

2-channel speed sensor

GEL 248

Compact sensor with
HTL-/TTL-output signals

Technical information

Version 10.13



General information

- ▶ Application approved speed sensor based on magnetic measurement principle
- ▶ Maintenance- and wear-free operation due to non-contact measurement of rotation
- ▶ Safe detection of slow rotation from 0 Hz without pulse loss and for high-speed rotation up to 25 kHz
- ▶ Suitable for ferromagnetic target wheels like toothed wheels, racks, slotted disks and sprocket wheels
- ▶ Two channels shifted by 90° provide the direction of rotation
- ▶ Robust and compact housing suitable for harsh application
- ▶ Simple flange mounting



Features

- ▶ Module target wheel 1.00 to 4.00
- ▶ Measuring range 0 to 25 kHz
- ▶ Temperature range -40 to +120°C
- ▶ Protection class IP 68
- ▶ Type test according to EN 50155

Fields of application

- ▶ Measurement of speed and position in gears, machines and motors
- ▶ Fluid technology
 - can be used in hydraulic pumps and motors
- ▶ Measurement of lengths in wood harvester
- ▶ Speed measurement in forklift motors



Output signals

- ▶ 2-channel square-wave signals shifted by 90°, HTL
- ▶ 2-channel square-wave signals shifted by 90° and their inversed signals, HTL
- ▶ 2-channel square-wave signals shifted by 90° and their inversed signals, 5 V TTL / RS 422

Technical data

Signal pattern	V	X	T
Electrical data			
Supply voltage V_S (reverse polarity protected)	10 to 30 V DC		5 V \pm 10 %
Current consumption per channel I_S (without load)	\leq 50 mA		
Output signal (short circuit-proof))	square-wave signals, HTL		square-wave signals, TTL
Output signal level high ⁽¹⁾	$\geq V_S - 2$ V		≥ 3.5 V
Output signal level low ⁽¹⁾	≤ 1.5 V		≤ 0.8 V
Output current per channel	≤ 20 mA		
Input frequency (target wheel)	0 Hz to 25 kHz		
Output frequency	0 Hz to 25 kHz		
Duty (depends on measuring scale and air gap)	50 % \pm 5 %		
Phase shift	90° \pm 20°		
Slew rate (2 m cable)	≥ 10 V/ μ s		
Electromagnetic compatibility	Industrial applications (EN 61000-1 to 4)		
Insulation	500 V AC (EN 60439-1)		
Mechanical data			
Module m of target wheel	1.00 / 1.25 / 1.50 / 1.75 / 2.00 / 2.25 / 2.50 / 3.00 / 3.50 / 4.00		
Permissible air gap ⁽²⁾	0.2 to 3.5 mm		
Width of target wheel	≥ 10 mm		
Form of target wheel	Involute gear as per DIN 867		
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	200 m/s ² (EN 60068-2-6)		
Shock resistance	2000 m/s ² (EN 60068-2-27)		
Type test	EN 50155		
Housing material of sensor	Zinc		
Weight of sensor (2 m cable)	Approx. 150 g		
Elektrical connection			
Cable	Cable halogen free and screened		
Cable outlet	radial or lateral		
Cable length	≤ 100 m		
Cable diameter	5.5 mm	5.0 mm	
Cable cross section	4 x 0.25 mm ²	9 x 0.15 mm ²	
Bending radius	25 mm		

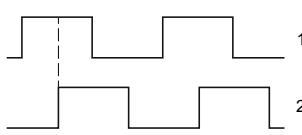
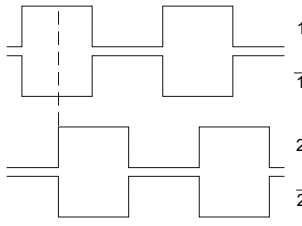
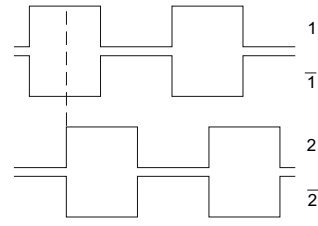
⁽¹⁾ Output signal level depends on output current and temperature

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

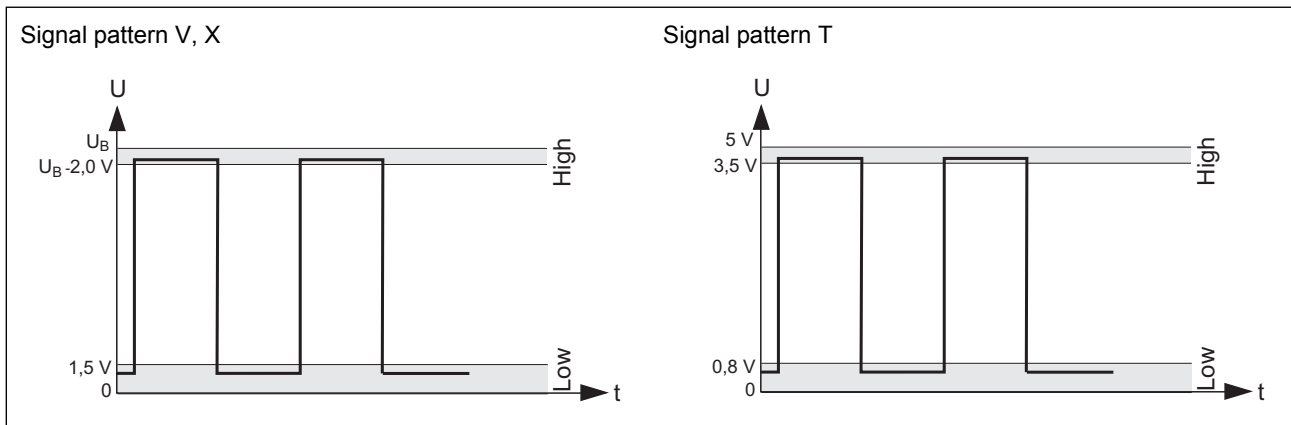
Signal pattern, Signal level, Electrical connection

Signal pattern

Signal pattern – voltage output

Output signals	Signal pattern (HTL level)	Signal pattern (TTL level)
2 channels, shifted by 90°	<p>V V_S: 10 ... 30 V DC</p> 	
2 channels, shifted by 90° with inversed channels	<p>X V_S: 10 ... 30 V DC</p> 	<p>T V_S: 5 V</p> 

Output signal level

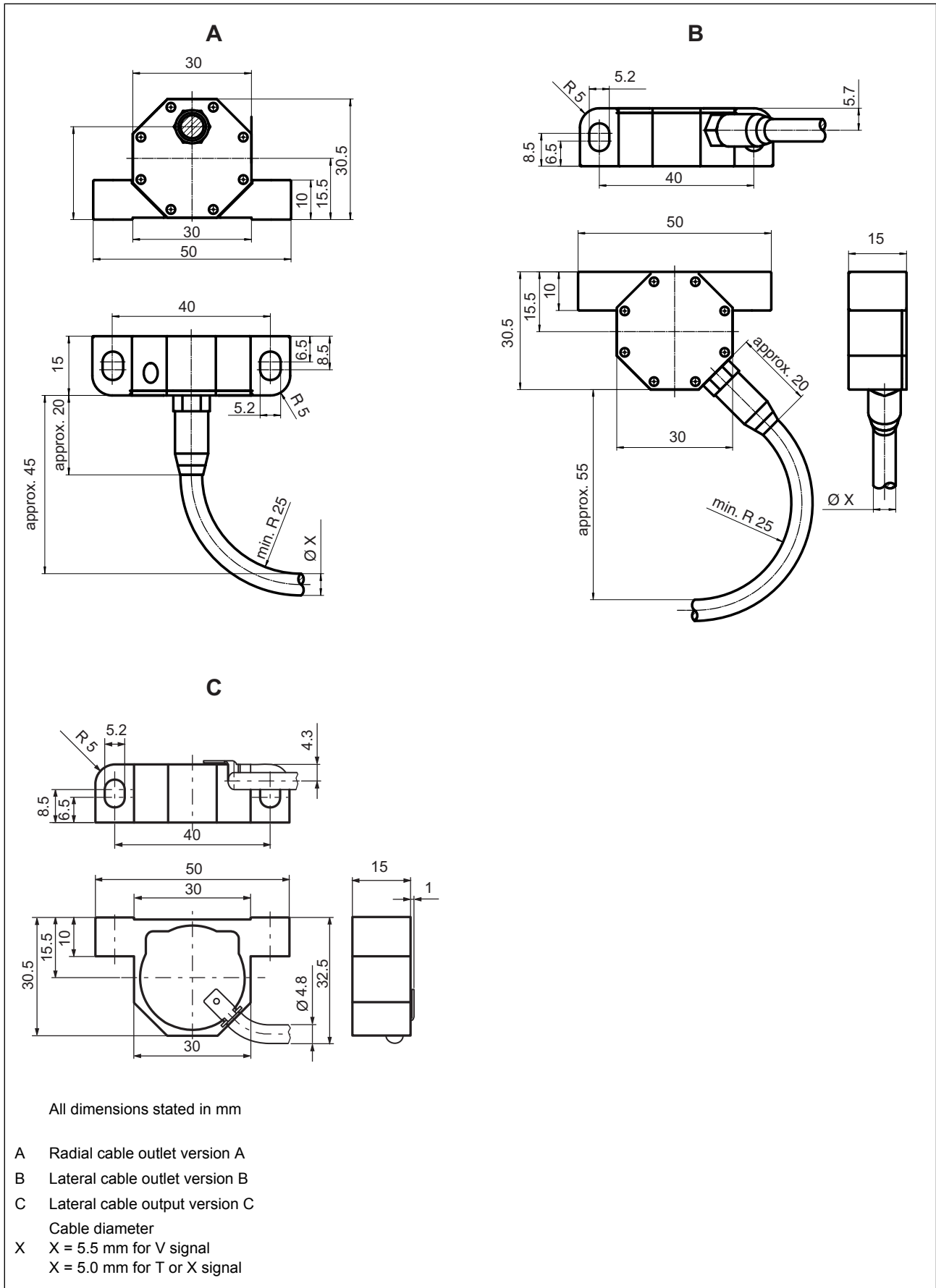


Connection assignment for signal pattern V / X / T

Signal	V	X	T
Channel 1	yellow	yellow	yellow
Channel 2	white	white	white
Channel $\bar{1}$		black	black
Channel $\bar{2}$		brown	brown
GND (0 V)	blue	blue	blue
+ V_S (10 ... 30 V DC)	red	red	
+ V_S (5 V)			red

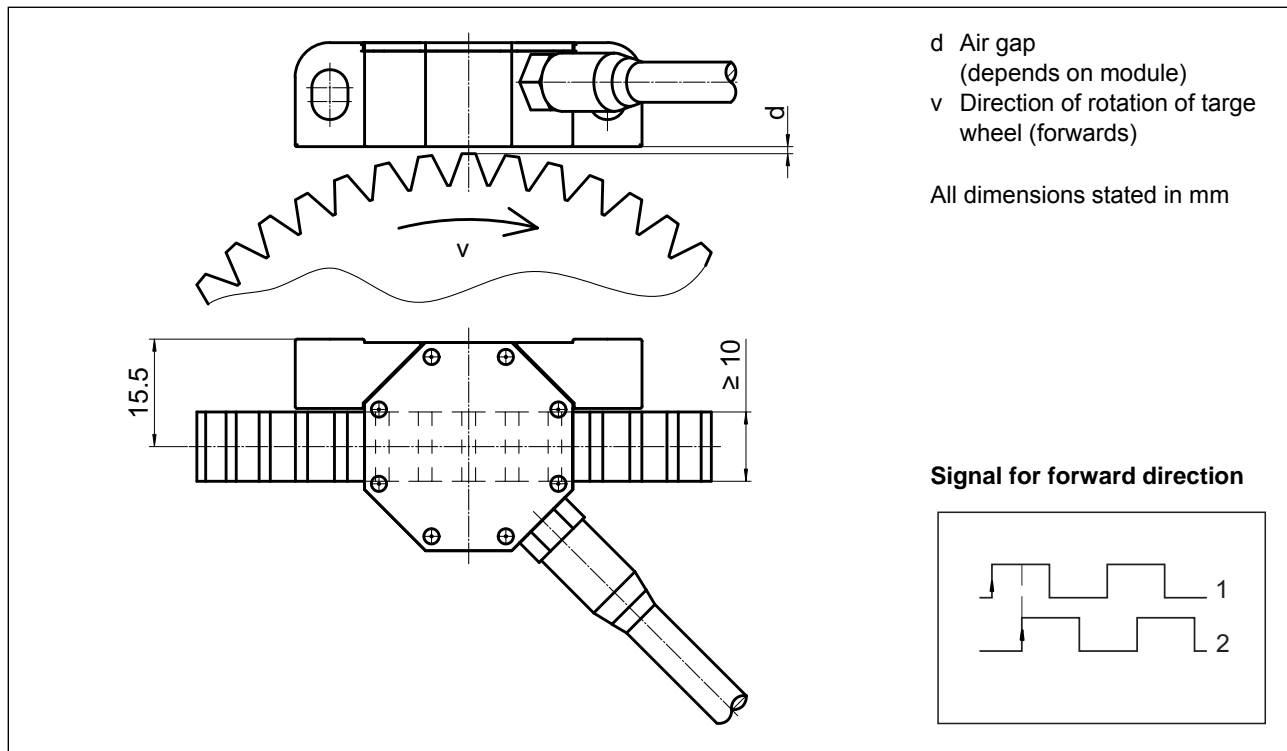
Dimensional drawings

Dimensional drawing for cable outlet option A / B / C



Assembly drawing

Assembly drawing



Please observe the notes on electromagnetic compatibility in the operating instructions!

Air gap table

Module (m)	Permissible air gap d
1.0	0.2 to 1.4 mm
1.5	0.2 to 1.8 mm
2.0	0.2 to 2.2 mm
2.5	0.2 to 2.8 mm
3.5	0.2 to 3.0 mm
4.0	0.2 to 3.5 mm

Type code

248	Signal pattern	
	V	2-channel square-wave signals shifted by 90°, HTL
	X	2-channel square-wave signals shifted by 90° and their inversed signals, HTL
	T	2-channel square-wave signals shifted by 90° and their inversed signals, 5 V TTL / RS 422
	Output circuit	
2 push-pull circuit		
Module		
M100	module 1.00	
M125	module 1.25	
M150	module 1.50	
M175	module 1.75	
M200	module 2.00	
M225	module 2.25	
M250	module 2.50	
M300	module 3.00	
M350	module 3.50	
M400	module 4.00	
Cable length (meter)		
01	1 m	
02	2 m	
05	5 m	
10	10 m	
Cable outlet		
A	radial, with screw sleeve	
B	lateral, with screw sleeve	
C	lateral, without screw sleeve (only with signal pattern V)	

Notes: For a special customized version a Y-No. will be created. A special version 248Yxxx is manufactured according to a drawing or application description and could differ from the technical standard specification.

Notice:



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

