

# Assun Motor

## Product Manual



For Electromagnetic Encoder

of

AM-EN1611-S103 Series

1<sup>st</sup> edition. October, 2019.

All Rights Reserved

Assun Motor Inc.

Assun Motor Pte Ltd

# Contents

Assun Motor.....	1
Product Manual.....	1
1. About the Manual.....	3
1.1 Validity of This Document .....	3
1.2 Using This Document.....	3
1.3 Definition of Terms .....	4
1.4 Definition of Symbols.....	4
2. Product Safety.....	5
2.1 Intended Product Usage .....	5
2.2 Product Usage Safety .....	5
2.3 Product Disposal/Recycling .....	7
3. Product Series Information.....	8
3.1 Product Series Structure Introduction.....	8
3.2 Product Model Information .....	9
3.3 General Technical Information .....	10
4. Product Function and Usage .....	10
4.1 Installation and Power Connection .....	10
4.2 Resolution Description .....	10
4.3 Three Phase Output Signal Description .....	11
5. Maintenance.....	12
Appendix .....	12
Appendix 1. Series Product Parameters .....	12
Appendix 2. Specified Product Drawing and Parameters .....	12
Contact.....	13
Singapore.....	13
China.....	13

# 1. About the Manual

## 1.1 Validity of This Document

The product manual document here is used for AM-EN1611-S103 series product by Assun Motor which is electromagnetic encoder. The manual has made detailed description to the safety and functional usage of this encoder product series. It helps the professional user to install and connect the encoder, and also guide the user in relevant function usage.

All data in this manual are based on the actual manufacturing and standard testing condition of AM-EN1611-S103 series product. Standard testing condition is environment temperature at 25°C and relative humidity at 30%-60%.

For relevant parameter summaries of the product series, please refer to Appendix 1 “Product Series Parameters”; For specified standard model or customized model, please refer to Appendix 2 “Detailed Product Drawing and Parameter”.

## 1.2 Using This Document

Please read this document carefully before install and set-up the product. Please pay extra attention to the second chapter “Product Safety”, and strictly follow the warnings and instructions.

Please retain this document throughout the entire working life of the product, and keep the document accessible to the operating and, if necessary, maintenance personnel at all times.

Pass a copy of this document on to any subsequent owner or user of the product.

### 1.3 Definition of Terms

Term	Meaning
PRR	Pulse Per Revolution
CW/CCW	Clockwise/Counter Clockwise
Channel	Signal Output Channels
VIL/VIH	Voltage Input Low / Voltage Input High
Pin	Control Function Connect Pin
Cable	Power Connection Cable
GND	Ground / Negative Pole
Vcc	Direct Current Voltage
RPM	Revolution per Minute

### 1.4 Definition of Symbols



Caution! Hazard to persons. Disregard may lead to injury.



Warning! Improper operation will cause product damage.



Caution! Hazardous due to hot surface. Disregard may lead to burns.

## 2. Product Safety

### 2.1 Intended Product Usage

The Assun Motor AM-EN1611-S103 series electromagnetic encoder are suitable for position signal output under rated DC power supply, it suitable for various DC drive and precision motion control systems. Product have signal cable in default condition, output signals are differentiate.

The product must be properly installed when in use, and shall be operated in an environment with good heat dissipation conditions. In normal installation condition, encoders connect to the end of motor or brake to become the last part of drive system. When motor or brake that connects to the encoder are in normal temperature, the encoder could work properly.

The product is not suitable for operation in environments with high humid or excessive dust. During the operation, please follow the parameter limits in the appendices to adjust the power supply and running state, so as to achieve the optimum signal output and longest product lifetime.

For usage of product in special environment, please contact our local sales or service staff for consultancy and get the relevant advice or customized service.

This product is NOT SUITABLE for applications where the failure of the product could result in the death of an individual or group of individuals.

### 2.2 Product Usage Safety



The product is a content of high-speed rotating shafts. Please make sure the product is properly mounted before commencement of operation to prevent potential hazards to people or equipment. Please refer to Chapter 4.1 of this manual for further installation guidance.



Product surface could be hot after long term touch of operating motor or brake. Please exercise caution when touching or handling the product.



Power supply must be filtered DC and the input voltage must be at rated value for normal operation. Cable connection must be strictly according to guidance for product normal operation. Wrong connections could damage the product. Detailed connection guidance please refer to chapter 4.1.



Please install the encoder in an environment with good heat sinking and/or ventilation. Inadequate heat dissipation will lead to the product overheat and will cause thermal damage to the internal electronic parts, resulting in malfunction and/or failure.



Please use the encoder according to the rated parameter in the appendix, otherwise it may cause the internal electronics damage, which could lead to irreversible damage to the motor.



The motor is not suitable for operating in high humid and dusty environments. High humidity or excessive dust concentration could lower the encoder accuracy and shorten the encoder lifetime.



The product is a precision high PPR encoder with high accuracy assembly requirements. Please do not personally disassemble the product.

## **2.3 Product Disposal/Recycling**

This series of motor products is manufactured with multiple types of metals, alloy materials, chemical adhesives and lubricants. Please dispose it properly as recyclable material. For a detailed product material listing please refer to Chapter 3.1.

## 3. Product Series Information

### 3.1 Product Series Structure Introduction

AM-EN1611-S103 series products is a series of high resolution electromagnetic encoder. Case diameter is  $\phi 16\text{mm}$ , case thickness is 10.7mm, rated voltage is 5V. For detailed series information and parameters please refer to Appendix 1.

The series product is electromagnetic three channel incremental encoder. When the motor shaft rotates, it brings the magnetic disc to rotate together, causing the magnetic field strength change. Magneto resistive sensor integrated PCB board will sense the change and transfer the change to electric signal output.

. The product's basic structure is depicted in illustration 1.

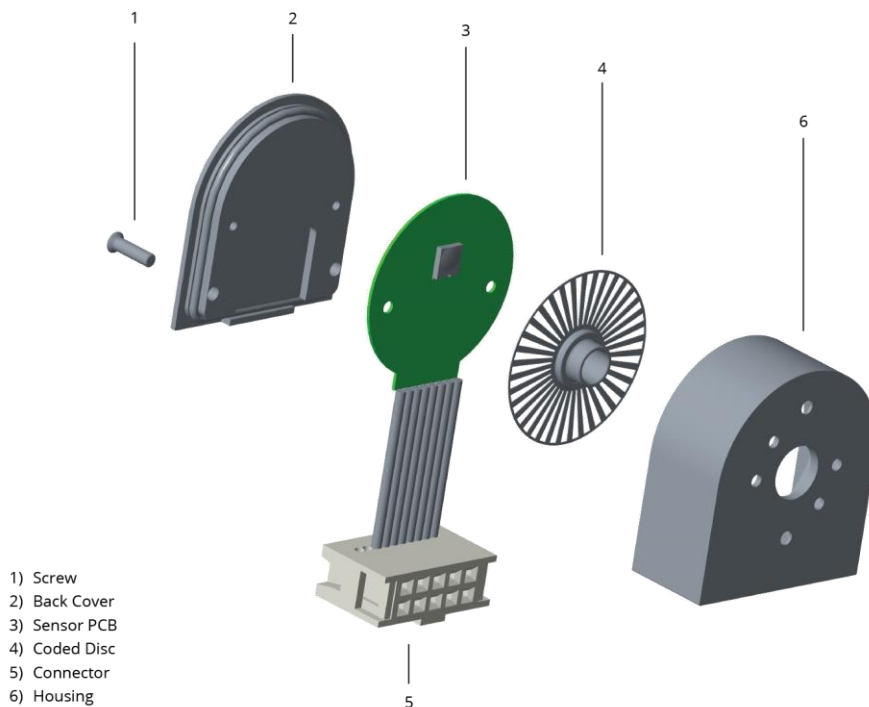


Illustration 1. Exploded Product View



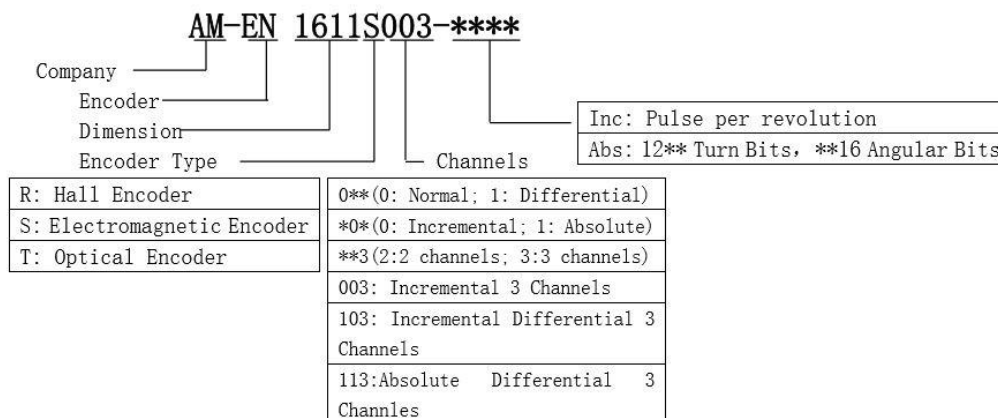
This series of product are manufactured using materials using multi-types of metal, alloy material and chemical products. Specific material usage as shown in Table 1.

**Table 1. Product Material Matrix**

Part	Case	Connector	Magneto resistive sensor	Disc	Welding Material	Cable Core
Material	Plastic	Plastic	Magneto resistive material	Magneto material	Tin	Copper
Part	PCB Board	PCB Circuit	Adhesive	Grease	Screw	Cable Insulation
Material	Glass Fiber	Copper	Epoxy Resin	Fluorine Grease	Stainless Steel	Teflon

### 3.2 Product Model Information

To make it convenient for the customer to choose a specific part number or model and understand the part number methodology, please refer below in Illustration 2 the explanation for model number composition principle.



**Illustration 2. Part Number Nomenclature**

Customers can choose suitable products based on their types and characteristics shown in the part number methodology. If products with special characteristics are required, please contact our regional sales person for customized service.

### 3.3 General Technical Information

Table 2. Product Series General Technical Information


Power	Signal Output	Ambient Temperature	Max. Inertia	Output Current (per channel)
5V±5%	V <sub>cc</sub> =5.0V, TTL Compatible	-25°C~80°C	0.015g·cm <sup>2</sup>	1.5mA(max)

## 4. Product Function and Usage

The series of product have eight connection pins. Including phase A, B, C positive and differential signals, and encoder power positive & ground.

### 4.1 Installation and Power Connection

Encoder must be properly and securely mounted, typically utilizing the treaded holes in the motor end cover to connect with the motor, in special cases could also use adhesive for connection. It will be recommended that encoder installed by manufacturer. If customer need to install by themselves, then please be cautious and better contact manufacturer for guidance. Meanwhile the encoder shall be installed in the good ventilated environments for good thermal dissipation.

 **Connection of encoder to controller shall be strictly according to pin functions. Wrong connection could lead to abnormal of encoder or even damage the encoder electronics.**

### 4.2 Resolution Description

Resolution of the encoder series, also PPR specs, is the number of pules generated when encoder disc rotate for one revolution. There are 32, 64, 128, 256, 512 and 1024 PPRs. Relative Max. working frequency is 20, 40, 100, 180, 360 and 512 KHz.

The standard product is with differential signal output. Differential signal output model could be used to achieve better system reliability.

## 4.3 Three Phase Output Signal Description

In the output signal, phase A and phase B is the rotating position signal, phase B signal is a quarter cycle later than phase A signal, so these two phase signals could be used to determine the rotating direction. Phase Z output signal is only a quarter cycle, used to define the origin point.

In actual application, if only A and B phase are needed, then just abandon phase Z.

## **5. Maintenance**

The product series is maintenance free, please do not disassemble in person. There are no repairable components inside the motor. Regarding any quality issue or maintenance needs, please contact our regional service person for relevant technical support.

Ignoring this warning will void the warranty.

## **Appendix**

### **Appendix 1. Series Product Parameters**

### **Appendix 2. Specified Product Drawing and Parameters**

## Contact

### Singapore

Tel: +65 6532-5243

Email: [info@assunmotor.com](mailto:info@assunmotor.com)

Add: #06-05, 1092 Lower Delta Road. Singapore 169203.

### China

Tel: +86 755-8368-8818

Email: [info\\_cn@assunmotor.com](mailto:info_cn@assunmotor.com)

Add: 7<sup>th</sup> Floor, Blk 6, Yongping Industrial Area, 9 Tongfu Road. Shenzhen, P.R.China.

### USA

Tel: +1-833-277-8688

Email: [info\\_us@assunmotor.com](mailto:info_us@assunmotor.com)

Add: Suit F208, 6370 Lusk Boulevard San Diego, CA 92121-2760 USA