MR
Bonded Radial Incremental Magnetic Rings

VARIOUS SIZES AND MOUNTING OPTIONS

ROBUST DESIGN

HIGH OPERATING SPEED

The robust RLS radial magnetic incremental rings consist of an elasto-ferrite layer firmly bonded on a stainless steel hub. The elasto-ferrite layer is magnetised with 2 mm long alternating magnetic poles, which form an incremental magnetic pattern.
A unique or distance-coded (DCRM) reference marks option can also be added to the incremental magnetic pattern. Radial magnetic rings offer reliable solutions for high performance applications.



Features and benefits

- Non-contact technology
- Compatible with RLS LM and RoLin family readheads
- High speed operation
- Easy mounting
- Different shaft diameters available
- Excellent resistance to dirt and dust
- Unique or periodic reference mark

ROBOTIC JOINTS | PAN/TILT POSITIONING | PRECISE GEAR BOX | MEDICAL | UAV

General information

The bonded radial incremental magnetic rings are a reliable solution for high performance applications. They can be installed with fasteners, by press-fitting or by gluing.

To assure safety and reliability at high speeds and temperatures, the rings can optionally be covered with a protective stainless steel foil. For maximum protection and use in particulary harsh environments, the cover foil can be fully welded to the ring. This protective layer also protects the elasto-ferrite from swarfs (e.g. metal, stone, glass, wood, etc.), chemical fluids (oils, coolants, grease, etc.) and minimises the influence of ageing (e.g. UV radiation).



Bonded radial ring



Bonded radial ring with cover foil



Bonded radial ring with welded cover foil (cross section U) IP67

Selection guide

Ring	OD [mm]	OD with cover foil [mm]	ID [mm]	H [mm]	Pole length [mm]	Number of poles	Compatibility with readheads						
							LM10	LM13	RLB	RLC2HD	RLC2IA	RLC2IC	RLM
MR031G	31 ±0.1	31.15 ±0.12	20 H7	8 ±0.1	2	50	Ri	Ri	No Ri	No Ri	Ri	Ri	Ri
MR031U	-	31.15 ±0.1	20 H7	10 ±0.1	2	50	Ri	Ri	No Ri	No Ri	Ri	Ri	Ri
MR040G	40 ±0.1	40.15 ±0.12	30 H7	8 ±0.1	2	64	Ri+DCRM	Ri+DCRM	No Ri	No Ri	Ri+DCRM	Ri+DCRM	Ri+DCRM
MR040U	-	40.15 ±0.1	30 H7	10 ±0.1	2	64	Ri+DCRM	Ri+DCRM	No Ri	No Ri	Ri+DCRM	Ri+DCRM	Ri+DCRM
MR047B	47.5 ±0.1		40 +0.02 0	5.5 ±0.1	2	76	-	-	No Ri	No Ri	Ri	Ri	Ri
MR050G	50.1 ±0.1	50.25 ±0.12	40 H7	8 ±0.1	2	80	Ri+DCRM	Ri+DCRM	No Ri	No Ri	Ri+DCRM	Ri+DCRM	Ri+DCRM
MR050U	-	50.25 ±0.1	40 H7	10 ±0.1	2	80	Ri+DCRM	Ri+DCRM	No Ri	No Ri	Ri+DCRM	Ri+DCRM	Ri+DCRM
MR057E	57.3 ±0.1	57.45 ±0.12	50 H7	10 ±0.1	2	90	Ri+DCRM	-	-	-	-	-	-
MR057G	56.5 ±0.1	56.65 ±0.12	45 H7	8 ±0.1	2	90	Ri+DCRM	Ri+DCRM	No Ri	No Ri	Ri+DCRM	Ri+DCRM	Ri+DCRM
MR063G	62.9 ±0.1	63.05 ±0.12	40 H7	8 ±0.1	2	100	Ri+DCRM	Ri+DCRM	No Ri	No Ri	Ri+DCRM	Ri+DCRM	Ri+DCRM
MR063U	-	63.05 ±0.1	50 H7 40 H7	10 ±0.1	2	100	Ri+DCRM	Ri+DCRM	No Ri	No Ri	Ri+DCRM	Ri+DCRM	Ri+DCRM
MR076G	75.6 ± 0.1	75.75 ± 0.12	60 H7	8 ± 0.1	2	120	Ri+DCRM	Ri+DCRM	No Ri	No Ri	Ri+DCRM	Ri+DCRM	Ri+DCRM
MR081G	80.7 ±0.1	80.85 ±0.12	60 H7	8 ±0.1	2	128	Ri+DCRM	Ri+DCRM	No Ri	No Ri	Ri+DCRM	Ri+DCRM	Ri+DCRM
MR081U	-	80.85 ±0.1	60 H7	10 ±0.1	2	128	Ri+DCRM	Ri+DCRM	No Ri	No Ri	Ri+DCRM	Ri+DCRM	Ri+DCRM
MR101G	101 ±0.1	101.15 ±0.12	85 H7	8 ±0.1	2	160	Ri+DCRM	Ri+DCRM	No Ri	No Ri	Ri+DCRM	Ri+DCRM	Ri+DCRM
MR101U	-	101.15 ±0.1	85 H7	10 ±0.1	2	160	Ri+DCRM	Ri+DCRM	No Ri	No Ri	Ri+DCRM	Ri+DCRM	Ri+DCRM
MR114U	-	113.95 ±0.1	95 H7	10 ±0.1	2	180	Ri+DCRM	Ri+DCRM	No Ri	No Ri	Ri+DCRM	Ri+DCRM	Ri+DCRM
MR123G	122.7 ±0.1	122.85 ±0.12	90 H7	8 ±0.1	2	194	Ri	Ri	No Ri	No Ri	Ri	Ri	Ri
MR127G	126.5 ±0.1	126.65 ±0.12	100 H7	8 ±0.1	2	200	Ri+DCRM	Ri+DCRM	No Ri	No Ri	Ri+DCRM	Ri+DCRM	Ri+DCRM
MR127U	-	126.65 ±0.1	100 H7	10 ±0.1	2	200	Ri+DCRM	Ri+DCRM	No Ri	No Ri	Ri+DCRM	Ri+DCRM	Ri+DCRM
MR162G	162.2 ±0.1	162.35 ±0.12	143 H7	8 ±0.1	2	256	Ri+DCRM	Ri+DCRM	No Ri	No Ri	Ri+DCRM	Ri+DCRM	Ri+DCRM
MR162U	-	162.35 ±0.1	143 H7	10 ±0.1	2	256	Ri+DCRM	Ri+DCRM	No Ri	No Ri	Ri+DCRM	Ri+DCRM	Ri+DCRM
MR325E	325.1 ±0.2	-	280 G7 240 G7	10 ±0.1	2	512	Ri+DCRM	Ri+DCRM	No Ri	No Ri	Ri+DCRM	Ri+DCRM	Ri+DCRM

Ri	- Unique reference mark or only incremental track available
No Ri	- No reference mark option, only incremental track available
Ri+DCRM	- Unique, distance-coded reference mark or only incremental track available

The installation holes in the 3D models of the rings are provided without modeled threads.

For detailed readheads documentation and 3D models, refer to

- **LM10**
- **LM13**
- **RLB**
- **RLC2IA**
- **RLC2IC**
- **RLC2HD**
- **RLM.**

All documents are available in the **RLS Media Center**.

Storage and handling

Storage temperature

–40 °C to +85 °C

Operating temperature

–40 °C to +85 °C

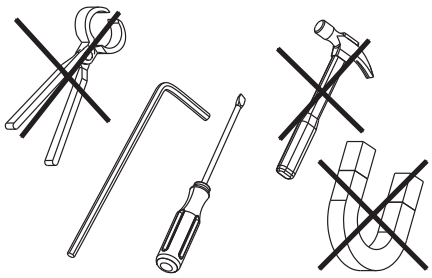
IP rating

High resistance to humidity
Ring with welded cover foil IP67

For higher operating temperatures **contact RLS**.

Important handling and installation notice

To ensure proper function and avoid damage, please observe the following precautions when handling and installing the magnetic encoder system:



Handle with care. Do not use industrial tools (e.g. magnetic bases or heavy-duty equipment) near the product, as strong magnetic fields or mechanical force can damage sensitive components.

Do not use impact tools. Tools such as drifts, punches, or similar are strictly prohibited during installation, especially for adjusting run-out.

Ensure proper alignment. Incorrect assembly of the readhead and ring can impair system performance and lead to premature wear or permanent damage.

Respect tolerances. Always follow the specified distance and angular alignment tolerances precisely.

Avoid contact. The readhead must not touch the ring at any point during rotation. Physical contact may damage the ring surface.

Do not heat the ring. Induction heating can alter the magnetic pattern and must not be used under any circumstances.

Keep packaged until use. Leave the product in its original packaging until it is ready for final installation to prevent contamination or accidental damage.

The magnetic ring should not be exposed to magnetic field densities higher than 25 mT on its surface, as this can damage the ring.

Chemical resistance

The use of alcohol for cleaning is considered safe, but it is not allowed to immerse the ring in alcohol. This does apply for rings with engraved serial number.

For more information on chemical resistance **contact RLS**.

Accuracy of ring encoder systems

The accuracy of the ring encoder measurement is influenced by **encoder accuracy errors** and **installation-dependent errors**. In order to evaluate the total accuracy, each of the significant errors must be considered. Fig. 1 shows a typical accuracy error plot with marked particular influences.

Encoder accuracy errors

System error consists of a magnetisation error, crosstalk and SDE.

Ring	System error [°] Over the entire RH*
MR031	±0.16
MR040	±0.13
MR047	±0.1
MR050	±0.10

*RH - Ride height

Ring	System error [°] Over the entire RH
MR057	±0.09
MR063	±0.08
MR076	±0.07
MR081	±0.06
MR0101	±0.05

Ring	System error [°] Over the entire RH
MR114	±0.05
MR123	±0.04
MR127	±0.04
MR162	±0.03
MR325	±0.03

Magnetisation error

The magnetisation error is caused by imperfections in the elasto-ferrite material and possible deviations resulting from the magnetisation process. This error does not include eccentricity of mounting of the ring.

The following factors influence the result:

- the magnetic inhomogeneity of the elasto-ferrite layer,
- the ring installation tolerances during the magnetisation process,
- the measurement uncertainty of the magnetisation system during manufacturing process
- the quality of the magnetisation system.

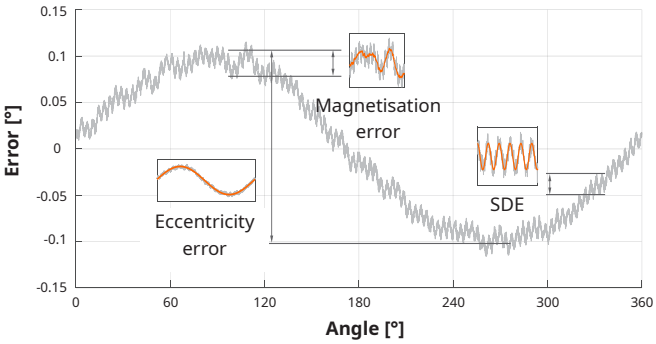


Fig. 1. Typical accuracy error plot.

Fig. 1 to Fig. 4 are for representation purpose only.

The magnetisation accuracy A_M can be calculated by the following formula:

$$A_M = \pm \frac{4.6}{D}$$

where *D* is the outer ring diameter in [mm].

D [mm]	A_M [°]
20	±0.229
40	±0.115
60	±0.076

Crosstalk

Crosstalk is an undesirable effect of reference mark magnetisation on the incremental track magnetisation, which leads to accuracy peaks. It depends on both the ride height and the lateral offset.

An example of crosstalk is shown in Fig. 2.

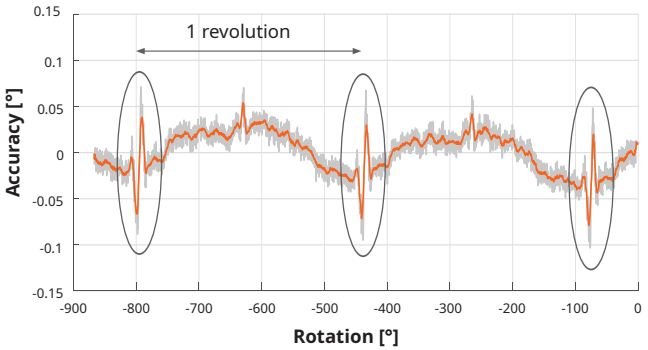


Fig. 2. Crosstalk representation. The crosstalk (Ri magnetisation) is circled.

Sub divisional error (SDE) or interpolation error

The sub divisional or interpolation error is a periodical accuracy error. It is influenced by the following factors:

- the length of poles,
- the homogeneity and cycle definition of magnetic poles,
- the sensing distance (ride height) of the installed readhead,
- the quality of the signal processing,
- the characteristics of the internal AMR sensor.

The SDE leads to speed ripples in applications where the encoder is used as speed feedback, e.g. in speed control loops. For radial rings, SDE is strongly influenced by ride height.

The maximum SDE at optimal sensing distance can be calculated by the following formula:

$$SDE = \pm \frac{0.58 \times K}{OD}$$

where:
SDE is Sub divisional error (°)
OD is the outer ring diameter in (mm)
K = 1 for magnetic rings with outer diameter >30
K = 2 for magnetic rings with outer diameter <30

OD (mm)	SDE (°)
20	±0.029
40	±0.014
60	±0.009

Hysteresis

Hysteresis is the difference in result of measuring the same point when approached from different directions.
It is known that ferromagnetic materials maintain their magnetised state in response to external fields, trying to change their direction.
The hysteresis in encoder systems depends on the strength of the magnetic field. A stronger magnetic field leads to a smaller hysteresis and vice versa. Therefore the hysteresis is strongly influenced by the ride height at which the readhead is installed (Fig. 3).

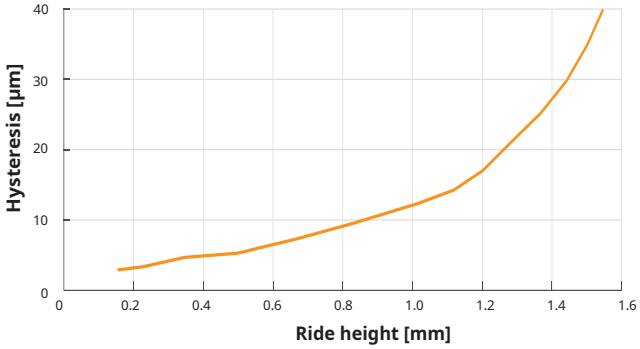


Fig. 3. Hysteresis vs. ride height (for encoder systems with 2 mm pole length).

Installation-dependent errors

Installation and adjustment of the ring and the readhead, in addition to the given encoder-specific error, normally have a significant effect on the overall accuracy of a system. Of particular importance are the installation eccentricity and the effect of deformations resulting from the ring installation.

Installation eccentricity

Eccentricity can be caused by the misalignment of the ring's center towards the rotational axis, as can be seen on Fig. 4.
The error caused by eccentricity can be calculated by the following formula

$$E_{accuracy} = \pm 0.115 \frac{e}{D}$$

where $E_{accuracy}$ is eccentricity error in [°], e is misalignment of ring's center towards the rotational axis in [µm] and D is the outer ring diameter in [mm].

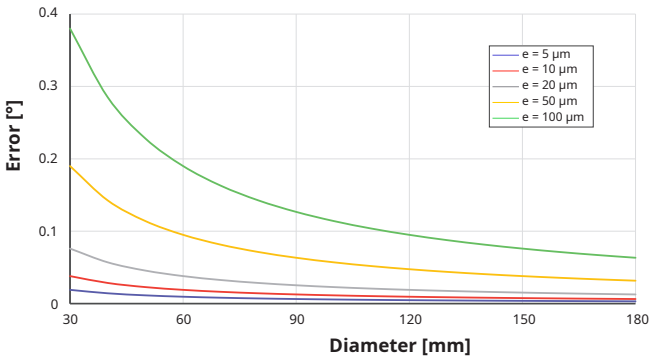


Fig. 4. Influence of installation eccentricity on accuracy.

Deformations of the ring during installation

By installing a ring to a non-ideally circular shaft, possible deformations can occur. These can have a significant influence on the system accuracy error.

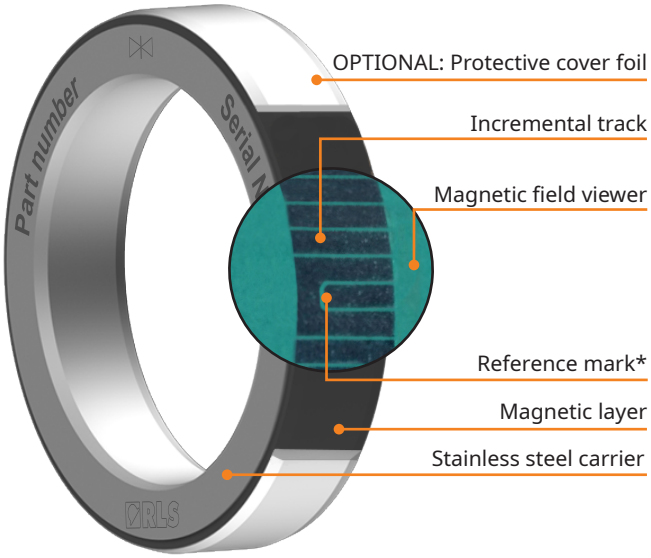
Maximum speed table

Below are maximum speed values limited by the mechanical characteristics of the ring. For electrical characteristics use **Ring speed calculator.** For higher speed **contact RLS.**

Ring	Option B, E and G (no cover foil)	Option G (with cover foil)	Option U (with welded cover foil)
MR031	10,000	40,000	55,000
MR040	9,000	30,000	50,000
MR047	8,500	-	-
MR050	8,300	24,700	42,000
MR057	7,437	21,700	-
MR063	6,750	19,600	34,000
MR076	5,600	16,300	-
MR081	5,232	15,300	26,000
MR101	4,181	12,200	21,000
MR114	-	-	18,000
MR123	3,444	10,100	-
MR127	3,200	9,700	16,000
MR162	2,598	7,600	13,000
MR325	1,000	-	-

Speed is in RPM.

Magnetic ring design



The shape of the reference mark may vary. The image is for representation purposes only.

* The MR047B has the reference mark located on the opposite side.

The position of the magnetised reference mark is always the same, on the engraved side of the ring as shown in the figure below.

Ring markings

All magnetic ring markings, except MR047B include serial number, QR code, logo, part number and reference mark. They are engraved on the hub. The reference mark engraving can deviate from the actual position of the reference mark magnetization for ±5 °. The engraving is for orientation purposes only.

▷|◁	YD1B70
Reference mark sign	Serial number example - unique combination of six letters and digits

Technical specifications

Mechanical data

Material of magnetic layer	NBR + ferrite
Hub thermal expansion coefficient (CTE)	10.2×10^{-6} [K^{-1}]

Environmental data

Storage and operating temperature	–40 °C to +85 °C For higher operating temperatures **contact RLS**.

Reference mark

Unique reference mark

The readhead must be ordered with reference mark option **A** (see corresponding readhead data sheet). The magnetic ring must be ordered with reference mark option **A** (see **Part numbering**).

The shape and position of the magnetised reference mark are critical so this option is only available as factory order.

Distance coded reference mark (DCRM)

The readhead should be ordered with reference mark option **A**. The distance coded reference mark option provides multiple reference marks that are individually spaced according to specific mathematical algorithm. Absolute position is calculated after traversing 2 succesive reference marks. Maximum length and minimum traverse depend on basic spacing (**K**) between reference marks. The magnetic ring must be ordered with reference mark option **D** (see **Part numbering**).

For more references on ring **contact RLS.**

MR040G / MR040U	MR050G / MR050U	MR057E / MR057G	MR063G/MR063U	MR076G	MR081G/MR081U	MR101G/MR101U	MR114U	MR127G / MR127U	MR162G / MR162U	MR325E
2 mm pole length	2 mm pole length	2 mm pole length	2 mm pole length	2 mm pole length	2 mm pole length	2 mm pole length	2 mm pole length	2 mm pole length	2 mm pole length	2 mm pole length
K = 32 [°]	**K = 40** [°]	**K = 36** [°]	**K = 40** [°]	**K = 60** [°]	**K = 64** [°]	**K = 40** [°]	**K = 60** [°]	**K = 80** [°]	**K = 64** [°]	**K = 128** [°]
360	360	360	360	360	360	360	360	360	360	360
309.38	310	320	320	312	313	335	328	322	336	336
270	270	288	288	270	270	315	300	288	315	315
213.75	216	244	245	219	219	288	266	248	290	291
180	180	216	216	180	180	270	240	217	270	270
118.13	121.5	168	169	126	127	241	204	175	243	245
90	90	144	144	90	90	225	180	144	225	225
22.5	27	92	94	33	34	194	142	101	197	199
0	0	72	72	0	0	180	120	72	180	180
-	-	16	18	-	-	146	80	27	150	153
-	-	0	0	-	-	135	60	0	135	135
-	-	-	-	-	-	99	18	-	104	108
-	-	-	-	-	-	90	0	-	90	90
-	-	-	-	-	-	52	-	-	58	62
-	-	-	-	-	-	45	-	-	45	45
-	-	-	-	-	-	0	-	-	11	16
-	-	-	-	-	-	-	-	-	0	0

Installation instructions

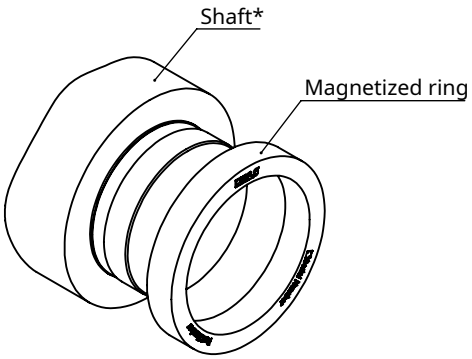
Machine the mounting shaft according to the dimensions given in the table below. Values in orange represent option with cover foil.

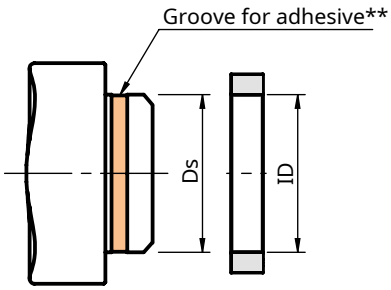
Radial ring	Outer diameter - OD [mm]	Inner diameter - ID [mm]	Shaft diameter (clearance fit installation, fasteners, gluing) - Ds	Shaft outer diameter (press-fit) - Dspd	Mass [g]	System error [°]	Moment of inertia [kgmm²]
MR031G	31 / 31.15 +0.1 / +0.12 –0.1 / –0.12	20 H7 +0.021 0	20 g6 –0.007 –0.02	20 r6 +0.041 +0.028	24	±0.16	3.9
MR031U	31.15 +0.1 –0.1	20 H7 +0.021 0	20 g6 –0.007 –0.02	20 r6 +0.041 +0.028	31	±0.16	5.3
MR040G	40 / 40.15 +0.1 / +0.12 –0.1 / –0.12	30 H7 +0.021 0	30 g6 –0.007 –0.02	30 r6 +0.041 +0.028	30	±0.13	8.9
MR040U	40.15 +0.1 –0.1	30 H7 +0.021 0	30 g6 –0.007 –0.02	30 r6 +0.041 +0.028	39	±0.13	12.1
MR047B	47.5 +0.1 –0.1	44 + 0.02 0	See mounting instructions on **page 10**		9	±0.11	4.5
MR050G	50.1 / 50.25 +0.1 / +0.12 –0.1 / –0.12	40 H7 +0.025 0	40 g6 –0.009 –0.025	40 r6 +0.05 +0.034	39	±0.10	19.4
MR050U	50.25 +0.1 –0.1	40 H7 +0.025 0	40 g6 –0.009 –0.025	40 r6 +0.05 +0.034	51	±0.10	25.9
MR057E	57.3 / 57.45 +0.1 / +0.12 –0.1 / –0.12	50 H7 +0.025 0	50 g6 –0.009 –0.025	50 r6 +0.05 +0.034	41	±0.09	29.0
MR057G	56.5 / 56.65 +0.1 / +0.12 –0.1 / –0.12	45 H7 +0.025 0	45 g6 –0.009 –0.025	45 r6 +0.05 +0.034	50	±0.09	33.0
MR063G	62.9 / 63.05 +0.1 / +0.12 –0.1 / –0.12	40 H7 +0.025 0	40 g6 –0.009 –0.025	40 r6 +0.05 +0.034	102	±0.08	69.6
MR063U	63.05 +0.1 –0.1	50 H7 / 40 H7 +0.025 0	50 g6 / 40 g6 –0.009 –0.025	50 r6 / 40 r6 +0.05 +0.034	83 / 131	±0.08	66.3 / 90.3
MR076G	75,6 / 75,75 +0.1 / +0.12 –0.1 / –0.12	60 H7 +0.030 0	60 g6 –0.010 –0.029	60 r6 +0.060 +0.041	87	±0.07	108
MR081G	80.7 / 80.85 +0.1 / +0.12 –0.1 / –0.12	60 H7 +0.030 0	60 g6 –0.01 –0.029	60 r6 +0.06 +0.041	126	±0.06	158.3
MR081U	80.85 +0.1 –0.1	60 H7 +0.030 0	60 g6 –0.01 –0.029	60 r6 +0.06 +0.041	163	±0.06	204.9
MR101G	101 / 101.15 +0.1 / +0.12 –0.1 / –0.12	85 H7 +0.035 0	85 g6 –0.012 –0.034	85 r6 +0.073 +0.051	133	±0.05	287.0
MR101U	101.15 +0.1 –0.1	85 H7 +0.035 0	85 g6 –0.012 –0.034	85 r6 +0.073 +0.051	171	±0.05	371.0
MR114U	113.95 +0.1 –0.1	95 H7 +0.035 0	95 g6 –0.012 –0.034	95 r6 +0.073 +0.051	221	±0.05	604.0
MR123G	122.7 / 122.85 +0.1 / +0.12 –0.1 / -0.12	90 H7 +0.035 0	90 g6 –0.012 –0.034	90 r6 +0.073 +0.051	316	±0.04	911.4
MR127G	126.5 / 126.65 +0.1 / +0.12 –0.1 / –0.12	100 H7 +0.035 0	100 g6 –0.012 –0.034	100 r6 +0.073 +0.051	271	±0.04	875.0
MR127U	126.65 +0.1 –0.1	100 H7 +0.035 0	100 g6 –0.012 –0.034	100 r6 +0.073 +0.051	345	±0.04	1118.0
MR162G	162.2 / 162.35 +0.1 / +0.12 –0.1 / –0.12	143 H7 +0.040 0	143 g6 –0.014 –0.039	143 r6 +0.09 +0.065	260	±0.03	1512.3
MR162U	162.35 +0.1 –0.1	143 H7 +0.040 0	143 g6 –0.014 –0.039	143 r6 +0.09 +0.065	334	±0.03	1948.1
MR325E	325.1 +0.2 –0.2	280 G7 / 240 G7 +0.069 / +0.044 +0.017 / +0.015	280 h6 / 240 h6 0 / 0 –0.032 / –0.029	280 s6 / 240 s6 +0.19 / +0.169 +0.158 / +0.14	1600 / 2900	±0.03	36640.0 / 57720.0

Installation by gluing

Make sure the installation surface is clean and free of debris. For more information see adhesive manufacturer's datasheet.

For all radial rings except MR047B

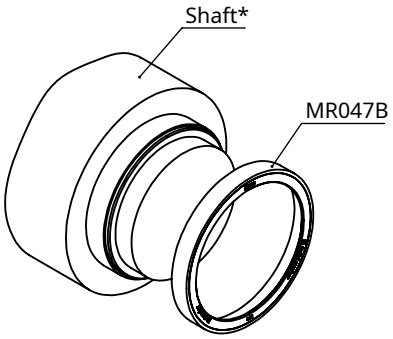


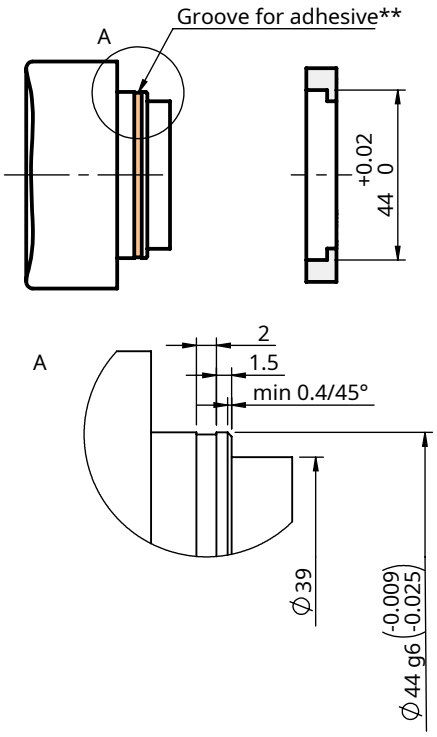


* Not provided.

** For the depth of the groove, please check the specifications of the adhesive (adhesive not provided).

For ring MR047B





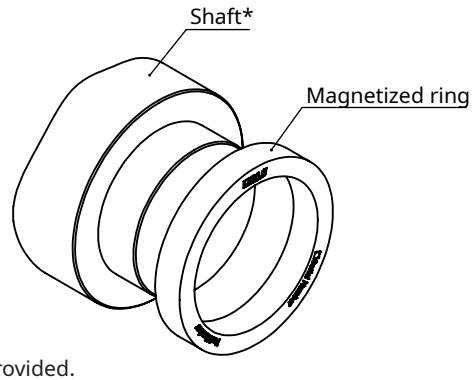
* Not provided.

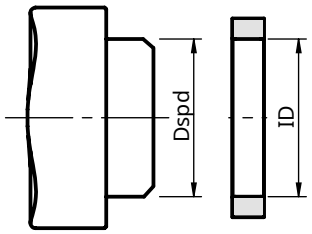
** For the depth of the groove, please check the specifications of the adhesive (adhesive not provided).

Installation by press-fitting

Make sure the installation surface is clean and free of debris. Slip the ring onto the mating shaft applying equal or uniform force along the whole ring circumference. For recommended shaft diameter (Dspd) see table on **page 9.**

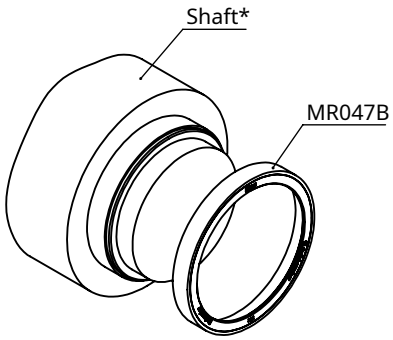
For all radial rings except MR047B

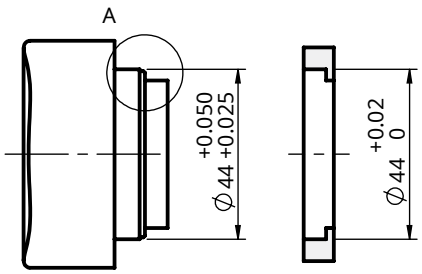


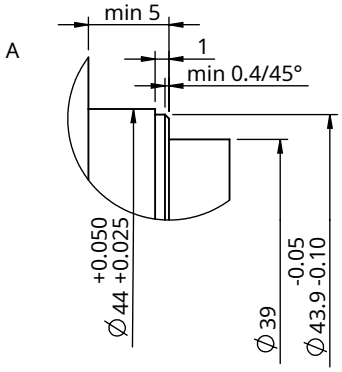


*Not provided.

For ring MR047B





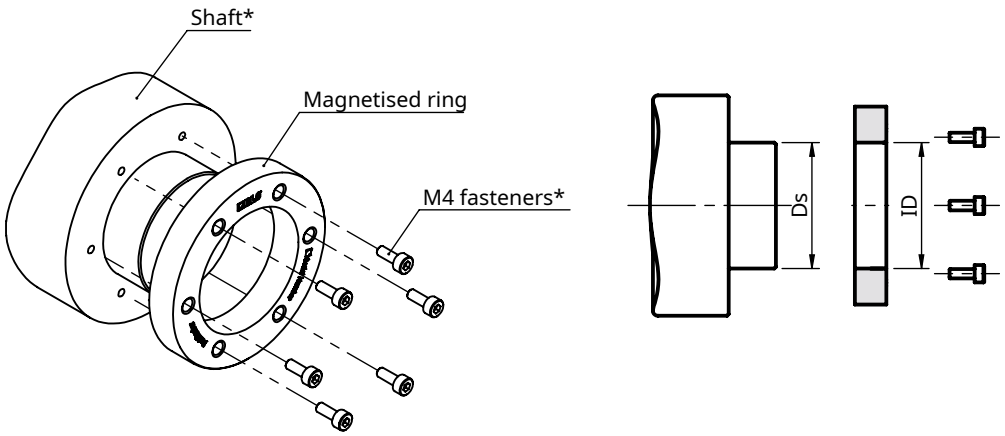


* Not provided.

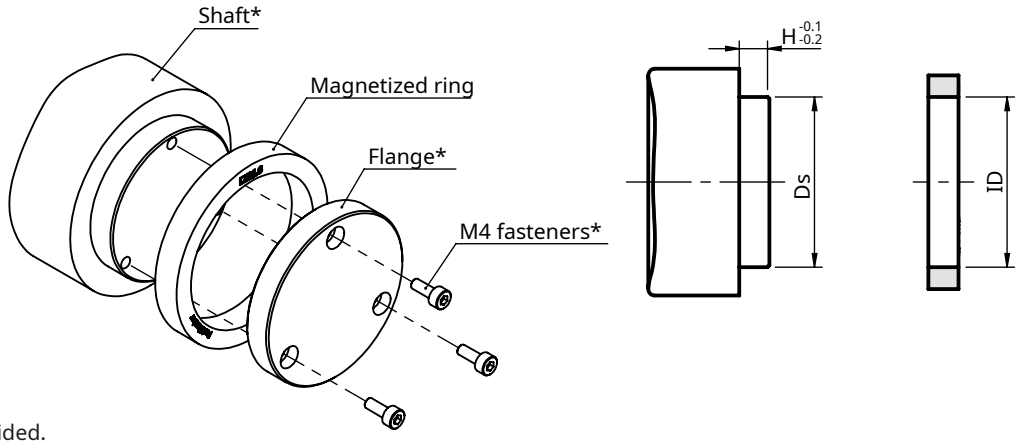
Installation with fasteners

Applicable for MR063G, MR081G, MR127G, MR162G, MR063U (ID: Ø40), MR127U, MR162U, MR081U, MR114U and MR325E rings.

Make sure the installation surface is clean and free of debris. Rings need to be attached with fasteners as per the installation drawings (see appropriate ring page).
For recommended tightening torque see Table of recommended fasteners tightening torques available at **RLS media center.**

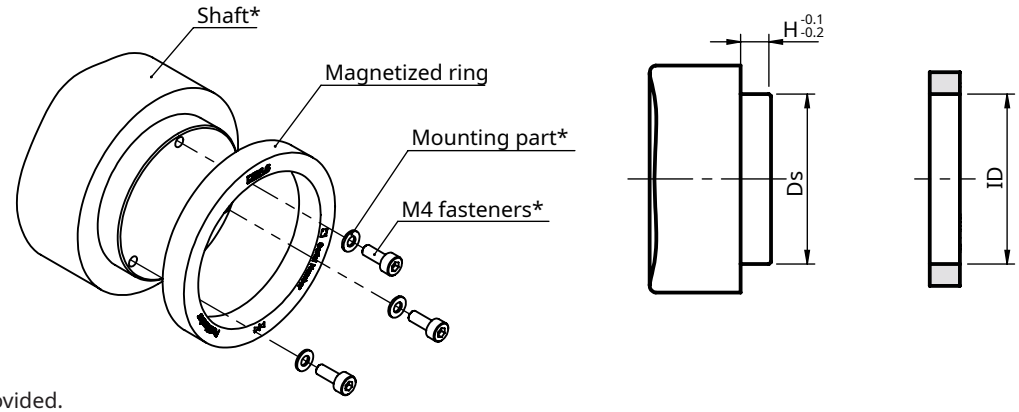


Flange



* Not provided.

Mounting part



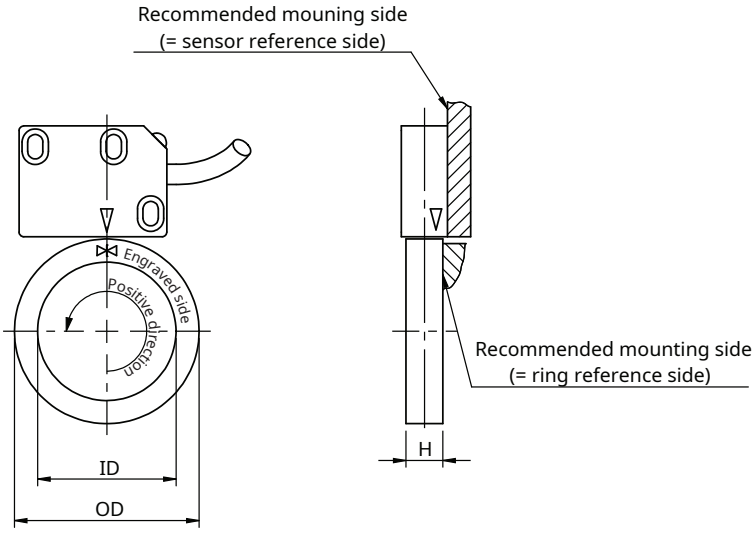
* Not provided.

Installation drawings

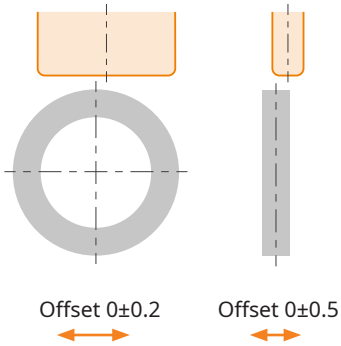
Standard ring (except MR047B)

The following **drawings show the positive direction of rotation of the ring and not the readhead.**

Installation with LM10 readhead

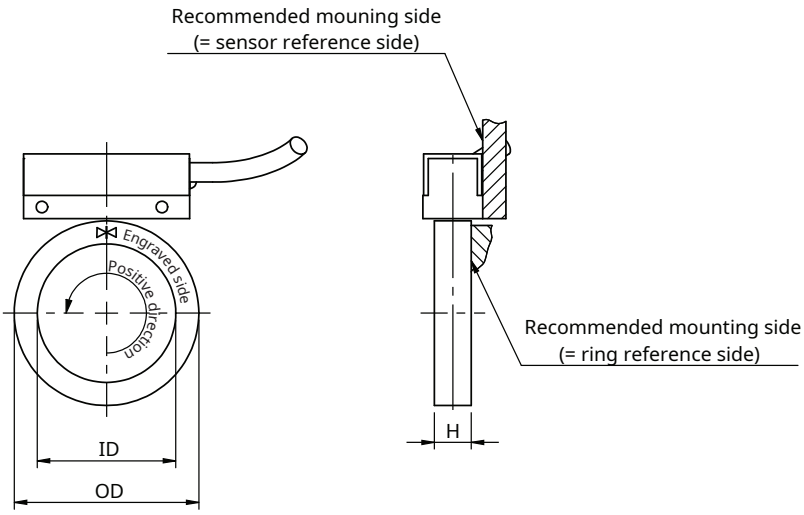


Offset range

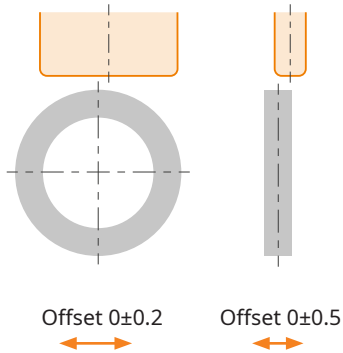


For readhead specifications see LM10 data sheet available at **RLS media center.**

Installation with LM13 readhead

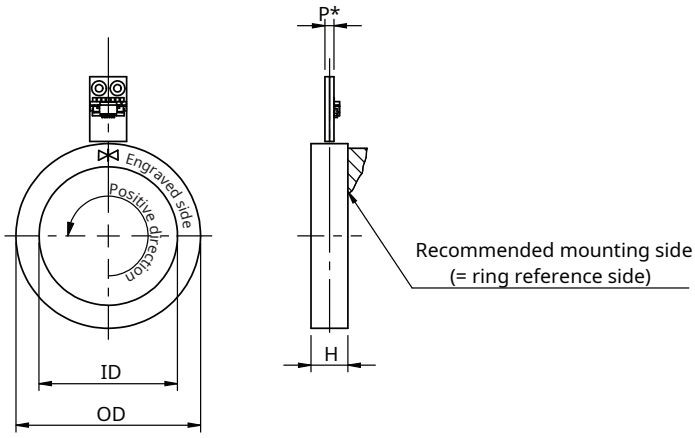


Offset range

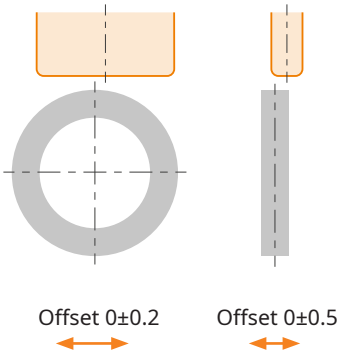


For readhead specifications see LM13 data sheet available at **RLS media center.**

Installation with RLB readhead



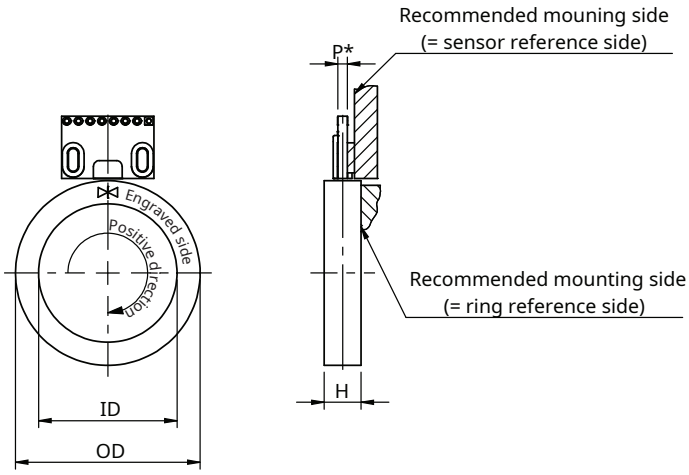
Offset range



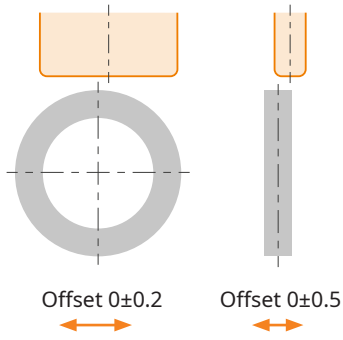
For readhead specifications see RLB data sheet available at **RLS media center.**

* Centerline of marked dimension is specified as a centerline of entire encoder.

Installation with RLC2HD readhead



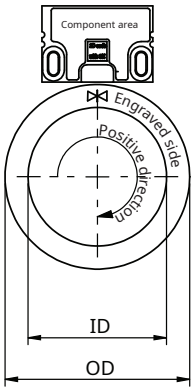
Offset range

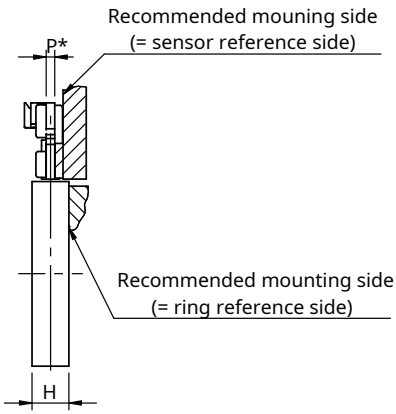


For readhead specifications see RLC2HD data sheets available at **RLS media center.**

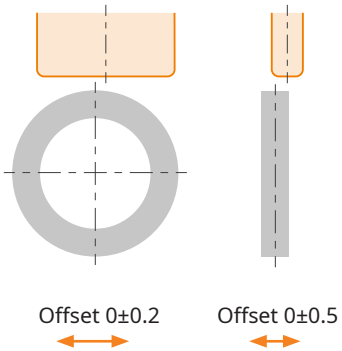
* Centerline of marked dimension is specified as a centerline of entire encoder.

Installation with RLC2IA readhead





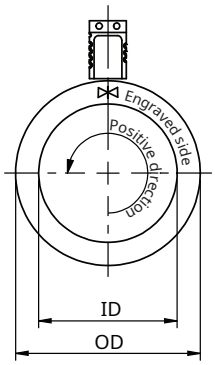
Offset range

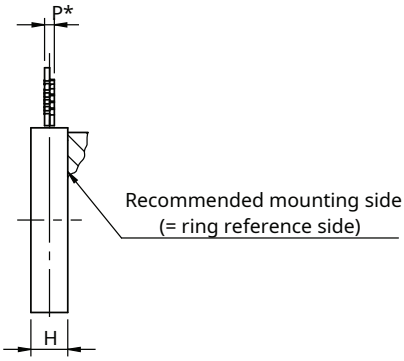


For readhead specifications see RLC2IA data sheet available at **RLS media center.**

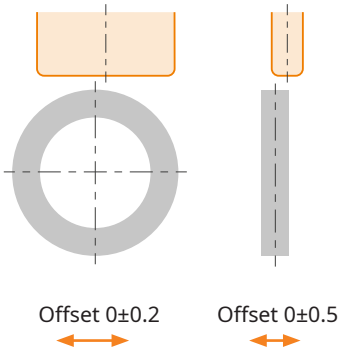
* Centerline of marked dimension is specified as a centerline of entire encoder.

Installation with RLC2IC readhead





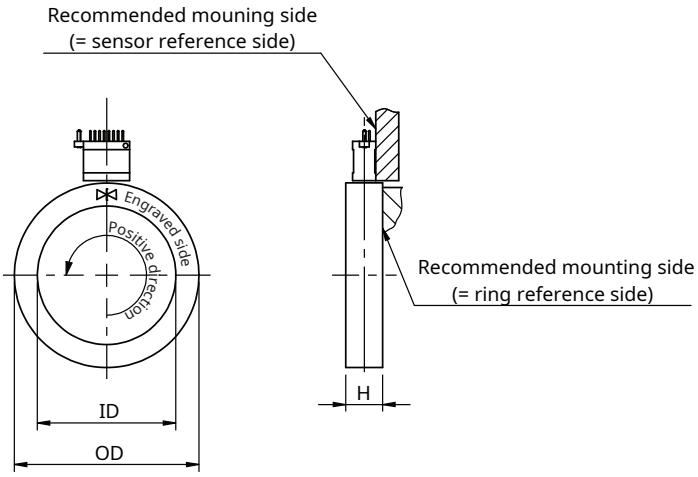
Offset range



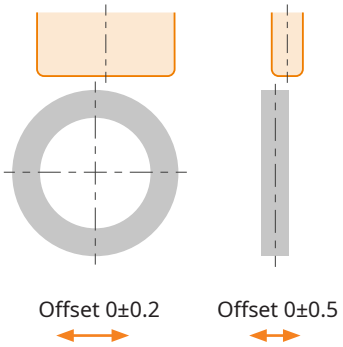
For readhead specifications see RLC2IC data sheet available at **RLS media center.**

* Centerline of marked dimension is specified as a centerline of entire encoder.

Installation with RLM readhead



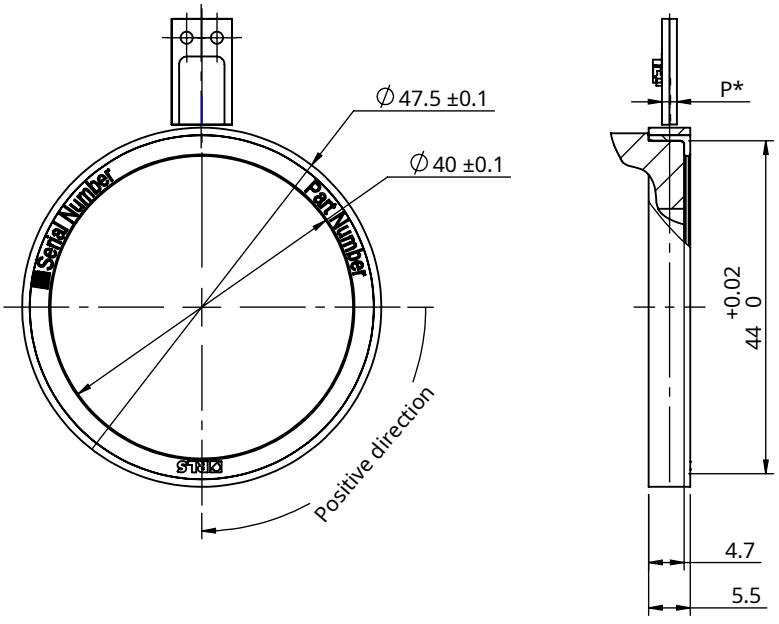
Offset range



For readhead specifications see RLM data sheet available at **RLS media center.**

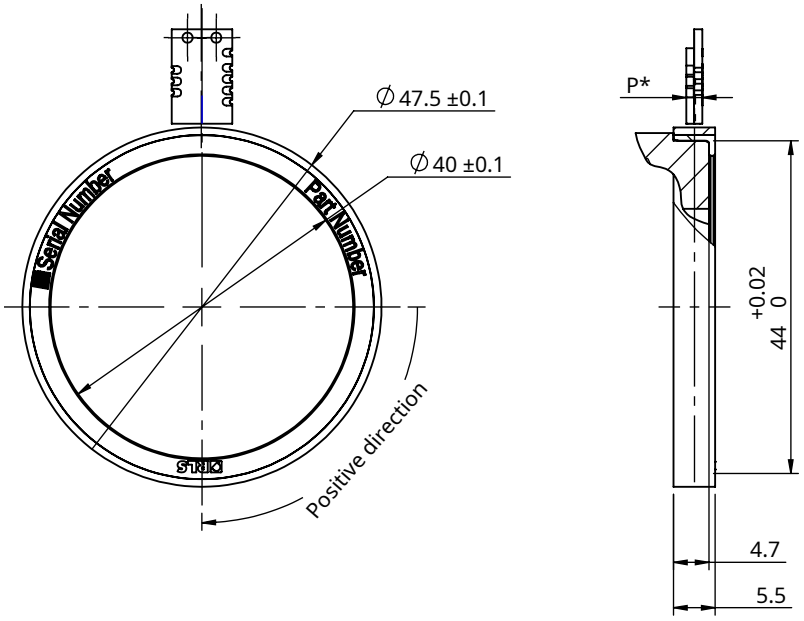
Installation for ring MR047B

Installation with RLB readhead



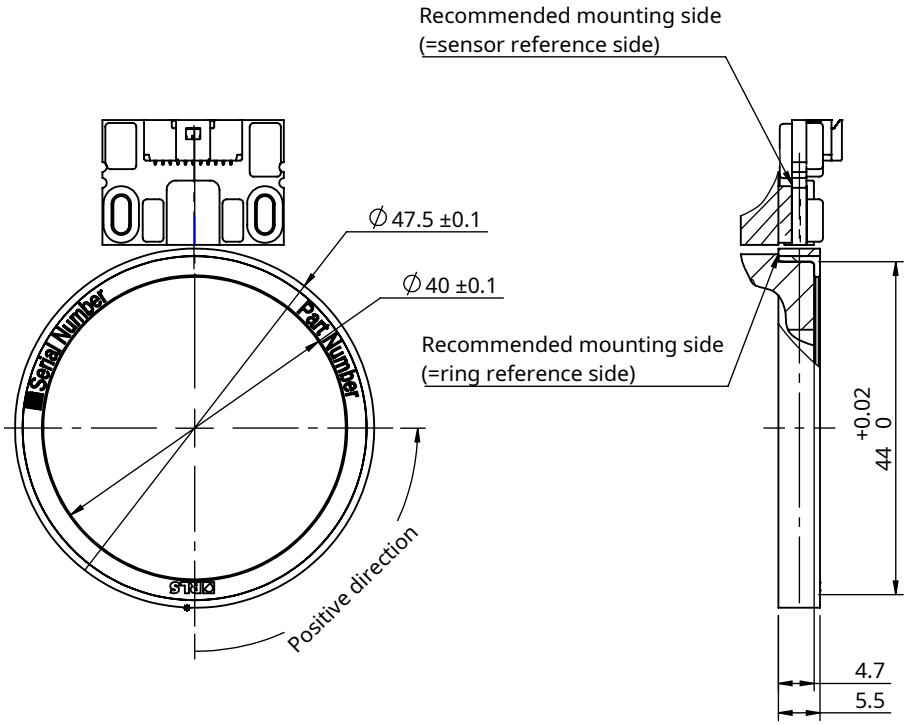
* Centerline of marked dimension is specified as a centerline of entire encoder.

Installation with RLC2HD readhead

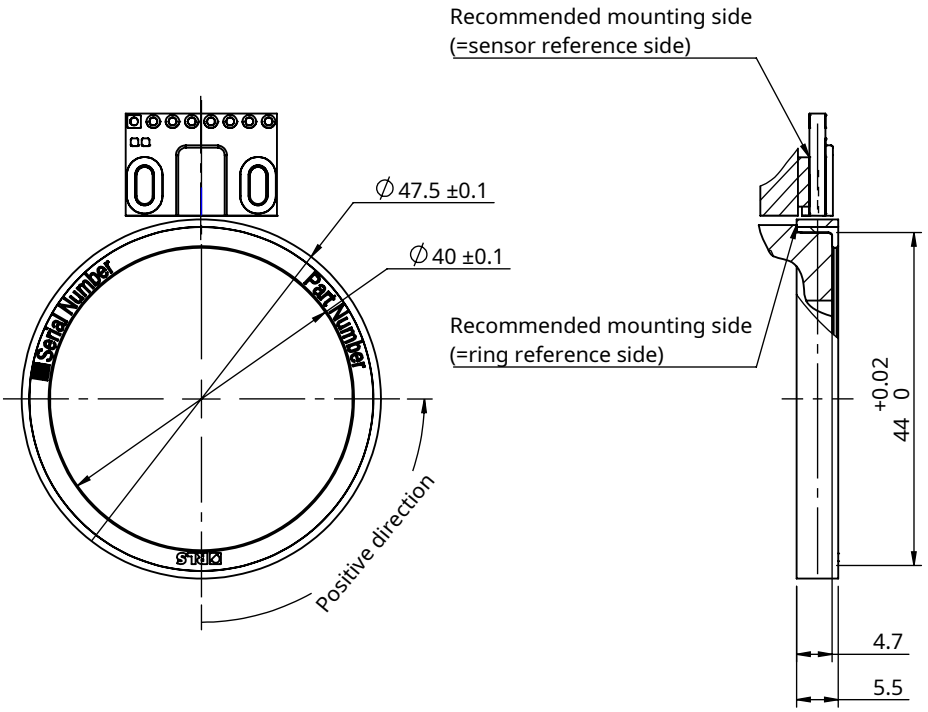


* Centerline of marked dimension is specified as a centerline of entire encoder.

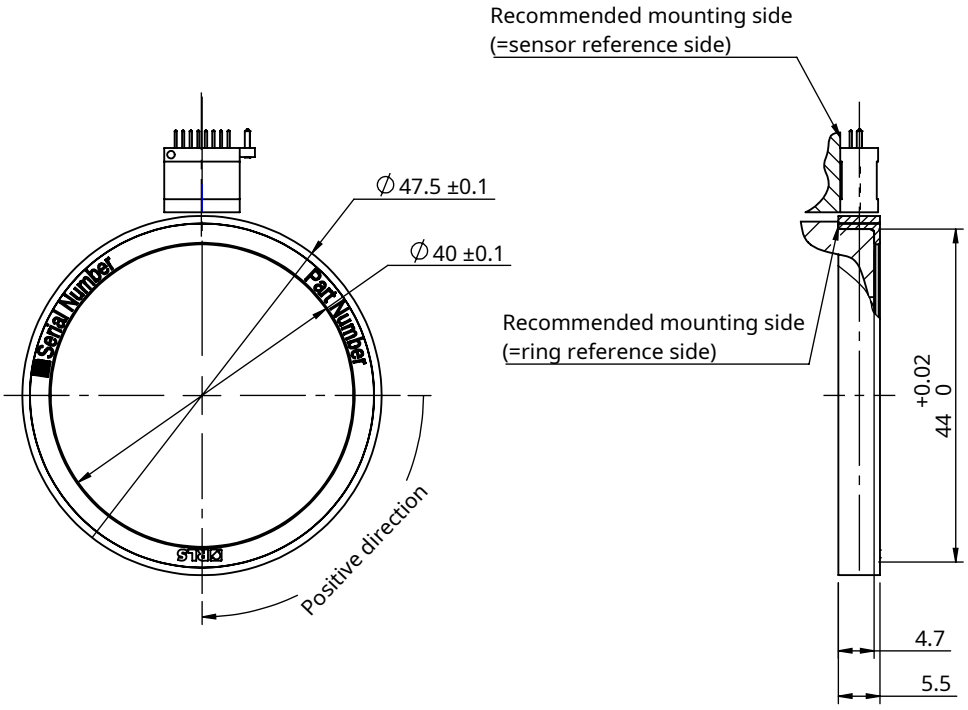
Installation with RLC2IA readhead



Installation with RLC2IC readhead

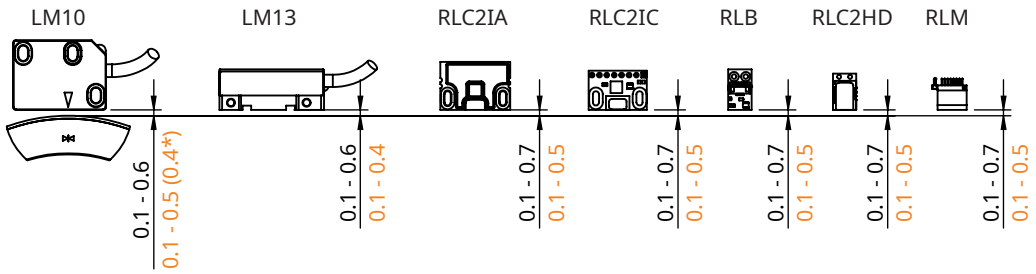


Installation with RLM readhead



Recommended ride height

For optimum performance, all readheads should be installed at **the recommended ride height of 0.3 mm**. The readheads are calibrated at this nominal ride height to achieve lower SDE and higher accuracy.



Dimensions and tolerances are in mm. Values in orange represent option with cover foil.

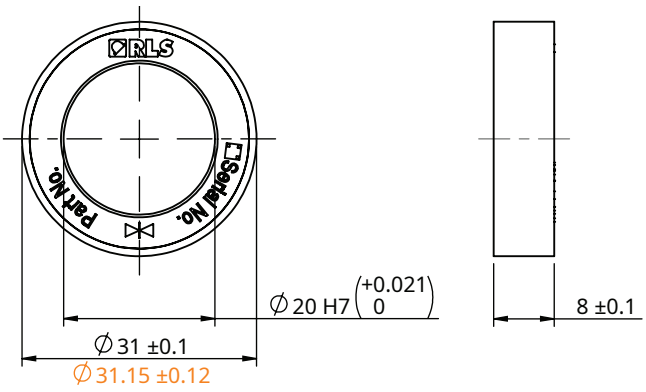
* For combination with bonded radial rings with welded cover foil up to and including MR040.

Dimension drawings

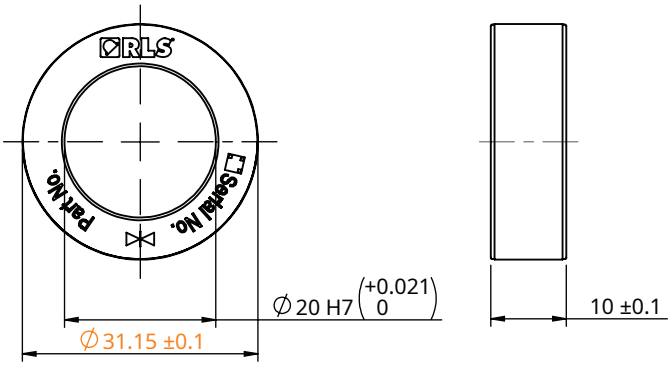
Dimensions and tolerances are in mm. Values in orange represent option with cover foil.

3D model available for download at **RLS website** The installation holes in the 3D models of the rings are provided without modeled threads.

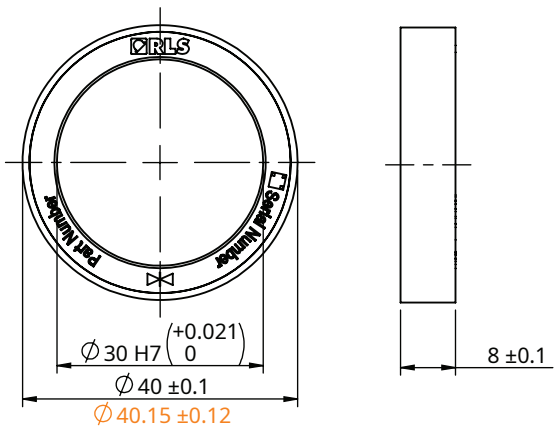
MR031G



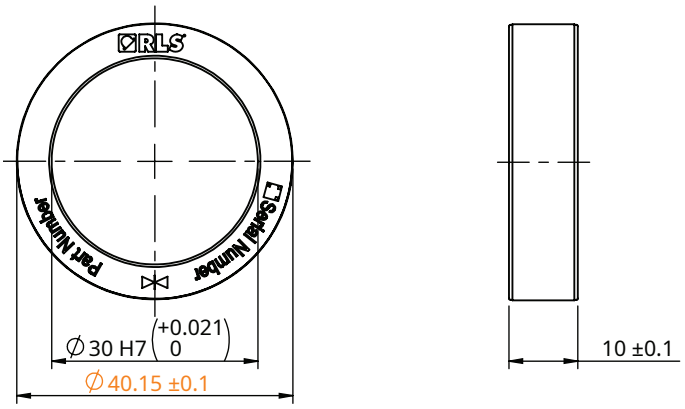
MR031U



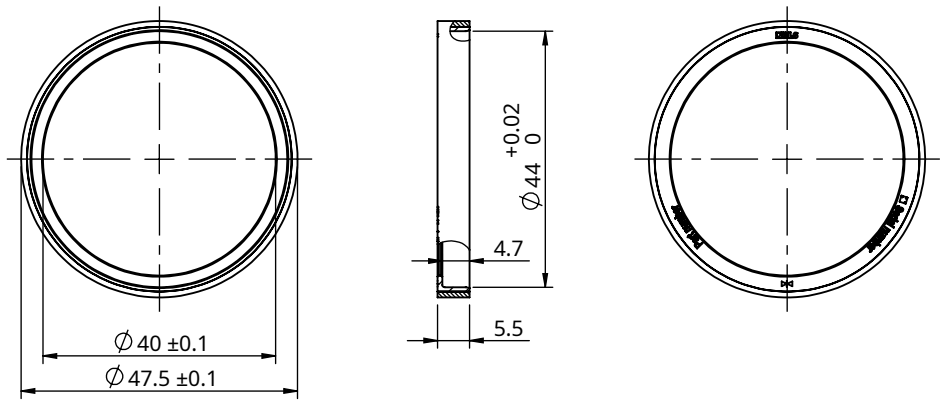
MR040G



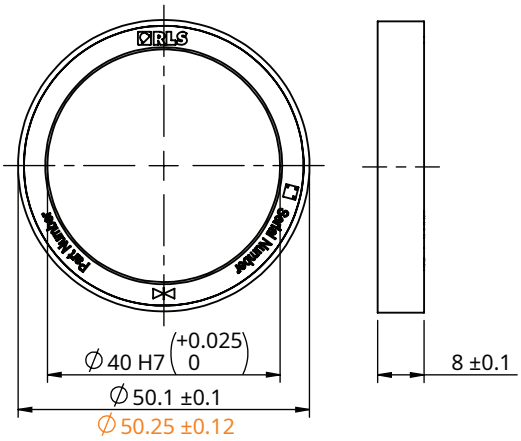
MR040U



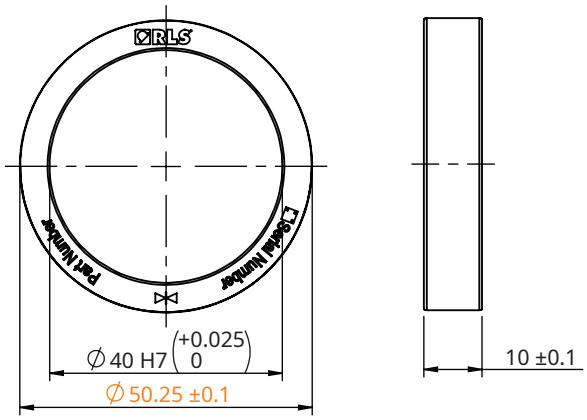
MR047B



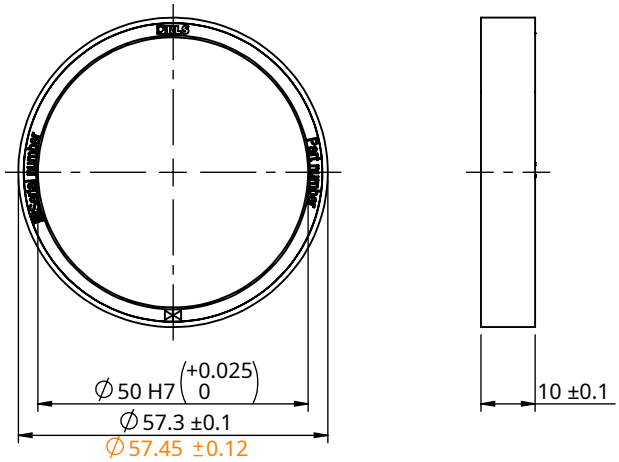
MR050G



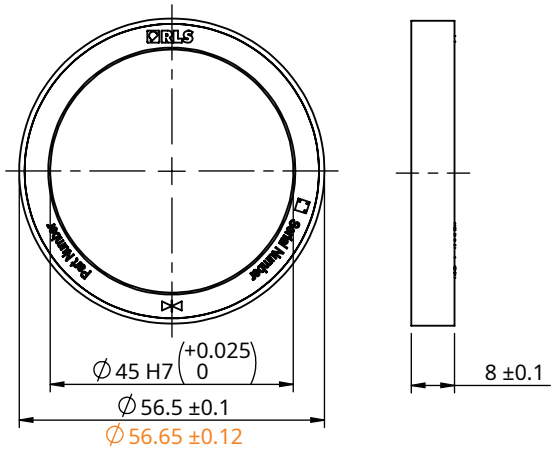
MR050U



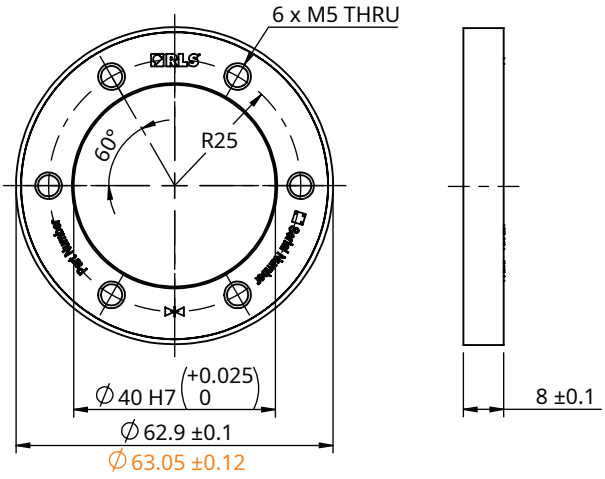
MR057E



MR057G

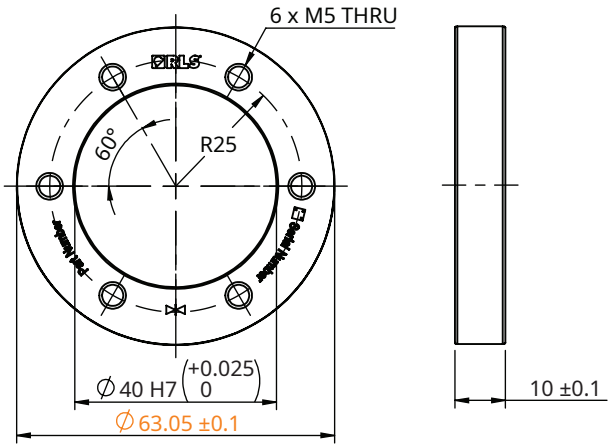


MR063G

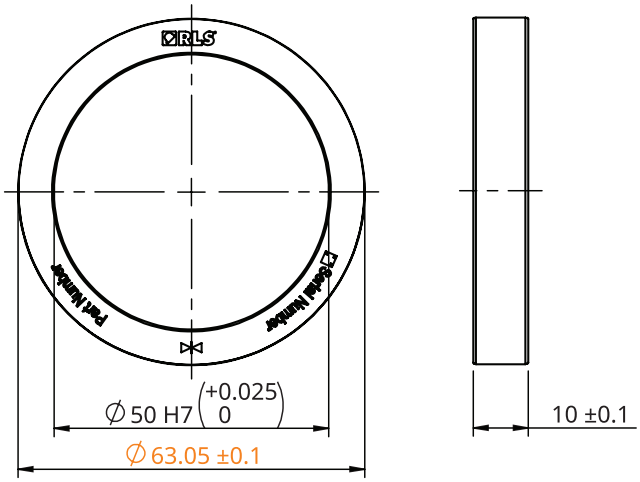


MR063U

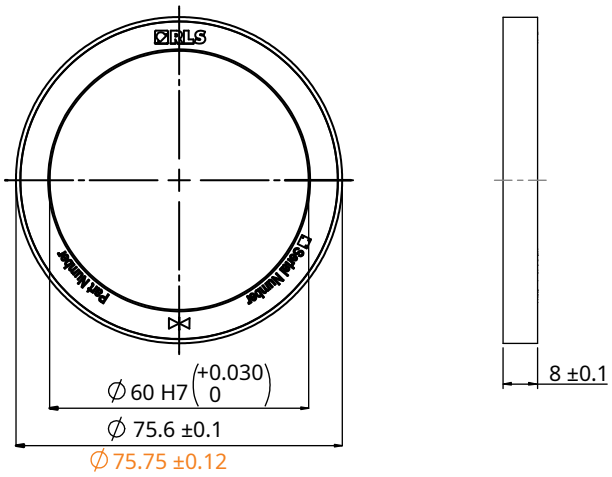
MR063U with inner diameter Ø40 H7



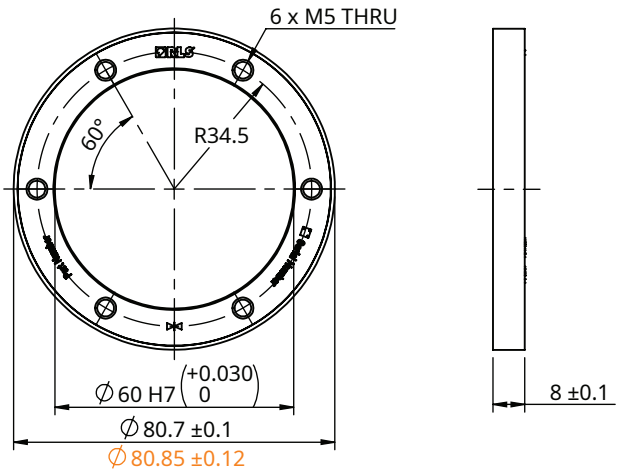
MR063U with inner diameter Ø50 H7



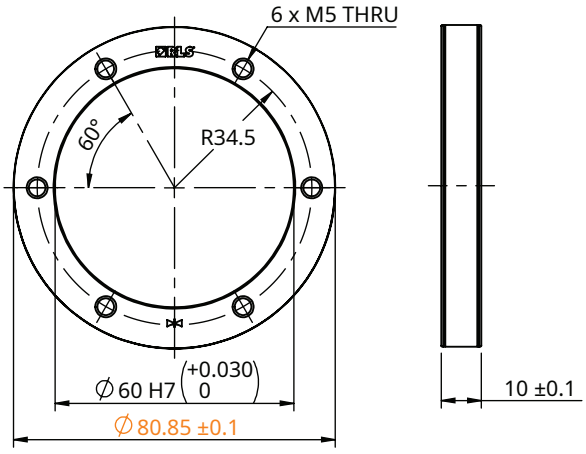
MR076G



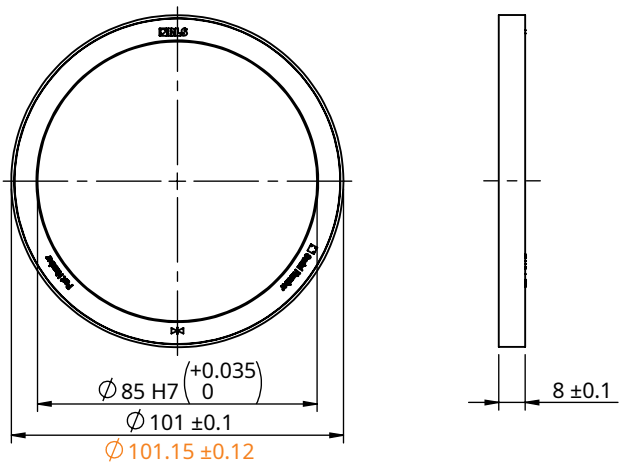
MR081G



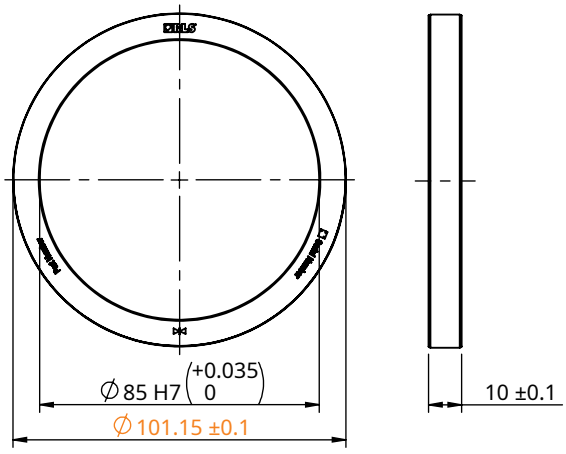
MR081U



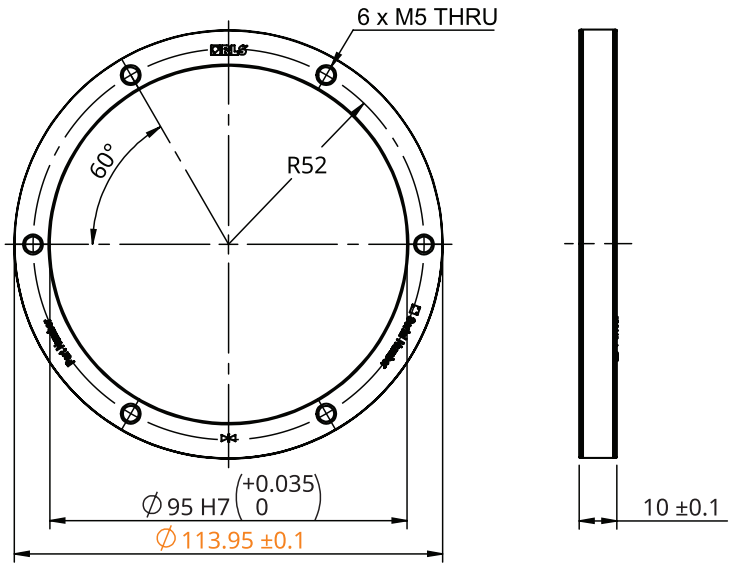
MR101G

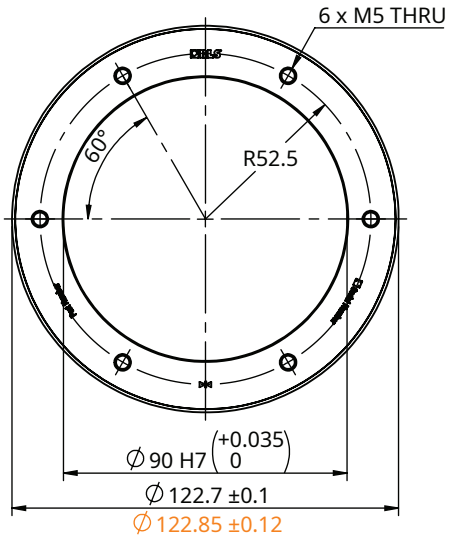


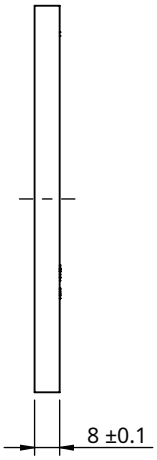
MR101U



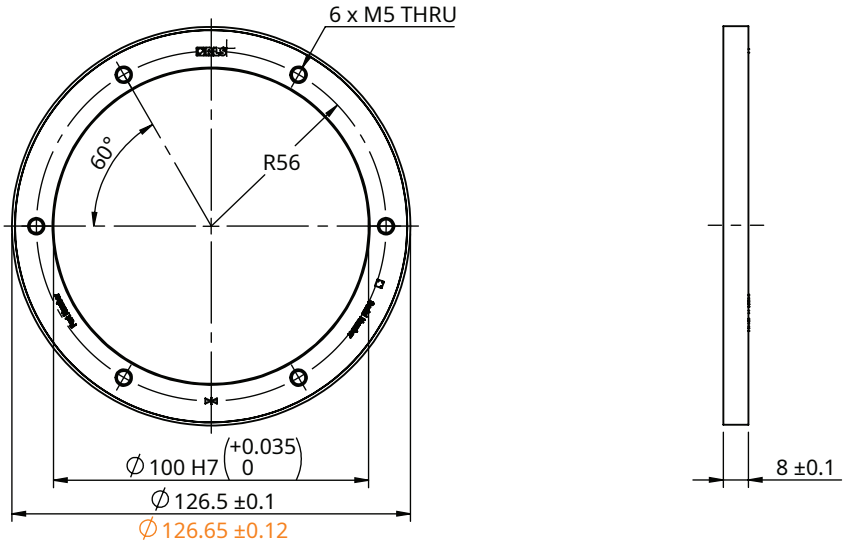
MR114U



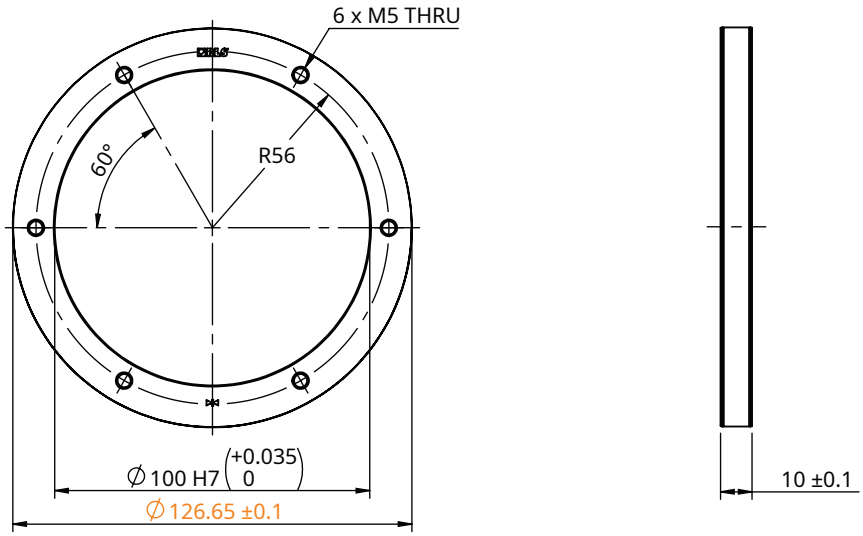

6 x M5 THRU
60°
R52.5
∅90 H7 (+0.035 0)
∅122.7 ±0.1
∅122.85 ±0.12


8 ±0.1

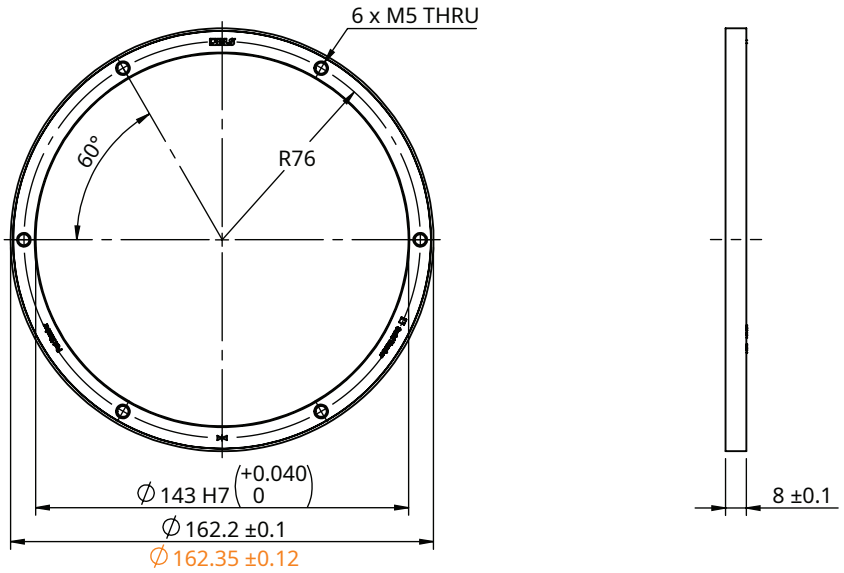
MR127G



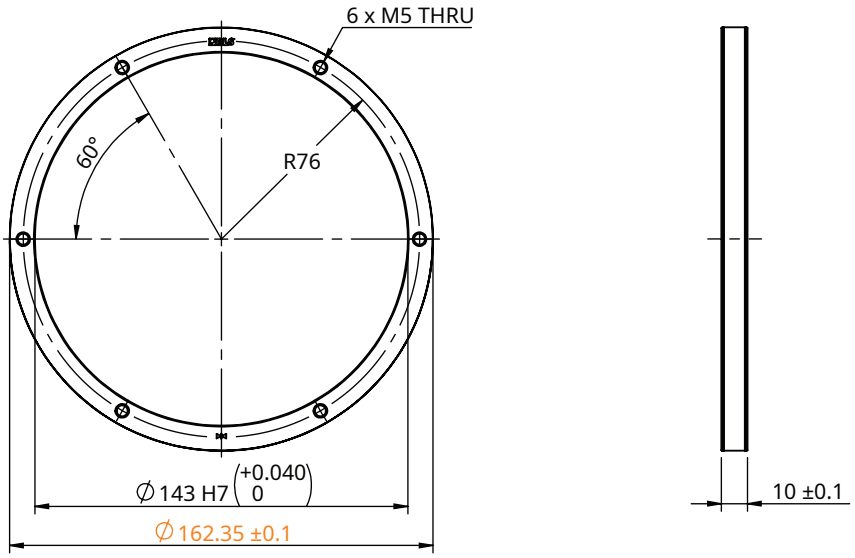
MR127U



MR162G

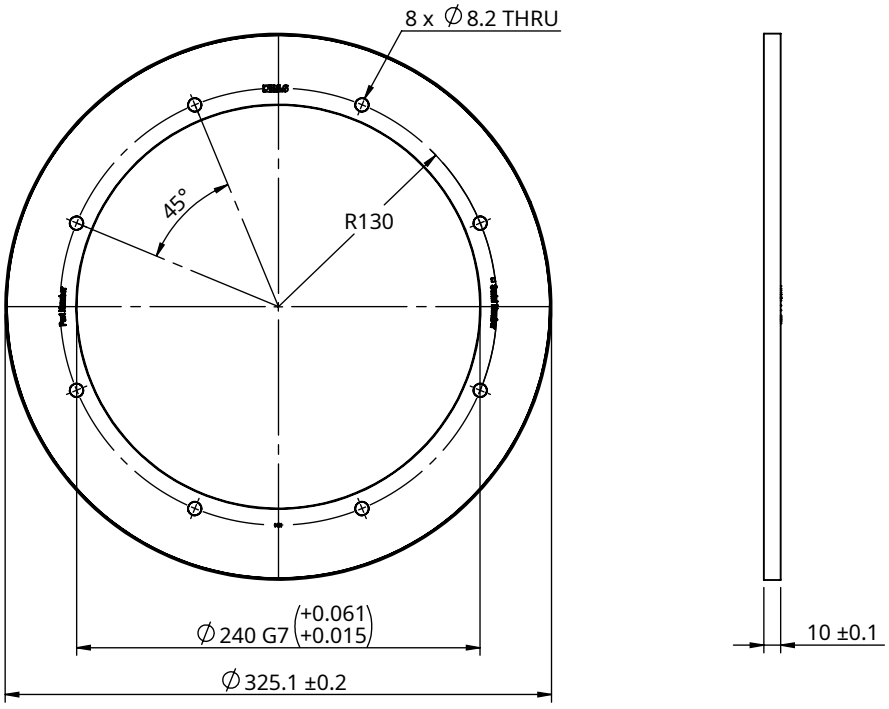


MR162U

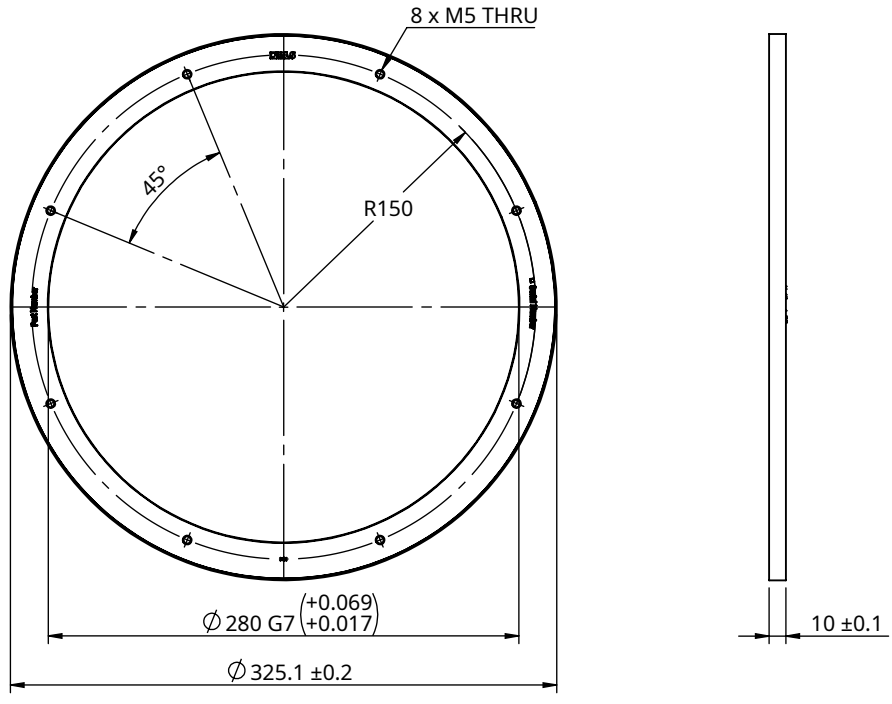


MR325E

MR325E with inner diameter Ø240 G7



MR325E with inner diameter Ø280 G7



Part numbering

MR 031 G 020 B 050 N 00

Outer diameter

031 - 31 mm	**063** - 63 mm	**123** - 123 mm
040 - 40 mm	**076** - 76 mm	**127** - 127 mm
047 - 47 mm	**081** - 81 mm	**162** - 162 mm
050 - 50 mm	**101** - 101 mm	**325** - 325 mm
057 - 57 mm	**114** - 114 mm	

Cross section

B - Height 5.5 mm
E - Height 10 mm
G - Height 8 mm
U - Height 10 mm, welded cover foil

Inner diameter

020 - 20 mm	**060** - 60 mm	**143** - 143 mm
030 - 30 mm	**085** - 85 mm	**240** - 240 mm
040 - 40 mm	**090** - 90 mm	**280** - 280 mm
045 - 45 mm	**095** - 95 mm	
050 - 50 mm	**100** - 100 mm	

Reference mark

A - With reference mark
B - Without reference mark
D - Distance coded reference mark

Number of poles

050 - 50 poles	**100** - 100 poles	**194** - 194 poles
064 - 64 poles	**120** - 120 poles	**200** - 200 poles
076 - 76 poles	**128** - 128 poles	**256** - 256 poles
080 - 80 poles	**160** - 160 poles	**512** - 512 poles
090 - 90 poles	**180** - 180 poles	

Material

L - Stainless steel hub with bonded rubber tape
N - Stainless steel with bonded rubber tape, with cover foil

Special requirements

00 - No special requirements

Not all part number combinations are valid. The inner diameter of rings is related to the outer diameter and cannot be randomly selected. Refer to the table of available combinations on the next page.

Table of available combinations

Series	Outer diameter	Cross section	Inner diameter	Reference mark	Number of poles	Cover foil option	Special requirements
MR	031	G	020	A / B	050	L / N	00
		U				N	
	040	G	030	A / B / D	064	L / N	
		U				N	
	047	B	040	A / B	076	L	
	050	G	040	A / B / D	080	L / N	
		U				N	
	057	E	050	A / B / D	090	L / N	
		G	045				
	063	G	040	A / B / D	100	L / N	
		U	040			N	
			050				
	076	G	060	A / B / D	120	L / N	
	081	G	060	A / B / D	128	L / N	
		U				N	
	101	G	085	A / B / D	160	L / N	
		U				N	
	114	U	095	A / B / D	180	N	
	123	G	090	A / B	194	L / N	
	127	G	100	A / B / D	200	L / N	
		U				N	
	162	G	143	A / B / D	256	L / N	
		U				N	
	325	E	240	A / B / D	512	L	
			280				

Accessories



Magnet viewer
MM0001

Packaging

Packaging depends on the ring size and quantity ordered. In general, quantities up to 20 rings are packed individually in boxes, while larger quantities are supplied in dedicated trays.

Part	Tray size	Box size
MR047B	8 units per tray	12 trays per box

All incremental magnetic rings with VHB adhesive tape have 12 months shelf life and should be installed within this period. Date of manufacture is printed on the packaging label.

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Document issues

Issue	Date	Page	Description
7	8. 10. 2025	7, 13-14, 22	MR047B mounting instructions added
8	15. 12. 2025	10 - 40	Angle of projection added
9	27. 7. 2026	2, 3	IP67 added
		2, 15, 17	RLC2IA added
		19	Installation tolerances amended
		-	General data sheet design amended
10	2. 9. 2026	19	Recommended ride height note removed

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