

SALES BULLETIN

HEIDENHAIN CORPORATION

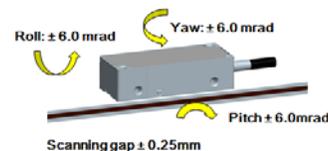
333 East State Parkway
Schaumburg, IL 60173-5337
Telephone: (847) 490-1191
Fax: (847) 490-3931
E-mail: info@heidenhain.com

FROM: Kevin Kaufenberg – Product Manager
SUBJECT: LIC 4100
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1. Introduction – Motivation

After the successful introduction of the LIC 4000 with EnDat interface, the **LIC 4100** exposed absolute encoder will provide further interfaces like *Fanuc*, *Mitsubishi*, and *Panasonic*. The *Yaskawa* interface will be introduced at a later date. So far, more than 3000 LIC 4000 have been delivered to more than 100 customers worldwide for the most diverse applications (for example measuring and production equipment in the semiconductor industry, high-accuracy tools for the production of flat screens, displays and LEDs, direct drives, fabric machines, etc.).

2. Technical advantages of the LIC 4100 series



- Additional interfaces like *Fanuc*, *Mitsubishi*, *Panasonic*, and *Yaskawa*
- RMS < 8 nm and resolutions as fine as 1 nm for highly dynamic applications with maximum positioning accuracy
- Traversing speed: ≤ 600 m/min
- Higher mounting tolerances for gap, roll, pitch, and yaw
- Higher operating temperature range –10° C to + 70° C
- IP 67 protection
- Increased scanning field of 15.51 mm² (previously 14 mm²) for further reduction of the sensitivity to contamination

2.1 Specifications

Specifications	LIC 4100	
	LIC 411 with G61 2.3	LIC 419 with G61 2.3 and SIA 1.0
Measuring standard Thermal expansion coefficient	METALLUR steel tape $\alpha_{\text{therm}} \approx 10 \text{ ppm/K}$ METALLUR glass or glass ceramic $\alpha_{\text{therm}} \approx 8 \cdot 10^{-6} \text{ K}^{-1}$ (glass) $\alpha_{\text{therm}} \approx (0 \pm 0.1) \cdot 10^{-6} \text{ K}^{-1}$ (Zerodur glass ceramic)	
Dimensions LxWxH	46x19x12mm ³ (Position of sideways mounting holes and position of cable outlet changed)	
Mounting tolerances	± 0,25mm gap ± 0,5mm line direction ± 6,0mrad roll/pitch/yaw	improved
Measuring length ML	up to 28440mm	
Absolute position values	EnDat 2.2	Fanuc Mitsubishi Yaskawa (®3331*) improved
Resolution	1nm/5nm/10nm (Standard)	
Calculation time t_{calc}	≤ 5 μs improved	
Power consumption (typ. @ 5.0V)	< 100mA	< 120mA
Traversing speed	≤ 600m/min improved	
Interpolation error [SP]	Pk-Pk: < ± 40nm RMS: < 8nm improved	
Vibration 55 to 2000 Hz (EN 60068-2-6)	≤ 500m/s ²	
Shock 6ms (EN 60068-2-27)	≤ 1000m/s ²	
Operating temperature	-10°C to +70°C improved	
Degree of protection	IP 67 improved	

2.2 Technical contents

Due to the technical implementation of the additional interfaces, the external appearance of the scanning head has changed. The LIC 4100 scanning head integrates scanning in one single housing, which is closed with a cover. Among other things, this leads to a higher degree of protection (IP 67) of the LIC 4100. The scanning was further optimized (one-piece scanning board, large scanning field of 15.51 mm²), but this led to a changed scanning position. As opposed to the LIC 4000, it is no longer centered to the scanning head. Other improvements like the increased mounting tolerances, reduced processing time ≤ 5 μs, higher traversing speed, and measuring lengths up to 28,440 mm will be communicated in the Exposed Linear Encoders brochure to be published for CONTROL 2014.

The LIC 41xx scanning head is dimensioned like the LIC 401x and LIDA 400, but the lateral position of M3 (3.5 mm) and the cable outlet (4.5 mm / 7.0 mm) have changed.

The same measuring standards and mounting modes as for the LIC 4000 are available for the LIC 4100. Mounting, adjustment, and diagnosis of the LIC 4100 can be done with the updated ATS software in combination with the PWM 20.

Additionally there are also single-section glass and glass ceramic measuring standards (with METALLUR grating) with a cross section of 15 x 2.9 mm up to measuring lengths of 3040 mm:

- $\alpha^{\text{therm}} \sim 8 \cdot 10^{-6} \text{ K}^{-1}$ (glass)
- $\alpha^{\text{therm}} = (0 \pm 0.1) \cdot 10^{-6} \text{ K}^{-1}$ (Zerodur glass ceramic)



3. Versions / ID numbers

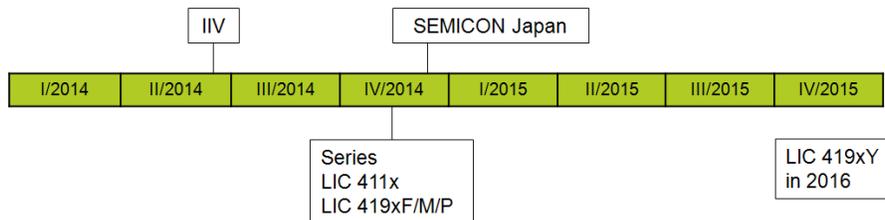
LIC 401 scanning head LIC 411, LIC 419 scanning head LIC 4103 scale



Starting with the introduction of the new **LIC 4100** series, the basic ID numbers for the **LIC 411** and **LIC 419 scanning heads** will only be assigned for the respective interface. Other variants, such as resolution, accuracy grade, connector type, will be listed as variants.

Since the measuring standards and mounting modes used (LIC 4005, LIC 4007 parts kit and LIC 4009 scale tape) correspond to the LIC 4000, the entries in the price book will merely be marked with the addition LIC 4100.

4. Start of series production / Schedule for LIC 4100 (“Discontinuation of LIC 4000 with LIC 401 scanning head”)



LIC 4100 prototypes can be delivered upon request as of mid-2014 at the earliest. Any new customer applications or substantial demands to be expected should already be discussed on the basis of the LIC 4100 (after consultation with HEIDENHAIN).

- ***It is planned to discontinue the LIC 4000 with LIC 401 scanning head gradually by the time series production of the LIC 4100 starts. This will be communicated in due time.***

5. Prices

The prices of the AK LIC 411 and AK LIC 419 scanning heads correspond to the prices of the LIC 401X scanning heads in the price book. Since the measuring standards and mounting modes used correspond to the LIC 4000, the entries in the Price Book will merely be marked correspondingly.

The LIC 4103 (glass and glass ceramic measuring standards) will be added as new entries. The price matrix already in place for the sample deliveries (LIDA 403 + 20 %) will be maintained. The only exception will be the LIC 4003 glass ceramic measuring standards with an accuracy grade of $\pm 3 \mu\text{m}$, for which there will be a surcharge of 30 % on the LIDA 403 price. Higher accuracy grades will be available on request.

6. Adjustment and diagnosis

For adjustment and diagnosis, HEIDENHAIN offers the familiar adjustment and testing package. It consists of the following components: PWM 20 and Adjusting and Testing Software (ATS). An update is available for the current software. It can be loaded via the HEIDENHAIN FileBase.

7. Documentation

The Product Information for the new LIC 4100 series is included in the new Exposed Linear Encoders brochure and contains the LIC 41x3, LIC 41x5, LIC 41x7, and LIC 41x9 series.