity protected)	10 to 30 V DC
Current consumption per channel $I_S$ (without load)	$\leq 28$ mA
Output signal (short circuit-proof)	Square-wave signals
Output signal level high <sup>(1)</sup>	$\geq V_S - 1.5$ V
Output signal level low <sup>(1)</sup>	$\leq 1.0$ V
Output current per channel	$\leq 20$ mA
Input frequency of target wheel	0.4 Hz to 20 kHz
Output frequency	0.4 Hz to 20 kHz
Duty (depends on measuring scale and air gap)	50% $\pm$ 10 %
Phase shift	typ. 90°
Slew rate (2 m cable)	$\geq 5$ V/ $\mu$ s
Electromagnetic compatibility	Rail vehicles (EN 50121-3-2) Industrial applications (EN 61000-6-1 to 4)
Insulation	500 V AC (EN 60439-1)
<b>Mechanical data</b>	
Module m of target wheel	1.00 / 1.25 / 1.50 / 1.75 / 2.00 / 2.25 / 2.50 / 3.00 / 3.50
Permissible air gap <sup>(2)</sup>	0.2 to 3.5 mm (see air gap table)
Width of target wheel	$\geq 10$ mm (smaller ones on request)
Form of target wheel	Involute gear as per DIN 867, rectangular gear 1:1 or slot- ted disk (on request)
Material of target wheel	Ferromagnetic steel
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 (flange)	Aluminium anodized
Material of sensor tube	stainless steel
Weight of sensor (incl. 2 m cable, with flying lead)	Approx. 500 g
<b>Electrical connection</b>	
Cable	Cable halogen free and screened (specification on re- quest), cable outlet straight
Cable length	$\leq 100$ m
Cable diameter	7.1 mm
Cable cross section	4 x 0.5 mm <sup>2</sup>
Bending radius static / dynamic	21 mm / 36 mm

<sup>(1)</sup> Output signal level depends on output current and temperature

<sup>(2)</sup> Air gap depends on module of target wheel. Observe the air gap table in this document

# Signal pattern, Signal level, Electrical connection

## Signal pattern – voltage output

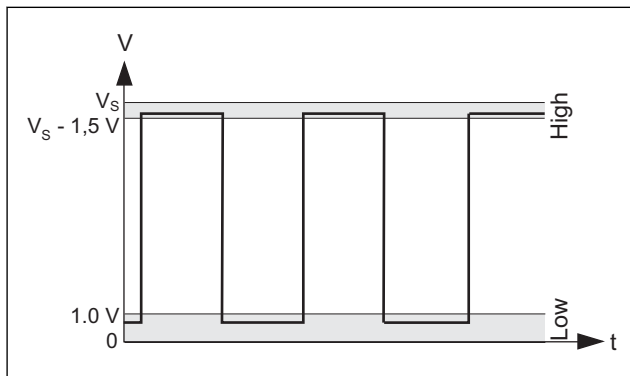
Output signals	Signal pattern
2 channels shifted by 90°	<p>V <math>V_S</math>: 10 to 30 V DC</p> 

### Explanation

1, 2 = Channel 1, channel 2

$V_S$  = Supply voltage

## Output signal level

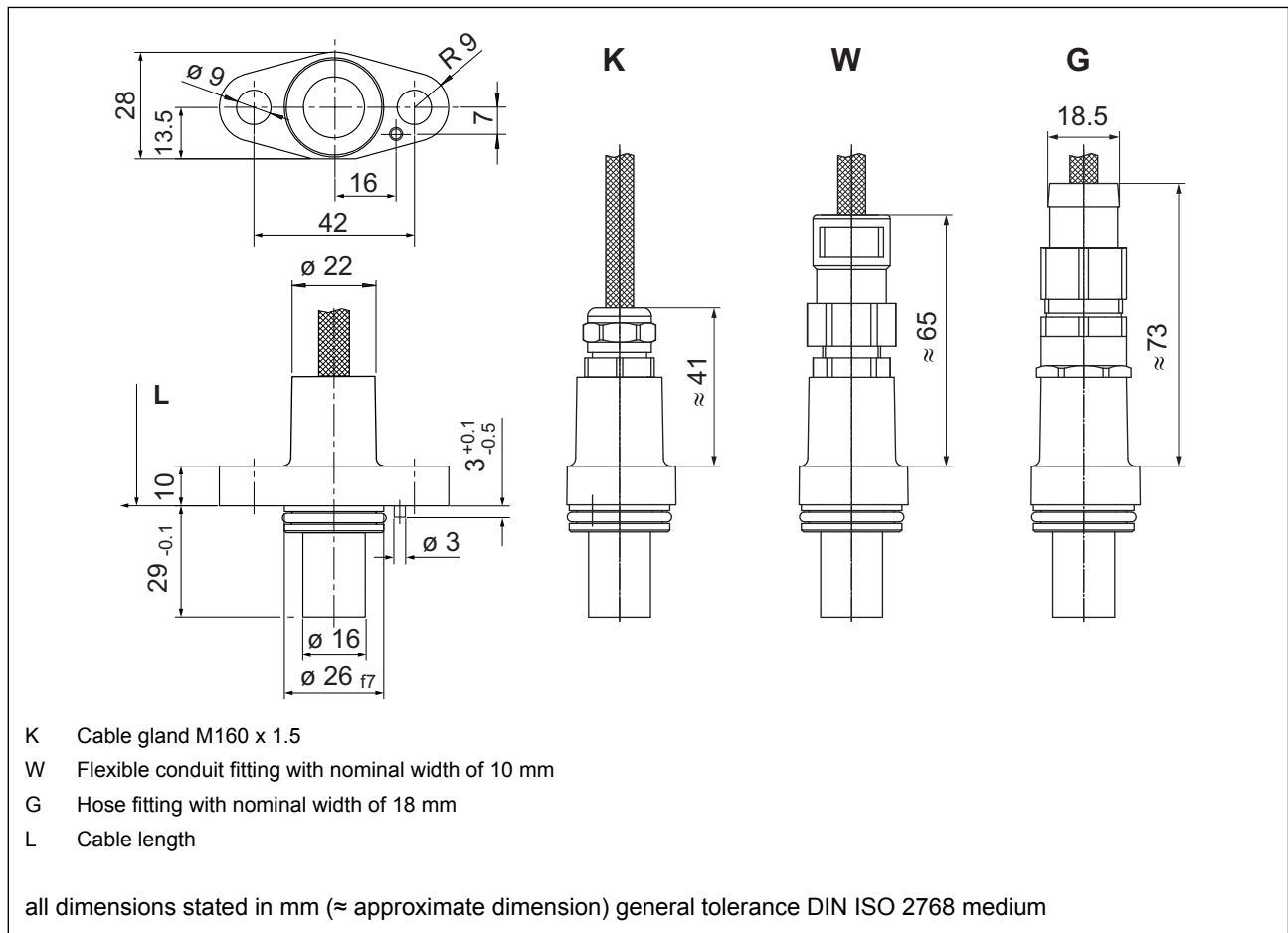


## Electrical connection

Function	Core colour
Channel 1	blue
Channel 2	white
GND (0 V)	green
+ $V_S$ (10 to 30 V DC)	orange
Cable / screen	1 / 1

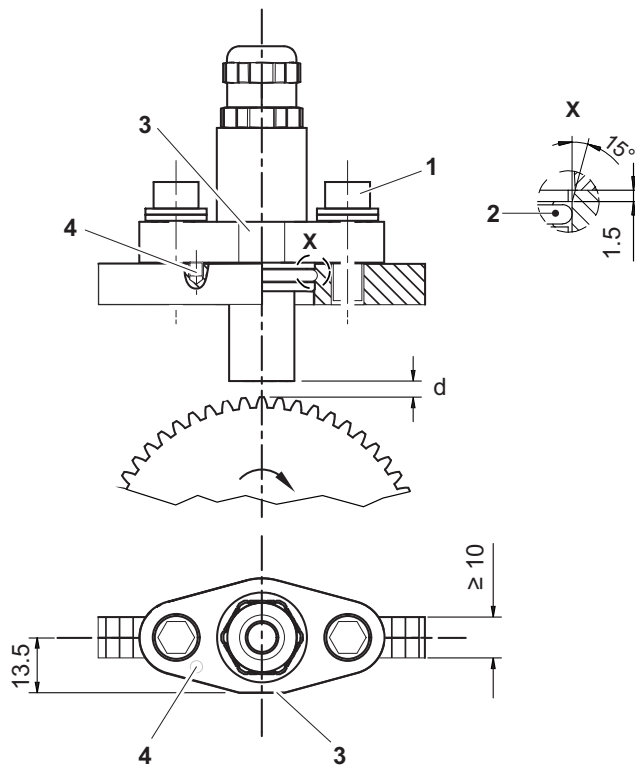
# Dimensional drawing

## Dimensional drawing



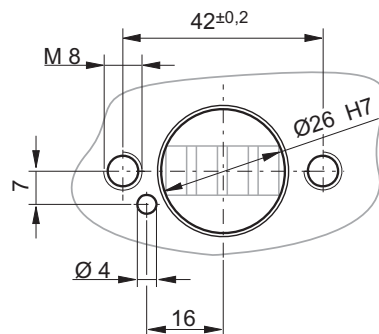
# Assembly drawing, Air gap table

## Assembly drawing

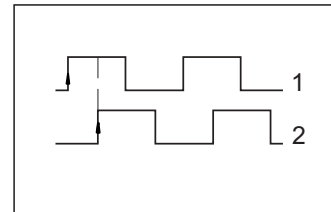


- X Bevelling
- d Air gap (see air gap table)
- 1 Mounting screw  
(recommended: M8 x 20, EN ISO 4762)
- 2 Sealing ring (21 x 2.5 mm; NBR)
- 3 Direction of rotation of the target wheel (forwards)
- 4 Visible surface<sup>(1)</sup>
- 5 Index pin

## Drilling plan



## Signal for forward direction



Please observe the notes on electromagnetic compatibility (EMC) in the mounting instructions!

## Air gap table

Module m	Permissible air gap d
1.0	0.2 to 1.0 mm
1.25	0.2 to 1.25 mm
1.5	0.2 to 1.5 mm
2.0	0.2 to 2.0 mm
3.0	0.2 to 3.0 mm
3.5	0.2 to 3.5 mm

<sup>(1)</sup> With view on the visible surface signals are output in forward direction when the target wheel rotates clockwise.

# Type code

## Type code GEL 2470

<b>2470</b>	<b>Signal pattern</b>	
	<b>V</b>	2-channel square-wave signals shifted by 90°
	<b>Module m</b>	
	<b>100</b>	Module 1.00
	<b>125</b>	Module 1.25
	<b>150</b>	Module 1.50
	<b>175</b>	Module 1.75
	<b>200</b>	Module 2.00
	<b>250</b>	Module 2.50
	<b>300</b>	Module 3.00
<b>350</b>	Module 3.50	
<b>Cable screen</b>		
<b>L</b>	Connected to sensor housing	
<b>P</b>	Not connected to sensor housing	
<b>Cable outlet</b>		
<b>K</b>	Cable gland	
<b>W</b>	Flexible conduit fitting	
<b>G</b>	Hose fitting	
<b>Flexible conduit / hose fitting</b>		
-	Without flexible conduit / hose fitting	
<b>A</b>	With flexible conduit (cable length minus 10 cm)	
<b>B</b>	With hose fitting (cable length minus 10 cm)	
<b>C</b>	With hose fitting according to DIN 5510 (cable length minus 10 cm)	
<b>Cable length L</b>		
<b>000</b>	Cable length in cm	
<b>Customising</b>		
<b>N</b>	Standard version	
<b>S</b>	Special version	

**Notes:** For a special customised version a Y-No. will be created. A special version 2470Yxxx is manufactured according to a drawing or application description and could differ from the technical standard specification.

Your notes:



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Subject to technical modifications and typographical errors.  
The latest version can be downloaded at [www.lenord.com](http://www.lenord.com).

