DATA SHEET

PAM7943D

Axial 360 degree absolute Encoder

The axial encoder system PAM7943 consists of a 360 degree absolute encoder and a two-track axial magnetic disc which are assembled in a packaged, which can be mounted directly.
This system offers a true-power-on position measurement system with an resolution up to 24 bit for single turn.

Due to it's axial magnetic disc and the compact, very flat sensor module the system is ideally suited for use in robot joints or flat motors.

With the proven MR-sensor technology and integrated correction algorithms the PAM is a very robust and reliable solution with a high accuracy and repeatability.

Features

- Singleturn absolute
- Up to 24 bit resolution
- Calibration algorithms
- True-power-on
- Wide temperature range from –40°C up to +85°C
- SPI 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-DSA-EG	Axial 360 degree absolute encoder, SPI

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	-	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_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	-	+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		-	49.0	-	mm
D_{in}	Inner diameter of the module		-	11.0	-	mm
H	Height of the module		-	20.05	-	mm

[1)] more details in Fig. 2

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	-	arcsec
Rep	Repeatability		-	±7.0	-	arcsec
Res	Resolution		-	24	-	bit
Speed	Maximum speed[4)]		-	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	GND	Ground
2	SS	Slave select
3	SCLK	Serial clock
4	MOSI	Master output
5	MISO	Master input
6	V_{CC}	Supply Voltage

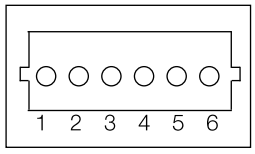


Fig. 1: Pinout of the PAM7943-DSA-EG connector

Dimensions

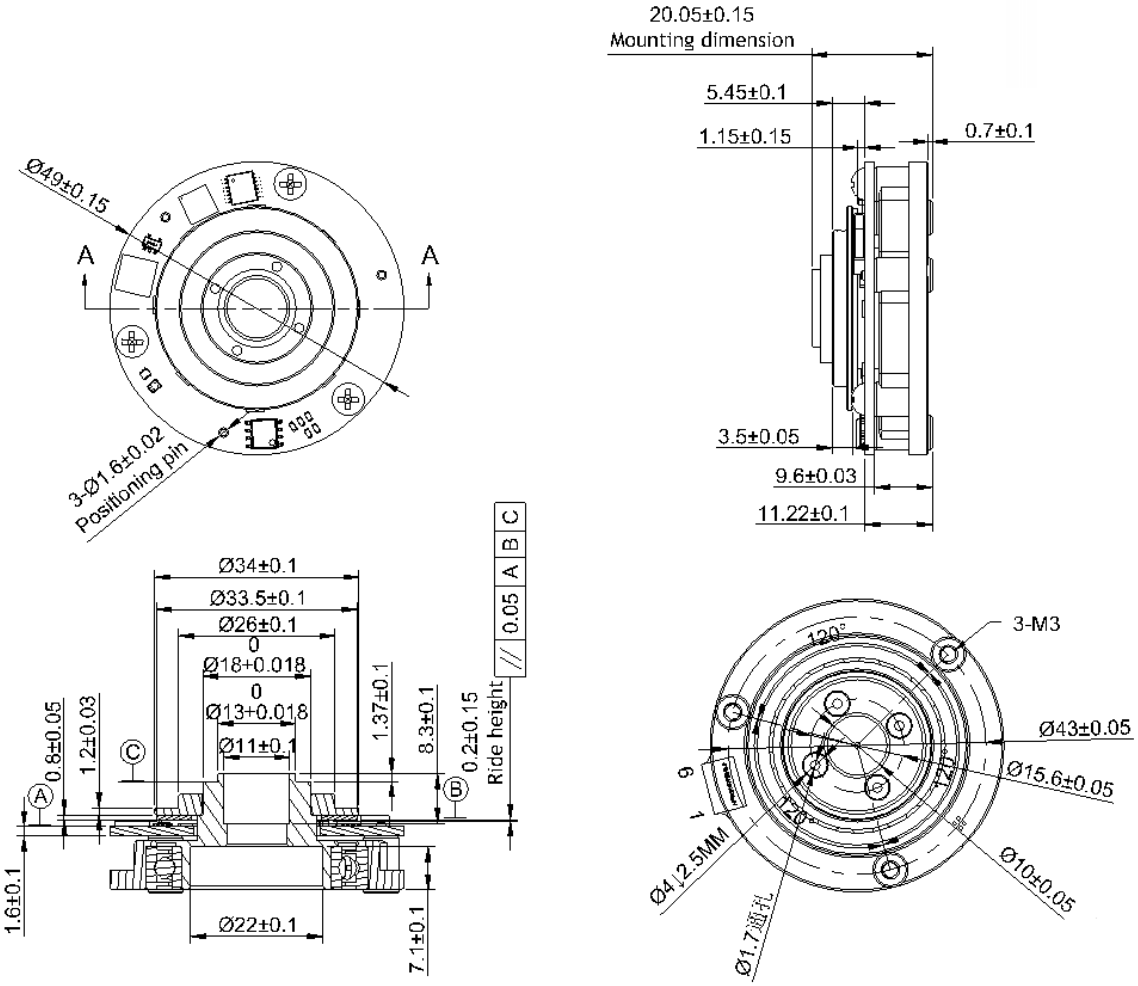


Fig. 2: Dimensions of PAM7943-DSA-EG.

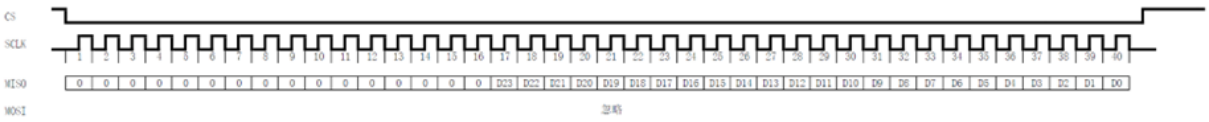
SPI interface

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

Communication parameters

Parameter	Symbol	Min	Max
Clock cycles	t_{cl}	400 ns	-
Clock frequency	F_{cl}	-	2.5 MHz

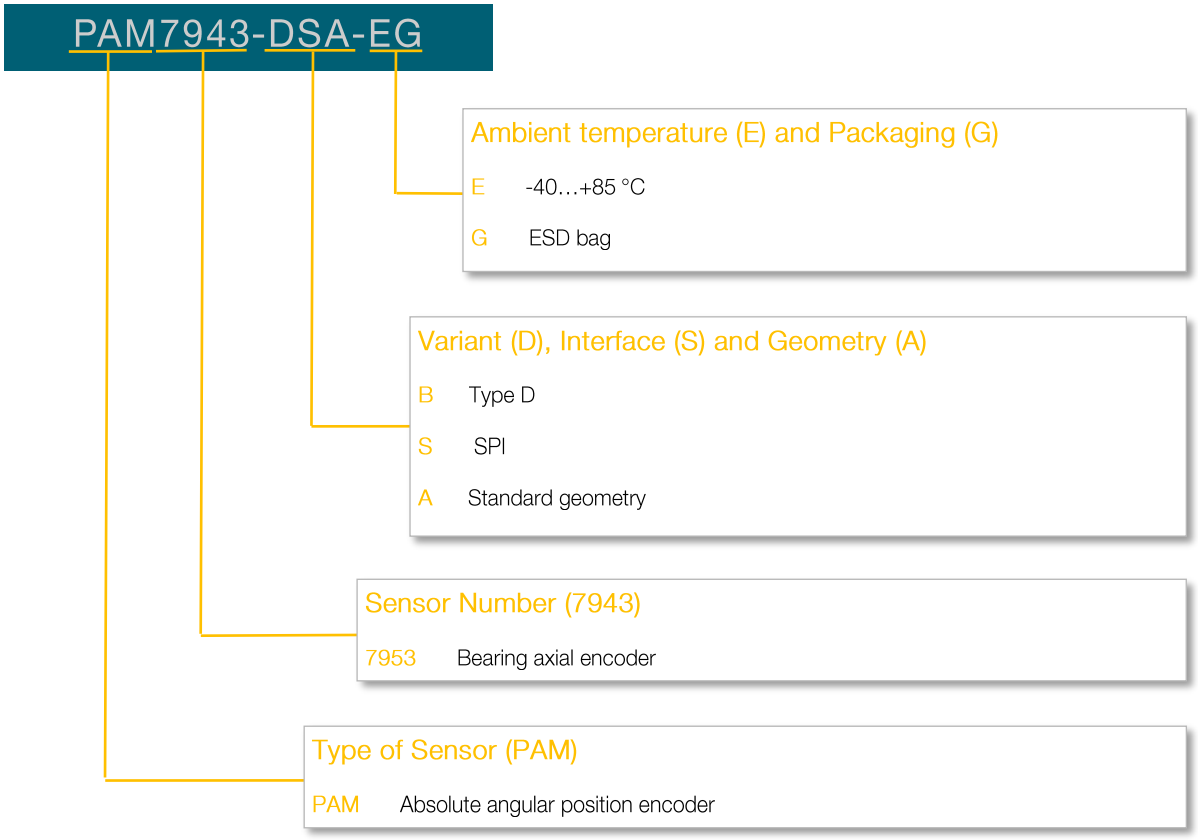
SPI timing diagramm



Using SPI MODE0 communication mode, the upper computer sends 48 SCLK

- BIT1~BIT8: Obligate
- BIT9~BIT16: Encoder status bits
  - BIT9: Obligate
  - BIT10: Obligate
  - BIT11: Obligate
  - BIT12:flash_crc_error
  - BIT13:magic_error
  - BIT14:temp_alarm
  - BIT15:chip_fflt
  - BIT16: prbs_error
- BIT17~BIT40: Encoder data bits
- BIT41~BIT48: CRC check bit, XOR value for the first 5 bytes

Additional Information on Ordering Code



General Information

Product Status

Article	Status
PAM7943-DSA-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.

Disclaimer

General Information

Application Information

Applications that are described herein for any of these products are for illustrative purposes only.Sensitec GmbH makes no representation or warranty – whether expressed or implied – that such applications will be suitable for the specified use without further testing or modification. Customers are responsible for the design and operation of their applications and products using Sensitec products, and Sensitec GmbH accepts no liability for any assistance with applications or customer product design. It is customer's sole responsibility to determine whether the Sensitec product is suitable and fit for the customer's applications and products planned, as well as for the planned application and use of customer's third party customer(s). Customers should provide appropriate design and operating safeguards to minimize the risks associated with their applications and products. Sensitec GmbH does not accept any liability related to any default, damage, costs or problem which is based on any weakness or default in the customer's applications or products, or the application or use by customer's third party customer(s). Customer is responsible for doing all necessary testing for the customer's applications and products using Sensitec products in order to avoid a default of the applications and the products or of the application or use by customer's third party customer(s). Sensitec does not accept any liability in this respect.

Life Critical Applications

These products are not qualified for use in life support appliances, aeronautical applications or devices or systems where malfunction of these products can reasonably be expected to result in personal injury.

Copyright © by Sensitec GmbH, Germany

Changelist

Version	Description of the Change	Date
PAM7943D.DSE.00	Original (pp. 1-7)	04/2025

Sensitec GmbH
Schanzenfeldstr. 2 • 35578 Wetzlar • Germany
Tel +49 (0) 6441 5291-0 • Fax +49 (0) 6441 5291-117
sensitec@sensitec.com • www.sensitec.com