DATA SHEET

PAM7943E

Axial 360 degree absolute Encoder

The PAM7943E is a compact, high-resolution rotary absolute encoder system designed for precise motion control applications.

The encoder system utilizes a dual-track magnetic disc — one absolute and one incremental — combined with advanced TMR sensor technology to provide true absolute position feedback. It offers high resolution along with excellent repeatability and absolute positioning accuracy.

The system delivers power-on absolute position feedback, ensuring reliable startup performance without the need for homing. Its compact and rugged design is built for demanding industrial environments.

Features

- Singleturn absolute
- Multiturn possible
- Up to 24 bit resolution
- Calibration algorithms
- True-power-on
- Wide temperature range from –40°C up to +85°C
- RS485 protocol interfaces

Advantages

- Compact design (axial)
- High accuracy
- Robust and reliable

Applications

- Off-axis applications
- Robotic joints
- Automated Guided Vehicles
- Flat electro motors

Product Overview

Article Name	Description
PAM7943-ELA-EG	Axial 360 degree absolute encoder, single bearing
PAM7943-ELB-EG	Axial 360 degree absolute encoder, double bearing
PAM7943-ELBB-EG	Axial 360 degree absolute encoder, double bearing, Multiturn

Quick Overview

Symbol	Parameter	min.	typ.	max.	Unit
V_{CC}	Supply voltage	4.75	5.0	5.25	V
I_C	Current consumption	100	125	150	mA
Res	Resolution Singleturn	-	24	-	bit
Acc	Accuracy	±15	-	±20	arcsec
T_{amb}	Operating temperature	-40	-	+85	°C

ESD

Electrical Data

T_{amb} = 25°C, V_{CC} = 5.0 V; unless otherwise specified

Symbol	Parameter	Conditions	min.	typ.	max.	Unit
V_{cc}	Supply voltage		4.75	5.0	5.25	V
F_{Pos}	Position Refresh Rate		-	18.0	-	kHz
I	Current	V_{CC} = 5.0 V	100.0	125.0	150.0	mA
t_{Start}	Start time		-	100	-	ms
T_{op}	Operating temperature		-40	-	+85	°C
$T_{storage}$	Storage temperature		-40	-	+105	°C

Mechanical Data [1)]

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

Symbol	Parameter	Conditions	min.	typ.	max.	Unit
D_{out}	Outer diameter of the module		-	35.0	-	mm
D_{in}	Inner diameter of the module		-	6.4	-	mm
H	Height of the module		12.2	-	14.9	mm

[1)] more details in Fig. 2 and Fig. 4

Performance Data

T_{amb} = +25°C, V_{CC} = 5.0 V, unless otherwise specified

Symbol	Parameter	Comment	Min.	Typ.	Max.	Unit
Acc	Accuracy		±15.0	-	±20.0	arcsec
Rep	Repeatability		-	-	±3.6	arcsec
Res_{Single}	Resolution		-	24	-	bit
Speed	Maximum speed		-	10000	-	RPM
N	Noise		-	±0.0005	-	°

Environmental Data

Symbol	Conditions	min.	typ.	max.	Unit
Vibration resistance		-	-	785	m/s^2
Shock resistance		-	-	980	m/s^2
External magnetic field		-	-	±100	mT
Humidity		-	-	70	%

Pinout of the sensor module

Pad	Symbol	Parameter
1	V_{CC}	Supply Voltage
2	GND	GND
3	A+	Signal
4	B-	Inverted signal

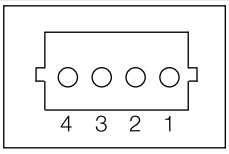


Fig. 1: Pinout of the PAM7943-ELA-EG connector

Dimensions

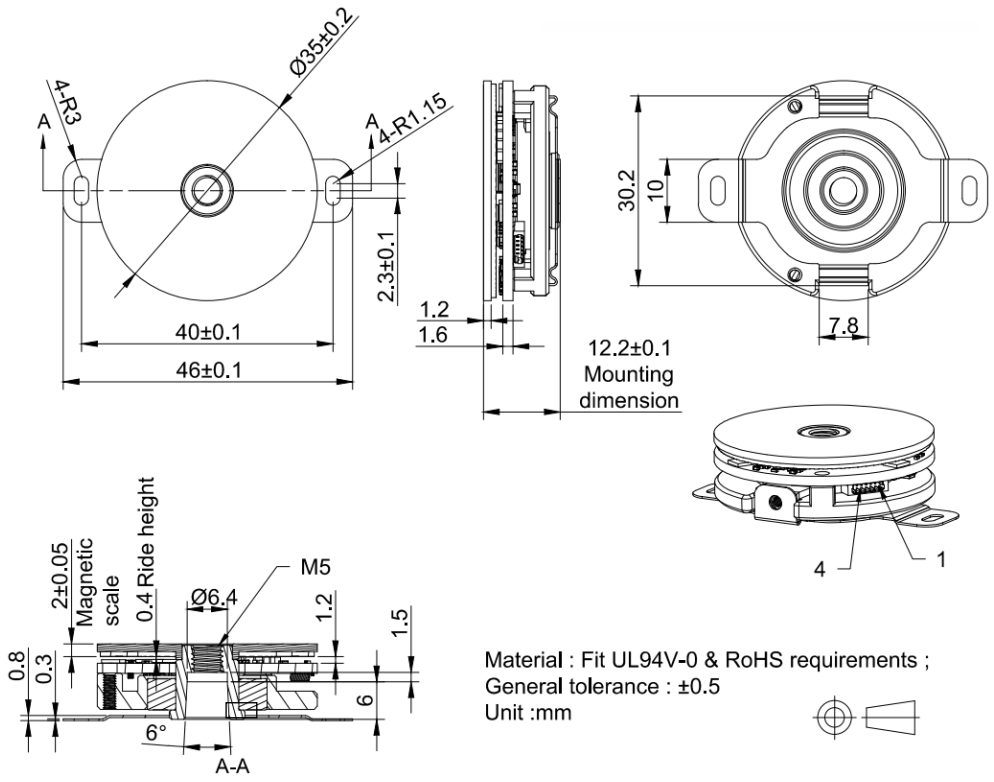


Fig. 2: Dimensions of PAM7943-ELA-EG.

Pinout of the sensor module

Pad	Symbol	Parameter
1	V_{CC}	Supply Voltage
2	GND	GND
3	A+	Signal
4	B-	Inverted signal

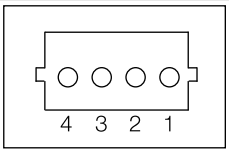


Fig. 3: Pinout of the PAM7943-ELB-EG connector

Dimensions

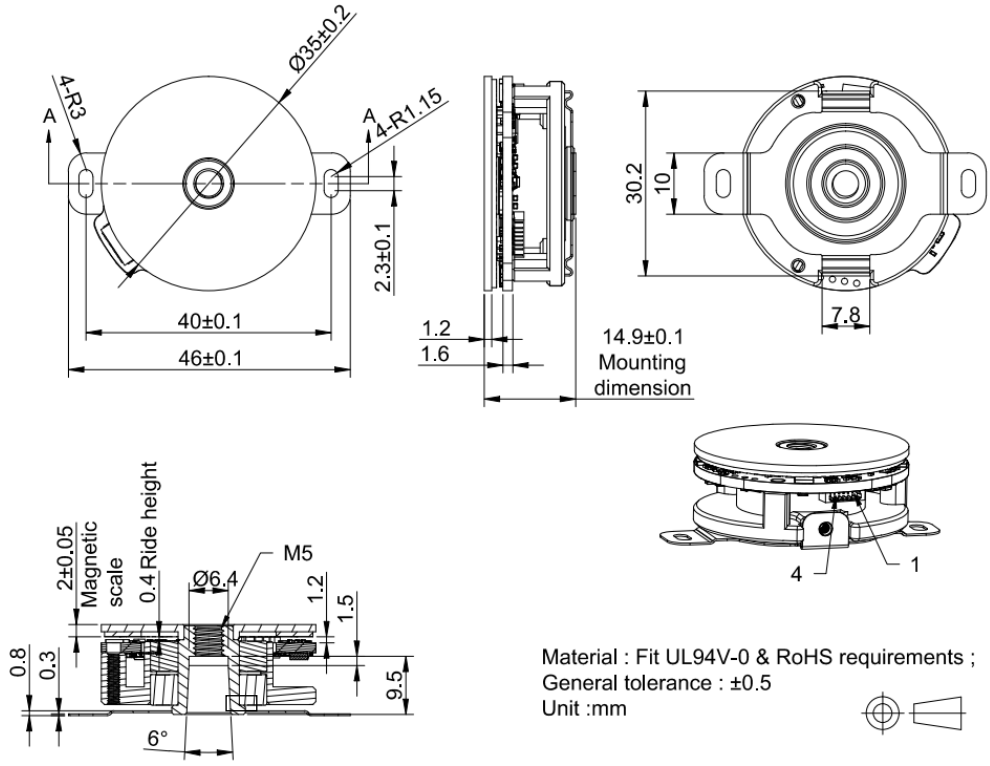


Fig. 4: Dimensions of PAM7943-ELB-EG.

RS485 interface

The following chapter describes how the RS485 interface is working and how it is possible to receive the position information of the sensor.

Communication parameters

Baud rate	2.5M
Byte length	8 bits
Even-odd check	Not have
Stop bit	1
Flow control	Not have
Request pass, letter mode	Passive and corresponding communication

Frame format

Request command	Control field					
Transmission data from encoder	1 Byte	2 Byte	3 Byte	4 Byte	5 Byte	6 Byte
	Control field	Status field	Position data			CRC

Control field

Start bit	Sink code			Data ID code				ID parity	Delimiter
0	0	1	0	dc0	dc1	dc2	dc3	dc4	1

Status field

Start bit	Information				Encoder error		Communication error		Delimiter
0	sd0	sd1	sd2	sd3	er0	er1	cl0	cl1	1

Status bits

Bit number	Detailed status
bit12	flash_crc_error
bit13	magic_error
bit14	temp_alarm
bit15	chip_fflt
bit16	prbs_error

RS485 interface

Position data

Data ID	D0	D1	D2	D3	D4	D5	D6	D7
0x02	AS0	AS1	AS2					

CRC verification code[1)]

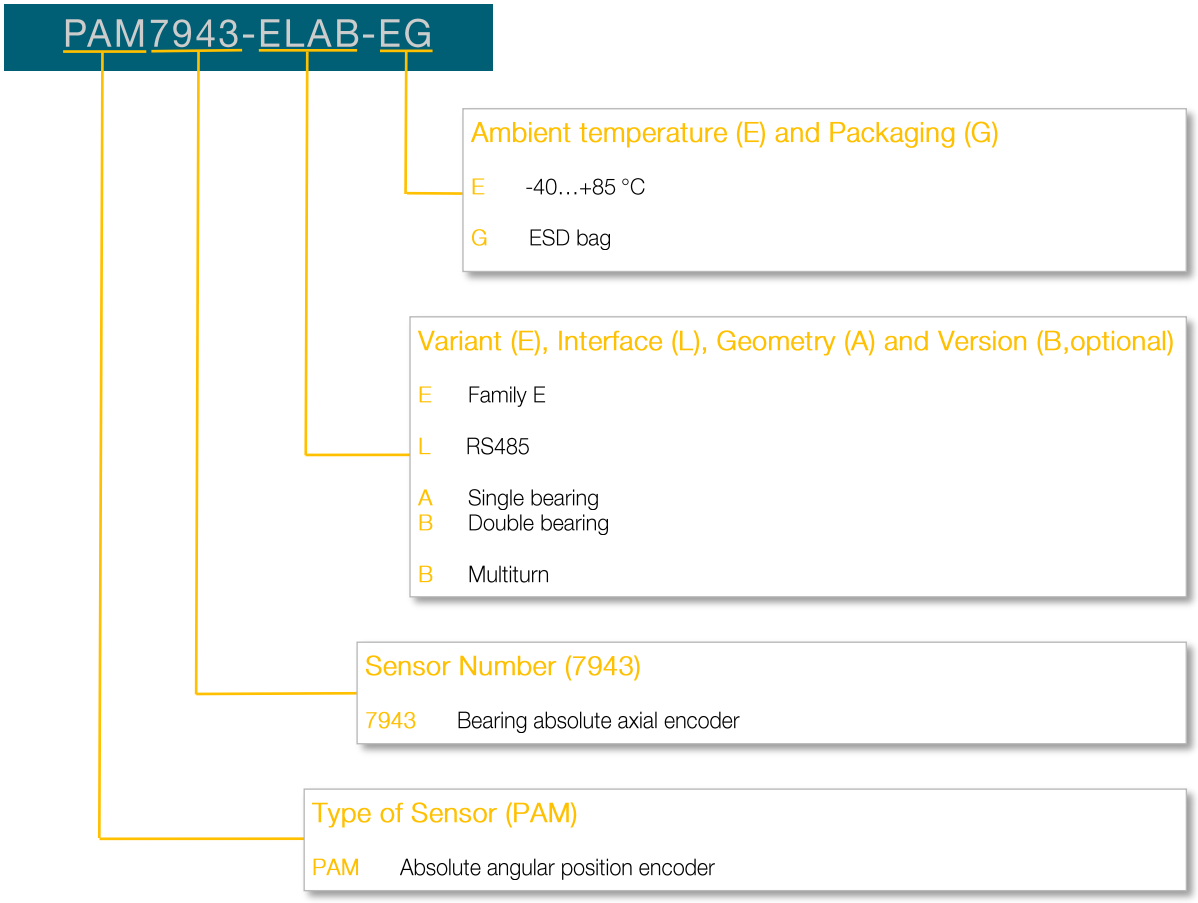
Start bit	CRC (LSB first)								Delimiter
0	cr0	cr1	cr2	cr3	cr4	cr5	cr6	cr7	1

1) CRC check code: G(x)=X8+1, (X=cr0-cr7)

Data ID

Command	Data ID	Data ID code				ID parity
Readout of data	0x02	0	0	0	0	0
	0x8A	1	0	0	0	1
	0x92	0	1	0	0	1
	0x1A	1	1	0	0	0
Writing to EEPROM	0x32	0	1	1	0	0
Readout of EEPROM	0xEA	1	0	1	1	1
Reset	0xC2	0	0	0	1	1
	0x62	0	0	1	1	0

Additional Information on Ordering Code



General Information

Product Status

Article	Status
PAM7943-ELA-EG	The product is under development.
PAM7943-ELB-EG	The product is under development.
PAM7943-ELBB-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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Changelist

Version	Description of the Change	Date
PAM7943E.DSE.00	Original (pp. 1-9)	04/2025

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