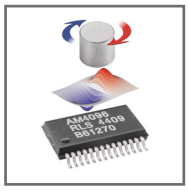
Data sheet
RMC22D01_08
Issue 8, 4th February 2019

RMC22 commutation and incremental encoder solution / complementary sinusoidal outputs



The RMC22Ux is designed for use in motor feedback applications requiring both A, B, Z incremental and U, V, W commutation signals. The RMC22BC provides analogue complementary sinusoidal outputs.

Robust non-contact OnAxis™ sensor technology provides ultimate long term reliability and with simple installation costs of ownership are minimal.

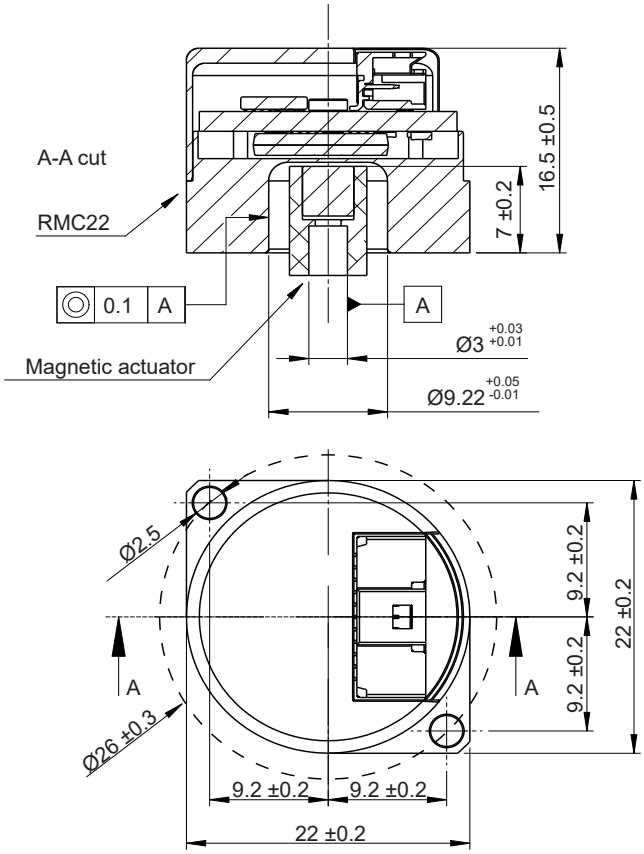
Installation is simplified with a range of magnetic actuators and mounting options for the encoder. A simple one time zero position programming then removes the need for careful adjustment of the encoder.

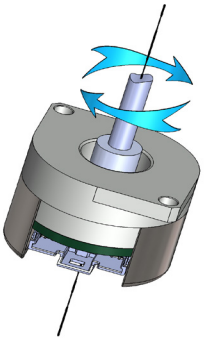
Resolutions are available from 256 to 1,024 pulses per revolution (1,024 to 4,096 counts per revolution with ×4 evaluation). U,V,W commutation signals are simultaneously output with 1 to 8 pole pairs (2 to 16 poles).

- **Incremental resolution up to 4,096 cpr**
- **Simple installation and setup**
- **U, V, W commutation signals with up to 16 poles (±24 mA output drive)**
- **Industry standard incremental outputs (RS422)**
- **Operating speed to 30,000 rpm**
- **Compact - 22 mm diameter body**
- **Non-contact, frictionless design**
- **Low inertia**
- **IP40**

Installation drawing

Dimensions and tolerances in mm





Clockwise rotation of magnetic actuator.

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

Installation procedure

1. Install the magnetic actuator

Use glue to fix the magnetic actuator to the shaft (recommended LOCTITE 648 or LOCTITE 2701). Actuator should protrude by 7 mm.

2. Install the flange with the encoder module on the mounting surface

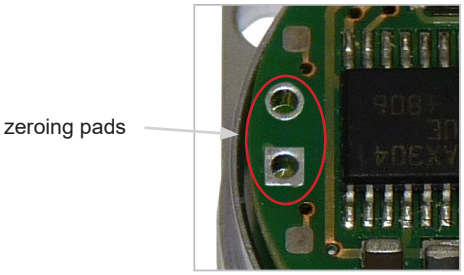
Screw the flange to the mounting surface using 2 screws (not provided).

3. Turn the power on

Plug in the mating connector and turn on the power.

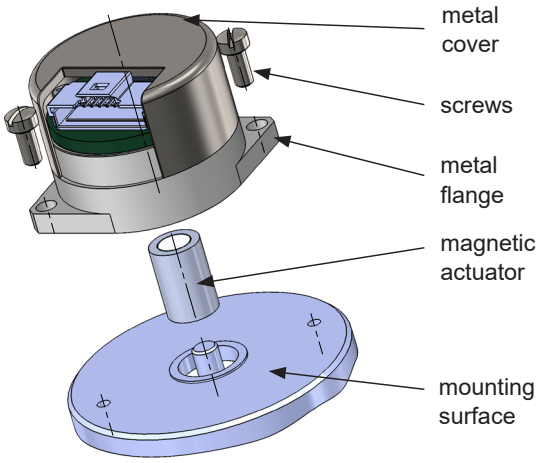
4. Zero the UVW signals

Move the motor to the required zero UVW position. Short together the two zeroing pads.



5. Cover the encoder with the metal cover

Place the metal cover over the encoder and gently press it in position. Be sure to align the opening with the connector.



Zero function

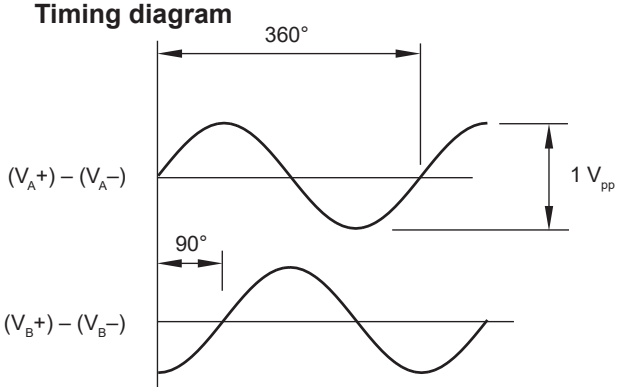
All the outputs can be zeroed at any angle. The first rising edge in the U signal will be reset at this point of zeroing as well as the position of reference impulse for incremental outputs.

RMC22BC – Analogue complementary sinusoidal outputs

2 channels V_A and V_B differential sinusoids in quadrature (90° phase shifted) - One period/360°

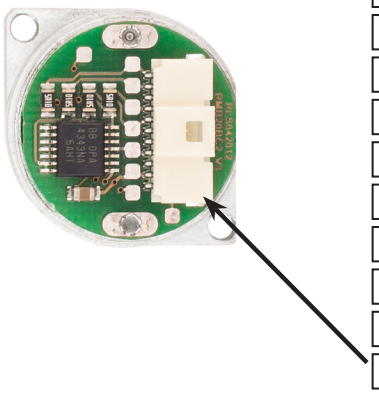
Power supply	V_{dd} = 5 V ± 5 %
Power consumption	20 mA (not loaded)
Outputs	Signal amplitude 0.5 ± 0.1 V_{pp} Signal offset $\frac{V_{dd}}{2}$ ± 5 mV
Maximum output frequency	500 Hz
Maximum speed	30,000 rpm
Temperature Operating and storage	–40 °C to +105 °C
Internal serial impedance	5.1 Ω

Timing diagram



V_A leads V_B for clockwise rotation of magnet

Connections



11	COS– (V_A–)
10	COS+ (V_A+)
9	NC
8	SIN– (V_B–)
7	SIN+ (V_B+)
6	NC
5	NC
4	GND
3	GND
2	V_{dd}
1	V_{dd}

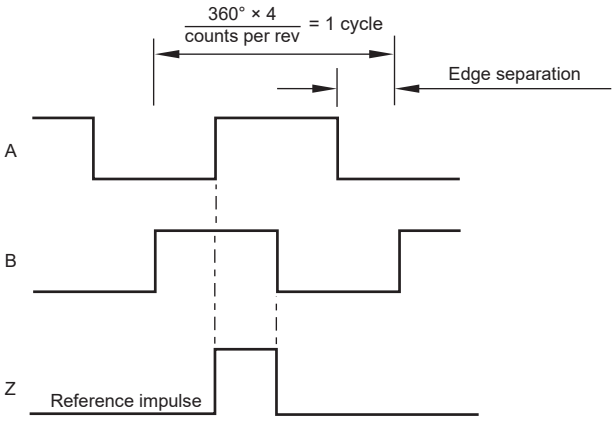
RMC22Ux – Commutation single ended + incremental with line driver, 5 V

Power supply	V_{dd} = 5 V ± 10 %
Power consumption	30 mA (not loaded)
Maximum speed	30,000 rpm
Accuracy*	±0.5°
Hysteresis	0.17° typ.
Incremental outputs	A, B, Z, A–, B–, Z– (RS422)
Incremental resolution	256, 512, 1,024, 2,048, 4,096 cpr
Commutation outputs	U, V, W (±24 mA output drive)
Number of poles for commutation outputs	2, 4, 6, 8, 10, 12, 14, 16
Temperature Operating and storage	–40 °C to +105 °C
Weight	22 g

* At 12 bit resolution and within specified installation tolerances.

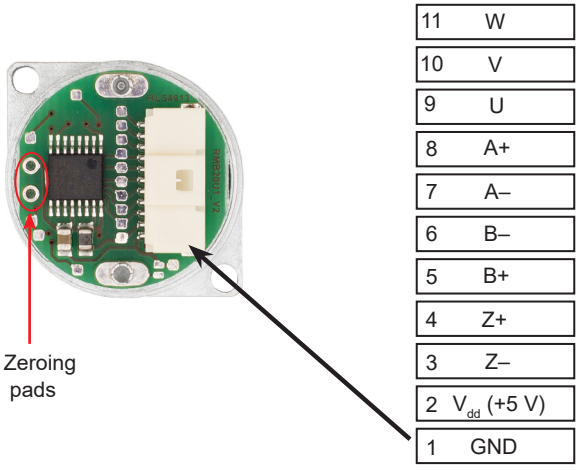
Timing diagram - Incremental

Complementary signals not shown

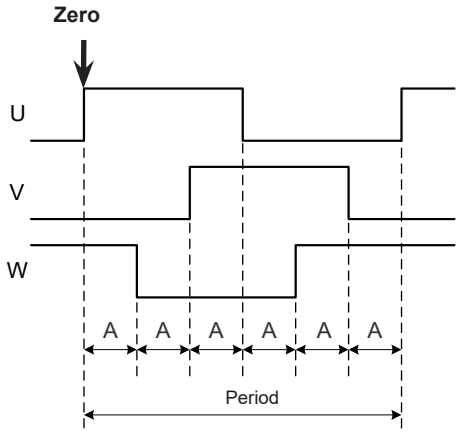


B leads A for clockwise rotation of magnet.

Connections

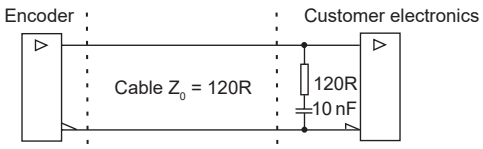


Timing diagram - Commutation for clockwise rotation



Recommended signal termination

For complementary signals only



UVW outputs

Pole	A	Period	Pole pairs*
2	60°	360°	one
4	30°	180°	two
6	20°	120°	three
8	15°	90°	four
10	12°	72°	five
12	10°	60°	six
14	8.57°	51.42°	seven
16	7.50°	45°	eight

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

Part numbering

RMC22 UA 12B AA 10

Output type
BC - Analogue complementary sinusoidal, 5 V
Ux - Commutation single ended + incremental with line driver, 5 V

Code	Description	Nr. of poles
UA	one (1) period per revolution	2 poles
UB	two (2) periods per revolution	4 poles
UC	three (3) periods per revolution	6 poles
UD	four (4) periods per revolution	8 poles
UE	five (5) periods per revolution	10 poles
UF	six (6) periods per revolution	12 poles
UG	seven (7) periods per revolution	14 poles
UH	eight (8) periods per revolution	16 poles

Resolution
For BC:
01S - One sine/cosine wave per revolution

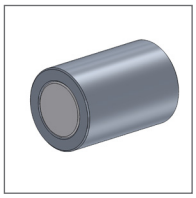
For Ux:
08B - 256 counts per revolution
09B - 512 counts per revolution
10B - 1,024 counts per revolution
11B - 2,048 counts per revolution
12B - 4,096 counts per revolution

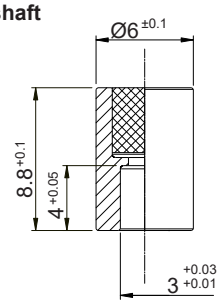
Connector type
AA - Molex 501568-1107

Special requirements
10 - None (standard)

Magnetic actuator and magnet part numbering

Actuator for integration onto shaft



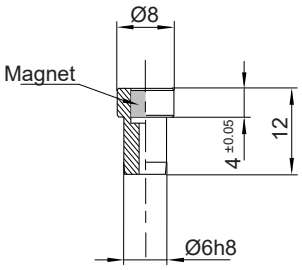


Fixing: Glue (recommended – LOCTITE 648 or LOCTITE 2701)

Part number:

For resolutions from 10 bit absolute (800 cpr incremental) and above
RMA03A3A07 – Ø3 mm shaft

Actuator for integration into shaft

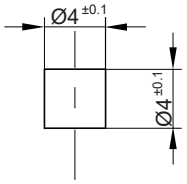


Hole = Ø6G7
Fixing: Glue (recommended – LOCTITE 648 or LOCTITE 2701)

Part numbers:

For resolutions from 10 bit absolute (800 cpr incremental) and above
RMH06A3A00

Magnet for direct recessing in non-ferrous shafts



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

Part numbers:

For resolutions from 10 bit absolute (800 cpr incremental) and above
RMM44A3A00 (individually packed) – for sample quantities only
RMM44A3C00 (packed in tubes)

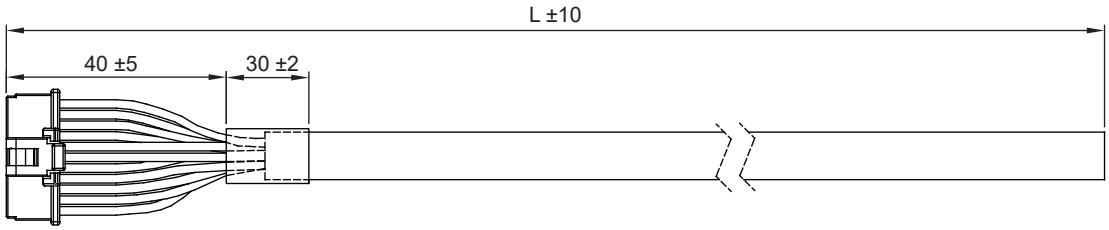
Accessories part numbering

Cable assembly for connection
of MOLEX 501330-1100, 12 core

Cable specifications

Cable specifications	LI12YC12Y
Configuration	4 × 2 × 0.14 mm²
Sheath color	Grey (RAL7032)
Rated voltage	250 V
Temperature range	Stationary –40 °C to +130 °C Moving –30 °C to +125 °C
Environmental conformation	Conform to RoHS Conform to 73/23/EWG-Guideline CE Halogen free
Chemical resistance	Largely resistant to acids, bases and usual oils. Free from lacquer damaging substances and silicone.

Dimensions



Part number	Cable length (L)
ACC001	30 cm
ACC002	50 cm
ACC003	100 cm

Head office

RLS merilna tehnika d.o.o.
Poslovna cona Žeje pri Komendi
Pod vrbami 2
SI-1218 Komenda
Slovenia

T +386 1 5272100
F +386 1 5272129
E mail@rls.si
www.rls.si

Document issues

Issue	Date	Page	Corrections made
1	21. 4. 2011	-	New document
2	4. 7. 2013	2	Magnet tolerance in installation drawing amended
3	22. 1. 2013	1, 3	U, V, W specification added
4	24. 4. 2015	2	Changed dimensions and tolerances in installation drawing
		3	Sine/cosine option added
		5	Part numbering updated with the sine/cosine output option and a new option of LOCTITE glue added
5	3. 12. 2015	1	New image
		3, 4	Temperature from +85 °C to +105 °C
6	26. 3. 2018	6	Accessories part numbering added
7	20. 12. 2018	7	IP protection grade added
8	4. 2. 2019	2	Magnet tolerance in installation drawing amended

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