RLS®
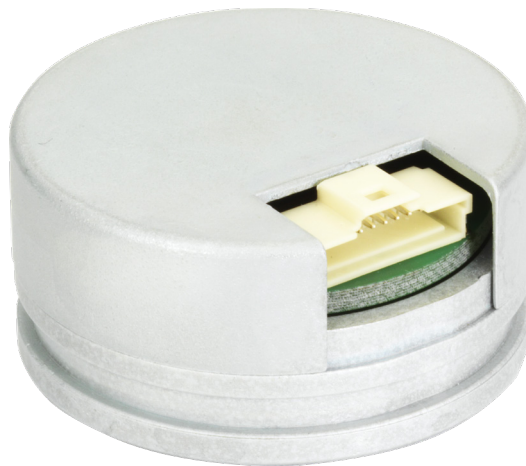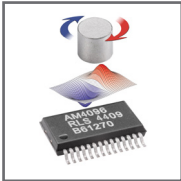
RMC35 commutation and incremental encoder solution

The RMC35 is designed for use in motor feedback applications requiring both A, B, Z incremental and U, V, W signals.

Robust non-contact OnAxis™ sensor technology provides ultimate long term reliability and with simple installation costs of ownership are minimal.
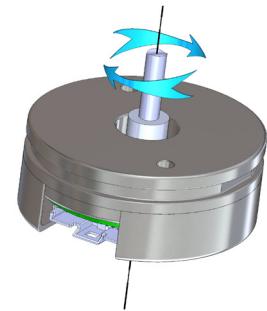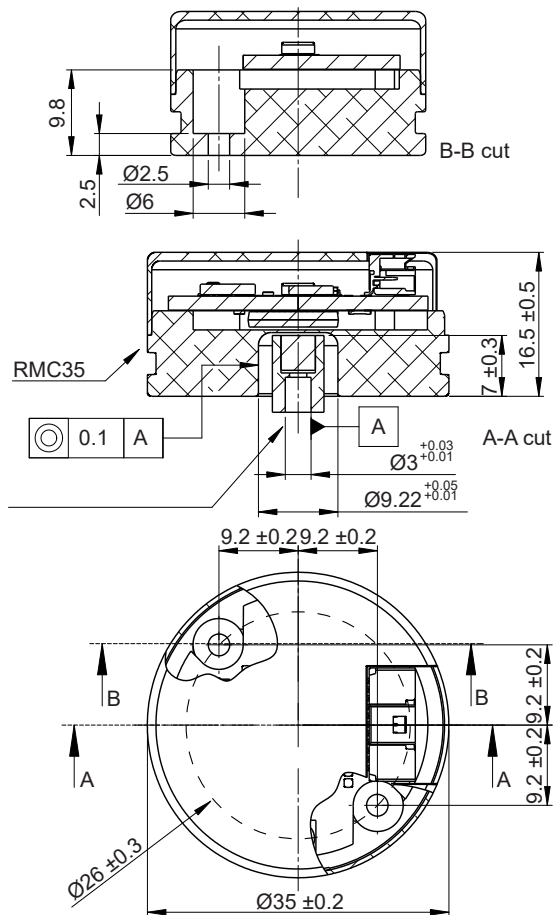
Installation is simplified with a range of magnetic actuators and mounting options for the encoder. A simple one time zero position programming then removes the need for careful adjustment of the encoder.

Resolutions are available from 64 to 2,048 pulses per revolution (256 to 8,192 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 from 256 to 8,192 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 - 35 mm diameter body**
- **Non-contact, frictionless design**
- **Low inertia**
- **IP40**

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Data sheet
RMC35D01_08

Installation drawing
Dimensions and tolerances in mm

9.8

2.5

Ø2.5
Ø6

B-B cut

RMC35

16.5 ±0.5

7 ±0.3

◎ 0.1 A

A

A-A cut

Ø3 $^{+0.03}_{+0.01}$

Ø9.22 $^{+0.05}_{+0.01}$

9.2 ±0.2 9.2 ±0.2

B

B

A

A

9.2 ±0.2 9.2 ±0.2

Ø26 ±0.3

Ø35 ±0.2

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.

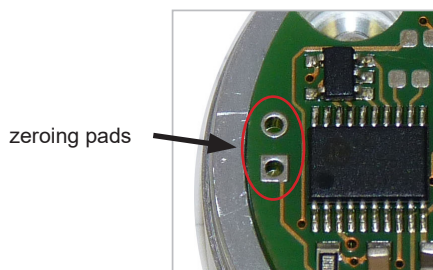**2. Install the flange with the encoder module on the mounting surface**

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

3. Turn the power on
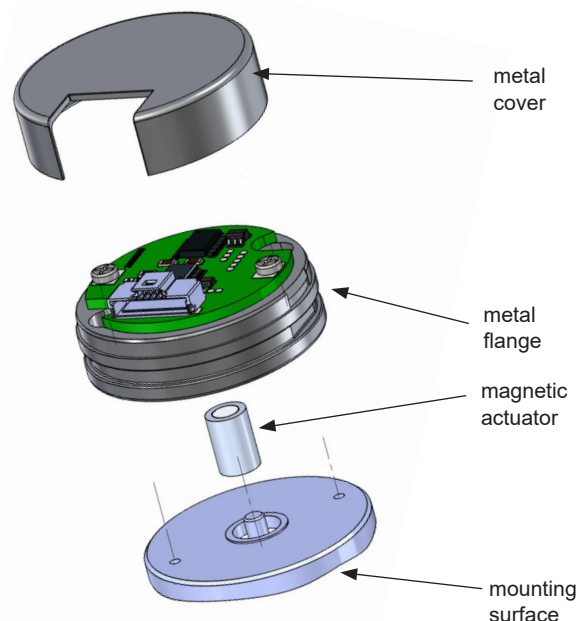
Plug in the mating connector and turn on the power

4. Zero the UVW signals

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

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.


metal cover

metal flange

magnetic actuator

mounting surface

Product specification

Power supply	5 V ± 10 %
Power consumption	40 mA (not loaded)
Accuracy	±0.5°
Hysteresis	0.17° typ.
Incremental outputs	A, B, Z, A-, B-, Z- (RS422)
Incremental resolution	256, 320, 400, 500, 512, 800, 1,000, 1,024, 1,600, 2,000, 2,048, 4,096, 8,192 cpr
Commutation outputs	U, V, W (±24 mA output drive)
Number of poles for commutation outputs	2, 4, 6, 8, 10, 12, 14, 16
Operating temperature	−40 °C to +105 °C (Limited by connector. All other components used are specified for operation from -40 °C to +125 °C.)
Weight	45 g

Incremental resolution (cpr)	Maximum speed (rpm)
8,192	4,000
4,096	8,000
2,048, 2,000	16,000
1,600	20,000
All other resolutions	30,000

Connections

Zeroing pads

W
V
U
A+
A-
B-
B+
Z+
Z-
V_{dd} (+5 V)
GND
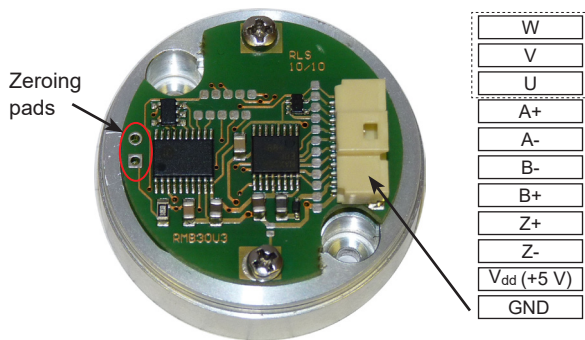
Please note!
For IC output pins 9, 10 and 11 are not connected.

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.

## Timing diagram - Incremental
Complementary signals not shown

$$\frac{360° \times 4}{\text{counts per rev}} = 1 \text{ cycle}$$

edge separation

A

B

Z   reference impulse
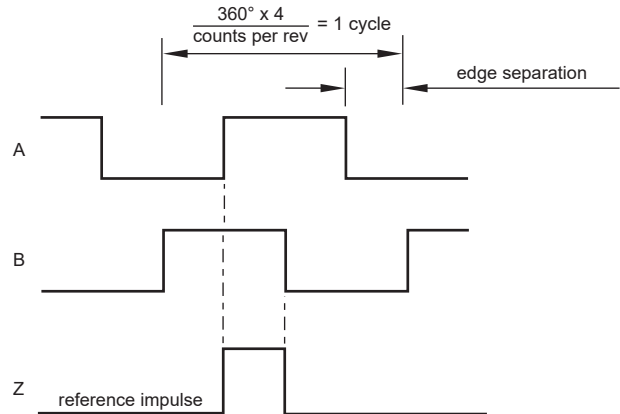
B leads A for clockwise rotation of magnet.

Timing diagram - Commutation for clockwise rotation

Zero

U

V

W

A A A A A A

Period
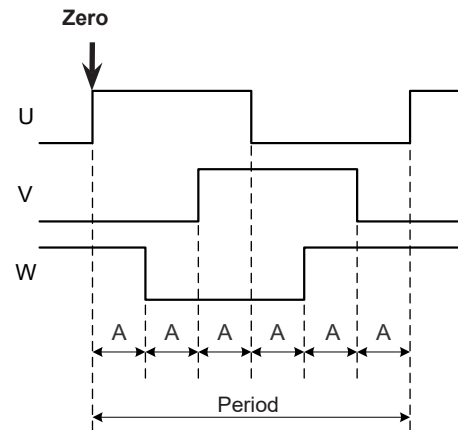
Recommended signal termination
For complementary signals only

Encoder   Customer electronics

Cable Z_0 = 120R

120R
10 nF
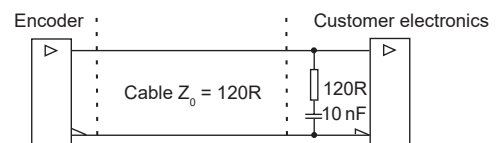
Zero function

The UVW commutation outputs can be zeroed at any angle with a resolution of 0.0879 degrees. 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.

Part numbering

RMC35   UA   12B   AA   10

Special requirements
10 - None (standard)

Connector type
AA - Molex 501568-1107

Output type
IC - Incremental, RS422, 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 (counts per revolution)

Decimal		Binary	
D32 - 320	**1D0** - 1,000	**08B** - 256	**12B** - 4,096
D40 - 400	**1D6** - 1,600	**09B** - 512	**13B** - 8,192
D50 - 500	**2D0** - 2,000	**10B** - 1,024	
D80 - 800		**11B** - 2,048	

Magnetic actuator and magnet part numbering

Actuator for integration onto shaft
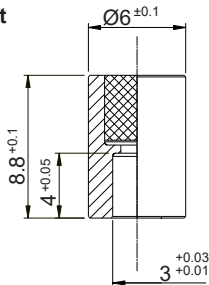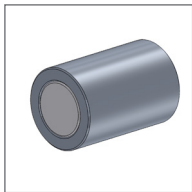
Ø6 ±0.1
8.8 +0.1
4 +0.05
3 +0.03 +0.01

Part number:

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

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

Actuator for integration into shaft

Ø8
Magnet
4 ±0.05
12
Ø6h8

Part numbers:

For resolutions from 10 bit absolute (800 cpr incremental) and above
RMH06A3A00
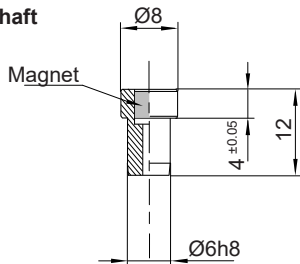
Hole = Ø6G7
Fixing: Glue (recommended – LOCTITE 648 or LOCTITE 2701)

Magnet for direct recessing in non-ferrous shafts
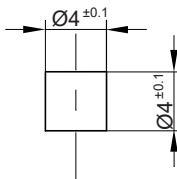
Ø4 ±0.1
Ø4 ±0.1

Part numbers:

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

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

Accessories part numbering

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

Cable specifications

Cable specifications	LI12YC12Y
Configuration	$4 \times 2 \times 0.14$ mm^2
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
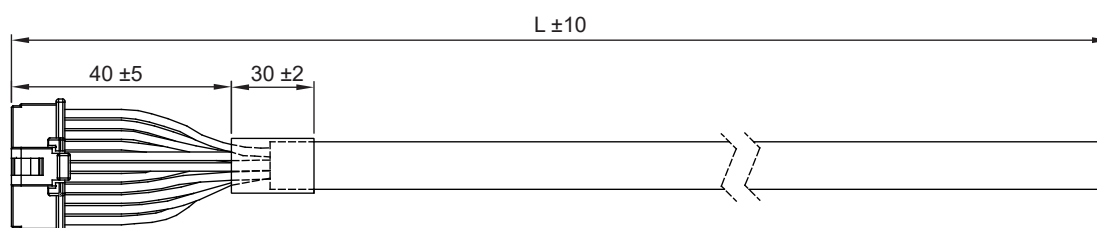
Part number	Cable length (L)
ACC001	30 cm
ACC002	50 cm
ACC003	100 cm

Document issues

Issue	Date	Page	Corrections made
1	21. 4. 2011	-	New document
2	22. 1. 2013	1,3	U, V, W specification added
3	11. 2. 2014	3	Resolution and maximum speed table added
4	24. 4. 2015	2	Changed dimensions and tolerances in installation drawing
		3	Pin out comment added for incremental output
		4	Ordering code updated with the incremental 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	5	Accessories part numbering added
7	20. 12. 2018	1	IP protection grade added
8	4. 2. 2019	2	Magnet tolerance in installation drawing amended

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