

# 2-channel speed sensor

## ▶ GEL 248

Compact sensor with  
HTL-/TTL-output signals

SENSORLINE

▶ **LENORD+BAUER**

### Technical information

Version 08.09



### 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 0.70 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

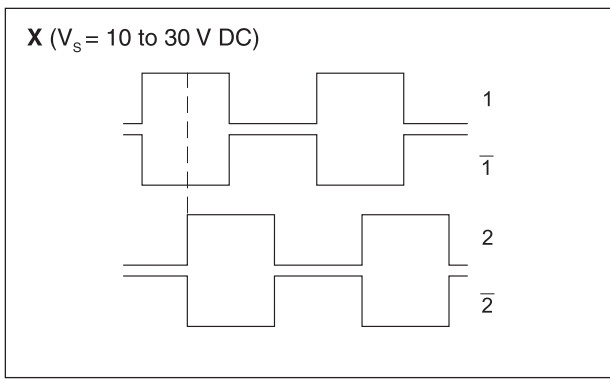
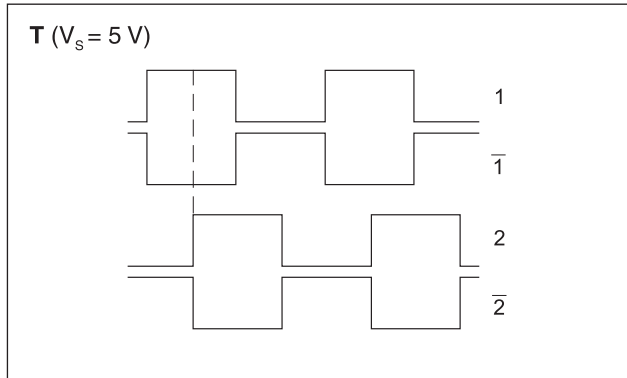
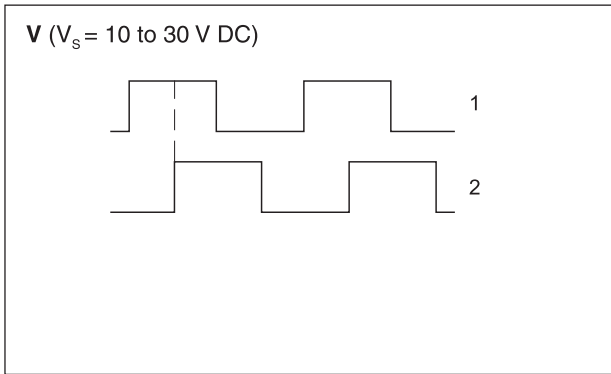
# Technical data

Signal pattern	V	X	T
<b>Electrical data</b>			
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 <sup>(1)</sup>	$\geq V_S - 2$ V		$\geq 3.5$ V
Output signal level low <sup>(1)</sup>	$\leq 1.5$ V		$\leq 0.8$ V
Output current per channel	$\leq 20$ 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)	$\geq 10$ V/ $\mu$ s		
Electromagnetic compatibility	Industrial applications (EN 61000-1 to 4)		
Insulation	500 V AC (EN 60439-1)		
<b>Mechanical data</b>			
Module m of target wheel	0.70 / 1.00 / 1.25 / 1.50 / 1.75 / 2.00 / 2.25 / 2.50 / 3.00 / 3.50 / 4.00		
Permissible air gap (for module m) m = 0.70 m = 1.00 m = 1.50 m = 2.00 m = 2.50 m = 3.50 m = 4.00	0.2 to 0.8 mm 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 0.2 to 3.5 mm		
Width of target wheel	$\geq 10$ 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 <sup>2</sup> (EN 60068-2-6)		
Shock resistance	2000 m/s <sup>2</sup> (EN 60068-2-27)		
Type test	EN 50155		
Housing material of sensor	Zinc		
Weight of sensor (2 m cable)	Approx. 150 g		
<b>Elektrical connection</b>			
Cable	Cable halogen free and screened		
Cable outlet	radial or lateral		
Cable length	$\leq 100$ m		
Cable diameter	5.5 mm	5.0 mm	
Cable cross section	4 x 0.25 mm <sup>2</sup>	9 x 0.15 mm <sup>2</sup>	
Cable typ	LK1062	LK1052	
Bending radius	25 mm		

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

# Signal pattern, Signal level, Electrical connection

## Signal pattern



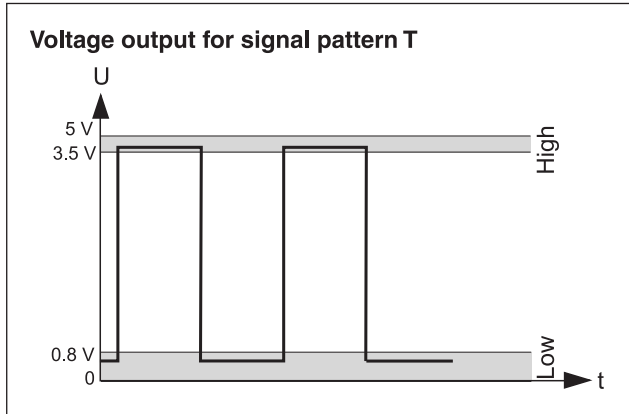
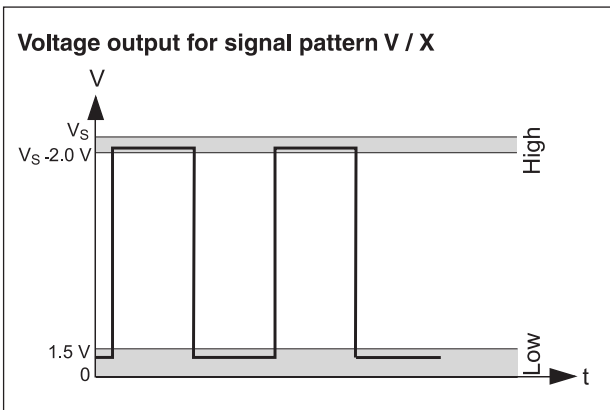
### Explanations:

1, 2 = channel 1, channel 2

$\bar{1}$ ,  $\bar{2}$  = invers channel 1, invers channel 2

$V_S$  = supply voltage

## Signal level



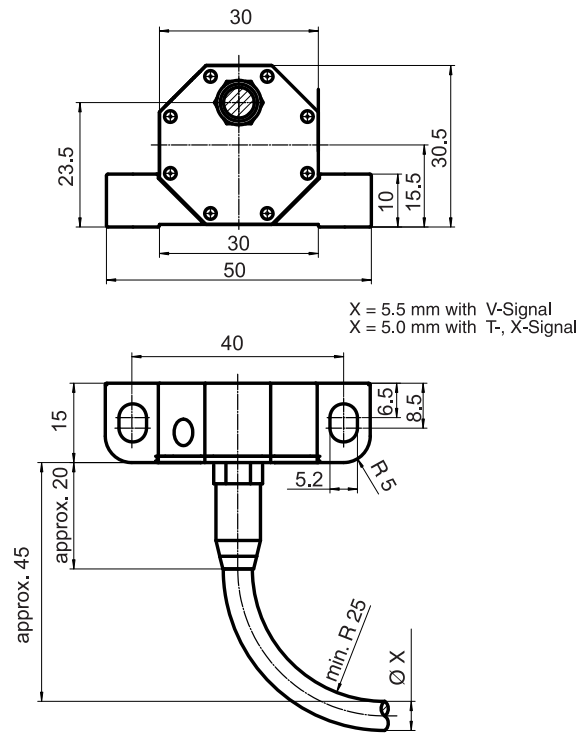
## Electrical connection

### Electrical connection for signal pattern V / X / T

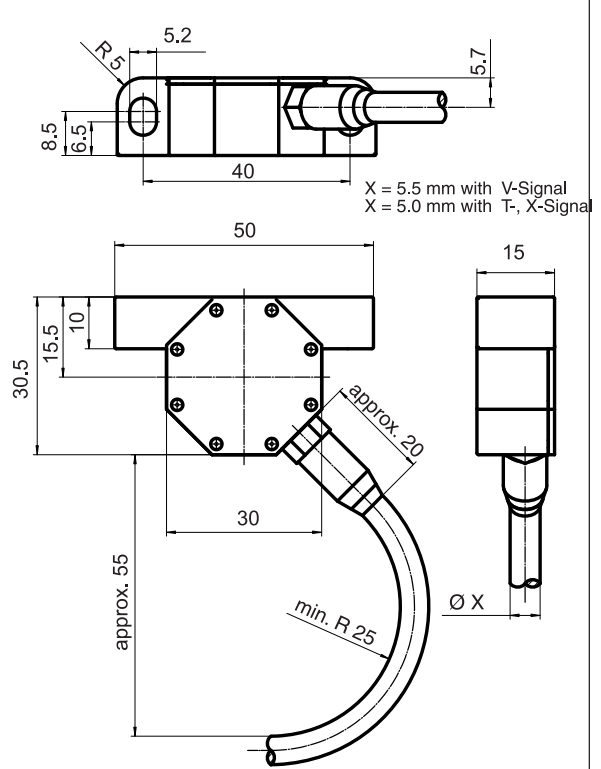
Signal pattern	V	X	T
Channel 1	yellow	yellow	yellow
Channel 2	white	white	white
Channel $\bar{1}$		black	black
Channel $\bar{2}$		brown	brown
GND (0 V)	blue	blue	blue
+ $V_S$ (10 to 30 V DC)	red	red	
+ $V_S$ (5 V)			red

# Dimensions

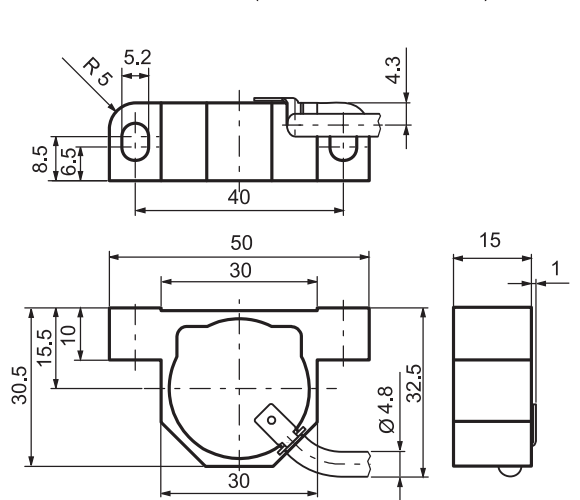
**Dimension GEL 248 (cable outlet, version A)**



**Dimension GEL 248 (cable outlet, version B)**

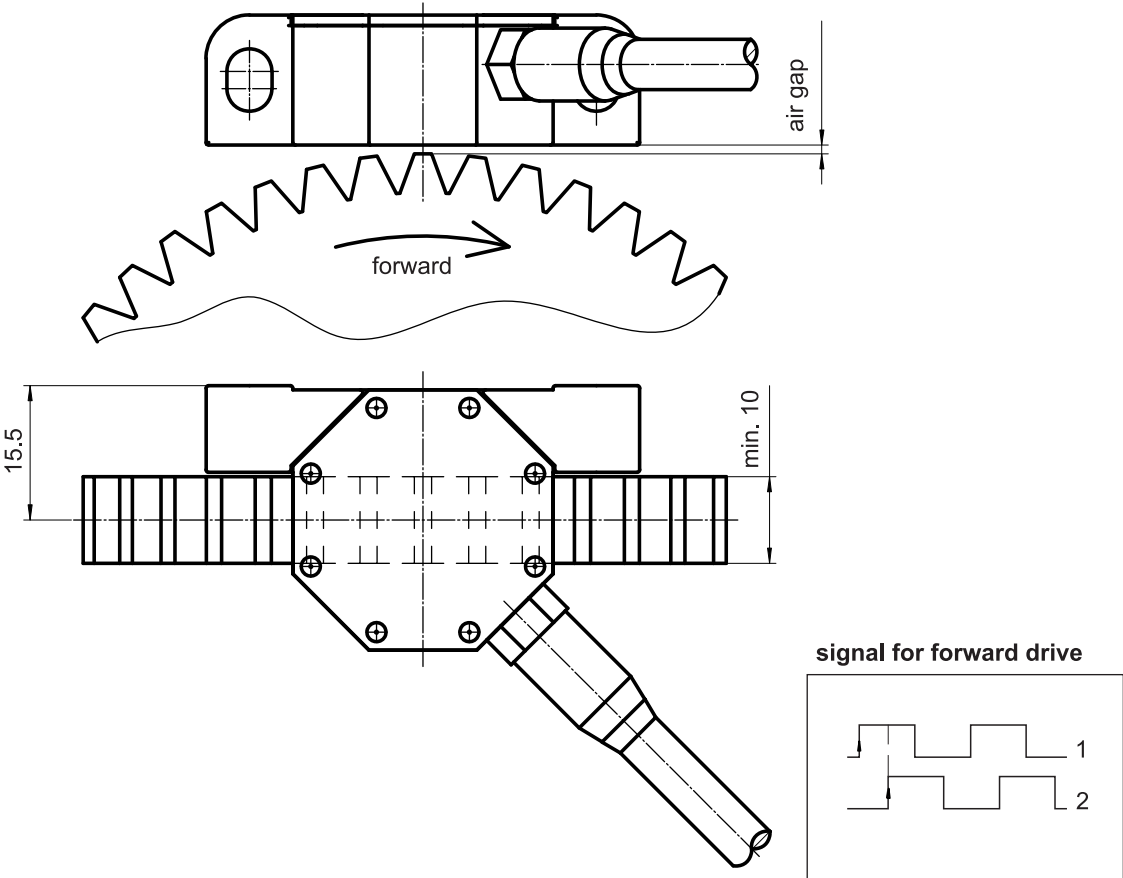


**Dimension GEL 248 (cable outlet, version C)**



# Assembly drawing

## Assembly drawing



Please observe the EMC-reference in the operating instructions!

# Type code

<b>248</b>	<b>Signal pattern</b>	
	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
	<b>Output circuit</b>	
2	push-pull circuit	
	<b>Module</b>	
	<b>M070</b>	module 0.70
	<b>M100</b>	module 1.00
	<b>M125</b>	module 1.25
	<b>M150</b>	module 1.50
	<b>M175</b>	module 1.75
	<b>M200</b>	module 2.00
	<b>M225</b>	module 2.25
	<b>M250</b>	module 2.50
	<b>M300</b>	module 3.00
	<b>M350</b>	module 3.50
	<b>M400</b>	module 4.00
	<b>Cable length (meter)</b>	
	<b>01</b>	1 m
	<b>02</b>	2 m
	<b>05</b>	5 m
	<b>10</b>	10 m
	<b>Cable outlet</b>	
	<b>A</b>	radial, with screw sleeve
	<b>B</b>	lateral, with screw sleeve
	<b>C</b>	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.

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