



General

- ▶ The measuring system comprises a scanning unit MiniCODER basic and a precision target wheel
- ▶ Precision target wheels for attachment to shafts with a shaft diameter from 8 mm to 130 mm are to be ordered separately
Limited selection of target wheel variables available from stock
- ▶ Magneto-resistive sensors contactlessly scan the target wheel and acquire the rotational speed
- ▶ Output signals are two 90° phase offset square-wave signals, their inverse signals TTL / RS 422 as well as a reference signal
- ▶ Equipped with integrated interpolation, internal amplification of the sensor signals
- ▶ Evaluates the signals from the reference gap and in this way references the position

Features

- ▶ Output signal level TTL / RS 422
- ▶ Frequency range 0 to ≤ 500 kHz
- ▶ Rotational speed measurement range from 0 to over $30,000 \text{ min}^{-1}$
- ▶ Temperature range -20 °C to $+100$ °C
- ▶ Protection class IP 68

Advantages

- ▶ Maintenance and wear-free due to the magnetic measuring system
- ▶ Suitable for target wheels with module 0.4 or 0.5
- ▶ Extremely robust thanks to fully encapsulated electronics
- ▶ Flexible cable laying due to axial cable outlet

Field of application

- ▶ Position and rotational speed acquisition in machine tool engineering

Description

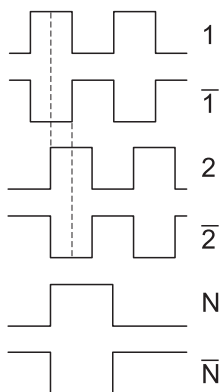
Construction and design

The measuring unit comprises a scanning unit and a measuring scale. The system does not need dedicated bearings for this task, as the measuring scale is mounted directly on the shaft. The market-optimised system operates contactlessly and is extremely compact.

Sensors, magnet and electronics are manufactured using the latest micro system technology and are fully encapsulated, as such they are particularly resistant to shocks and vibration. A further advantage of this system is that it is maintenance and wear-free and therefore reduces operating costs.

Output signals (signal pattern)

The MiniCODER basic outputs square-wave signals with TTL level. In addition, it evaluates signals from a reference gap (TG).



Signal pattern	V_S	V_{out}
TG	+ 5 V DC \pm 5 %	TTL

V_S Supply voltage

V_{out} Signal output

Reference marks

The MiniCODER basic can detect reference marks in the form of a gap. This reference pulse detected can be used for referencing the position.

The selection of the reference mark is defined by the size and rotational speed of the target wheel used, as both parameters have an effect on the forces acting on the reference mark.

Reference mark G – gap

On a target wheel a tooth is milled away over half the width of the tooth wheel. In this way there is a gap in the reference track that is detected.

Interpolation factor

The sin/cos signals generated in the encoder are interpolated and output as square-wave signals. The interpolation factors 1, 2, 4 and 8 are available. The interpolation is undertaken directly in the sensor.

On the usage of a target wheel with 250 teeth and the selection of an interpolation factor of 8, the MiniCODER basic provides 2000 square-wave signals per turn.

Module

The module describes the relationship between the number of teeth and the outside diameter of a target wheel. Given the same number of teeth the following applies: the smaller the module the smaller outside diameter.

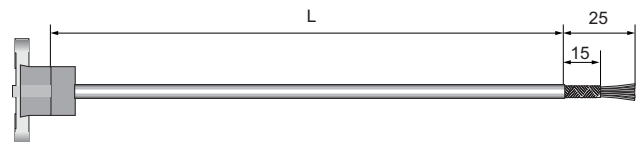
Air gap table

Type	Module	Air gap d , preset measure	Distance tolerance
4	0.4	0.15 mm	\pm 0.03 mm
5	0.5	0.15 mm	\pm 0.03 mm

The MiniCODER must be ordered to suit the target wheel.

Connection type

The MiniCODER basic are supplied with a flying lead.



Connection type K – flying lead

L Cable length (see type code)

*) Note: as far as possible lay the cable screen so it is coaxial.

Cable length

With the connection type K (flying lead) there are 4 cable lengths available: 30, 150, 250, 600 cm.

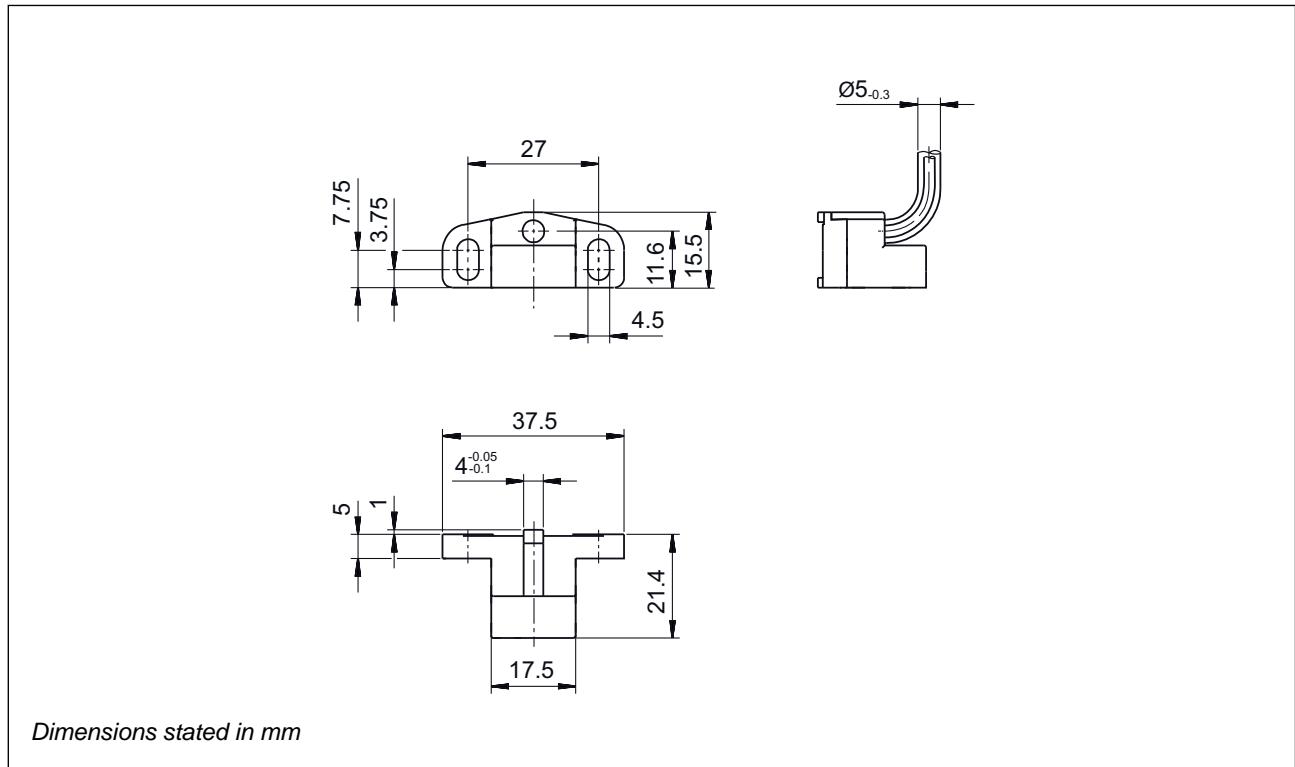
Technical data

Electrical data	
Supply voltage V_S	5 V DC \pm 5 %, reverse polarity protected
Current consumption	\leq 60 mA
Output level	TTL / RS422
Output signal	Two square-wave signals offset by 90° and their inverse signals, short-circuit-proof; with reference pulse
Output frequency	\leq 500 kHz
Power consumption without load	\leq 0.3 W
Electromagnetic compatibility	EN 61000-6-1 to 4 ⁽¹⁾
Dielectric strength	500 V, in accordance with EN 60439-1
Mechanical data	
Permissible air gap	0.15 mm \pm 0.03 mm
Width of the target wheel	min. 4.0 mm
Target wheel material	Ferromagnetic steel
Weight	30 g
Housing material	Die cast zinc
Ambient data	
Assured operating temperature range	-20 °C to +100 °C
Operating and storage temperature range	-20 °C to +100 °C
Protection class	IP 68
Vibration resistance	100 m/s ² , in accordance with DIN EN 60068-2-6
Shock resistance	1000 m/s ² , in accordance with DIN EN 60068-2-27
Electrical connection	
Max. permissible cable length	100 m (Pay attention to voltage drop on the supply cable)
Connection	9-core cable, core cross-section 0.15 mm ² , outside diameter 5 _{-0.3} mm, min. bending radius 25 mm.

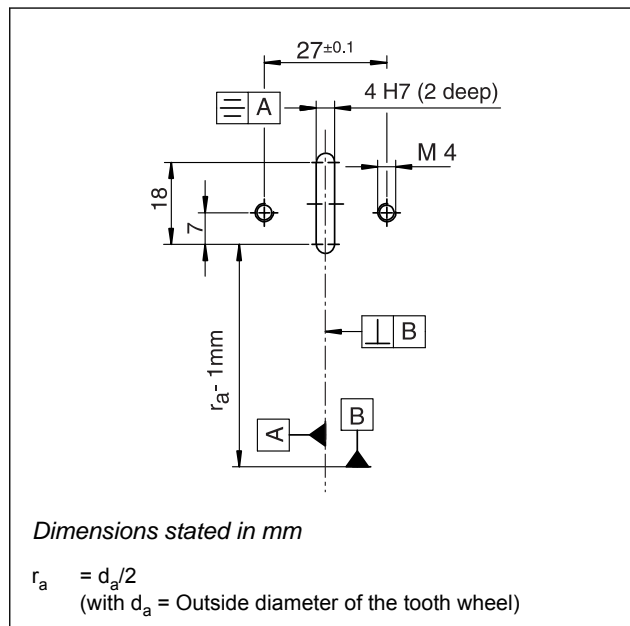
⁽¹⁾ The normative limits are met in case of correct mounting and connection. A further improvement in the electromagnetic immunity is achieved if the connection cable is coaxially earthed (e.g. at the open end of the cable) and the separate screened cable for the earthing close to the sensor is kept as short as possible.

Dimensional drawing, boring and milling sketch, installation drawing

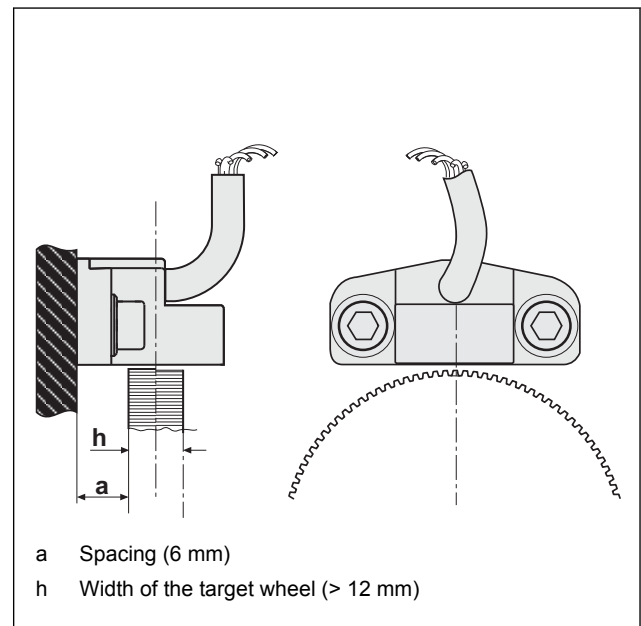
Dimensional drawing GEL 2440 – axial cable outlet



Boring and milling sketch



Assembly drawing



Type code, target wheels

Type code GEL 2440

	Signal pattern
C	Square-wave signals TTL / RS422
	Reference mark
G	Gap
	Interpolation factor
1	1
2	2
4	4
8	8
	Cable outlet
G	Axial
	Module
4	0.4
5	0.5
	Connection type
K	Flying lead
	Cable length
	Stated in cm: 030, 150, 250 or 600
2440	— — — — — — — — — —

Target wheels

For the measurement of rotary movements, MiniCODERs form a unit together with target wheels. The target wheel size and the related diameter depend directly on the module and the number of teeth.

Standard target wheels






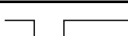
Standard target wheels are available on short delivery times from stock. For specifications and designs see "Technical information ZAx / ZFx".

Custom target wheels

Custom target wheels are manufactured individually to customer requirements. Please send us a design drawing of your target wheel (if possible as a dxf file) to info@lenord.de.

Terminal assignment

Terminal assignment

Core colour	Signal / function		TG
green	V_{1+}	Track 1	
yellow	V_{1-}	/Track 1	
grey	V_{N+}	Reference track	
white	0 V	GND	
brown	V_S	+ 5 V supply voltage	
blue	V_{2+}	Track 2	
red	V_{2-}	/Track 2	
pink	V_{N-}	/Reference track	

Your notes:



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The latest version can be downloaded at www.lenord.com.

