i³SAAC-Precision-Box

Additional electronics for the
i³SAAC-Precision-System

GEL SDA10

Technical information

Version 2020-12

General

- i³SAAC-Precision-Box as part of the system for the minimisation of the eccentricity error
- Increasing the system accuracy of incremental measuring systems
- Physically compatible with existing M23 connectors
- Easy commissioning using the testing and programming unit GEL 211CS0

i³SAAC-Precision-Box

Features

- High accuracy possible even at high rotational speed
- Frequency range from 0 to 200 kHz

Advantages

- Function with standard MiniCODERs
- Looping through of 4 temperature signals or other signals
- Maintenance and wear-free
- Easy installation and commissioning
- Independent of tooth wheel

Field of application

Applications with increased accuracy requirements,
e.g.:

- Simple positioning solution for small to medium rotary tables or rotary axes in machine tools
- Turning and milling centres

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Description

i³SAAC-Precision-System

The i³SAAC-Precision-System combines rotational speed measurement and high-accuracy positioning applications.

The system comprises:

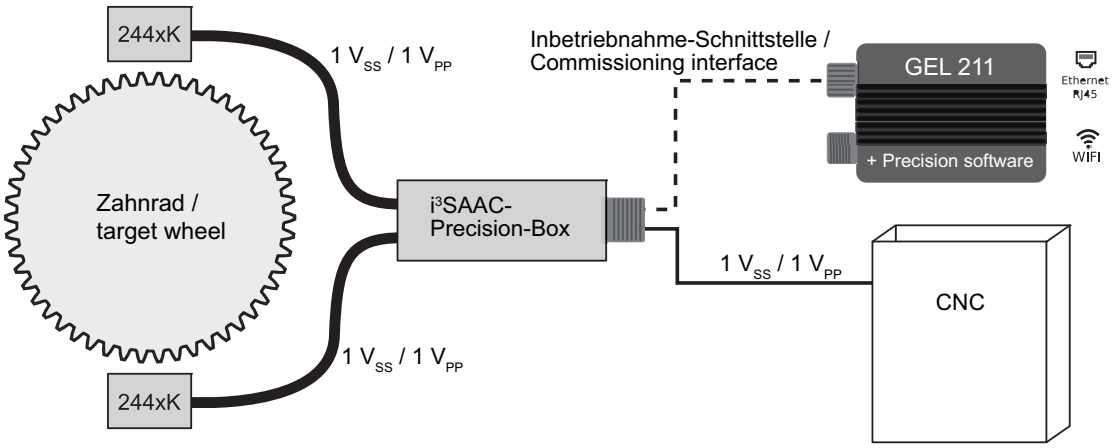
- 2 MiniCODERs 2444K␣␣␣␣P or 2449K␣␣␣␣P
- 1 target wheel with even number of teeth
- 1 i³SAAC-Precision-Box GEL SDA10

Example:

- *2 MiniCODERs 2444KZPG3P050*
- *1 target wheel with 256 teeth, module 0.3 - such as ZFZ1122*
- *1 i³SAAC-Precision-Box SDA10A1KK0K0001*

A testing and programming unit GEL 211CS0 is required for commissioning. A GEL 211BS0 is not suitable for this application.

You will find information about the MiniCODERs in the Technical information GEL 2444 (DS21-2444) and GEL 2449 (DS21-2449). You will find the Technical information on our homepage www.lenord.com.



MiniCODER

The two MiniCODERs are mounted at 180° in relation to each other and connected to the i³SAAC-Precision-Box.

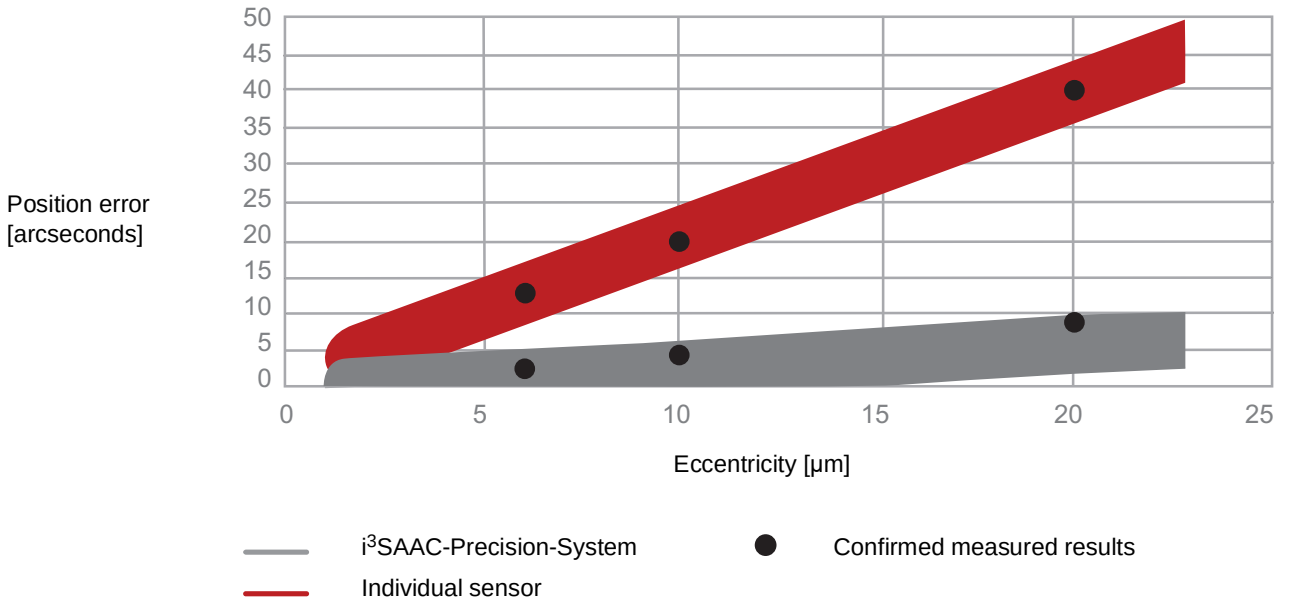
i³SAAC-Precision-Box

The Box is mounted directly on the spindle and replaces the M23 connector normally used there.
The Box acquires the signals from the two MiniCODERs, prepares them and passes them to the control system (CNC). Optionally available signals (e.g. temperature sensors) can be connected directly to the Box. The signals are output unchanged on the M23 connector. A suitable female connector is included in the scope of supply.
Before commissioning the i³SAAC-Precision-System, the MiniCODER data and the i³SAAC-Precision-Box data are to be adjusted using the testing and programming unit GEL 211CS0.

Eccentricity error

The eccentricity error is a measure of the concentricity of the target wheel. The eccentricity error is minimised and the total system error significantly reduced by means of the i³SAAC-Precision-System with the two MiniCODERs mounted at 180° to each other and the i³SAAC-Precision-Box. The system accuracy that can be achieved depends on the quality and the number of teeth of the target wheel used.

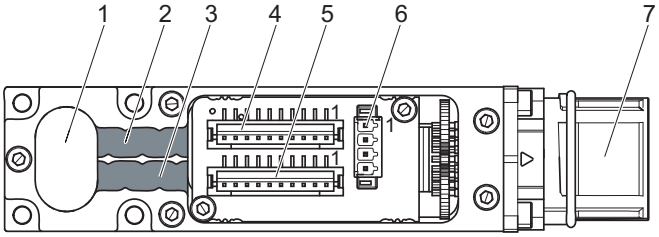
Eccentricity error of individual sensor and i³SAAC-Precision-System



Comparison of individual sensor and i³SAAC-Precision-System

Technical data

Electrical data	
Supply voltage $+U_B$	5 V DC ± 5 %
Current consumption	Approx. 100 mA
Output level	1 V_{pp} Differential signal
Output signal	Two sinusoidal signals offset by 90° and their inverse signals, reference pulse
Output frequency	0 to 200 kHz
Dielectric strength	500 V, DIN EN 61439-1:2012-06
EMC	Electromagnetic immunity DIN EN 61000-4-4:2013-04
Mechanical data	
Degree of protection	IP 54
Housing material	Aluminium
Weight	Approx. 160 g
Dimensions (length × width × height)	113.6 mm × 25.5 mm × 45.5 mm
Vibration resistance	200 m/s^2, in accordance with DIN EN 60068-2-6:2008-10
Shock resistance	2000 m/s^2, in accordance with DIN EN 60068-2-27:2010-02
MTTF FIT	5,000,000 h at 55 °C 204 10^{-9} h^{-1} at 55 °C
Ambient data	
Working temperature range	-20 °C to +85 °C
Operating and storage temperature range	-20 °C to +85 °C
Maximum relative humidity of air	< 95 %
Condensation	Not permitted



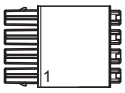
1 Cable entry
2 Cable duct and contact surface for cable screens
3 Cable duct and contact surface for cable screens
4 MiniCODER 1
5 MiniCODER 2
6 Temperature sensor or other signals
7 GEL 211CS0 / CNC

Connections

MiniCODER 1 / MiniCODER 2

10-pin female connector	Pin	Signal / function	
	1	U_B	+ 5 V supply voltage
	2	U_{1+}	Signal track 1
	3	U_{1-}	Inverse signal track 1
	4	U_{2+}	Signal track 2
	5	U_{2-}	Inverse signal track 2
	6	U_{Sense}	5 V Sense
	7	U_{N+}	Signal reference track N
	8	U_{N-}	Inverse signal reference track N
	9	0 V	GND
	10	Not used	

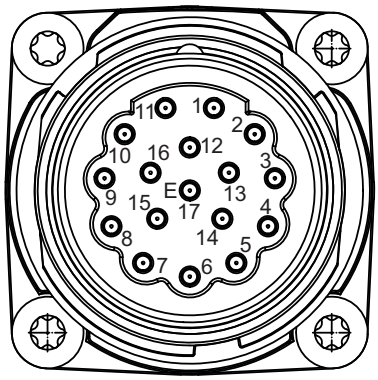
Optional spindle signals

4-pin female connector	Pin	Signal / function		Appropriate for cross-section:
	1	Temp2 +	Temperature sensor 2 + (or other signals)	0.14 - 0.25 mm²
	2	Temp2 –	Temperature sensor 2 - (or other signals)	
	3	Temp1 +	Temperature sensor 1 + (or other signals)	
	4	Temp1 –	Temperature sensor 1 - (or other signals)	

Use only screened cables!

Connections

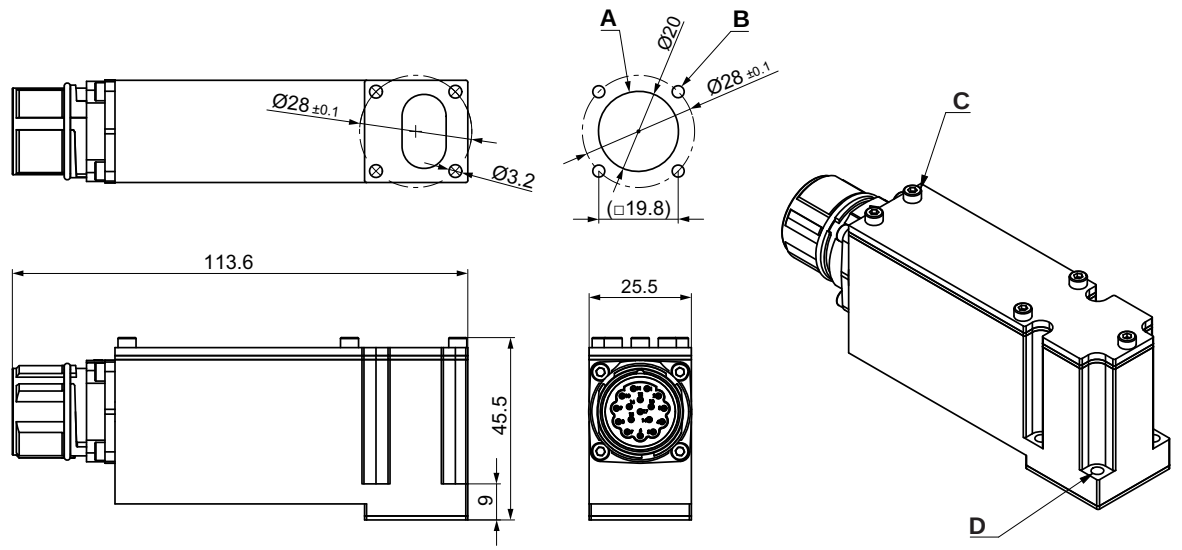
GEL 211CS0 / CNC

17-pin panel-mounting socket with pin contacts (M23)	Pin	Signal / function	
 *View of pin contact side*	1	U_{1+}	Signal track 1
	2	U_{1-}	Inverse signal track 1
	3	U_{N+}	Signal reference track N
	4	Not used	
	5	Temp2 –	Temperature sensor 2 -
	6	Temp2 +	Temperature sensor 2 +
	7	0 V	GND
	8	Temp1 +	Temperature sensor 1 +
	9	Temp1 –	Temperature sensor 1 -
	10	U_B	+ 5 V supply voltage
	11	U_{2+}	Signal track 2
	12	U_{2-}	Inverse signal track 2
	13	U_{N-}	Inverse signal reference track N
	14	Not used	
	15	0 V	GND (jumper pin 7)
	16	U_{Sense}	5 V Sense
	17	Not used	

Dimensional drawing

All dimensions stated in mm; general tolerance DIN ISO 2768 -mK

Dimensional drawing i³SAAC-Precision-Box

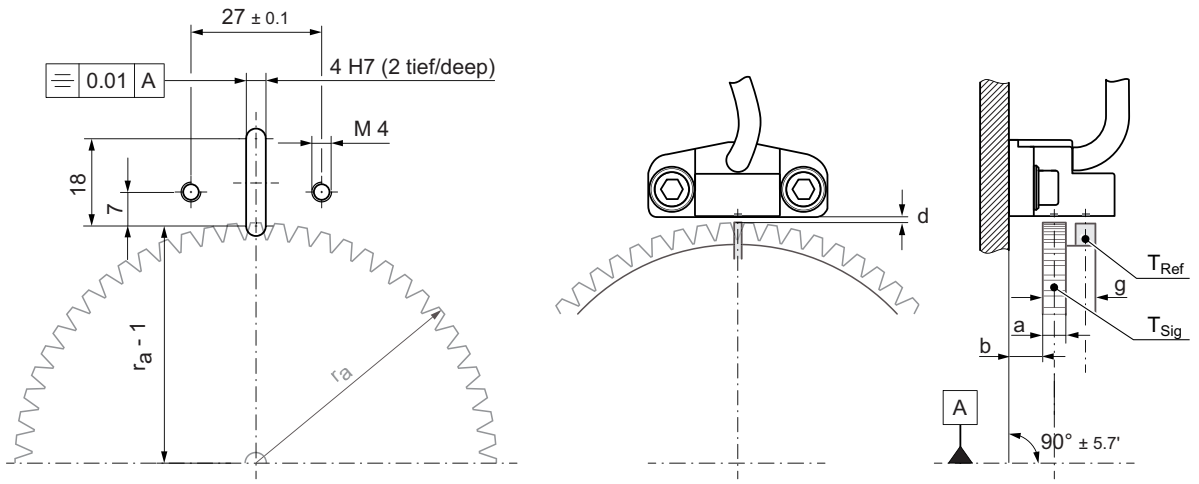


A Mounting opening
B M3 or M2.5
C Cover screws; screw tightening torque 0.2 Nm
D Mounting screws:
Maximum screw head diameter 5.5 mm, e.g. M3 DIN 912 or M2.5 DIN 912 with washer M2.5 DIN 433

Mounting instructions MiniCODER

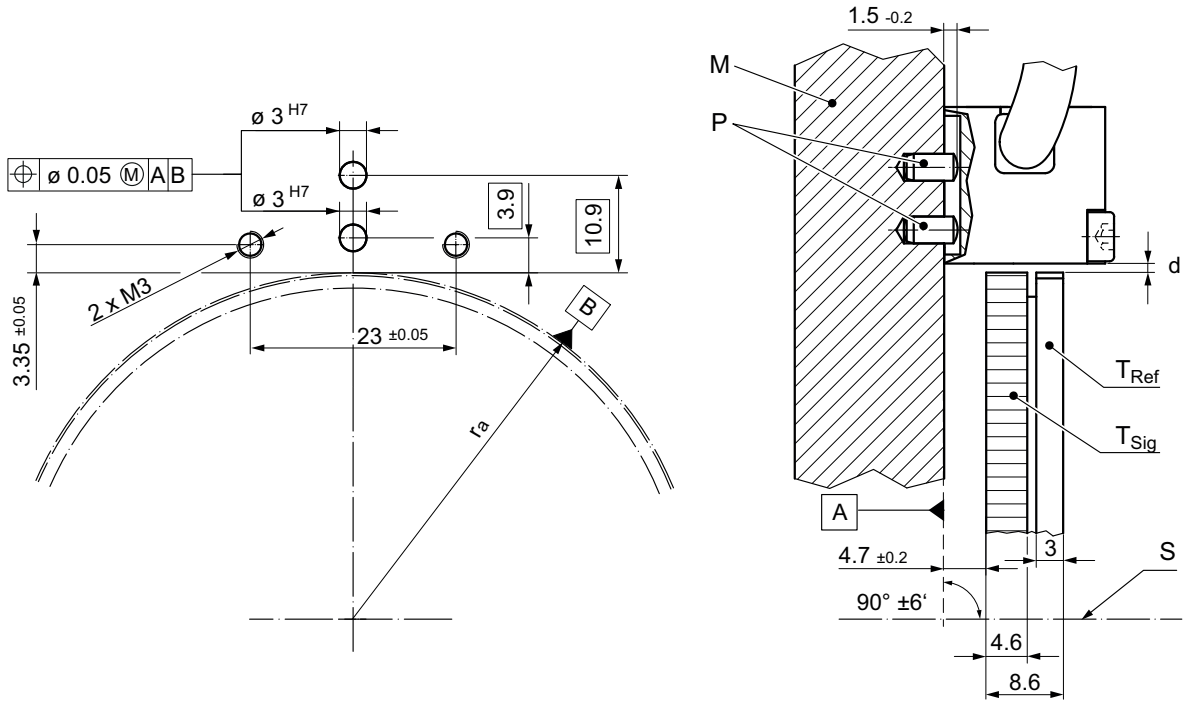
All dimensions stated in mm; general tolerance DIN ISO 2768 -mK

Hole pattern and installation dimensions GEL 2444



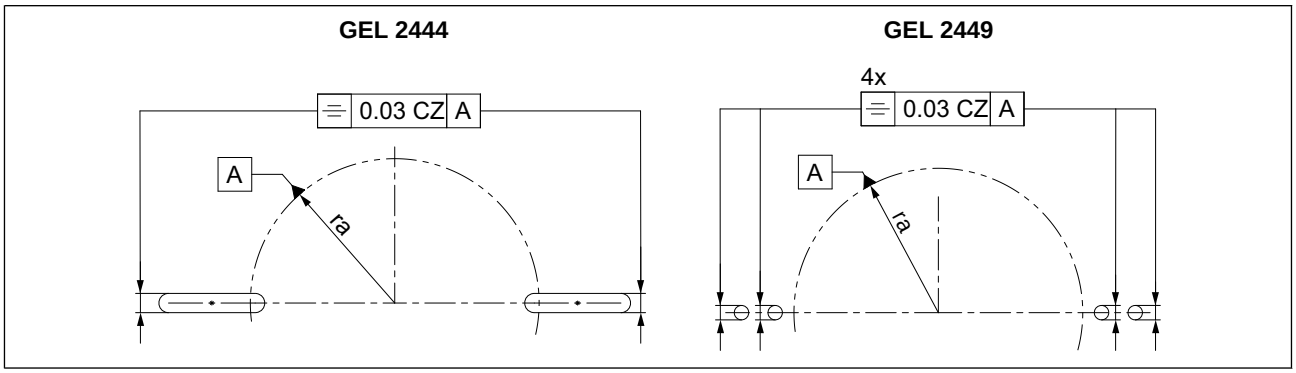
a	Width of the signal track
b	Mounting surface to target wheel distance: dependent on the geometry of the target wheel (e.g. width of the signal track)
d	Air gap (depending on target wheel module)
g	Width of the target wheel
r_a =	$d_a/2$ (with d_a = outside diameter of the target wheel)
T_{Ref}	Reference track
T_{Sig}	Signal track

Hole pattern and installation dimensions GEL 2449



d	Air gap (depending on target wheel module)	M	Mounting
r_a	Half the outside diameter of the target wheel	P	Positioning pins M3
S	Centre line shaft / target wheel	T_{Ref}	Reference track
		T_{Sig}	Signal track

Position tolerances



Type code and accessories

Type code

	A1				**Design** Angular housing attachment to the drive
		KK			**Input** 2 × sin/cos sensors (MiniCODER GEL 2444K or 2449K)
			0K		**Output** 1 × sin/cos output M23
				0001	**Device function** High-accuracy angle signal
SDA10	_ _	_ _	_ _	_ _ _ _	

Accessories

Testing and programming unit

- Testing Lenord+Bauer sensors with sin/cos output 1 V_{pp}, e.g. MiniCODER
- Transmitting the data via WLAN or Ethernet to mobile terminal devices (tablet, PC, etc.)
- Display of the data in a web browser, independent of the operating system

- Adjustment of the i³SAAC-Precision-Box using the commissioning wizard

Accessories

Item no.:	Identifier:
PK211C-244XK-E	Configuration kit, consisting of: ▪ MiniCODER testing and programming unit GEL 211CS04E2M ▪ Sensor connection cable GG211 ▪ Power supply unit 5 V, ZB211CB ▪ Operating instructions D-71B-211CS0 ▪ Case with foam insert XW1303
PK211C-244XK-W	Configuration kit, consisting of: ▪ MiniCODER testing and programming unit GEL 211CS04W2M ▪ Sensor connection cable GG211 ▪ Power supply unit 5 V, ZB211CB ▪ Operating instructions D-71B-211CS0 ▪ Case with foam insert XW1303
GG211-17POL-M23	Adapter cable GEL 211 — i³SAAC-Precision-Box GEL SDA10

Notes:

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