Data sheet
LA11D01_06
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LA11 absolute magnetic encoder system

Track system

LA11 is an absolute magnetic linear encoder system designed for motion control applications as a position and velocity control loop feedback element.

The encoder system is highly reliable due to contactless absolute measuring principle, built-in safety algorithms and high quality materials/components used.

The measuring standard is a magnetic scale which consists of a stainless steel substrate with an elasto-ferrite layer. The elasto-ferrite layer is magnetised with two tracks. The incremental track is magnetised with 2 mm long (alternating south and north) poles and the absolute track is magnetised with a pseudo random binary sequence (PRBS) absolute code with 13 bit length. The elasto-ferrite layer is immune to chemicals commonly found in industry.

The readhead includes Hall sensor arrays for PRBS track reading, an AMR sensor for incremental track reading, interpolation electronics and custom logic circuitry. The data from the Hall arrays and interpolator are processed in the internal MCU using special algorithms to determine the absolute position.

The electronics design provides short response and recovery times.

Diagnostic information is available through a serial communication channel and status LED.

- True absolute system
- Suitable for highly dynamic control loops
- Small footprint
- High accuracy
- Resolutions up to 0.244 µm
- Axis lengths up to 16.3 m
- Speeds up to 7 m/s at 0.977 µm resolution
- Integral status LED
- Synchronous (SSI, SPI, BiSS) communication protocols available
- Parallel incremental output (analogue ∿ or digital ⊓⊔)
- Double shielded, drag-chain compatible cable
- Simple and fast installation
- Robust measuring principle
- Excellent degree of protection to IP68

Technical specifications

System data	
Maximum length for AS scale	16.3 m
Incremental pole length	2 mm

Maximum speed for parallel incremental signals

Ordering code	Resolution (µm)	Interpolation factor	Maximum speed (m/s)								
13B	**~0.244**	**8,192**	1.82	0.91	0.23	0.11	0.06	0.03	0.02	0.01	0.01
12B	**~0.488**	**4,096**	3.65	1.82	0.46	0.23	0.12	0.06	0.05	0.02	0.01
11B	**~0.976**	**2,048**	7	3.65	0.91	0.46	0.24	0.12	0.10	0.05	0.02
2D0	**1**	**2,000**	7	3.73	0.93	0.47	0.24	0.12	0.10	0.05	0.02
10B	**~1.953**	**1,024**	7	7	1.82	0.91	0.48	0.24	0.19	0.10	0.05
09B	**~3.906**	**512**	7	7	3.65	1.82	0.95	0.49	0.38	0.19	0.10
08B	**~7.812**	**256**	7	7	7	3.65	1.90	0.97	0.77	0.39	0.19
07B	**15.625**	**128**	7	7	7	7	3.81	1.94	1.53	0.77	0.39
06B	**31.25**	**64**	7	7	7	7	7	3.89	3.07	1.55	0.78
05B	**62.5**	**32**	7	7	7	7	7	7	6.14	3.10	1.56
04B	**125**	**16**	7	7	7	7	7	7	7	6.19	3.11
		Edge separation (µs)	0.07	0.12	0.50	1	2	4	5	10	20
		Maximum count frequency (MHz)	15	8	2	1	0.50	0.25	0.20	0.10	0.05
		Ordering code	**K**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**

System accuracy	±40 µm/m
Short range accuracy	< ±10 µm/10 mm (see diagram 5)
Coefficient of thermal expansion (CTE)	11 ±1 µm/m/K
Repeatability	Unit of resolution
Hysteresis	< 2 µm at 0.1 mm ride height (see diagram 1)
Electrical data	
Power supply	Option A: From 4.75 V to 5.75 V - Voltage on readhead, consider voltage drop over cable (see diagram 3, 4, 5, 6) Option B: From 8 V to 30 V (see diagram 7)
Reverse polarity protection	For option A only
Set-up time after switch-on	< 350 ms
Power consumption (without load)	Option A: < 150 mA at 5 V power supply Option B: see diagram 7
Voltage drop over cable	~ 80 mV/m - without load
Mechanical data	
Mass	Readhead (with 1 m cable, no connector) 41 g, magnetic scale 60 g/m
Cable	PUR high flexible cable, drag-chain compatible, double-shielded. Read more on page 9.
Environmental data	
Temperature	Operating 0 °C to +55 °C Storage –20 °C to +70 °C
Vibrations (55 Hz to 2000 Hz)	300 m/s² (IEC 60068-2-6)
Shocks (11 ms)	300 m/s² (IEC 60068-2-27)
Humidity	100 % (condensation permitted)
EMC Immunity	IEC 61000-6-2 (particularly: ESD: IEC 61000-4-2; EM fields: IEC 61000-4-3; Burst: IEC 61000-4-4; Surge: IEC 61000-4-5; Conducted disturbances: IEC 61000-4-6; Power frequency magnetic fields: IEC 61000-4-8; Pulse magnetic fields: IEC 61000-4-9)
EMC Emission	IEC 61000-6-4 (for industrial, scientific and medical equipment: IEC 55011)
Environmental sealing	Only readhead: IP68 (according to IEC 60529)