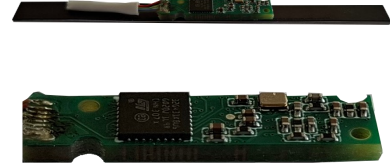# PLM7922C

Linear absolute Encoder

The PLM7922 linear encoder system features a absolute linear encoder combined with a two-track magnetic scale, an incremental and an absolute track. The encoder delivers true power-on position detection with an effective resolution of 0.1 µm.

Thanks to its robust design, the sensor is ideal for use in motion control systems, providing precise position and speed detection.

Utilizing proven MR sensor technology and integrated correction algorithms, the PLM7922 ensures high accuracy, excellent repeatability, and reliable performance even in demanding environments.

Product Overview

Article Name	Description
PLM7922-CSA-EG	Linear absolute encoder, SPI

Quick Overview

Symbol	Parameter	min.	typ.	max.	Unit
V_{CC}	Supply voltage	-	3.3	-	V
I_C	Current consumption	100	125	150	mA
Res	Resolution	-	12	-	bit
Acc	Accuracy	-	-	±30	µm
Rep	Repeatability	-	±0.5	-	µm
T_{amb}	Operating temperature	-40	-	+85	°C

Features

- Up to 70 mm maximum measuring length
- Absolute position detection
- Effective resolution of 0.1 µm
- Absolute error smaller 30 µm
- Calibration algorithms
- True-power-on
- Wide temperature range from –40°C up to +85°C
- SPI protocol interfaces

Advantages

- Compact design
- High accuracy
- Robust and reliable

Applications

- Motion control systems
- Industrial automation
- Robotics applications
- Precision measurement

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PLM7922C
Linear absolute Encoder

Mechanical Data [1)]

T_{amb} = 25°C; unless otherwise specified

Symbol	Parameter	Conditions	min.	typ.	max.	Unit
L	Length of the module		-	25.0	-	mm
W	Width of the module		-	6.0	-	mm
H	Height of the module		-	4.15	-	mm

[1)] more details in Fig. 2

Electrical Data

T_{amb} = 25°C, V_{CC} = 3.3 V; unless otherwise specified

Symbol	Parameter	Conditions	min.	typ.	max.	Unit
V_{cc}	Supply voltage		-	3.3	-	V
F_{Pos}	Position Refresh Rate		-	2.0	-	kHz
I_A	Current	V_{CC} = 5.0 V	100.0	125.0	150.0	mA
t_{Start}	Start time		-	100.0	-	ms
T_{op}	Operating temperature		-40	-	+85	°C
$T_{storage}$	Storage temperature		-40	-	+85	°C

Performance Data

T_{amb} = +25°C, V_{CC} = 3.3 V, unless otherwise specified

Symbol	Parameter	Comment	Min.	Typ.	Max.	Unit
Acc	Accuracy		-	-	±30.0	µm
Rep	Repeatability		-	±0.5	-	µm
Res	Resolution		-	12	-	bit
Res_{eff}	Effective resolution		-	0.1	-	µm
Range	Measuring range	Bidirectional 3 cycles	5	-	70	mm
S	Speed		-	-	2	m/s

Environmental Data

Symbol	Conditions	min.	typ.	max.	Unit
Vibration resistance		-	-	785	m/s^2
Shock resistance		-	-	980	m/s^2
External magnetic field (thickness direction)		-	-	±100	mT
External magnetic field (moving direction)		-	-	±5	mT
External magnetic field (width direction)	no negative field allowed	-	-	+5	mT
Humidity		-	-	70	%

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Pinout of the sensor module

Pad	Symbol	Parameter
1	SCK	Inner shield
2	Miso	Clock signal
3	Mosi	Inverted clock signal
4	CS	Supply Voltage
5	GND	Ground
6	V_{CC}	Supply Voltage
7	NC	Not connected
8	NC	Not connected
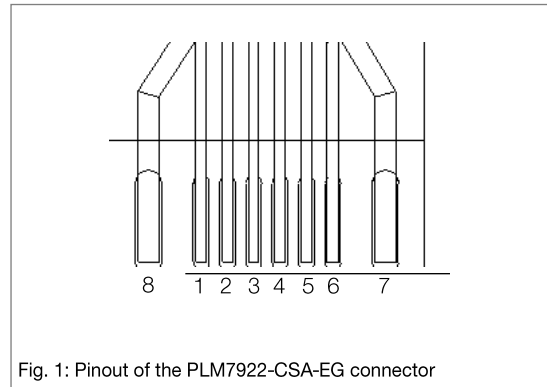
Fig. 1: Pinout of the PLM7922-CSA-EG connector

Dimensions
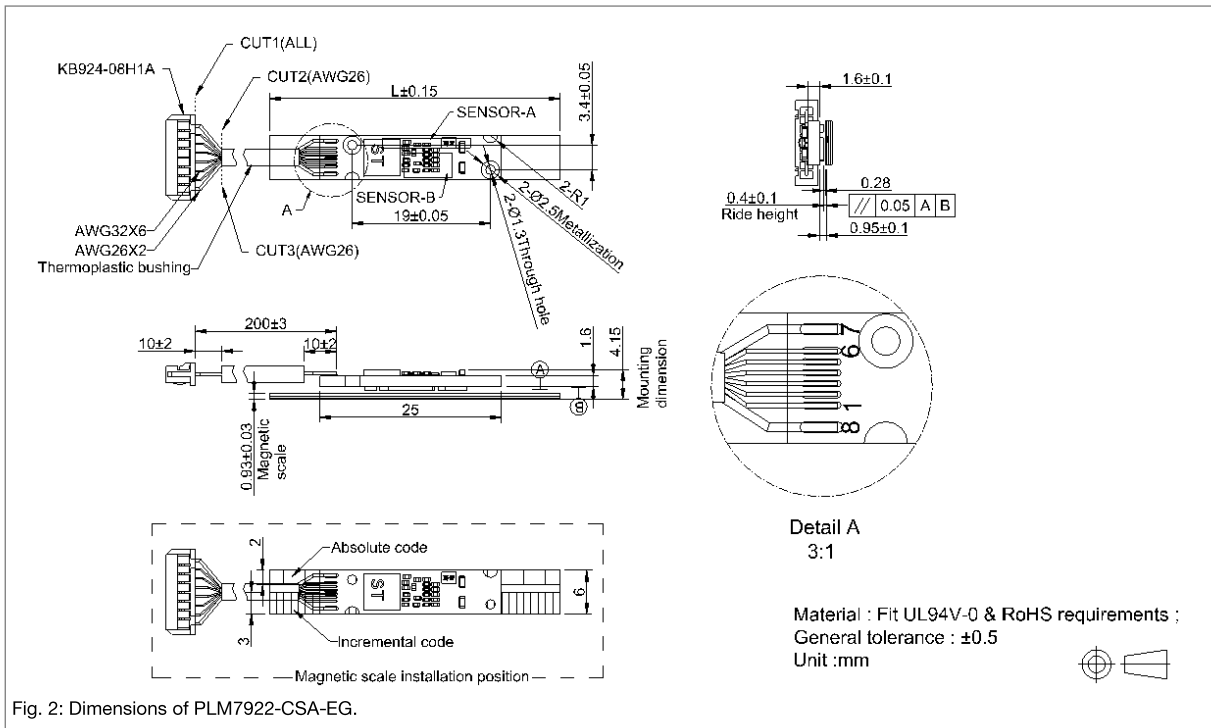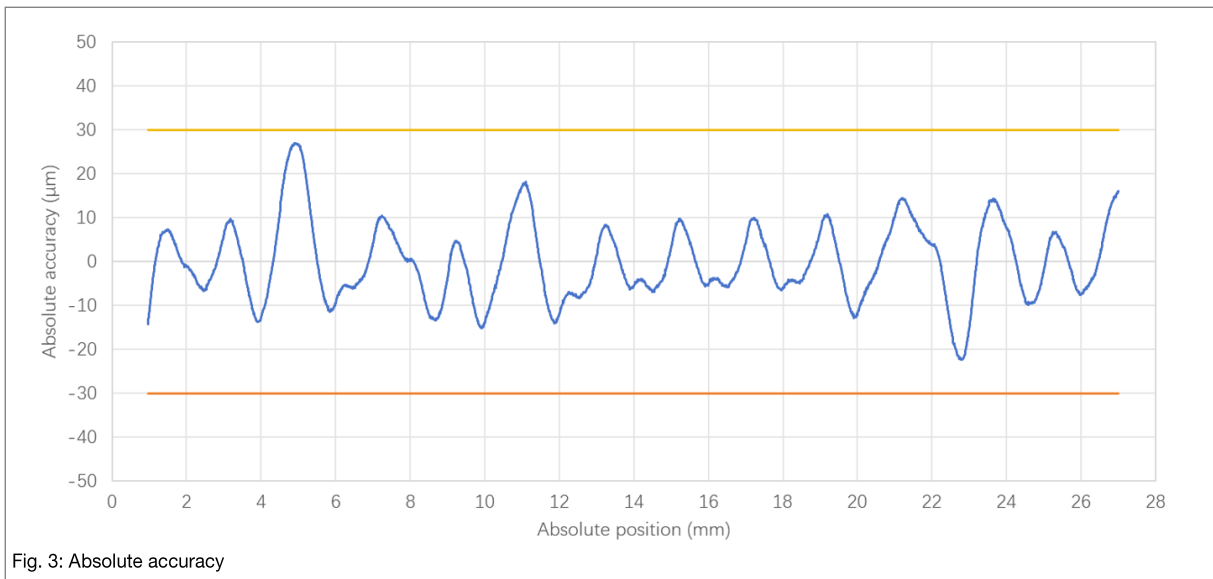

Fig. 2: Dimensions of PLM7922-CSA-EG.

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Performance data

Fig. 3: Absolute accuracy

Fig. 4: Repeatibility

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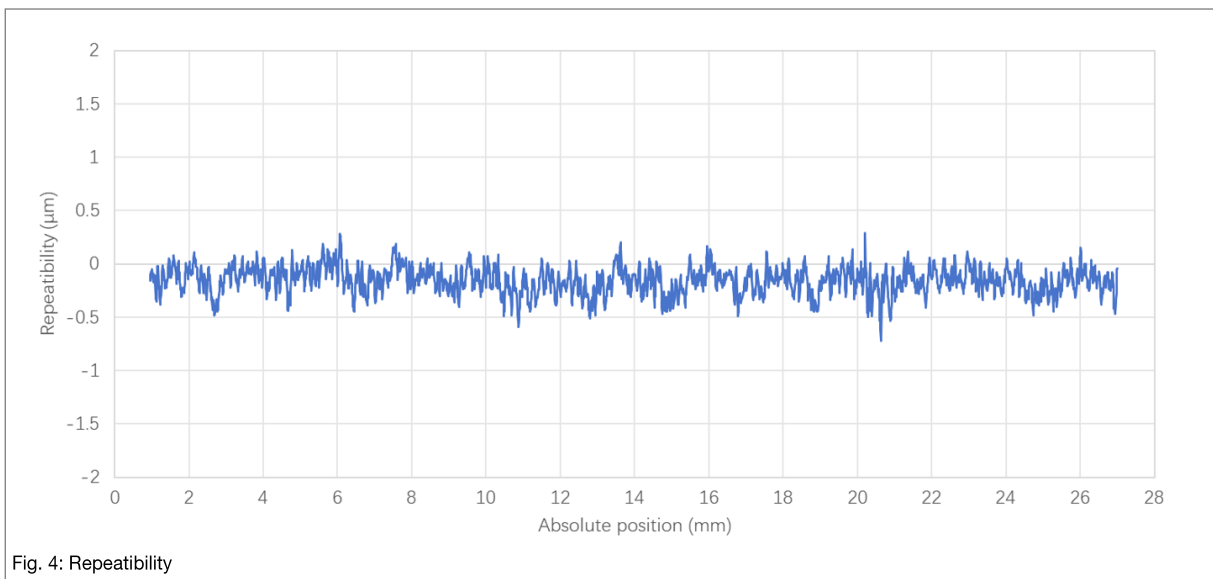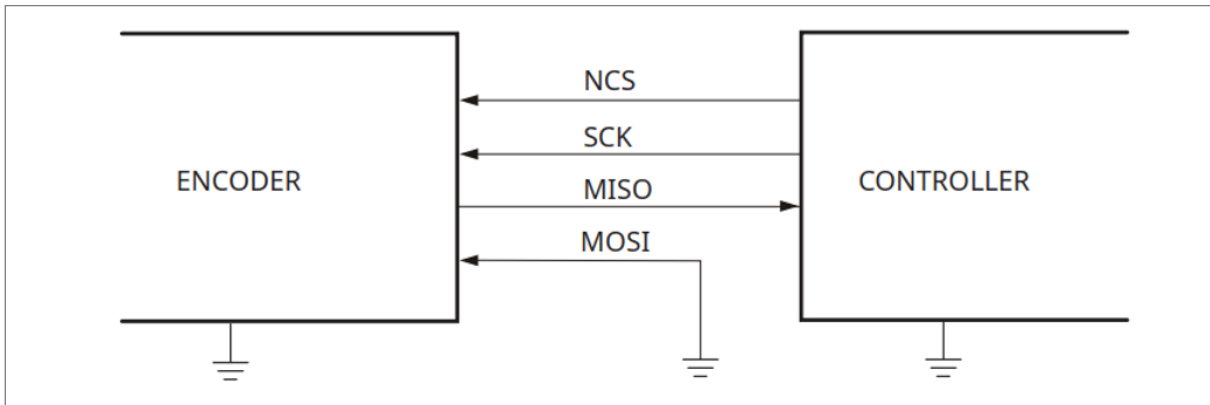
SPI interface

The Serial Peripheral Interface (SPI) bus is a four-wire bidirectional synchronous serial communication interface, typically used for short distance communication. It operates in full duplex mode, where master (controller) selects the slave with NCS line, generates clock signal on SCK line, sends command over MOSI line and receives data over MISO line.

All data signals are 3.3 V LVTTL. Inputs are 5 V tolerant. The maximum current sourced or sunk from signal lines should not exceed 5 mA. Single-ended signals should be as short as possible, especially when high frequencies are used.
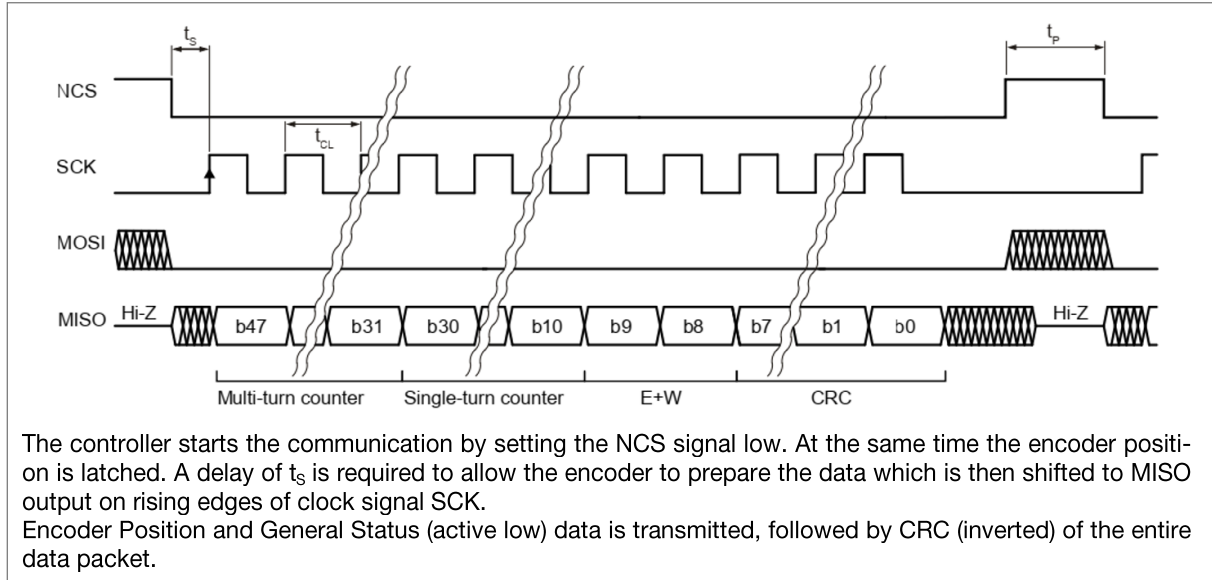
Signal termination: 100 Ω resistors are added in series with all SPI signals.

Electrical connection

Signal	Description
NCS	Active low. NCS line is used for synchronization between master and slave devices. During communication it must be held low. Idle is high. When NCS is high, MISO line is in high-Z mode. This allows connection of multiple slaves in paralell, sharing all lines except NCS. Encoder position data is latched on falling edge of NCS signal.
SCK	Serial clock. Shifts out the data on rising edge.
MOSI	Master output Slave input. Command from the controller to encoder. If only position data is requested, this signal should always be zero. It can be tied to GND.
MISO	Master input Slave output. Data is output on rising edge on SCK after NCS low. When NCS is high, MISO line is in high-Z mode.

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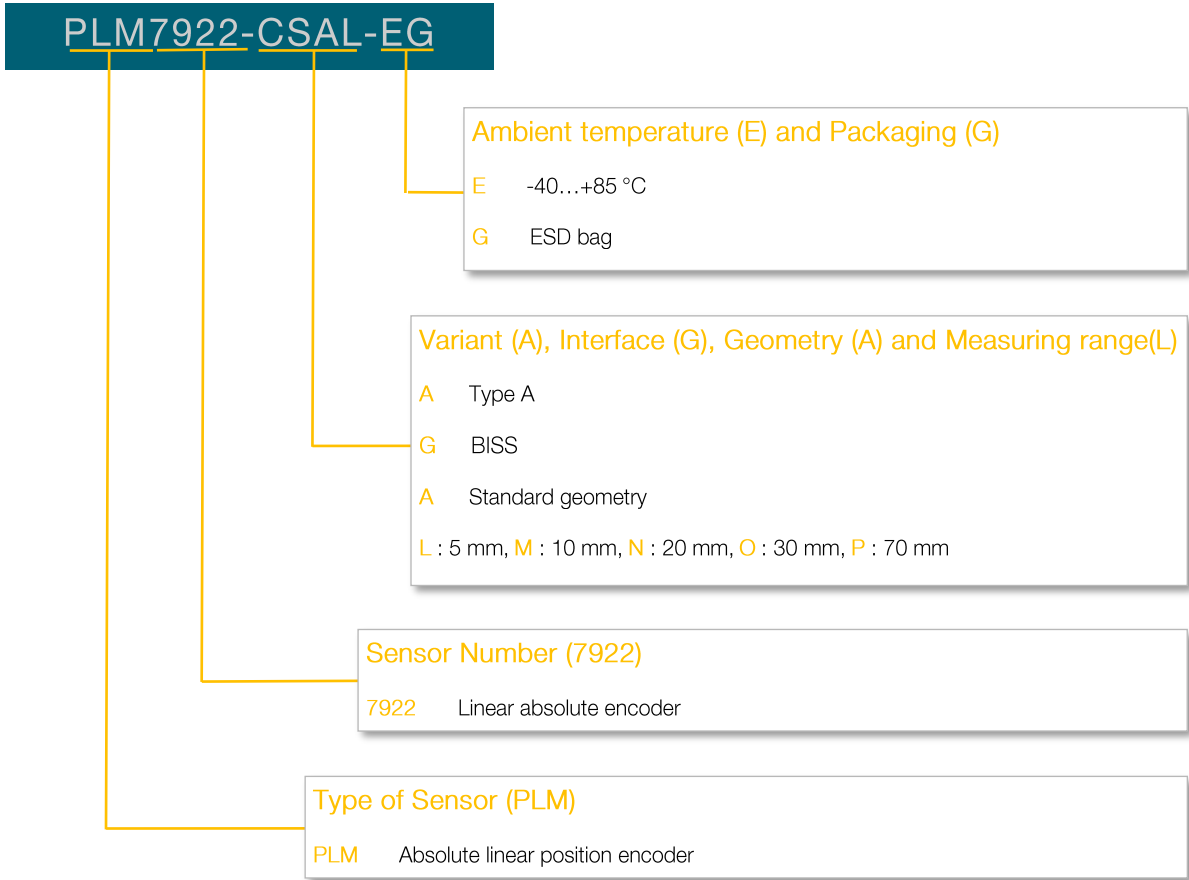
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Timing diagram

The controller starts the communication by setting the NCS signal low. At the same time the encoder position is latched. A delay of t_S is required to allow the encoder to prepare the data which is then shifted to MISO output on rising edges of clock signal SCK.
Encoder Position and General Status (active low) data is transmitted, followed by CRC (inverted) of the entire data packet.

Communication parameters

Parameter	Symbol	Min	Max
Clock period	t_{CL}	250 ns	-
Clock frequency	f_{CL}	-	4 MHz
Time after NCS low to first SCK rising edge	t_S	5 µs	-
Pause time	t_P	5 µs	-

Encoder position data structure

Bit	Description
b31:b10	Encoder position + zero padding bits – Left aligned, MSB first.
b9	Error – If low, the position data is not valid.
b8	Warning – If low, the position data is valid, but some operating conditions are close to limits.
b7:b0	Inverted CRC, 0x97 polynomial

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Additional Information on Ordering Code

PLM7922-CSAL-EG

Ambient temperature (E) and Packaging (G)

E   -40…+85 °C

G   ESD bag

Variant (A), Interface (G), Geometry (A) and Measuring range(L)

A   Type A

G   BISS

A   Standard geometry

L : 5 mm, M : 10 mm, N : 20 mm, O : 30 mm, P : 70 mm

Sensor Number (7922)

7922   Linear absolute encoder

Type of Sensor (PLM)

PLM   Absolute linear position encoder

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General Information

Product Status

Article	Status
PLM7922-CSA-EG	The product is under development.
Note	The status of the product may have changed since this data sheet was published. The latest information is available on the internet at www.sensitec.com.

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General Information

Application Information

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Changelist

Version	Description of the Change	Date
PLM7922C.DSE.00	Original (pp. 1-9)	04/2025

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