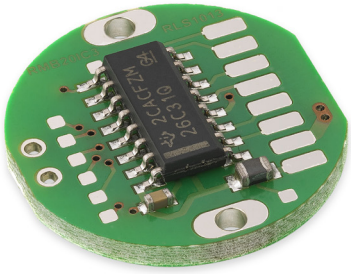
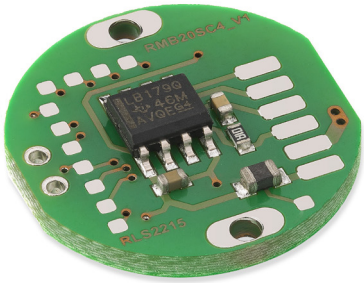
Data sheet
RMB20D04_04
Issue 4, 26th March 2019

RMB20 encoder module with AM4096





The RMB20 encoder module provides the functionality of the RM22 encoder in a compact component format for simple customer integration. With a PCB diameter of only 20 mm, the module fits into miniature designs.

The encoder module consists of a magnetic actuator and a separate sensor board. Custom encoder chip that is mounted on a sensor board reads and processes the rotation of magnetic actuator and gives the required output format. Output signals are provided in industry standard absolute, incremental, analogue, commutation and linear formats.

The RMB20 can be designed into equipment used in a wide range of applications including marine, medical, print, converting, industrial automation, motor control and instrumentation.

Product range

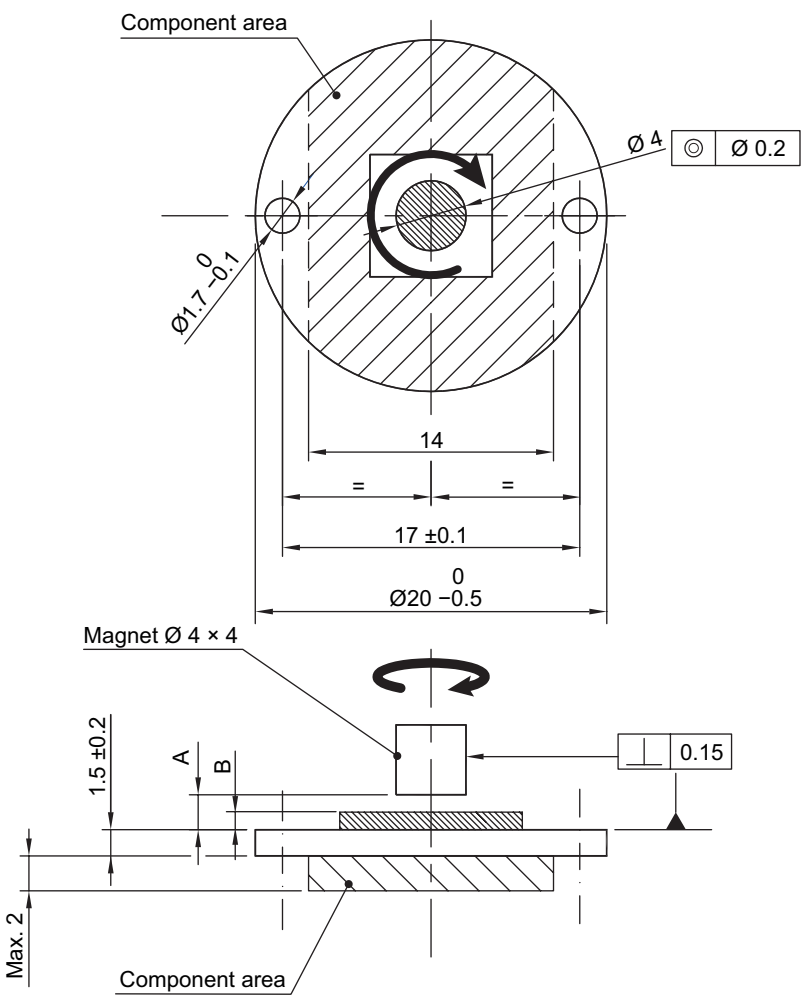
RMB20IC
Incremental with 8 to 1024 pulses per revolution (32 to 4096 counts per revolution with x4 evaluation).

RMB20SC
Synchro serial interface (SSI) with 32 to 4096 positions per revolution.

The encoder module includes zeroing pads for setting the encoder zero position. The new zero position can be set by shorting the two zeroing pads.

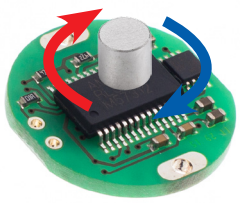
- **Price performance solution**
- **20 mm diameter circular module**
- **5 V power supply**
- **High speed operation to 60,000 rpm**
- **Absolute - up to 12 bit resolution**
- **Industry standard absolute and incremental output formats**
- **Accuracy to ±0.5°**
- **RoHS compliant (lead free) - see Declaration of conformity**

Installation drawing



Module	A PCB surface to magnet distance [mm]	B Chip height [mm]
RMB20IC	2.8 ± 0.5	Max. 1.60
RMB20SC		

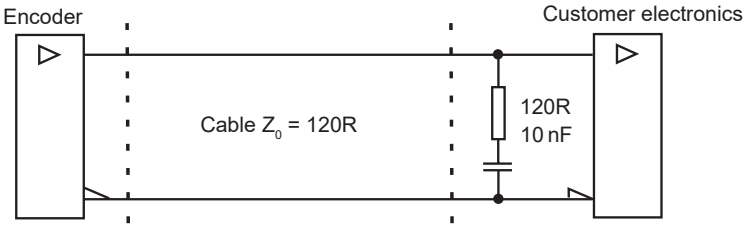
NOTE: For the accuracy specified, the central line of the magnet needs to be square to the chip within 2° and aligned within the center of the board ±0.1 mm (mid point between the two mounting holes).



Clockwise (CW) rotation of magnet

Recommended signal termination

For data output lines only



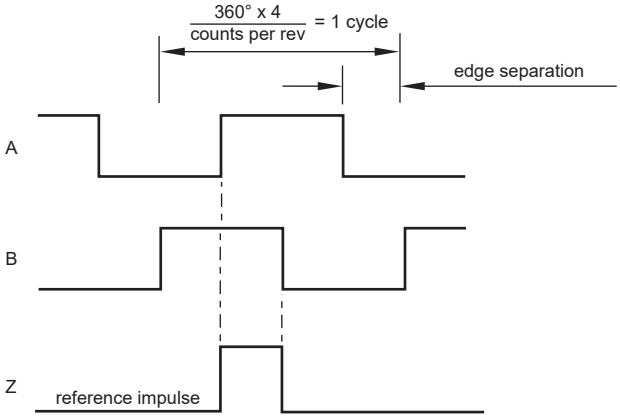
RMB20IC – Incremental output

Square wave differential line driver to RS422

Power supply	V_{dd} = 5 V ± 5 %
Power consumption	35 mA
Output signals	A, B, Z, A–, B–, Z– (RS422)
Resolutions	32, 64, 128, 256, 512, 1,024, 2,048, 4,096 cpr
Maximum speed	60.000 for resolutions up to 1,024 cpr 30.000 for 2,048 and 4,096 cpr
Accuracy	±0.5°
Hysteresis	0.18°
Temperature Operating and storage	–40 °C to +125 °C

Timing diagram

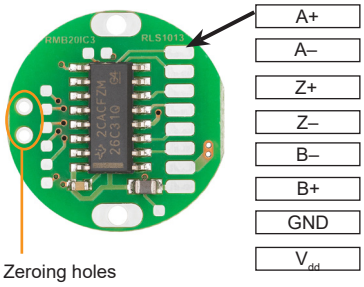
Complementary signals not shown



B leads A for clockwise rotation of magnet.

Connections

RMB20IC

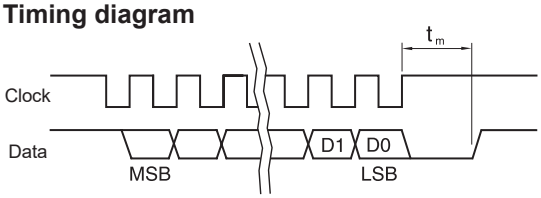


RMB20SC – Absolute binary synchro-serial interface (SSI)

Serial encoded absolute position measurement

Output code	Natural binary
Power supply	V_{dd} = 5 V ± 5 %
Power consumption	35 mA
Resolutions	512, 1,024, 2,048, 4,096 positions per revolution
Repeatability	≤ 0.07°
Data output	Serial data (RS422)
Data input	Clock (RS422)
Temperature Operating and storage	–40 °C to +125 °C

Timing diagram

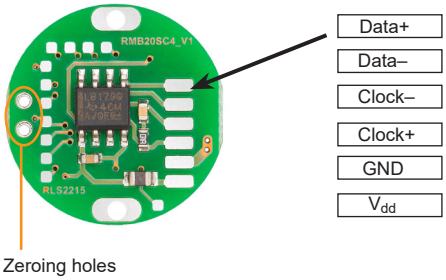


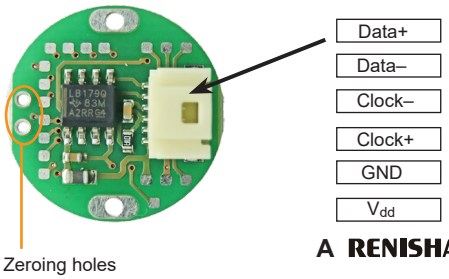
Clock ≤ 4 MHz 12.5 µs ≤ t_m ≤ 20.5 µs

Position increases for clockwise rotation of magnet.

Connections

RMB20SC





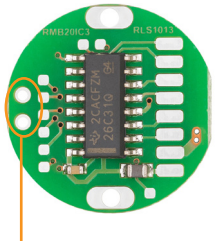
Connector type: Molex 501568-0607
Mating connector: Molex 501330-0600
Crimp terminal: 501334-0000

Zero position setting procedure

The output angle position data can be zeroed at any angle with resolution of 0.0879°. The relative output position is the difference between absolute position and data in the zero register.

The value in the zero register can be changed by writing a desired value with the TWI interface or with using a “Zero” input pin. With low to high transition of a signal on “Zero” pin the current absolute value is stored into the zero register. When zeroing the relative position, the chip must not be in power-save mode as the EEPROM is not accessible in this state.

RMB20 zeroing example



zeroing holes

The zeroing holes can be shorted to set the zero position of the encoder.

Ordering code

RMB20 IC 09B C 96

Output type
IC - Incremental, RS422
SC - Absolute binary synchro-serial (SSI), RS422

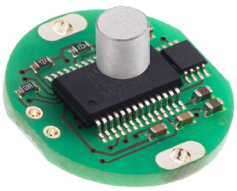
Resolution
Counts/positions per revolution:

05B - 32	**08B** - 256	**11B** - 2048
06B - 64	**09B** - 512	**12B** - 4096
07B - 128	**10B** - 1024	

Special requirements*
96 - With AM4096 - up to 12 bit
C6 - With Molex connector (for SC only)

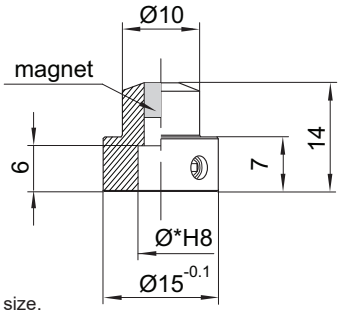
Shape
C - Circular

* For sample quantities of RMB20 supplied with a magnet please add “KIT” to the end of the required RMB20 part number, eg. RMB20IC09BC96KIT.



Magnetic actuator and magnet ordering information

Actuator for integration onto shaft



Shaft = Ø*h7
Fixing: Grub screw provided

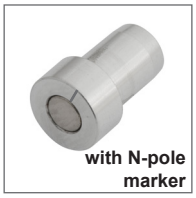
* Hole diameter for nominal shaft size. See table on the right for more information on available shaft sizes.

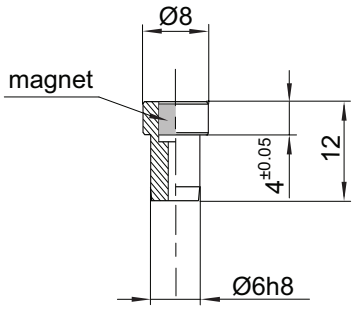
Part numbers:

For resolutions up to 9 bit absolute (512 cpr incremental)
RMA04A2A00 – Ø4 mm shaft **RMA10A2A00** – Ø10 mm shaft
RMA05A2A00 – Ø5 mm shaft **RMA19A2A00** – Ø3/16" shaft
RMA06A2A00 – Ø6 mm shaft **RMA25A2A00** – Ø1/4" shaft
RMA08A2A00 – Ø8 mm shaft **RMA37A2A00** – Ø3/8" shaft

For resolutions from 10 bit absolute (800 cpr incremental) and above
RMA04A3A00 – Ø4 mm shaft **RMA10A3A00** – Ø10 mm shaft
RMA05A3A00 – Ø5 mm shaft **RMA19A3A00** – Ø3/16" shaft
RMA06A3A00 – Ø6 mm shaft **RMA25A3A00** – Ø1/4" shaft
RMA08A3A00 – Ø8 mm shaft **RMA37A3A00** – Ø3/8" shaft

Actuator for integration into shaft





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

Part numbers:

For resolutions up to 9 bit absolute (512 cpr incremental)
RMH06A2A00

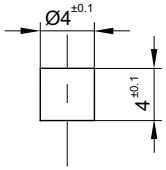
For resolutions from 10 bit absolute (800 cpr incremental) and above
RMH06A3A00

With N-pole marker scribed to a ±5° accuracy:

For resolutions up to 9 bit absolute (512 cpr incremental)
RMH06A2A02

For resolutions from 10 bit absolute (800 cpr incremental) and above
RMH06A3A02

Magnet for direct recessing in non-ferrous shafts



Fixing: Glue (recommended – LOCTITE 648 or 2701)

Part numbers:

For resolutions up to 9 bit absolute (512 cpr incremental)
RMM44A2A00 (individually packed) – for sample quantities only
RMM44A2C00 (packed in tubes)

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

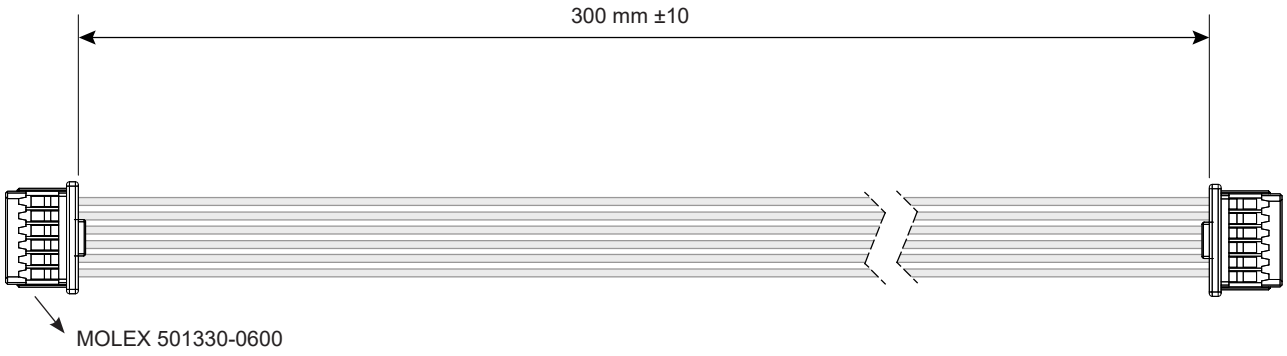
Accessory

ACC028: Cable assembly with dual ended connectors

Cable specifications

Cable length	300 mm
Number of wires	6
Wire size	28 AWG
Wire insulation diameter	0.6 mm
Wire type	UL 1571
Connector type	Molex 501330-0600
Crimp terminal	501334-0000
Mating connector type	Molex 501568-0607

Dimensions



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	Amendments done
1	29. 4. 2016	-	New document
2	14. 7. 2016	3	Zeroing pads added
3	2. 6. 2017	1	RoHS logo added
		4	Zeroing procedure added
4	26. 3. 2019	3	Molex connector for RMB20SC added