RMC22

Commutation and Incremental Magnetic Encoder

EXCELLENT PRICE PERFORMANCE RATIO

HIGH-SPEED OPERATION

SIMPLE INSTALLATION AND SETUP

The RMC22 is a robust non-contact magnetic encoder designed for use in BLDC motor feedback applications requiring both A, B, Z incremental and U, V, W commutation signals. To simplify alignment to the motor rotor, the encoder allows setting of the zero position.



Features and benefits

- Incremental resolutions up to 4,096 cpr
- U, V, W commutation signals with up to 16 poles
- High speed operation
- Zeroing function
- Non-contact, frictionless design
- Long term reliability
- Simple installation and setup

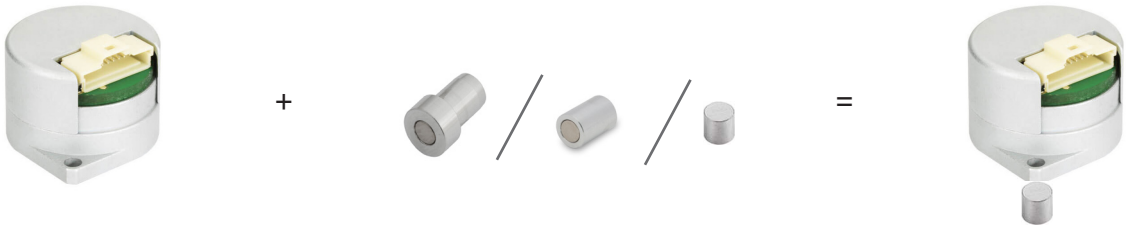
INDUSTRIAL AUTOMATION | ASSEMBLY LINES | MOTOR CONTROL | MACHINE TOOLS | ELECTRIC ACTUATORS

General information

The RMC22 consists of a 22 mm diameter encoder body and a diametrically magnetised magnet or actuator.

The encoder supports resolutions from 256 to 1,024 pulses per revolution (1,024 to 4,096 counts per revolution with ×4 evaluation) and provides U, V, W commutation signals for motors with 1 to 8 pole pairs.

Wide installation tolerances and a wide range of magnetic actuators simplify integration, while the built-in zero-position programming simplifies alignment to the motor rotor.



RMC22 encoder **Actuator or magnet** **RMC22 system**

Product range

IC

Incremental encoder with A, B, Z signals (RS422) and resolutions up to 4,096 cpr.

Ux

Commutation encoder with single-ended U, V, W signals up to 16 poles and incremental A, B, Z signals (RS422) with resolutions up to 4,096 cpr.

Storage and handling

Operating and storage temperature

–40 °C to +125 °C

–40 °C to +105 °C (limited by connector)

Humidity

IP40



Readhead is ESD sensitive - handle with care.
Do not touch electronic circuit, wires or sensor area without proper ESD protection or outside of ESD controlled environment.

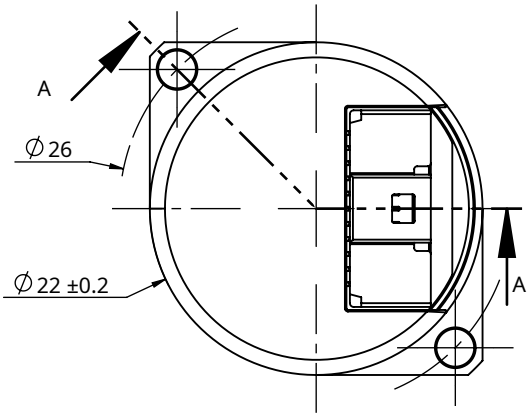
Packaging

Less than 20 products are packed individually in an antistatic box or an antistatic bag. If the order quantity is 20 systems or more, the products are packed in antistatic plastic trays. Magnets and readheads are packed separately.

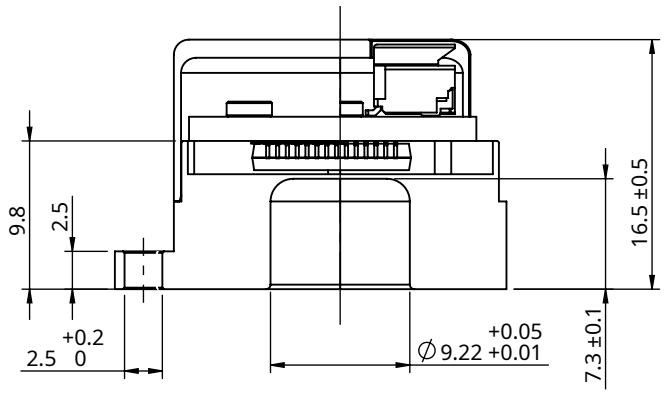
Dimension drawings

Dimensions and tolerances are in mm. Dimensions without tolerance values are in accordance with ISO 2768-m.

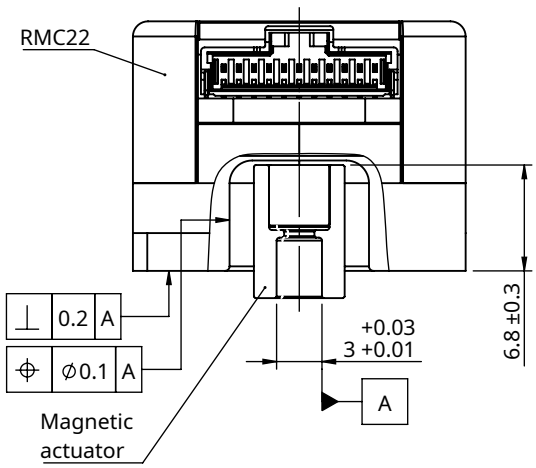




A-A
section view



Installation drawing





Clockwise rotation of magnetic actuator. Position increases for clockwise (CW) rotation of magnetic actuator.

Installation instructions

1. Install the magnetic actuator

Fix the magnetic actuator to the shaft using adhesive (recommended: LOCTITE® 648 or LOCTITE® 2701). Ensure the actuator is centered on the shaft and aligned coaxially. The actuator must protrude 6.8 mm from the mounting surface. Allow the adhesive to fully cure according to the manufacturer's specifications before proceeding.

2. Install the flange with the encoder module

Mount the flange to the mounting surface using two screws (not provided). Handle the encoder module using appropriate ESD precautions.

3. Power on

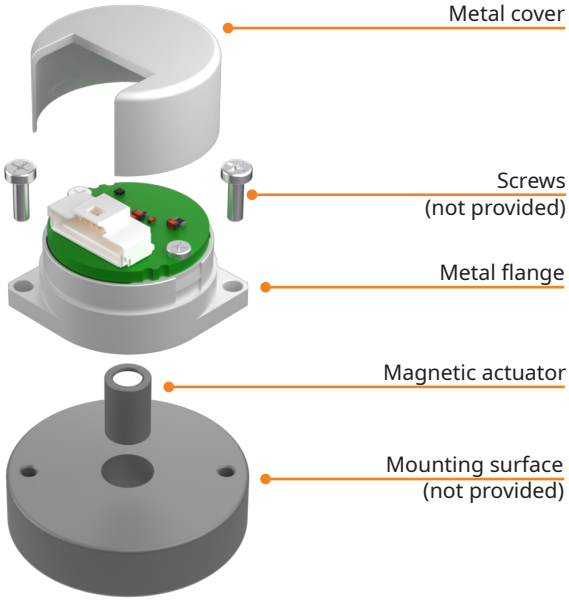
Connect the mating connector and switch on the power supply.

4. Zero the UVW signals

Move the motor to the required zero UVW position. Short together the two zeroing holes to set the zero position. Remove the short after zeroing is completed.

5. Install the metal cover

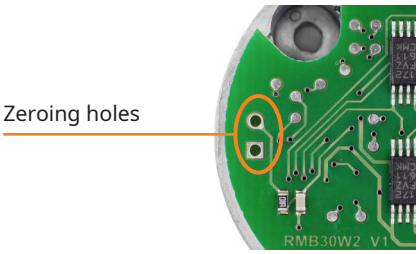
Place the metal cover over the encoder and gently press it into position. Ensure the opening in the cover is aligned with the connector. Do not force the cover or apply stress to the connector.



Zero position setting procedure

Encoder zero position can be easily set by shortening the zeroing holes on the board. After locking the motor at the mechanical zero position short together the two zeroing holes.

The output angle position data can be zeroed at any angle with resolution of 0.0879°. The first rising edge on the U signal will be reset at this point of zeroing. The reference impulse of the incremental signals is not changed by this procedure.



Output types

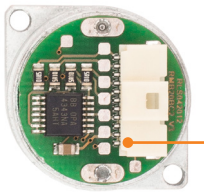
Analogue complementary sinusoidal outputs

RMC22BC

Specifications

Power supply	V_{dd} = 5 V ±5 %
Current consumption	Max. 20 mA (not loaded)
Outputs	Signal amplitude 0.5 ± 0.1 V_{pp} Signal offset $\frac{V_{dd}}{2}$ ± 5 mV
Maximum output frequency	500 Hz
Maximum speed	30,000 rpm
Operating and storage temperature	–40 °C to +105 °C
Internal serial impedance	5.1 Ω

Connections

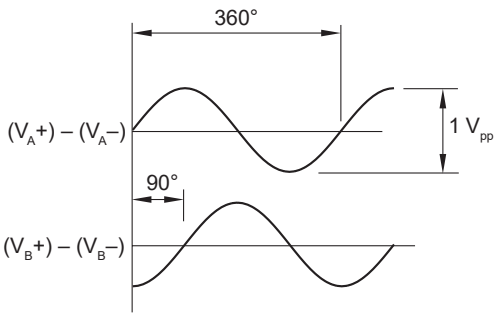


V_A–
V_A+
NC
V_B–
V_B+
NC
NC
GND
GND
V_{dd}
V_{dd}

Connector type
Molex 501568-1107
Mating connector (Not provided)
Molex 501330-1100 (crimp terminal 501334-xxxx)

Timing diagram

Complementary signals not shown



V_A leads V_B for clockwise rotation of magnet

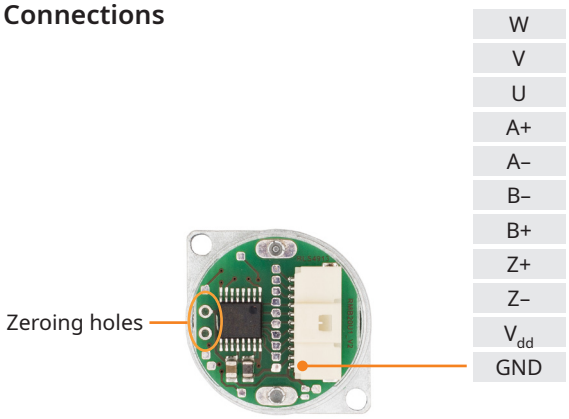
Commutation single ended + incremental line driver

RMC22Ux

Specifications

Power supply	V_{dd} = 5 V ±10 %
Current consumption	Max. 30 mA (not loaded)
Incremental outputs	A+, B+, Z+, A–, B–, Z– (RS422)
Accuracy	±0.5°
Hysteresis	0.17° typ.
Commutation outputs	U, V, W (±24 mA output drive)
Number of poles for commutation outputs	2, 4, 6, 8, 10, 12, 14, 16
Resolutions	256, 512, 1,024, 2,048, 4,096 cpr
Maximum speed	30,000 rpm
Operating and storage temperature	–40 °C to +105 °C

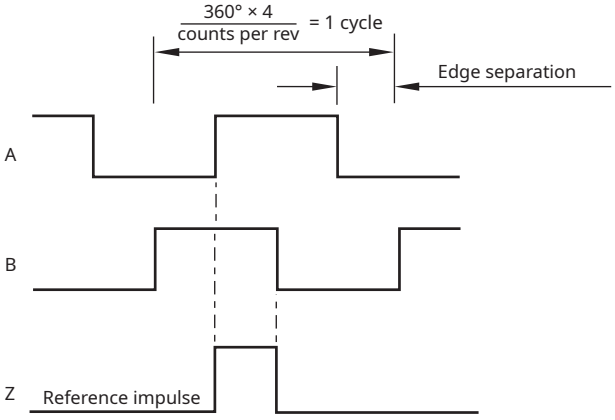
Connections



Connector type
Molex 501568-1107
Mating connector (Not provided)
Molex 501330-1100 (crimp terminal 501334-xxxx)

Timing diagram - Incremental

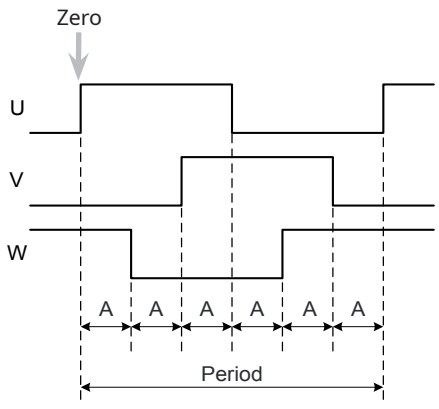
Complementary signals not shown



B leads A for clockwise rotation of magnet.

Timing diagram

Communication for clockwise rotation



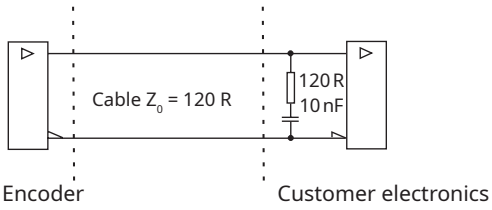
UVW outputs

Pole	A	Period	Pole pairs*
2	60°	360°	1
4	30°	180°	2
6	20°	120°	3
8	15°	90°	4
10	12°	72°	5
12	10°	60°	6
14	8.57°	51.42°	7
16	7.50°	45°	8

* Number of pole pairs equals number of periods per revolution.

Recommended signal termination

For complementary signals only



Part numbering

RMC22 UA 12B AA 10

Output type

BC - Analogue complementary sinusoidal, 5 V

Ux - Commutation single ended + incremental with line driver:

UA - One period per revolution (2 poles)
UB - Two periods per revolution (4 poles)
UC - Three periods per revolution (6 poles)
UD - Four periods per revolution (8 poles)
UE - Five periods per revolution (10 poles)
UF - Six periods per revolution (12 poles)
UG - Seven periods per revolution (14 poles)
UH - Eight periods per revolution (16 poles)

Resolution

For **BC**:

01S - One sine/cosine wave per revolution

For **Ux:**

08B - 256 counts per revolution
09B - 512 counts per revolution
10B - 1,024 counts per revolution
11B - 2,048 counts per revolution
12B - 4,096 counts per revolution

Connector options

AA - Molex 501568-1107

Special requirements

10 - No special requirements

Table of available combinations

Series	Output type	Resolution	Connector options	Special requirements
RMC22	BC	01S	AA	10
	UA / UB / UC / UD / UE / UF / UG / UH	08B / 09B / 10B / 11B / 12B		

Accessories

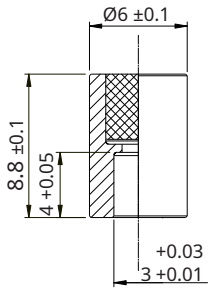


Cable assembly 11 pin
ACC001 cable assembly 0.3 m
ACC002 cable assembly 0.5 m
ACC003 cable assembly 1 m
ACC026 cable assembly 3 m

Magnetic actuator and magnet

Actuator for integration onto shaft



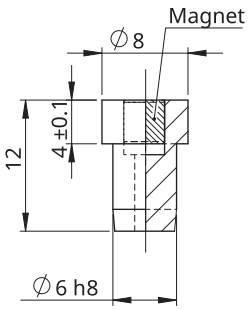


Part number:
RMA03A3A07 – ID = Ø3 mm shaft

Fixing: Glue (recommended – LOCTITE 648 or LOCTITE 2701)

Actuator for integration into shaft



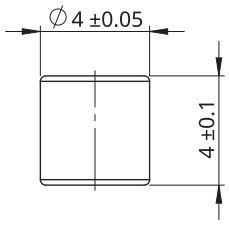


Part number:
RMH06A3A00

Hole = Ø6G7
Fixing: Adhesive (recommended – LOCTITE 648 or 2701)

Magnet for direct recessing in non-ferrous shafts





Part numbers:
RMM44A3A00 (individually packed) – for sample quantities only
RMM44A3C00 (packed in tubes)

Fixing: Adhesive (recommended – LOCTITE 648 or 2701)

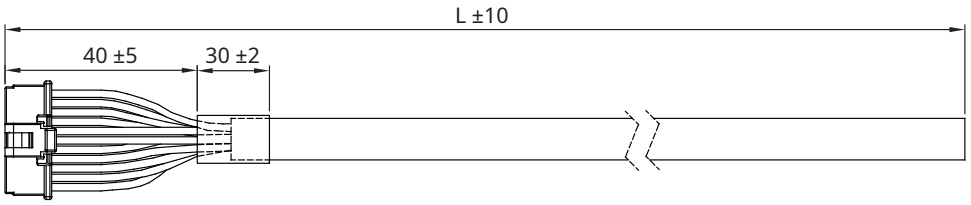
Cable assemblies

Cable specifications for connection of Molex 501330-1100, 12 core

Part numbers	**ACC001** (cable length, L: 0.3 m) **ACC002** (cable length, L: 0.5 m) **ACC003** (cable length, L: 1 m) **ACC026** (cable length, L: 3 m)
Connector	Molex 501330-1100, 11 pins
Wire diameter	AWG26 (0.14 mm^2)
Sheath color	Grey (RAL7032)
Rated voltage	250 V
Operating temperature	–30 °C to +125 °C
Environmental conformation	RoHS conform 73/23/EWG-Guideline CE conform Halogen free

Dimensions

Dimensions and tolerances in mm.



Pin	Wire color
1	Blue
2	Red
3	Brown
4	White
5	Green
6	Yellow
7	Grey
8	Pink
9	Black
10	Violet
11	Grey/Pink

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Document issues

Issue	Date	Page	Description
10	12. 1. 2023	5	Magnetic actuator tolerance updated
11	18. 11. 2026	General	New document design

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