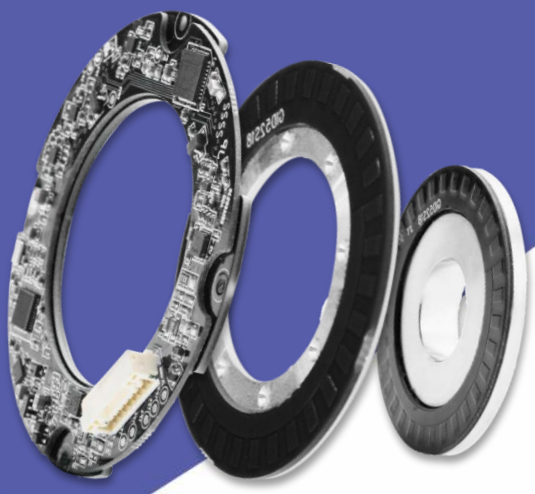
锐鹰传感
REAGLE SENSING

Hollow-shaft multiturn absolute rotary encoder
KIN60-M16S23ST00-SEC0V5
KIN60-M16S23BS20-SEC0V5
KIN60-M16S19SI00-SEC0V5
SPECIFICATION



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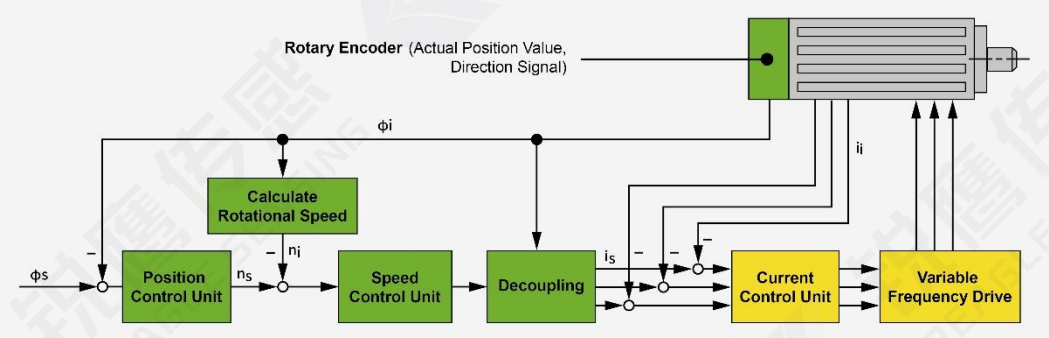
ZHEJIANG REAGLE SENSING TECHNOLOGY INCORPORATED

Contents

1. Summary Info

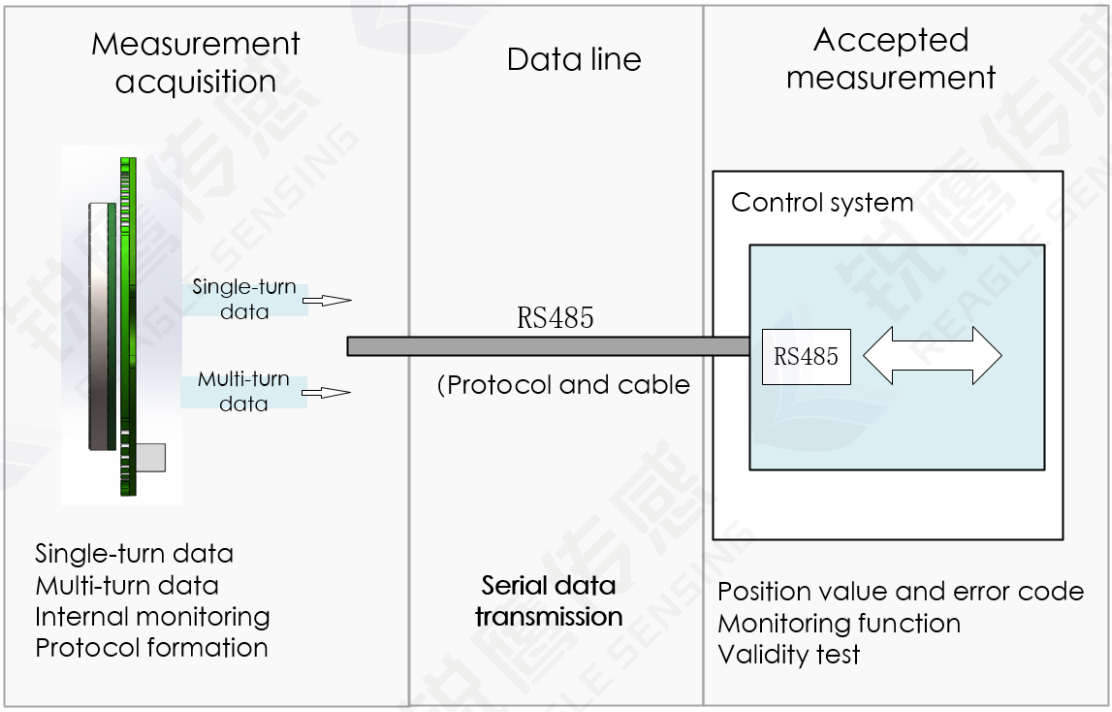
This manual primarily describes how to use the hollow inductor series KIN60 Multiturn encoder from Reagle Sensing. This product is mainly used in servo drive control systems, providing the feedback necessary for accurate position and speed control units.



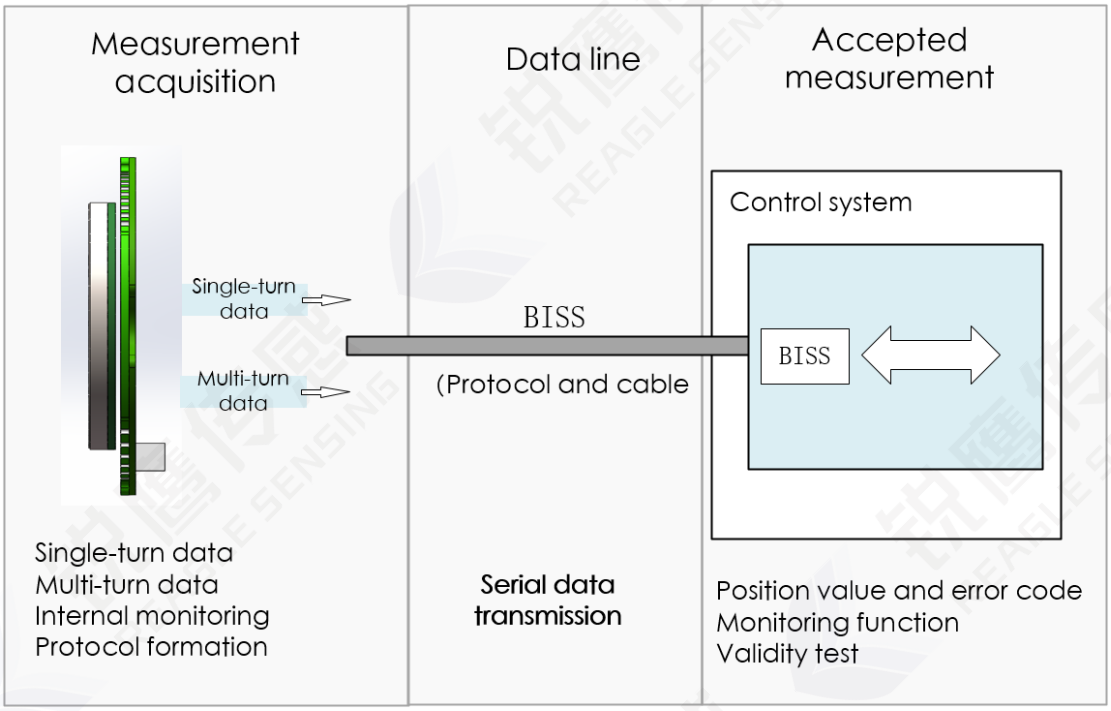
Position and velocity control system

The performance of the encoder has a decisive impact on the essential characteristics of the motor, such as:

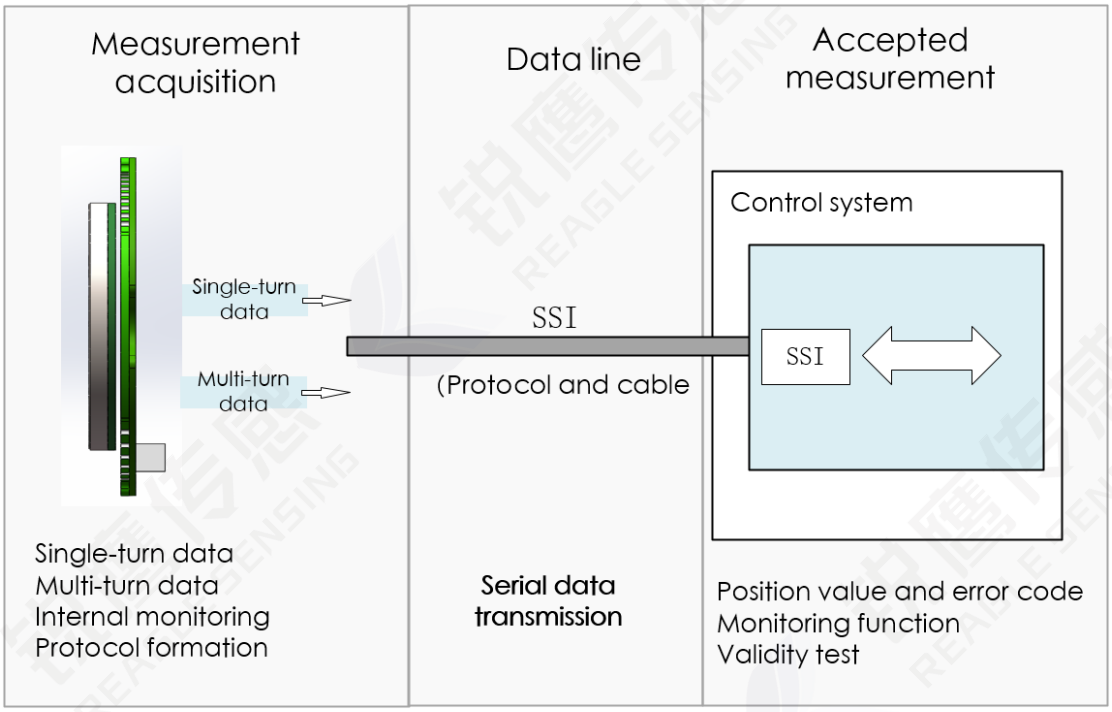
- Positioning accuracy
- Speed stability
- Bandwidth, determining the response speed to drive command signals and resistance to interference
- Motor size
- Noise



Equipped with RS485 communication encoder



Equipped with BISS communication encoder



Equipped with SSI communication encoder

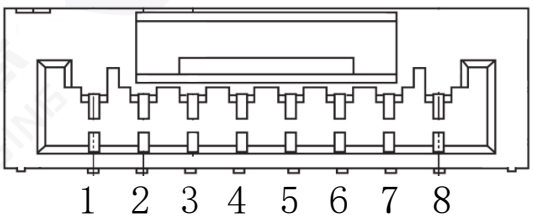
2．Technical Specifications

Product model	Stator Model: KIN60-M16S23ST00-SEC0V5 KIN60-M16S23BS20-SEC0V5 KIN60-M16S19SI00-SEC0V5 Rotor Model: KIN60-28MA KIN60-34MR	
Resolution	Supports up to 8388608 (23bit), compatible with 17bit	
Turns	65536（16bit）	
Auxiliary Functions	Fault Warning * Electromagnetic Environment Warning	
Communication Interface	RS485，BISS，SSI	
Communication frequency	⩽16K	
Baud rate	RS485：2.5Mbps； BISS：Max 10Mbps； SSI：2.5Mbps；	
Input shaft allowable deviation	Axial：±0.2mm Radial：±0.1mm	Axial Play:＜±0.03mm
Main shaft speed	⩽6000rpm	
Moment of inertia	≈0.08kg·mm^2	
Weight	≈0.10kg (excluding cables)	
Rotor angular acceleration	⩽80000rad/s^2	
Vibration	The amplitude is 1.5mm between 10 ~ 55Hz; Acceleration of 98m/s² between 55~2000 Hz; 2 hours per axial (XYZ)	
Shock	Impact acceleration 980m/s^2 ，11ms； 3 times per direction, total 18 times	
Operating Temperature	-40℃~85℃	
Humidity	≤90%(40℃/21d, based on EN60068-2-78); No Condensing	
IP Rating	—（Motor Rear Case Protection）	

3. Electrical Parameters

Items		T=25°C		
		Min.	Typ.	Max.
Main power supply voltage		4.75 V	5V	5.25V
Main power supply current (Typ)		--	150mA	--
Battery Voltage		--	3.6V	--
Battery-powered current consumption (motor idle)		--	35uA	--
Battery Warning Voltage		--	3.1V	--
Mode Switching Voltage	Main Power to Low Power Mode Switching	--	4.2V	--
	Low Power to Main Power Mode Switching	--	4.3V	--
Differential Level	High	3.5V	--	--
	Low	--	--	1.7V
Edge change time		--	--	100ns
Insulation resistance		50MΩ	--	--

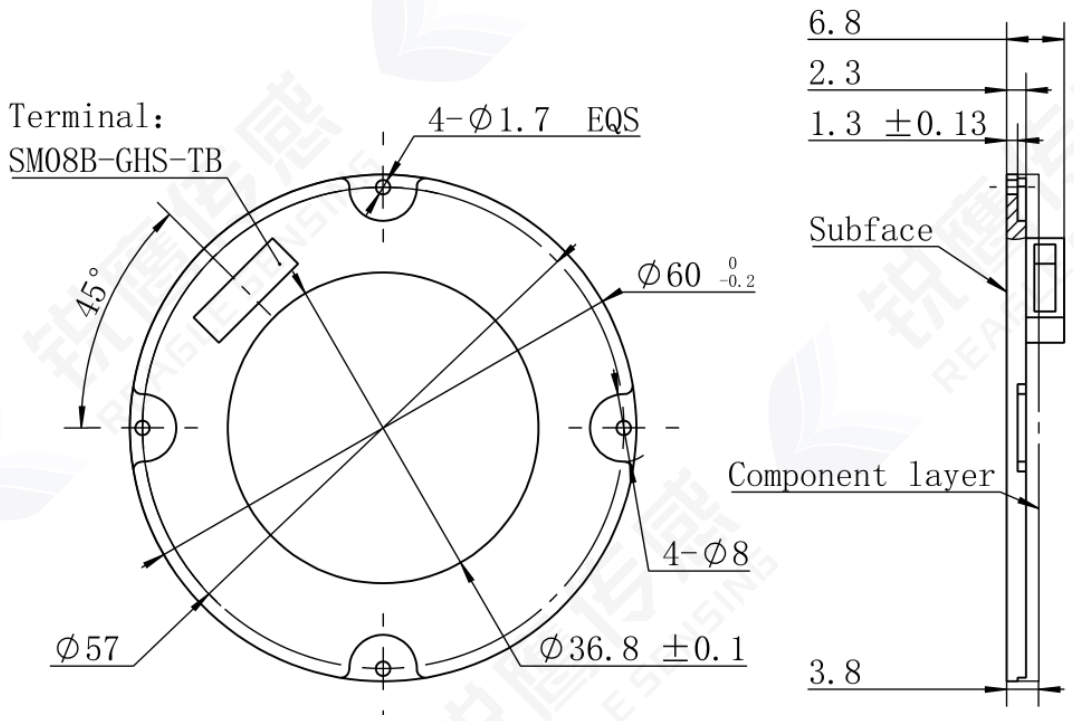
4. Cable Definition



Terminal Numbering	1	2	3	4	5	6	7	8
RS485 Definition	NC	NC	485+	485-	Battery +	Battery GND	5V	GND
BISS Definition	DATA+	DATA-	CLK+	CLK-	Battery +	Battery GND	5V	GND
SSI Definition	DATA+	DATA-	CLK+	CLK-	Battery +	Battery GND	5V	GND

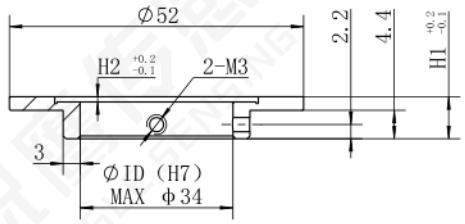
5. Mechanical Specifications

✧ Stator Structure Dimension Diagram

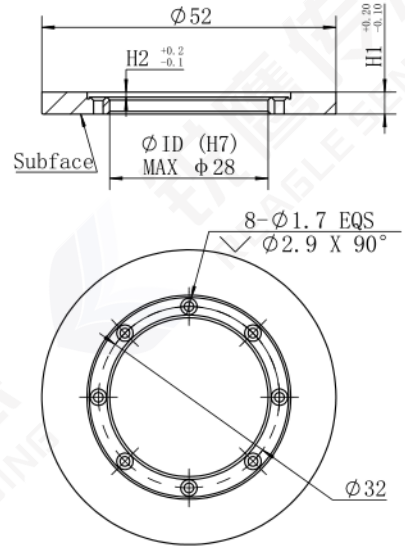


✧ Rotor Structure Dimension Diagram

Radial rotor



Axial rotor

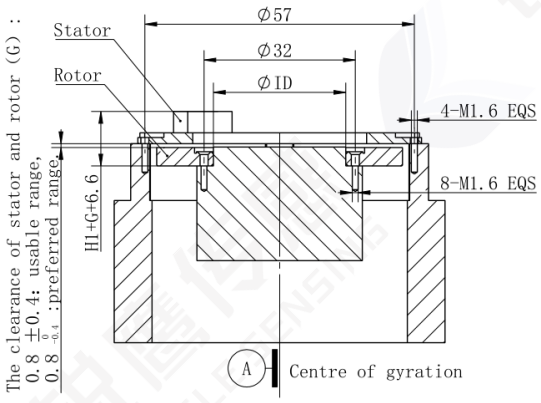


Type	ID (mm)	H1 (mm)	H2 (mm)	Fixed direction
KIN60-28MA	28	3.9	0.9	Axial
KIN60-34MR	34	8.4	0.9	Radial

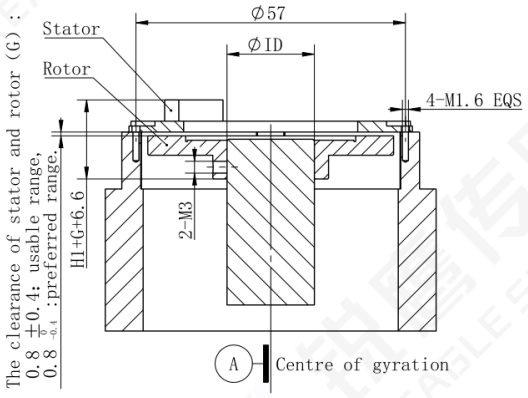
✧ Stator-Rotor Installation Position Requirements

The relative position of stator and rotor:

Axial mount:

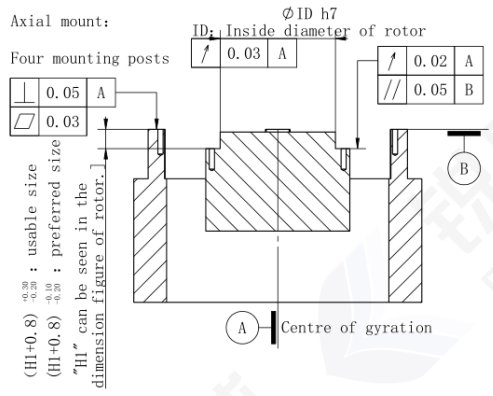


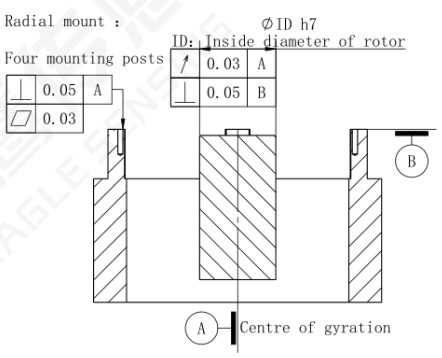
Radial mount:

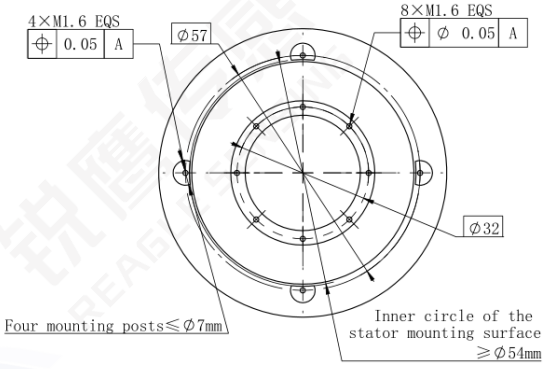


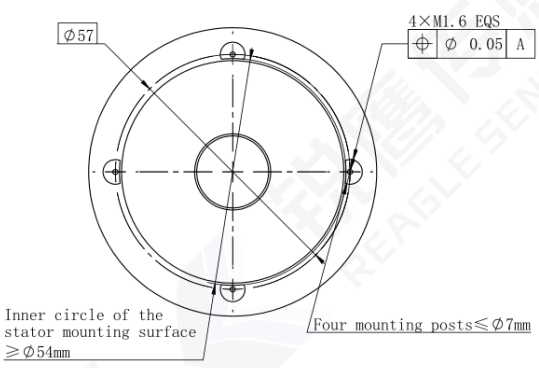
["H1" can be seen in the dimension figure of rotor.]

✧ Recommended Installation Platform



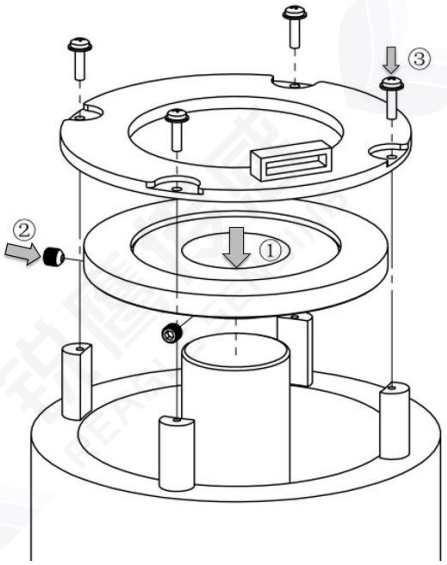




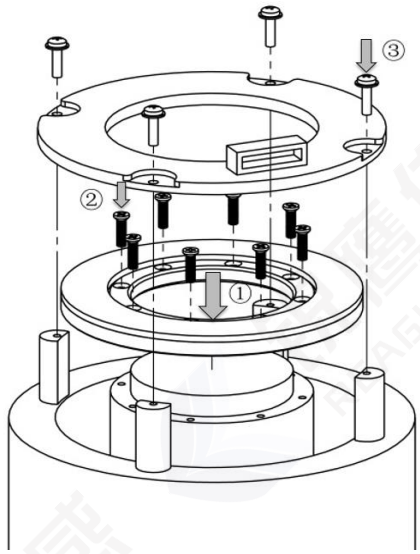


6．Mounting Procedure

6.1 Installation Diagram



Radial rotor complete assembly schematic diagram

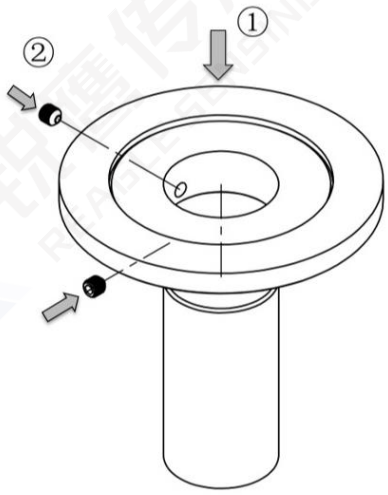


Axial rotor complete assembly schematic diagram

6.2 Installation Accessories

- Phillips Torque Screwdriver
- Metric 1.5mm Hex Allen Torque Wrench
- 8-M1.6×6 Phillips Countersunk Screw
- 4-M1.6×5 Phillips Pan Head Screw + Flat Washer Set
- 3-M3×3 Hex Socket Set Screw with Cup Point

6.3 Installation Sequence



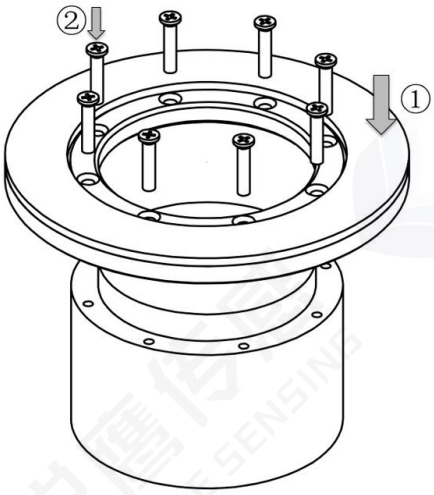
Radial Rotor Installation:

a. Fit the encoder rotor over the motor shaft to the appropriate position.

b. Use the metric 1.5mm hex Allen torque wrench to sequentially screw in two M3×3 hex socket set screws with cup points.

[Note]:

1) If adjustment of rotor height is needed, the locking action should be done after adjustment.
2) To prevent the screws from loosening, you can apply threadlocker to the screw holes beforehand, or use screws pre-coated with threadlocker. Recommended screw locking torque is 7±0.2 kgf·cm.



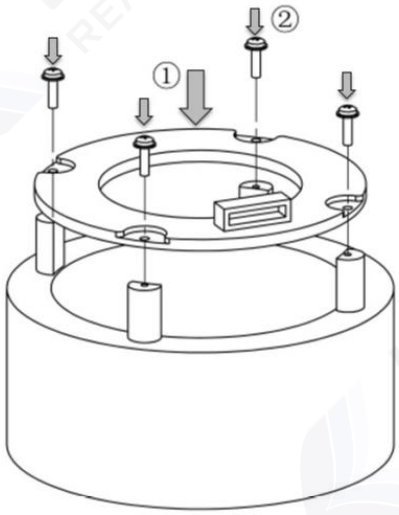
Axial Rotor Installation:

a. Fit the encoder rotor over the motor shaft until it flushes with the end face and align the eight screw holes.

b. Use the Phillips torque screwdriver to sequentially screw in eight screws (M1.6×6 Phillips countersunk screws).

[Note]:

1) After screwing in the eight countersunk screws, ensure that the screw heads do not protrude more than 0.5mm above the rotor surface to prevent stator interference.
2) To prevent the screws from loosening, apply threadlocker to the screw holes beforehand, or use screws pre-coated with threadlocker. Recommended screw locking torque is 1.2±0.2 kgf·cm.



Stator Installation:

a. Place the encoder stator on the stator mounting surface, aligning the four screw holes.

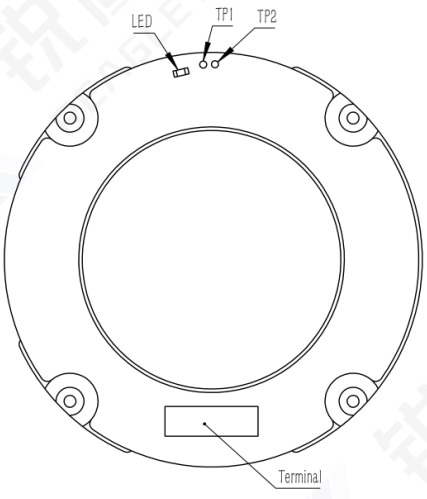
b. Use the Phillips torque screwdriver to sequentially screw in four screw assemblies (M1.6×5 Phillips pan head screws + flat washer set).

[Note]:

To prevent the screws from loosening, apply threadlocker to the screw holes beforehand, or use screws pre-coated with threadlocker. Recommended screw locking torque is 1.2±0.2 kgf·cm.

7. Calibration Methods

7.1 Calibration Operation



① Power the encoder normally;

② Short TP1 and TP2, maintain the short for 1 second before releasing. After this, the green light will start flashing at a frequency of 8 times per second;

③ While the green light is flashing (within 1 minute), rotate the rotor in the same direction for more than 2.5 turns. If the indicator light remains on, it indicates

7.2 Indicator Light Status Explanation

Status	Indicator Light Display	Status Explanation
Power On	Flash once then off	Indicating power-on initialization
Normal Operation	Off	Indicating initialization is complete after power-on, and there are no alarms
Offline Calibration in Progress	Flashing 8 times per second	Indicating calibration is underway, and there are no alarms
Offline Calibration Failure	Flashing once per second	Indicating offline calibration has failed
Offline Calibration Success	Steady on	Indicating offline calibration has success

8. Communication Specifications

Table 1: TAMA Protocol Parameters

1	Single-turn position resolution	131072 (17bit，ENID = 0x11) or 8388608 (23bit，ENID = 0x17)
2	Multi-turn position resolution	65536 (16bit)
3	Overspeed alarm threshold	7200rpm

Please refer to "Reagle Communication Protocol Description (TAMA-STD) [Public]" for specific details.

Table 2: BISS Protocol Parameters

1	Single-turn position resolution	131072 (17bit) or 8388608 (23bit)
2	Multi-turn position resolution	65536 (16bit)
3	Overspeed alarm threshold	7200rpm

For specific content regarding the BISS protocol, please consult "Reagle Communication Protocol Description (BISS-C) [Public]".

Table 3: SSI Protocol Parameters

1	Single-turn position resolution	2097152 (21bit)
2	Multi-turn position resolution	65536 (16bit)
3	Overspeed alarm threshold	7200rpm

For details on the SSI protocol, refer to "Reagle Communication Protocol Description (SSI) [Public]".

9．Configuration Instructions

For order codes, please refer to the "Reagle Sensing Absolute Encoder Ordering Instructions."

Recommended terminal cable specifications can be found in the "Reagle Sensing Hollow Encoder Recommended Terminal Cable Drawings."

Revision History

No.	Version Number	Modification Details or Changes	
		Location	Content
35DCD	V1.0	/	New Version
385FB	V1.1	Mechanical Specifications Communication Specifications	Added layer information for components. Added list of protocol parameters.
3AB92	V1.2	Add BISS\SSI model number	Add BISS\SSI model number Physical image update

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