Specifications

Rotary Absolute Magnescale

RS87-1024EGA

1st Edition

Magnescale Co., Ltd.

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1. Product Overview

1-1. Overview

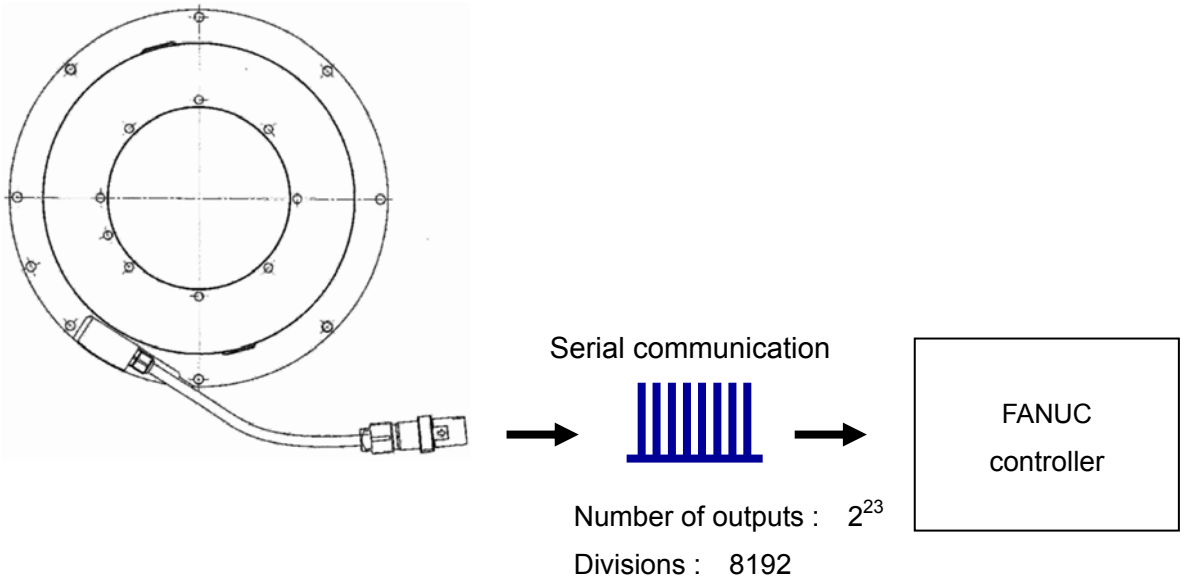
This product is a rotor-stator separated type high-accuracy rotary absolute magnescale that outputs position signals for machine tools and other equipment requiring high-accuracy positioning. This is a FANUC serial communication model.

1-2. Features

- Magnetic detection system for superior environmental resistance from condensation and other effects
- Large through holes are provided in the inside diameter of the rotor for easy cable routing
- Slim design with a total height of 21 mm including the rotor and stator
- Two-axis addition system with two heads for high accuracy

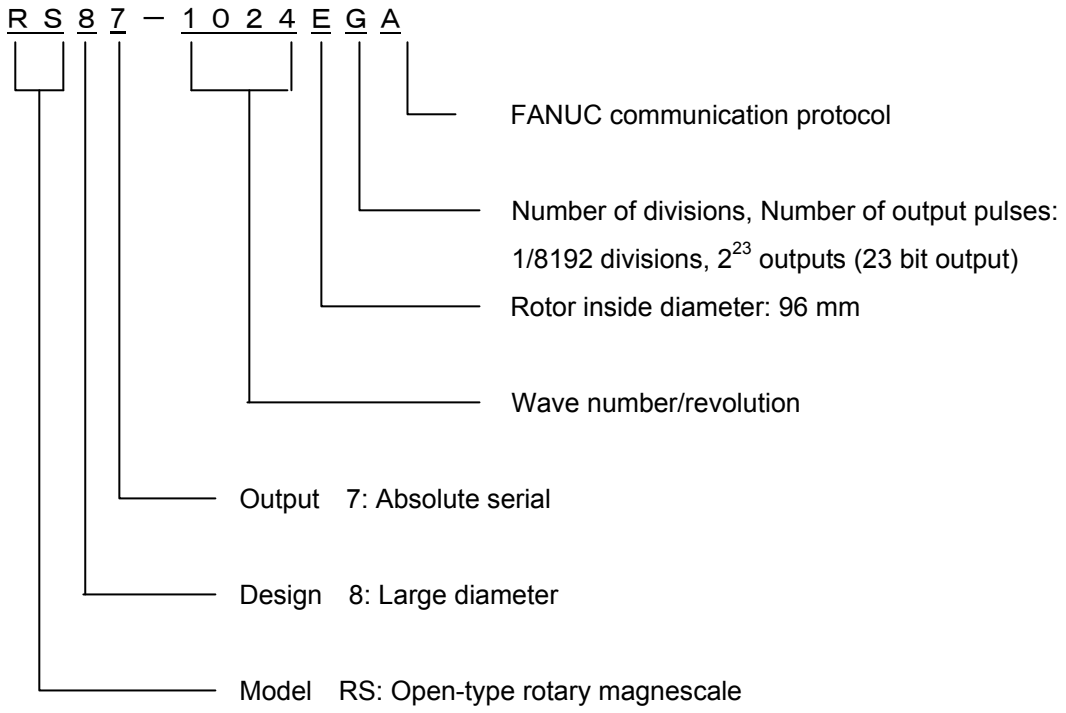
1-3. System Configuration

RS87 has an interpolation circuit built into the rotary magnescale and is a bidirectional serial communication model that is compliant with the FANUC absolute serial communication specifications.



1-4. Model Name

Standard Specification Model:



Special Specification Model:

1-5. Name and Function of Each Part

1 : Rotor

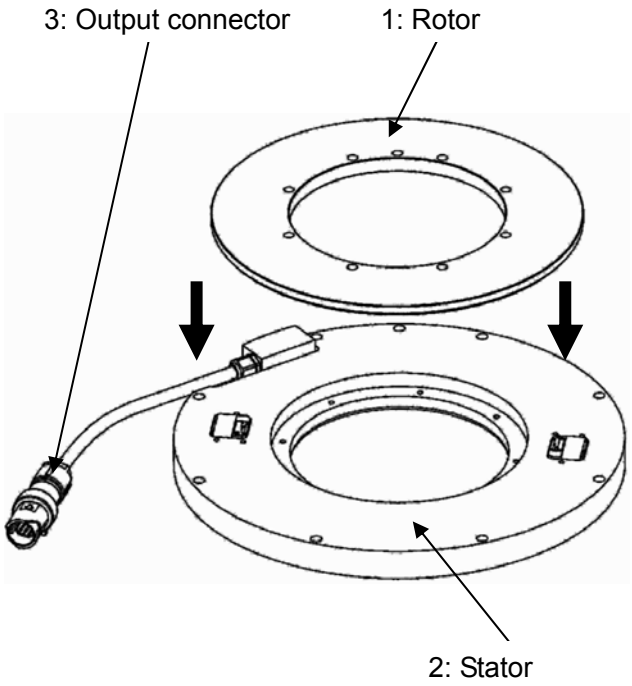
An absolute signal for detecting the absolute position and an incremental signal are recorded to the special magnetic material of the detection surface.

2 : Stator

The stator incorporates MR elements for high-accuracy magnetic detection and amplifier circuits including a specially-designed Magnescale Co., Ltd. LSI.

3 : Output connector

A power supply of 5 V DC is provided for output of absolute serial signals.



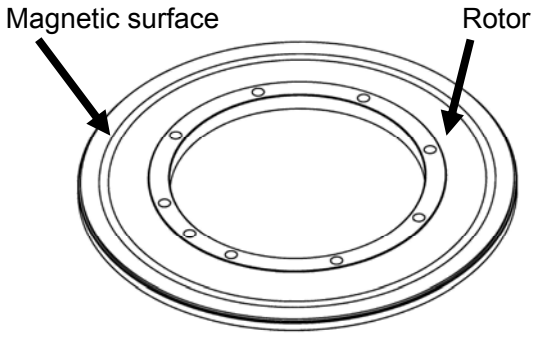
Handling of the magnetic surface

(1) Do not bring magnets or objects with a strong magnetic field into contact with or in the vicinity of the rotor magnetic surface.

(2) Be careful not to damage the magnetic surface.

(3) To clean, use a clean cloth to gently wipe off any dust or dirt. Except for alcohol, do not use any organic solvents.

**** When cleaning with alcohol, be sure to wipe gently.***



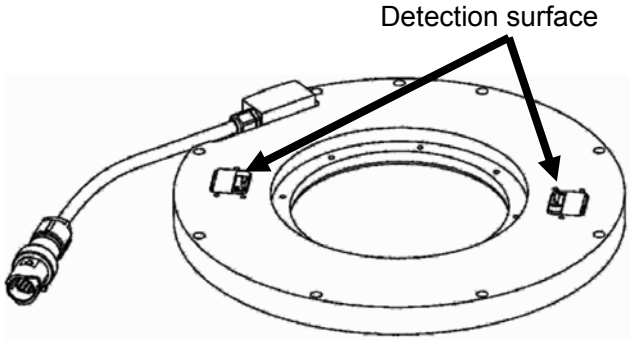
Handling of the detection surface

(1) Do not bring magnets or objects with a strong magnetic field into contact with or in the vicinity of the rotor detection surface.

(2) Be careful not to damage, or give external force to the detection surface. Metal cover layer of detection surface is thin enough.

(3) To clean, use a clean cloth to gently wipe off any dust or dirt. Except for alcohol, do not use any organic solvents.

**** When cleaning with alcohol, be sure to wipe gently.***

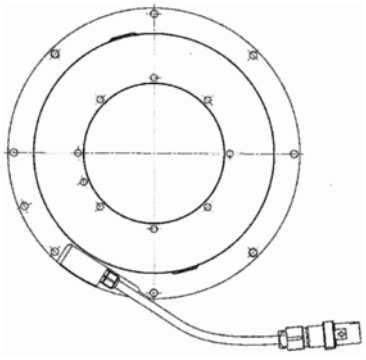


2. Specifications

2-1. Rotary Magnescale Specifications

Item	RS87-1024EGA
Output signal	Absolute serial (Full duplex: Compliant with EIA-422)
Detecting method	Magnetic (MR sensor)
Output wavelength	500 μm (λ)
Output wave number	1024λ / revolution
Accuracy	±2.5 s （at 20℃）
Number of divisions	1/8192 divisions (23 bit output)
Revolution direction	Clockwise
Response revolution	5000 min^{-1}
Operating temperature range	0～60℃
Storage temperature range	-10～60℃
Vibration resistance	150 m/s^2（50～2000 Hz）
Shock resistance	1000 m/s^2（11 ms）
Protective design grade	IP65
Power supply voltage	DC 4.75－5.25 V　(at cable connection end)
Current consumption （at 120Ωterminal）	330 mA or less
Inrush current	2 A max. (when the power supply rising time is 10 ms)
Power supply protection	In the case of errors such as a reverse-connected power supply or over-voltage, the internal fuse is cut to protect the power being supplied and wiring.
Dimensions	96 mm (inner diameter) × 21 mm (thickness) (For details, see section 8, Outside Dimensions.)
Cable length	Standard 2 m (maximum length of 30 m with extension cables)
Output connector	Male connector JN1HS10PL2 by Japan Aviation Electronics Industry
Compliant connector	Female connector JN2DS10SL2 by Japan Aviation Electronics Industry
Moment of inertia	9×10^{-4} kg･m^2 or less
Mass	2 kg or less (rotor : 0.2 kg / stator : 1.7 kg)

2-2. Output Connector Pin Specifications

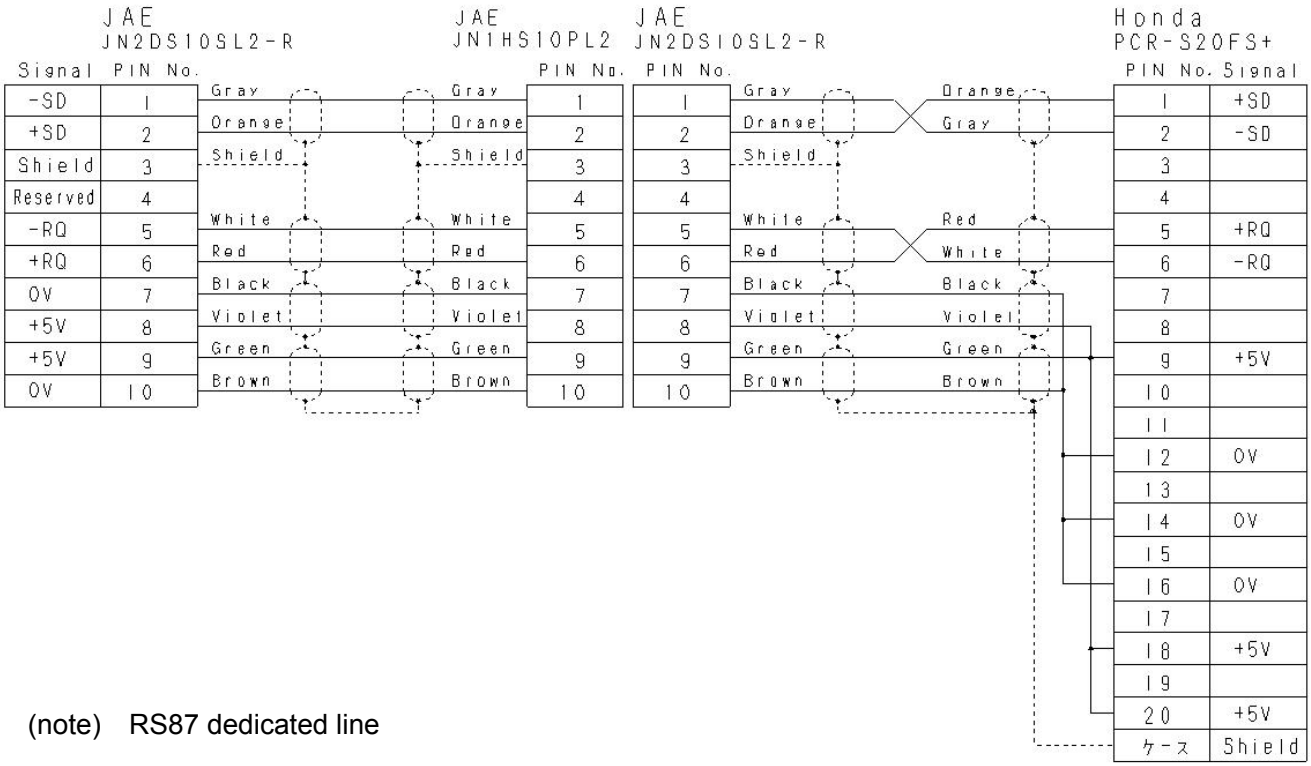


Extension cable (1)

Extension cable (2)

To FANUC NC

Extension cable (1) Extension cable (2)



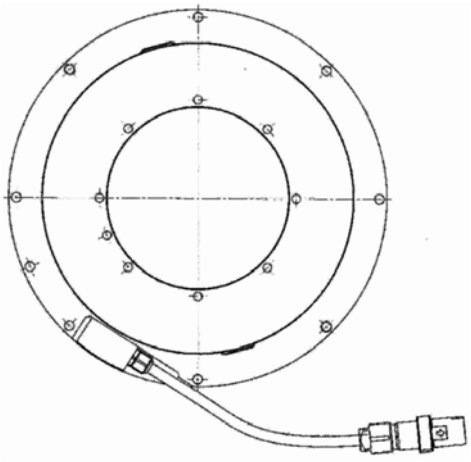
(note) RS87 dedicated line

2-3. Accessories

Hex. socket-head cap screws	M4×15	9	(for rotor installation)
Hex. socket-head cap screws	M4×20	9	(for stator installation)
Flat washers	for M4	18	
Spacers	140μm	1	
Accuracy chart		1	

3. Output Signal

RS87 (Serial Output)



3-1. Signal Specifications

RS87 performs data communication with a controller using bidirectional absolute serial communication protocol.

3-2. Communication Circuit Side

When connecting to a controller, be sure to follow the connection procedure of the controller manufacturer.

4. Power Supply

Use a power supply that satisfies the specifications below.

Use of a power supply with a short-circuit protection device is recommended.

Item	Power supply specifications
Supply voltage	DC 4.75－5.25V
Consumption current	330 mA or more (for each axis)
Inrush current	2 A or less (when the power supply rise time is 10 ms)
Ripple voltage	50 mVp-p or less

Note

When using the rotary magnescale with an external power supply instead of a controller power supply

The rotary magnescale begins functioning normally approximately 0.5 seconds after the power is turned on. A signal may be output momentarily when the power is turned on or off, and this signal can cause the entire system to malfunction.

To prevent this, be sure to follow the proper power-on and power-off procedures. Also, use the procedures below to turn the power off and on again if a malfunction occurs.

Power-on procedure

1. Turn on the power for the rotary magnescale.
2. Turn on the power for the receiving device.

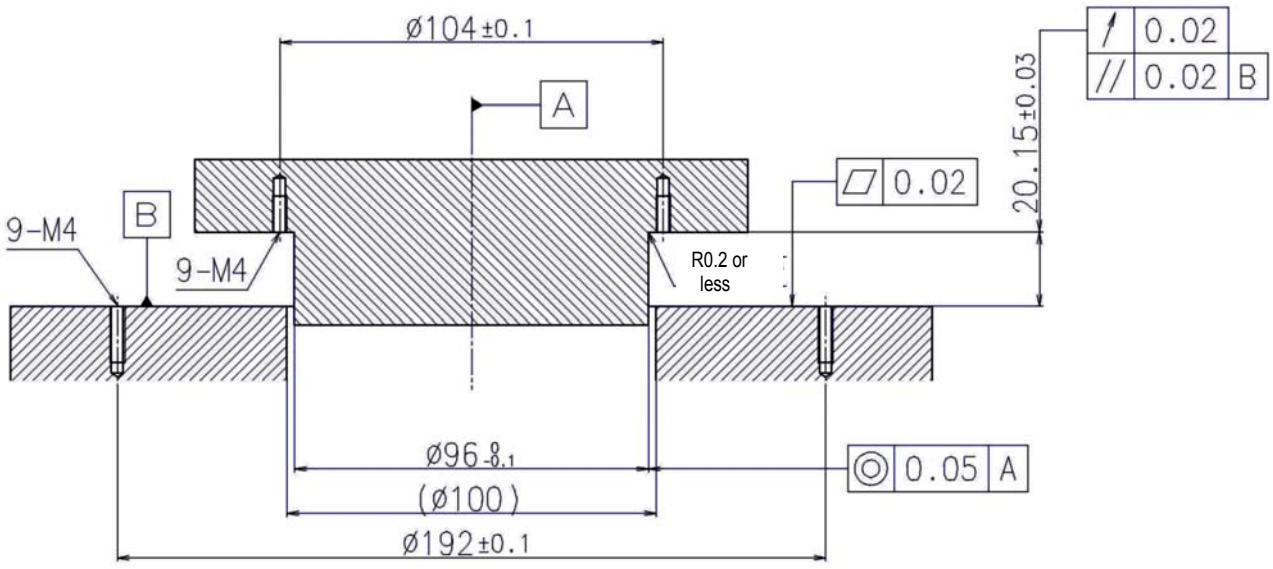
Power-off procedure

1. Turn off the power for the receiving device.
2. Turn off the power for the rotary magnescale.

5. Rotary Magnescale Installation

5-1. Installation Dimensions and Tolerance

Make preparations so that the rotary magnescale installation surface dimensions and tolerance have the values shown in the figure below.



■ Installation Precaution

・ If the surface of the rotary side or stationary side where the rotary magnescale will be installed has paint or other coating, remove the paint or coating in order to obtain conductivity between the rotary magnescale and the machine.

・ Before installing the rotary magnescale, be sure to check that the dimensional tolerance of the installation surface and machine shaft are within the standards. If the installation dimensional tolerance is not within the standards, the required accuracy will not be obtained, abnormal signals can be output, and the rotary magnescale can be damaged.

・ In environments where coolant can splash directly on the rotary magnescale, be sure to mount a cover on the rotary magnescale to protect the rotary magnescale from splashing.

・ Do not apply an external force to the detection surface of the stator or the rotor scale surface, and do not bring magnets or other objects with a strong magnetic field near them

・ The absolute position becomes 0 where the screws at the uneven location (22.5 degrees) among the nine installation screws for the rotor and stator are aligned within ±2 degrees. (See section 8. Outside Dimensions.)

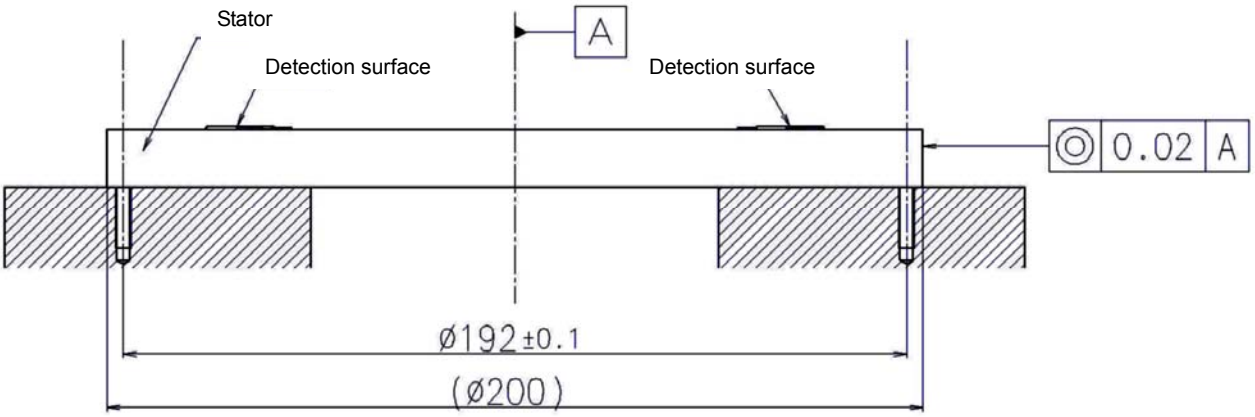
5-2. Installation Procedure

1. Checking the rotary magnescale installation surface

Check that there are no indentations, rust, or scratches on the machine shaft where the rotary magnescale will be installed. Completely wipe off any dust and dirt on the machine shaft.

2. Installing the rotary magnescale stator

Adjust the rotary magnescale stator so that it has a concentricity of 0.02 mm or less with the rotary shaft and secure in place using the nine M4 screws. (M4 tightening torque: 2.5 N･m)

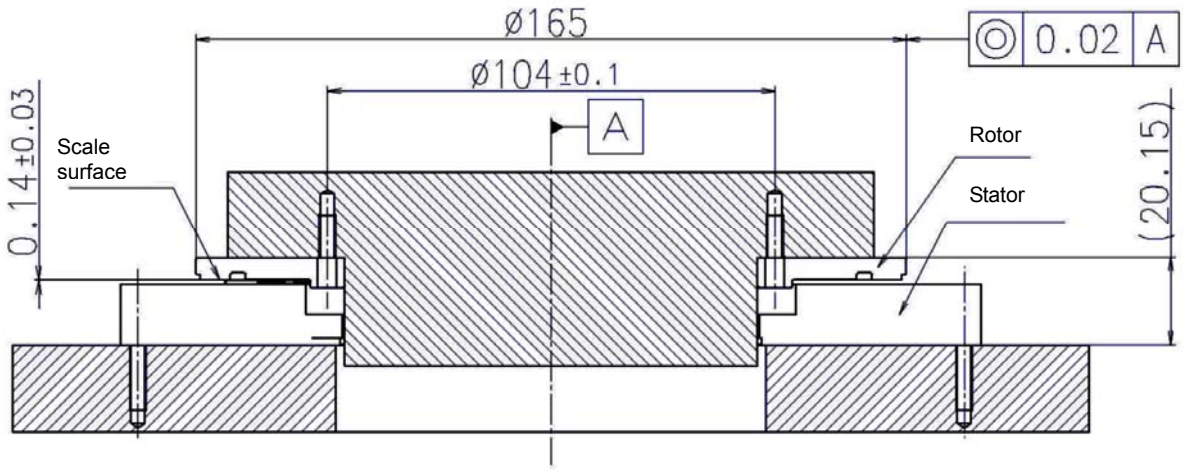


3. Adjusting the clearance of the rotary magnescale stator and rotor

Before temporarily securing the rotor to the rotary-side installation surface, check that the rotor scale surface does not contact the stator detection surface. Do not use thin metal plates for the adjustment spacers.

Temporarily secure the rotary magnescale rotor to the rotary-side installation surface, and adjust and check that the clearance between the stator detection surface and rotor scale surface is 0.14 ±0.03 mm or less.

<u> Please refrain from giving any external force to the rotor of which material is aluminum. Performance may be affected due to the change of shape/profile.</u>**



4. Installing the rotary magnescale rotor

Use nine M4 screws to secure the rotary magnescale rotor in place.

(M4 tightening torque: 2.5 N･m)

6. Safety standards and laws and regulations

FCC Part15 Subpart B Class A

ICES-003 Class A Digital Device

EN55011 Gp1 Class A, EN61000-6-2

Safety standards not applicable (60 V DC or less)

7. Outside Dimensions