ESSTMAGS Product Datasheet

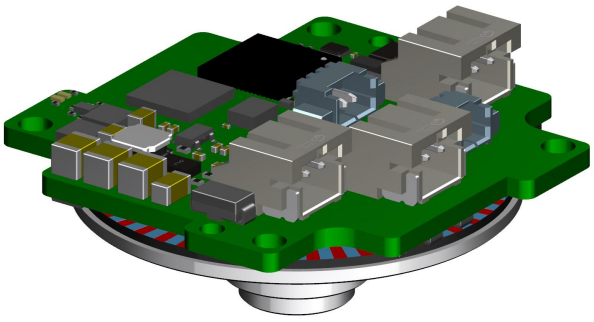
Magnetic rotary absolute position encoder

Product series: EAS-110

Product part number: EAS-110

Version: Ver1.0.5

Date: 2026-07-06



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1. Description

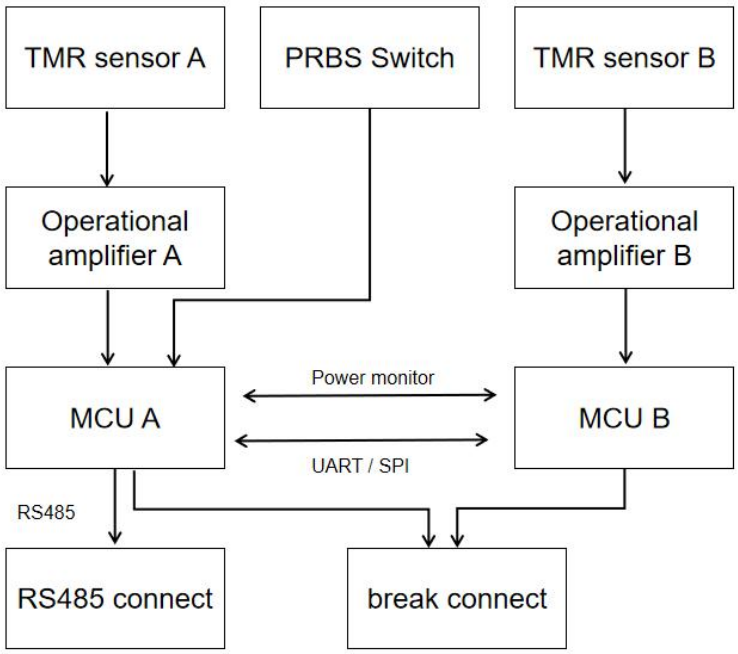
EAS series product is an absolute linear position detection magnetic encoder compliant with EAS 2 safety levels, specifically designed for industrial safety-related motion control systems. It enables high-precision detection of system position and speed, meeting the core requirements of functional safety applications.The sensor uses non-contact detection method based on TMR magnetic sensing technology. The magnetic scale has two magnetic tracks (incremental and absolute tracks).

The sensor has build-in signal processing circuit, and a digital output of RS485 format.

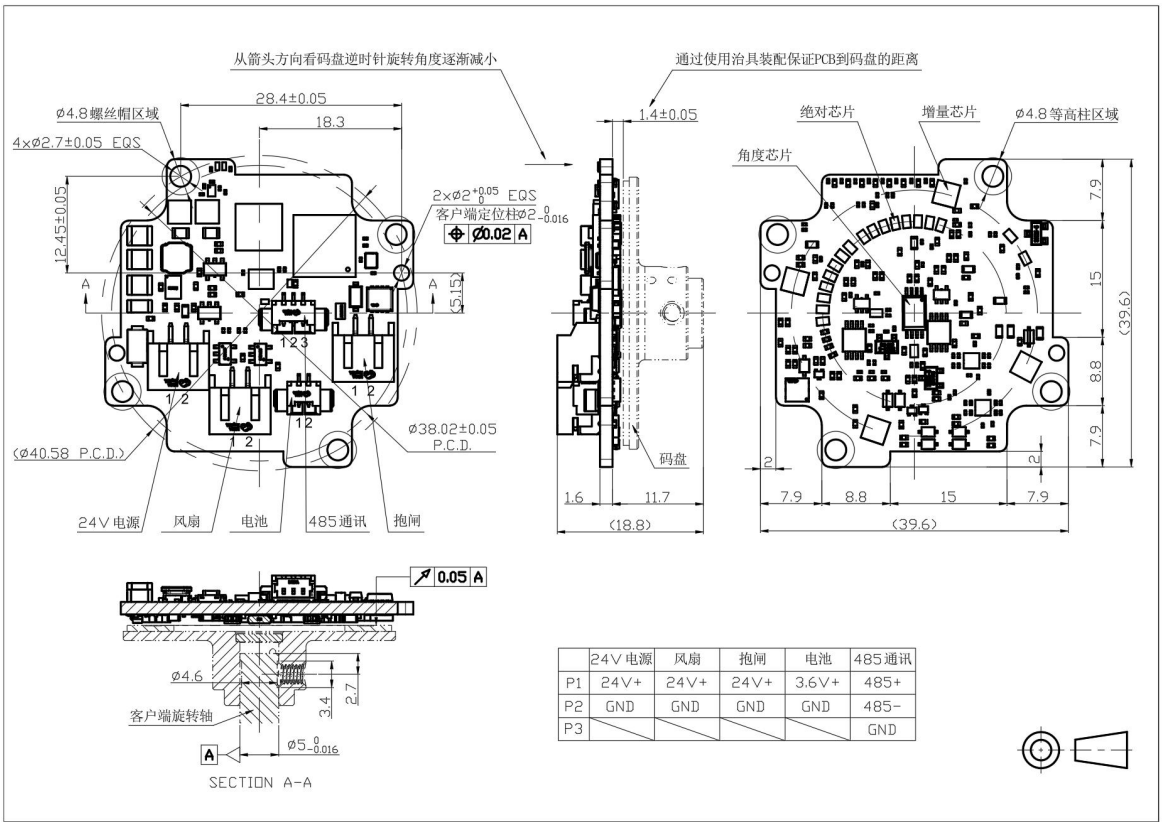
EAS series product has the following features:

- True absolute value system
- Absolute position dual track system
- Customized sensor chips
- The system is self-calibrating
- Single-turn resolution 20 bits, multi-turn resolution 16 bits
- The repeatability is 5 arc seconds
- Absolute positioning accuracy 10 arcseconds
- Communication mode is RS485

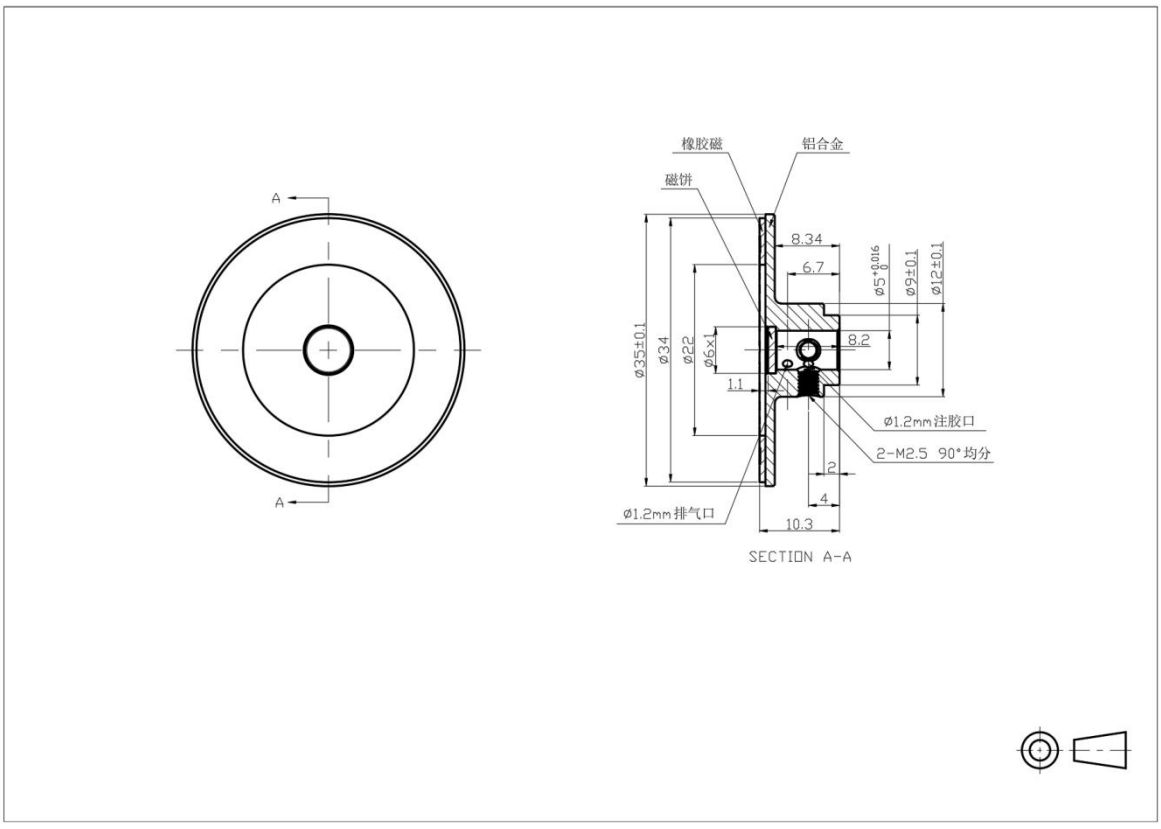
2. Product part number



3. EAS-110 Dimensions



	24V电源	风扇	抱闸	电池	485通讯
P1	24V+	24V+	24V+	3.6V+	485+
P2	GND	GND	GND	GND	485-
P3					GND



4. Electrical characteristic

4.1 EAS-110 Electrical connection

4.1.1 batter connect

Lead	NAME
1	BAT+
2	GND

4.1.2 24V connect

Lead	NAME
1	24V
2	GND

4.1.3 RS485 connect

Lead	NAME
1	A
2	B
3	GND

4.1.4 break connect

Lead	NAME
1	Break_2
2	Break_1

4.1.5 fan connect

Lead	NAME
1	24V
2	GND

4.2 General parameter

Operating and storage temperature	–40℃ to +105℃ (Note: The operating temperature of the diode on the encoder is -40℃ to +85℃)
Humanity	70%Rh
External magnetic field (thickness direction)	±100 mT
Shock (dependent on installation)	100 g
Vibration (dependent on installation)	80 g

4.3 Environmental parameter

Supply voltage	24V
Current	1A
Connector	2-pin + 2-pin + 2-pin + 2-pin + 3-pin
Start-up time	150 ms
ESD (HBM)	HBM, Class 2, ±2 kV

4.4 System parameter

Parameter	Unit	Min	Typ	Max	Comment
Resolution	bit		18		One lap
			16		Loopy
Maximum speed	RPM		10000		
Repeatability	arcsec		±5		Bidirectional 3 cycles
Absolute position error	arcsec		±30		
Input bandwidth	kHz			18	
Noise	°		±0.001		

5. RS485 protocol interface

5.1 Communication Interface Specification

The host computer communicates with the encoder through the RS485 interface by adopting a user-customized protocol frame.Communication parameters: baud rate 2.5 Mbps, 1 start bit, 8 data bits, 1 stop bit.The communication frame specification is described as follows:

(1) Downlink data frame sent by the host computer:

CF (Hex)Control Command	Function
4A	Brake & Data Reading Command
5A	Brake Release & Data Reading Command
6A	Open brake, feedback AB angle, turns, temperature
7A	Close brake, return AB angles, revolutions and temperature
C5	Command to set the angle difference between A and B to 90° Transmit when the encoder shaft is stationary
C2	After the host computer continuously sends 10 C2 commands, MCU A performs angle zero clearing, and MCU B sets the angle to 90 degrees This command shall be sent when the encoder shaft is stationary
62	Turn reset command; shall be sent when the encoder shaft is stationary

(2) The content of each byte in the corresponding uplink data frame responded by the encoder is as follows:

CF	SF	ABSA	ABSA	ABSA	ABM	ABM	ABSB	ABSB	CRC
0x4A	Status Feedback	Single-turn position of Encoder A, low byte first			Multi-turn position of Encoder A, low byte first		Multi-turn position of Encoder B, low byte first		Checksum X8+1
0x5A	Status Feedback	Single-turn position of Encoder A, low byte first			Multi-turn position of Encoder A, low byte first		Multi-turn position of Encoder B, low byte first		Checksum X8+1

Example of 5A:Host computer sends 5A,encoder replies 4A 02 B2 0A 43 07 FE FD 81 36

Example of 4A:Host computer sends 4A,encoder replies 4A 02 B2 0A 43 07 FE FD 81 36

Host send	Slave reply								
	Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
0x6A	0x6A	Alarm status	ABS0	ABS1	ABS2	ABM0	ABM1	B-ABS0	B-ABS1
0x7A	0x7A	Alarm status	ABS0	ABS1	ABS2	ABM0	ABM1	B-ABS0	B-ABS1
	Frame header	Alarm bit	Encoder A angle			Encoder A turns		Encoder B angle	

Host send	Slave reply	
	Byte9	Byte10
0x6A	Temperature	crc
0x7A	Temperature	crc
	Detected temperature value of A	crc

5.2 Definition Table of SF Status and Alarm Feedback Bytes

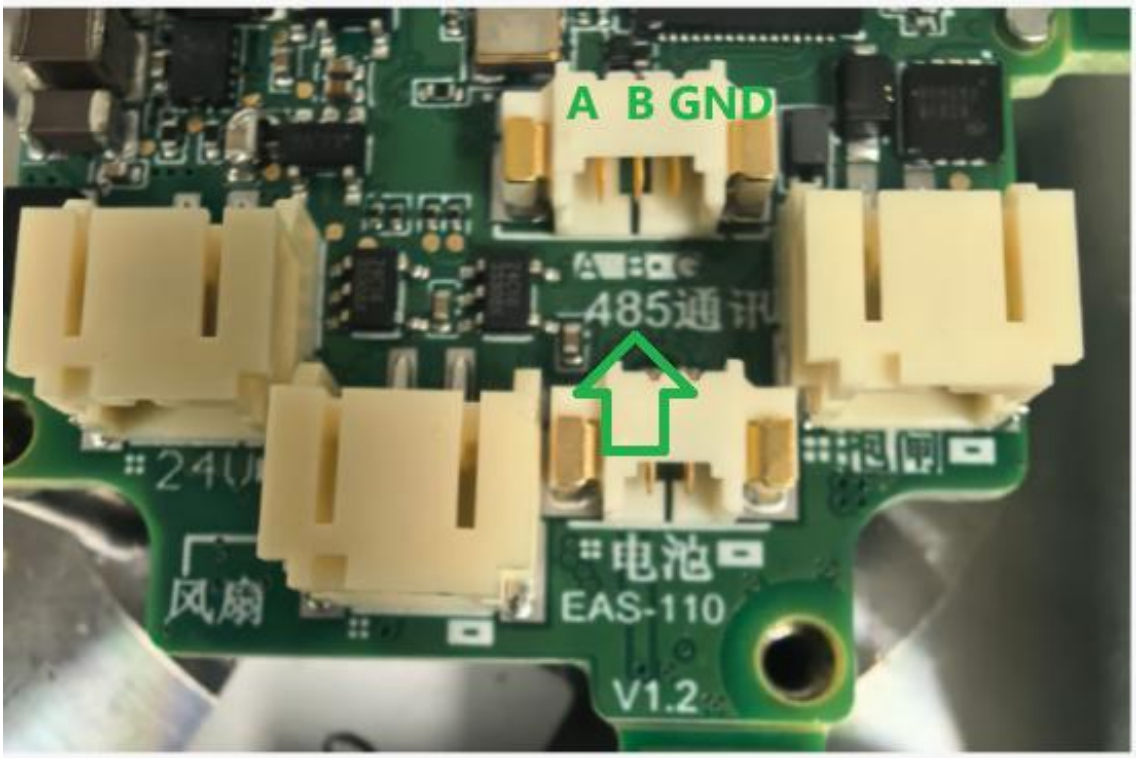
Bit	D0	D1	D2	D3
SF Byte Function	Reserved	Brake Detection Status	Power Supply Detection	Phase difference detection of 90° between A and B
	Reserved	1 = Brake engaged 0 = Brake released	1 = Power abnormal (<3.0V) 0 = Power normal	1 = Phase difference abnormal (phase difference greater than 95° or less than 85°) 0 = 90° phase difference normal
Bit	D4	D5	D6	D7
SF Byte Function	Temperature Detection	Reserved	Battery Low Voltage Fault Detection	Battery Low Voltage Alarm Detection
	1 = Temperature abnormality alarm 0 = Temperature	Reserved	1 = Battery voltage is lower than the minimum protection value	1 = Low battery voltage alarm (<=3.1V) 0 = No low battery

	normal		(<=2.75V), battery must be replaced 0 = No battery voltage error	voltage alarm

5.3 Operation Description of A/B 90° Phase Difference Detection

Name	Function Description
A/B 90° Phase Difference Detection	When either of the two A/B MCUs detects that the angular phase difference exceeds the threshold, a logic "1" is output, the phase difference abnormality alarm is triggered, and the encoder actively engages the brake. When both MCUs detect that the angular phase difference is less than or equal to the threshold, a logic "0" is output. After the brake is engaged, the brake can only be released when the upper computer sends the brake release command 0x5A and there is no phase difference alarm.

5.4 Encoder board communication interface



Communication interface A, B and GND are shown in the figure .