NEW

Micro Cross-Roller Ring **RAU**

Inner diameter: 10mm Outer diameter: 21mm

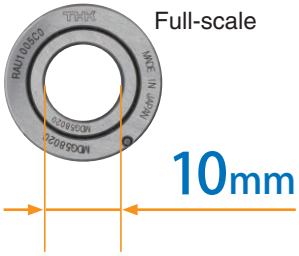
For a compact and lightweight system

THK CO., LTD.
TOKYO, JAPAN

CATALOG No.389-2E

The all-new micro-size Cross-Roller Ring RAU achieves rotary motion in a compact package.

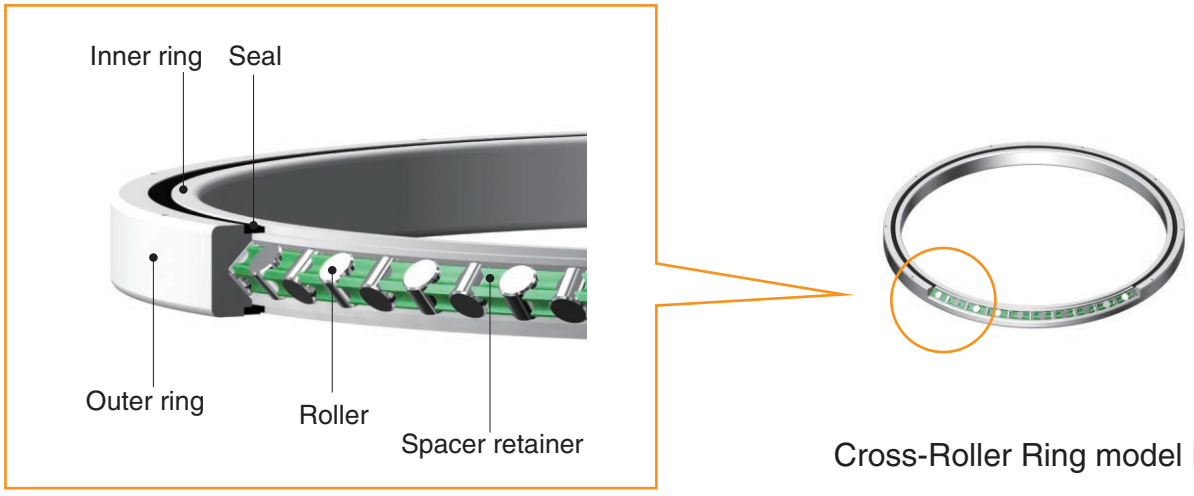
- **Micro Cross-Roller Ring** with inner diameter of 10 mm and outer diameter of 21 mm
- More **compact** than a conventional double row angular contact ball bearing
- Spacer retainer enables smooth movement and high rotation accuracy



Structure

In the RAU, the rollers travel on the V-shaped raceways ground into the inner and outer rings.
Alternating rollers are arrayed orthogonally so that one bearing can support loads and moments in any direction.
Also, because of the integrated structure, the RAU can be used for either inner ring or outer ring rotation.

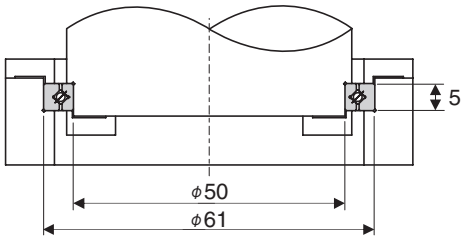
Fig. 1 Structure of Cross Roller-Ring Model RAU



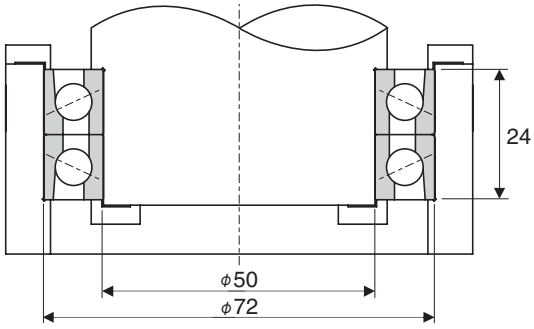
1. Compact and Rigid

The RAU is more compact and lighter weight than a double row angular contact ball bearing. It is also more rigid, even though it is made as compact as possible.

●Comparison, 50 mm inner diameter

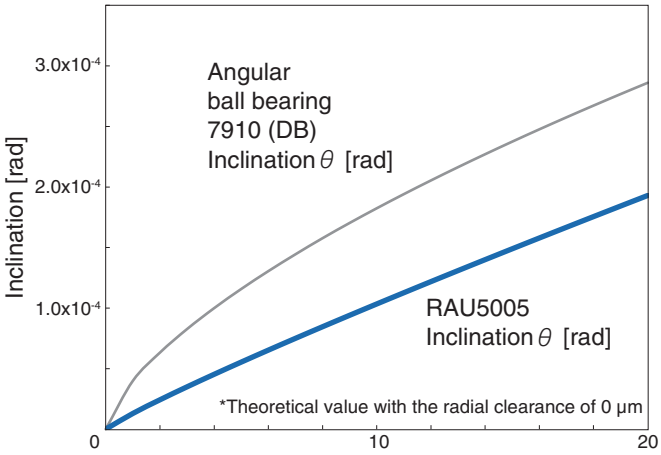


Model RAU



Angular ball bearing

Moment Rigidity Comparison



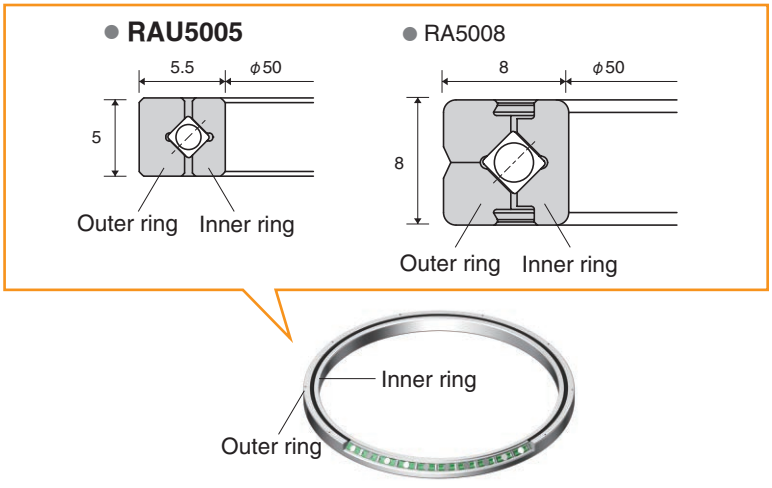
Comparison ofcross-sectional area and mass

Model No.	RAU5005	7910 (DB)
Cross-sectional area	27.5mm²	264mm²
Mass	32g	260g

2. Light Weight

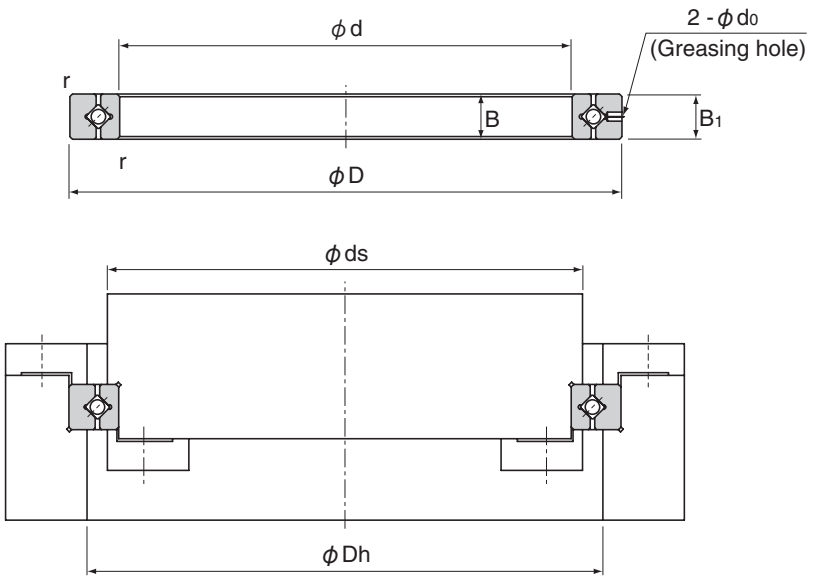
The cross-sectional area of the model RAU is 57% smaller than the Cross-Roller Ring model RA, which was previously the thinnest ever. This enables further weight reduction. The line-up also includes other models whose inner diameters are the smallest to date: 10, 15, 20, 30, and 40mm.

●Comparison of cross section and mass, 50 mm inner diameter



Model No.	RAU5005	RA5008
Cross-sectional area	27.5mm²	64mm²
Mass	32g	80g

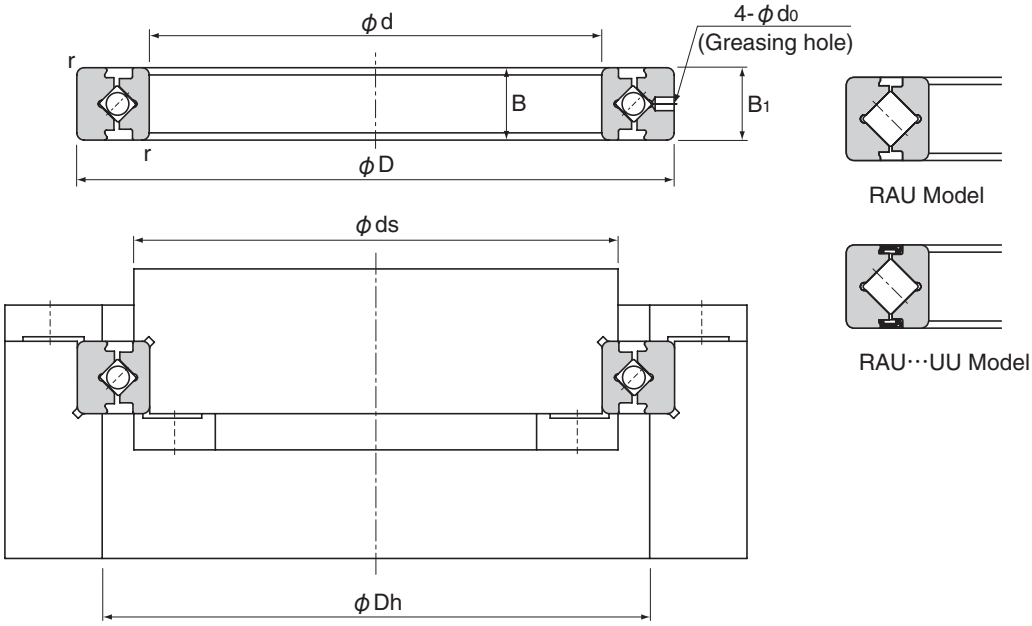
Model RAU (Small-diameter thin type. Width: 5mm)



Unit: mm

Model No.	Main dimensions						Shoulder height		Basic Load Rating (Radial)		Mass
	Inner diameter	Outer diameter	Roller Pitch Circle diameter	Width	Greasing Hole	r_{min}	ds (max)	Dh (min)	C [kN]	Co [kN]	[g]
	d	D	dp	B, B1	d0						
RAU1005	10	21	14.7	5	1	0.15	12.5	17	1.12	0.809	9
RAU1505	15	26	19.7	5	1	0.15	17.5	22	1.32	1.10	12
RAU2005	20	31	24.7	5	1	0.15	22.5	27	1.49	1.40	15
RAU3005	30	41	34.7	5	1	0.15	32.5	37	1.89	2.14	21
RAU4005	40	51	44.7	5	1	0.15	42.5	47	2.14	2.74	27
RAU5005	50	61	54.7	5	1	0.15	52.5	57	2.43	3.49	32
RAU6005	60	71	64.7	5	1	0.15	62.5	67	2.63	4.09	38
RAU7005	70	81	74.7	5	1	0.15	72.5	77	2.81	4.68	44
RAU8005	80	91	84.7	5	1	0.15	82.5	87	3.05	5.43	50
RAU9005	90	101	94.7	5	1	0.15	92.5	97	3.19	6.03	56
RAU10005	100	111	104.7	5	1	0.15	102.5	107	3.37	6.63	61

Model RAU (Interchangeable with model RA)



Unit: mm

Model No.	Main dimensions						Shoulder height		Basic Load Rating (Radial)		Mass
	Inner diameter	Outer diameter	Roller Pitch Circle diameter	Width	Greasing Hole	r_{min}	ds (max)	Dh (min)	C [kN]	Co [kN]	[g]
	d	D	dp	B, B1	d0						
RAU5008	50	66	57	8	1.5	0.5	53.5	60.5	5.10	7.19	80
RAU6008	60	76	67	8	1.5	0.5	63.5	70.5	5.68	8.68	90
RAU7008	70	86	77	8	1.5	0.5	73.5	80.5	5.98	9.80	100
RAU8008	80	96	87	8	1.5	0.5	83.5	90.5	6.37	11.3	110
RAU9008	90	106	97	8	1.5	0.5	93.5	100.5	6.76	12.4	120
RAU10008	100	116	107	8	1.5	0.5	103.5	110.5	7.15	13.9	140
RAU11008	110	126	117	8	1.5	0.5	113.5	120.5	7.45	15	150
RAU12008	120	136	127	8	1.5	0.5	123.5	130.5	7.84	16.5	170
RAU13008	130	146	137	8	1.5	0.5	133.5	140.5	7.94	17.6	180
RAU14008	140	156	147	8	1.5	0.5	143.5	150.5	8.33	19.1	190
RAU15008	150	166	157	8	1.5	0.5	153.5	160.5	8.82	20.6	200
RAU16013	160	186	172	13	2	0.8	165	179	23.3	44.9	590
RAU17013	170	196	182	13	2	0.8	175	189	23.5	46.5	640
RAU18013	180	206	192	13	2	0.8	185	199	24.5	49.8	680
RAU19013	190	216	202	13	2	0.8	195	209	24.9	51.5	690
RAU20013	200	226	212	13	2	0.8	205	219	25.8	54.5	710

Accuracy standards

Rotational accuracy

- Rotational Accuracy of the Inner Ring

Unit: μm

Nominal dimension of bearing inner diameter (d) (mm)		Radial runout tolerance of inner ring				Axial runout tolerance of inner ring			
Above	Or less	Grade 0	Grade P6	Grade P5	Grade P4	Grade 0	Grade P6	Grade P5	Grade P4
—	18	10	—	—	—	10	—	—	—
18	40	13	—	—	—	13	—	—	—
40	65	13	10	5	4	13	10	5	4
65	80	15	10	5	4	15	10	5	4
80	100	15	13	6	5	15	13	6	5
100	120	20	13	6	5	20	13	6	5
120	140	25	18	8	6	25	18	8	6
140	180	25	18	8	6	25	18	8	6
180	200	30	20	10	8	30	20	10	8

- Rotational Accuracy of the Outer Ring

Unit: μm

Nominal dimension of bearing outer diameter (D) (mm)		Radial runout tolerance of outer ring			Axial runout tolerance of outer ring		
Above	Or less	Grade 0	Grade P5	Grade P4	Grade 0	Grade P5	Grade P4
—	65	13	—	—	13	—	—
65	80	13	8	5	13	8	5
80	100	15	10	6	15	10	6
100	120	15	10	6	15	10	6
120	140	20	11	7	20	11	7
140	180	25	11	7	25	11	7
180	200	25	15	10	25	15	10
200	250	30	15	10	30	15	10

- The rotational accuracy of model RAU (Small-diameter thin type. Width: 5mm) is only available in normal grade (grade 0).

Dimensional accuracy

Unit: μm

Basic dimension d, D [mm]		Bearing inner diameter: Dimensional tolerance of dm		Bearing outer diameter: Dimensional tolerance of Dm		Bearing width: Dimensional tolerance of B,B 1	
Above	Or less	Upper limit	Lower limit	Upper limit	Lower limit	Upper limit	Lower limit
—	18	0	-8	—	—	0	-120
18	30	0	-10	0	-9	0	-120
30	50	0	-12	0	-11	0	-120
50	80	0	-15	0	-13	0	-120
80	120	0	-20	0	-15	0	-120
120	150	0	-25	0	-18	0	-120
150	180	0	-25	0	-25	0	-120
180	250	0	-30	0	-30	0	-120

- dm and Dm represent the arithmetic averages of the maximum and minimum diameters obtained by measuring the inner and outer diameters of the bearing at two points.

Radial clearance standard

Unit: μm

Roller Pitch circle diameter (dp) [mm]		CC0		C0	
Above	Or less	Min.	Max.	Min.	Max.
—	18	—	—	0	15
18	30	—	—	0	15
30	50	—	—	0	15
50	80	-8	0	0	15
80	120	-8	0	0	15
120	140	-8	0	0	15
140	160	-8	0	0	15
160	180	-10	0	0	20
180	200	-10	0	0	20
200	225	-10	0	0	20

Model selection

Determining the Conditions → **Determining the Type** → **Predicting the Service Life**
- Calculating the Static Safety Factor
- Calculating the Nominal Life

Predicting the Rigidity
- Determining the Radial Clearance
- Determining the Mounting Components

→ **Determining the Accuracy**

For details, see the THK technical support site.
There you can also download 2D and 3D CAD data.

For details, visit THK at **www.thk.com**
*Product information is updated regularly on the THK website.

Model composition

Model Number Coding

RAU5008 UU CC0 P4 B

Model No.

Seal symbol*
No symbol: Without seals
UU: Seals attached on both ends
U: Seal attached on one end (marked side)
UT: Seal attached on one end (unmarked side)

Radial clearance symbol
CC0: Negative clearance (preload)
C0: Positive clearance (no preload)

Accuracy symbol
No symbol: Normal grade (grade 0)
P6: Rotational accuracy grade 6
P5: Rotational accuracy grade 5
P4: Rotational accuracy grade 4

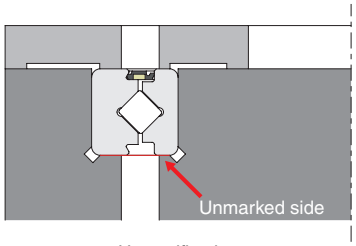
Accuracy target symbol
No symbol: Rotational accuracy of the inner ring
R: Rotational accuracy of the outer ring
B: Rotational accuracy of both the inner ring and outer ring

Considerations for model RAU (Small-diameter thin type. Width: 5mm)
Seals are not available. The only radial clearance available is C0.* The only accuracy available is normal grade (grade 0).

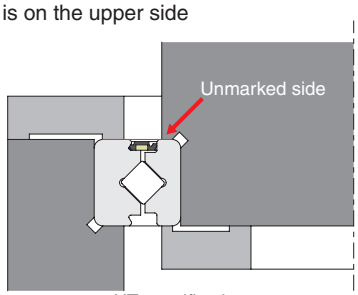
***Precautions for selecting the seal for one end**

For the cross-roller ring, the unmarked side is the die reference surface, so THK recommends assembling the unmarked side on the mounting reference surface of the rotational axis. Select the seal orientation according to the specification.

Example: Inner ring rotation specification/If the seal is on the upper side



U specification



UT specification

⚠ Precautions for Use

[Handling]

(1) Take care not to drop or strike the Cross Roller Ring. Doing so may cause injury or damage. Giving an impact to it could also cause damage to its function even if the product looks intact.

(2) When handling the product, wear protective gloves, safety shoes, etc., as necessary to ensure safety.

[Precautions on Use]

(1) Prevent foreign material, such as cutting chips or coolant, from entering the product. Failure to do so may cause damage.

(2) If the product is used in an environment where cutting chips, coolant, corrosive solvents, water, etc., may enter the product, use bellows, covers, etc., to prevent them from entering the product.

(3) Do not use the product at temperature of 80°C or higher. Exposure to higher temperatures may cause the resin/rubber parts to deform/be damaged.

(4) If foreign material such as cutting chips adheres to the product, replenish the lubricant after cleaning the product.

(5) Slight rocking can inhibit the formation of a film of oil between the rolling surface and the area of contact, resulting in fretting. THK recommends periodically rotating the cross roller ring several times to help ensure that a film forms on the surfaces and rolling elements.

(6) Do not use undue force when fitting parts (pin, key, etc.) to the product. This may generate permanent deformation on the raceway, leading to loss of functionality.

(7) When installing the Cross-Roller Ring, insert the ring by hammering the ring that is to be fixed (i.e. hammer the inner ring if the inner ring is to be fixed, or hammer the outer ring if the outer ring is to be fixed). Hammering the ring on the wrong side may cause damage.

(8) Insufficient rigidity or accuracy of mounting members causes the bearing load to concentrate on one point, and the bearing performance will drop significantly. Accordingly, give sufficient consideration to the rigidity/accuracy of the housing and base and strength of the fixing bolts.

(9) When mounting the presser flange, take into account the dimensional tolerances of the parts so that the flange firmly holds the inner and outer rings from the side.

[Lubrication]

(1) Do not mix different lubricants. Mixing greases using the same type of thickening agent may still cause adverse interaction between the two greases if they use different additives, etc.

(2) When using the product in locations exposed to constant vibrations or in special environments such as clean rooms, vacuum and low/high temperature, use the grease appropriate for the specification/environment.

(3) The consistency of grease changes according to the temperature. Take note that the torque of the Cross Roller Ring also changes as the consistency of grease changes.

(4) Since each Cross Roller Ring unit contains high-quality lithium soap group grease No. 2, initial greasing is not needed. However, the product requires regular lubrication since it has a smaller internal space than ordinary roller bearings and because the rollers need frequent lubrication due to their rolling contact structure.

As for the lubrication interval, normally replenish the same type of grease so that it is distributed throughout the interior at least every three to six months. Set the final lubrication interval/amount based on the actual machine.

When the bearing is filled up with grease, the initial rotational torque temporarily increases due to grease resistance. However, surplus grease will run off of the seals and the torque will return to the normal level in a short period. The thin type does not have an oil groove. Secure an oil groove in the inner diameter side of the housing for lubrication.

[Storage]

When storing the Cross Roller Ring, enclose it in a package designated by THK and store it in a room in a horizontal orientation while avoiding high temperature, low temperature and high humidity.

After the product has been in storage for an extended period of time, lubricant inside may have deteriorated, so add new lubricant before use.

[Disposal]

Dispose of the product properly as industrial waste.

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Micro Cross-Roller Ring Model RAU

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