

# Speed sensor MiniCoder GEL 2472

two electrically isolated measuring systems  
in a single housing

SENSORLINE

LENORD+BAUER

Technical information

version 06.06



The MiniCoder family from Lenord + Bauer offers space-saving solutions for the contactless measurement of rotational movements with direction sensing.

The MiniCoders operate from 0 Hz on for the detection of very slow movements without pulse loss and up to 20 kHz for the direct integration into high-speed motors and machines.

The high interference immunity ensures reliable function even under adverse operating conditions.

The MiniCoder GEL 2472 accommodates two independent measuring systems in one housing permitting connection of two different electronic control systems, e.g. wheel slip prevention and traction control. This configuration also permits the use of different supply voltages.

## Main features

- module range from  $m = 2.0$  to  $m = 3.0$
- measuring frequency from 0 to 20 kHz
- simple flange-mounting
- robust stainless steel casing
- customized cable fittings
- very high protection class IP 68
- wide temperature range  $-40\text{ °C}$  to  $+120\text{ °C}$
- high electromagnetic compatibility

## Fields of application

rail vehicles

- traction control
- anti-skid protection and wheel slip prevention
- motor speed control
- vehicle speed

## Output signals

Two electrically isolated systems that can be combined from

system 1 optionally:

- one square-wave signal and one direction signal
- one square-wave signal
- two  $90^\circ$ -shifted square-wave signals for direction sensing

and system 2:

- one square-wave signal

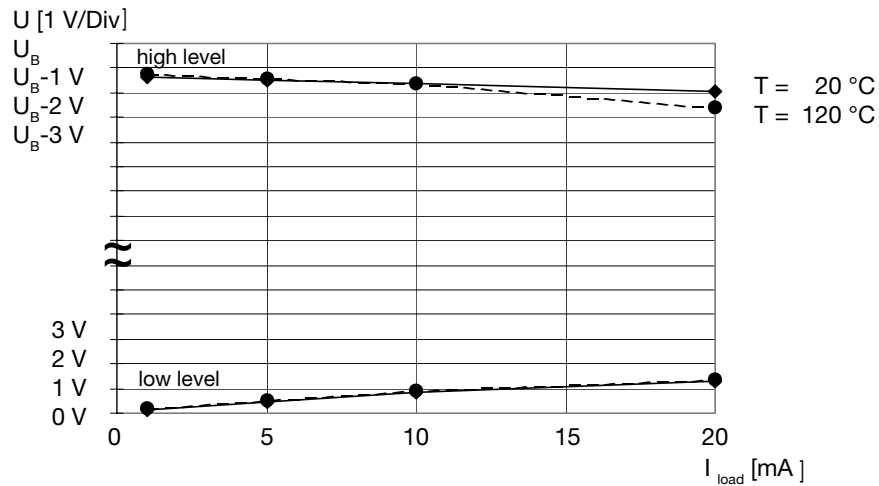
# Technical data

| <b>Electrical data</b>                   |   |
|--|---|
| Supply voltage                           | $U_B = 10 \dots 20 \text{ V DC}$ , reverse polarity protected   |
| Current consumption without load         | $I_B \leq 40 \text{ mA}$  |
| Output signals                           | electrically isolated, push-pull driver $I_{\max} = 20 \text{ mA}$  |
| Input and output frequency               | 0 ... 20 kHz  |
| Duty                                     | 0.5 +/- 0.25  |
| Rise time (2 m cable)                    | $\geq 10 \text{ V}/\mu\text{s}$   |
| Max. cable length                        | 100 m   |
| Electromagnetic compatibility *          | Case 1: screen connected to housing<br>Case 2: screen not connected to housing  |
|  | rail vehicles: EN 50121-3-2<br>industry applications: EN 61000-6-1 to 4<br>rail vehicles: test in according with EN 50121-3-2 <sup>1)</sup>     |
| Insulation resistance                    | 500 V   |
| Connection                               | fully potted cable outlet with stress relief, 2 x 4 x 0,5 mm <sup>2</sup><br>separated screen<br>cable specification: please request separately |
| <b>Mechanical data</b>                   |   |
| Module                                   | m = 2.0; 3.0<br>(other modules available on request)  |
| Admissible air gap                       | depending on module, frequency and temperature range up to max. 1.5 mm  |
| Working and operating temperature range  | -40°C ... +120°C  |
| Storage temperature range                | -40°C ... +120°C  |
| Protection class                         | IP 68   |
| Vibration resistance (EN 60068 part 2-6) | 200 m/s <sup>2</sup>  |
| Shock resistance (EN 60068 part 2-27)    | 2000 m/s <sup>2</sup>   |
| Width of the target wheel                | $\geq 20 \text{ mm}$ taking into account all tolerances   |
| Form of the target wheel                 | standard: m = 2.0 to 3.0, involute teeth according to DIN 867   |
| Material of the target wheel             | ferromagnetic steel   |
| Weight with 2 m cable without fittings   | approx. 550 g   |
| Housing                                  | stainless steel   |

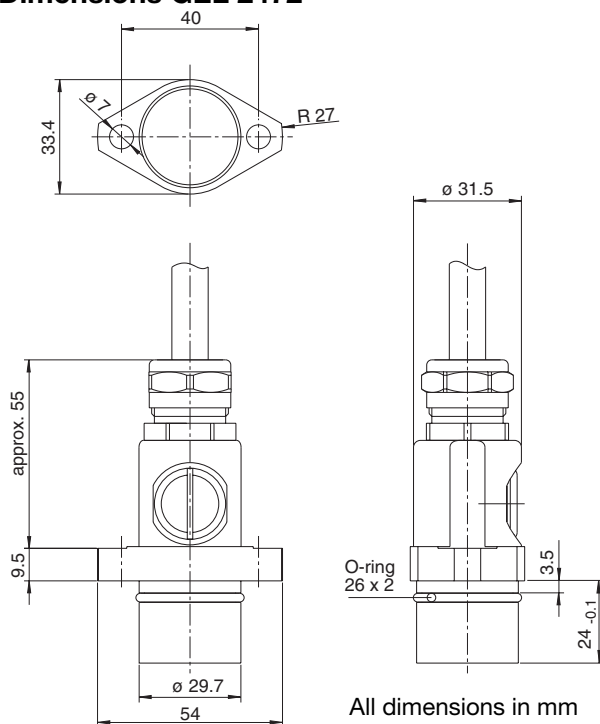
<sup>1)</sup> When the shield is not connected at the encoder end, the test level in acc. with EN 61000-4-4 may be lowered depending on installation conditions.

\* 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.

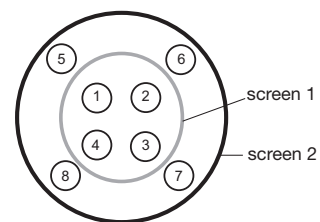
## Output level (typical course)



## Dimensions GEL 2472



## Cable core assignment



|          | No. | Core colour | Connection             |
|----------|-----|-------------|------------------------|
| system 1 | 1   | red         | + $U_{B(1)}$           |
|          | 2   | yellow      | track 1 <sub>(1)</sub> |
|          | 3   | black       | track 2 <sub>(1)</sub> |
|          | 4   | blue        | 0 V <sub>(1)</sub>     |
| system 2 | 5   | pink        | + $U_{B(2)}$           |
|          | 6   | grey        | 0 V <sub>(2)</sub>     |
|          | 7   | white       | track 1 <sub>(2)</sub> |
|          | 8   | brown       |                        |

## Signal pattern GEL 2472

### Signal pattern S:

Sense of rotation low for clockwise rotation (see installation drawing)

### Signal pattern V:

Track 2 leading track 1 for clockwise rotation (see installation drawing)

|          | Type | Signal pattern   | Type | Signal pattern         |
|----------|------|--|------|------------------------|
| system 1 | SE   |  | EE   |                        |
|          | S    | track 1 <sub>(1)</sub><br>sense of rotation <sub>(1)</sub> | E    | track 1 <sub>(1)</sub> |
| system 2 | E    | track 1 <sub>(2)</sub>                                     | E    | track 1 <sub>(2)</sub> |
| system 1 | VE   |  | E0   |                        |
|          | V    | track 1 <sub>(1)</sub><br>track 2 <sub>(1)</sub>           | E    | track 1 <sub>(1)</sub> |
| system 2 | E    | track 1 <sub>(2)</sub>                                     |      |                        |

# EMC installation advice and ESD instructions

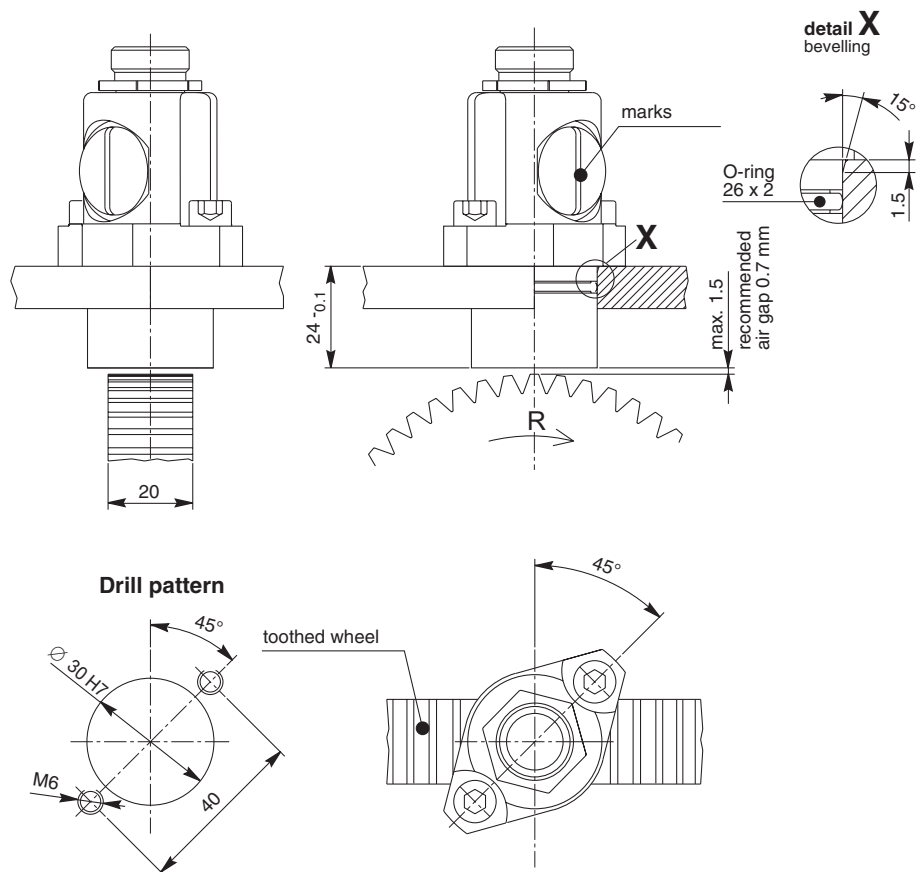
## EMC installation advice

- Connect the screen at the end of the cable using a **large contact surface**, if possible.
- Keep all unshielded cables **as short as possible**.
- Keep grounding connections **as short as possible** using large cross-sections (low-induction grounding strip, ribbon cable)
- Lay signal and control cables **away** from power lines.
- The power supply must correspond to installation class 0 or 1 in according with B.3 of EN 61000-4-5 of 1995.

## ESD instructions

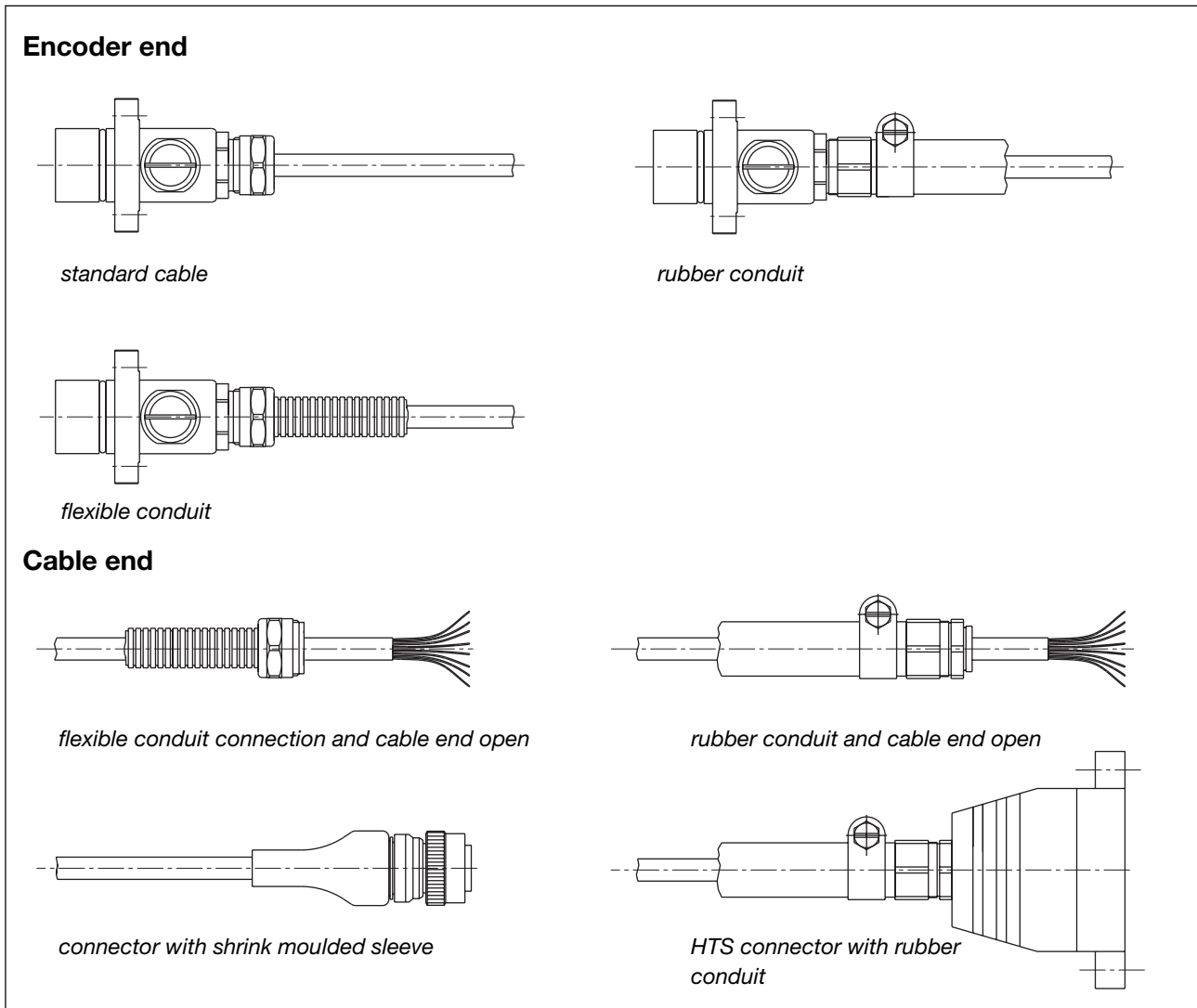
As with any other electronic device, when connecting the MiniCoder suitable precautions against electrostatic discharge must be taken. Do not touch connector pins and connecting wires without such precautions. Observe the guidelines in EN 100015-1.

## Installation drawing



All dimensions in mm

# Examples of customized cable connections, Type code



## Type code GEL 2472

|            |   |     |          |                     |             |                          |   |
|------------|---|-----|----------|---------------------|-------------|--------------------------|---|
| 2472       | --  | --- | -        | ----                | -           | <b>Signal pattern</b>    |   |
|            |   |     |          |                     |             | <b>SE</b>                | S- and E-Signal, electrically isolated        |
|            |   |     |          |                     |             | <b>VE</b>                | V- and E-Signal, electrically isolated        |
|            |   |     |          |                     |             | <b>EE</b>                | two square-wave signal, electrically isolated |
|            |   |     |          |                     |             | <b>E0</b>                | one square-wave signal                        |
|            |   |     |          |                     |             | <b>MMM</b>               | <b>Module</b>                                 |
| <b>200</b> | for signal pattern EE or E0<br>module 2.0 |     |          |                     |             |                          |   |
| <b>300</b> | module 3.0                                |     |          |                     |             |                          |   |
|            |   |     | <b>L</b> | <b>Cable screen</b> |             |                          |   |
|            |   |     | <b>P</b> |                     |             |                          |   |
|            |   |     |          |                     | <b>xxxx</b> | <b>Cable length (cm)</b> | cm of cable length                            |
|            |   |     |          |                     |             | <b>Preparation</b>       |   |
|            |   |     |          |                     |             | <b>N</b>                 | standard cable                                |
|            |   |     |          |                     |             | <b>S</b>                 | with special fittings                         |
| 2472       | --  | --- | -        | ----                | -           |                          |   |

## Ordering information

If customized cable, conduit and connectors are required, please supply detailed specifications.  
Module specification not required for signal types EE or E0 within a range m = 2.0 to m = 3.0.

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