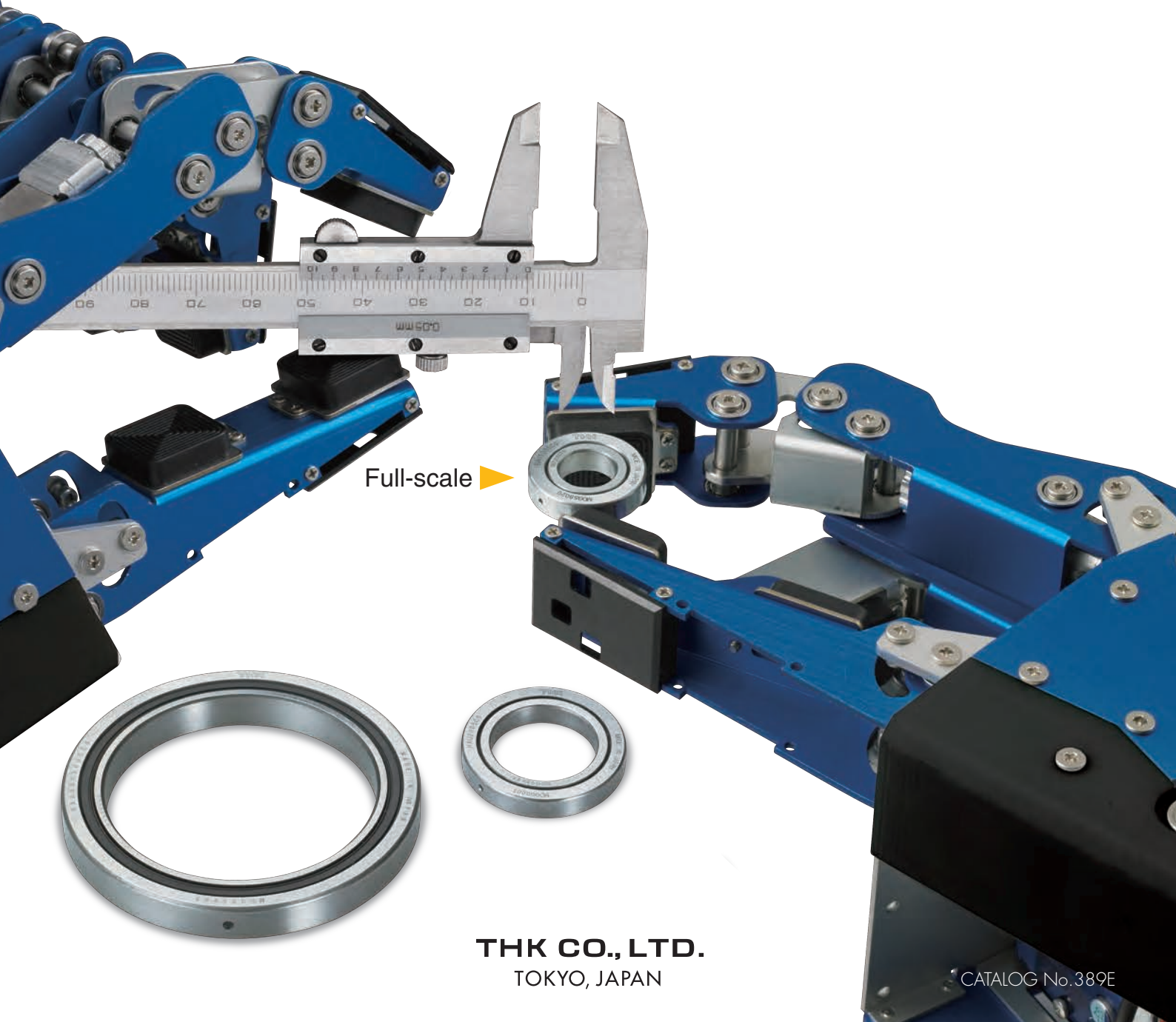


# Micro Cross-Roller Ring **RAU**

Inner diameter: **10<sub>mm</sub>** Outer diameter: **21<sub>mm</sub>**

For a compact and lightweight system

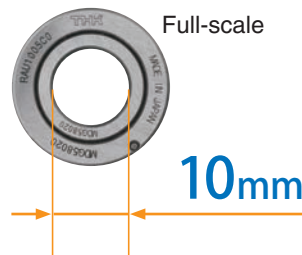


Full-scale 

# 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 angular contact ball bearing
- Spacer retainer enables smooth movement and high rotation accuracy



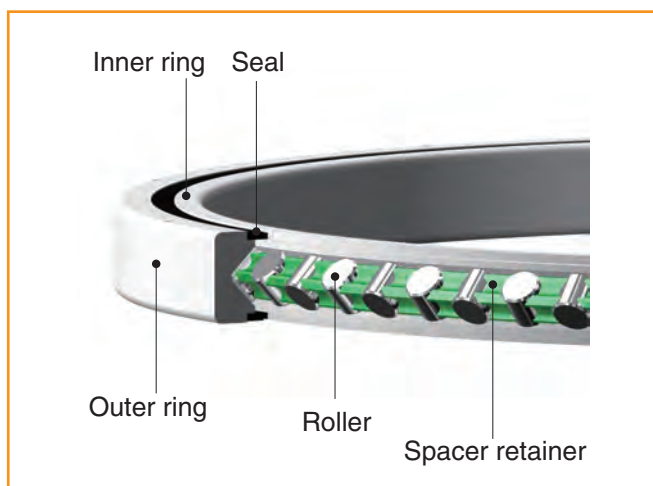
## Structure

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

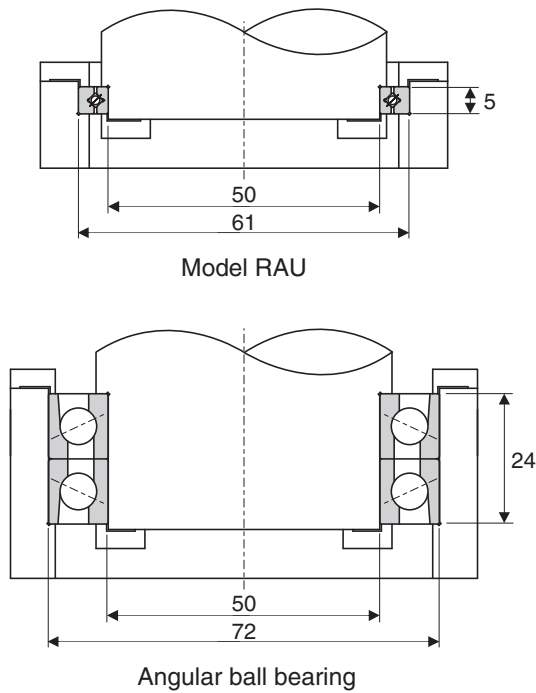


Cross-Roller Ring model RAU

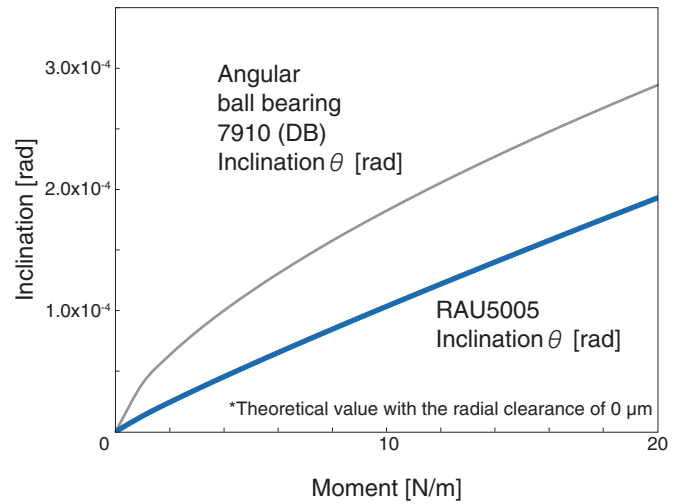
# 1. Compact and Rigid

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



Moment Rigidity Comparison



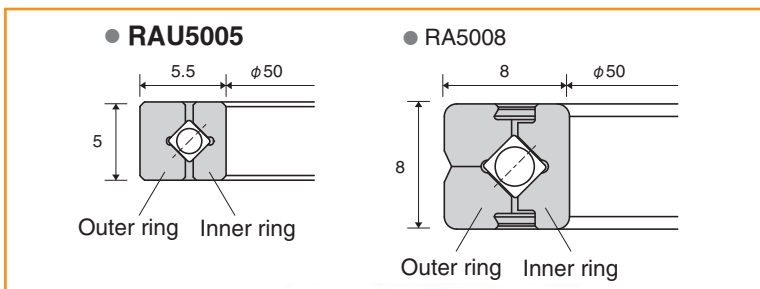
Comparison of cross-sectional area and mass

| Model No.            | RAU5005             | 7910 (DB)          |
|----------------------|---------------------|--------------------|
| Cross-sectional area | 27.5mm <sup>2</sup> | 264mm <sup>2</sup> |
| Mass                 | 32g                 | 260g               |

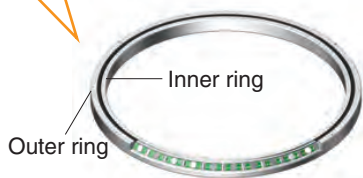
# 2. Light Weight

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.

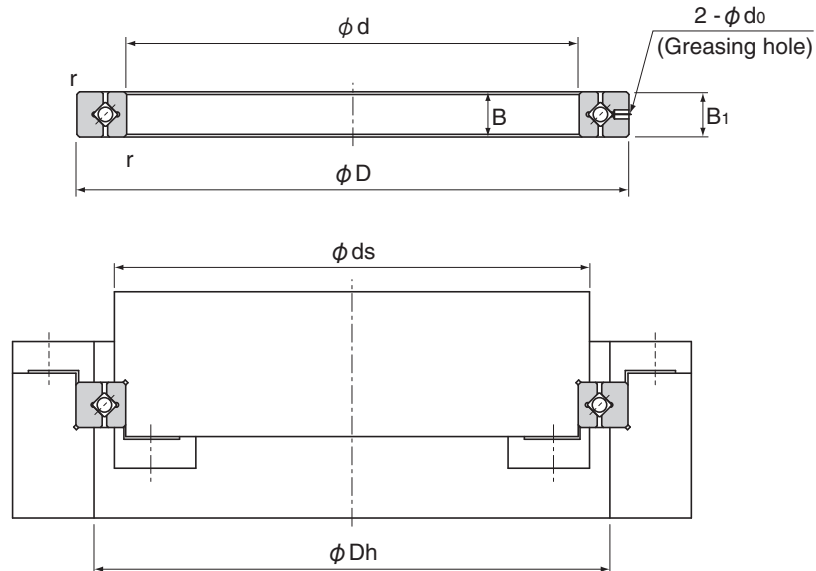
● Comparison of cross section and mass, 50 mm inner diameter



| Model No.            | RAU5005             | RA5008            |
|----------------------|---------------------|-------------------|
| Cross-sectional area | 27.5mm <sup>2</sup> | 64mm <sup>2</sup> |
| Mass                 | 32g                 | 80g               |



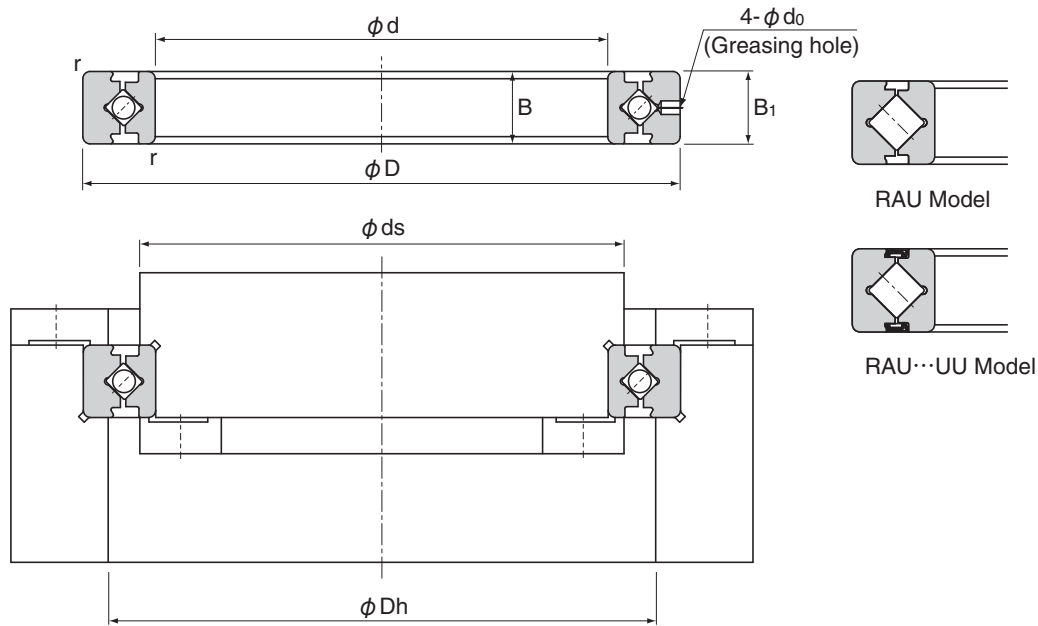
## Model RAU (Small-diameter thin type. Width: 5mm)



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] | [kg]  |
|           | d               | D              | dp                           | B, B <sub>1</sub> | d <sub>o</sub> |           |                 |          |                            |         |       |
| RAU1005   | 10              | 21             | 14.7                         | 5                 | 1              | 0.15      | 12.5            | 17       | 1.12                       | 0.809   | 0.009 |
| RAU1505   | 15              | 26             | 19.7                         | 5                 | 1              | 0.15      | 17.5            | 22       | 1.32                       | 1.10    | 0.012 |
| RAU2005   | 20              | 31             | 24.7                         | 5                 | 1              | 0.15      | 22.5            | 27       | 1.49                       | 1.40    | 0.015 |
| RAU3005   | 30              | 41             | 34.7                         | 5                 | 1              | 0.15      | 32.5            | 37       | 1.89                       | 2.14    | 0.021 |
| RAU4005   | 40              | 51             | 44.7                         | 5                 | 1              | 0.15      | 42.5            | 47       | 2.14                       | 2.74    | 0.027 |
| RAU5005   | 50              | 61             | 54.7                         | 5                 | 1              | 0.15      | 52.5            | 57       | 2.43                       | 3.49    | 0.032 |
| RAU6005   | 60              | 71             | 64.7                         | 5                 | 1              | 0.15      | 62.5            | 67       | 2.63                       | 4.09    | 0.038 |
| RAU7005   | 70              | 81             | 74.7                         | 5                 | 1              | 0.15      | 72.5            | 77       | 2.81                       | 4.68    | 0.044 |
| RAU8005   | 80              | 91             | 84.7                         | 5                 | 1              | 0.15      | 82.5            | 87       | 3.05                       | 5.43    | 0.050 |
| RAU9005   | 90              | 101            | 94.7                         | 5                 | 1              | 0.15      | 92.5            | 97       | 3.19                       | 6.03    | 0.056 |
| RAU10005  | 100             | 111            | 104.7                        | 5                 | 1              | 0.15      | 102.5           | 107      | 3.37                       | 6.63    | 0.061 |

**Model RAU** (Interchangeable with model RA. Width: 8mm, 13mm)



Unit: mm

| Model No. | Main dimensions |                |                              |                   |                |           | Shoulder height |          | Basic Load Rating (Radial) |         | Mass [kg] |
|-----------|-----------------|----------------|------------------------------|-------------------|----------------|-----------|-----------------|----------|----------------------------|---------|-----------|
|           | Inner diameter  | Outer diameter | Roller Pitch Circle diameter | Width             | Greasing Hole  | $r_{min}$ | ds (max)        | Dh (min) | C [kN]                     | Co [kN] |           |
|           | d               | D              | dp                           | B, B <sub>1</sub> | d <sub>0</sub> |           |                 |          |                            |         |           |
| RAU5008   | 50              | 66             | 57                           | 8                 | 1.5            | 0.5       | 53.5            | 60.5     | 5.10                       | 7.19    | 0.08      |
| RAU6008   | 60              | 76             | 67                           | 8                 | 1.5            | 0.5       | 63.5            | 70.5     | 5.68                       | 8.68    | 0.09      |
| RAU7008   | 70              | 86             | 77                           | 8                 | 1.5            | 0.5       | 73.5            | 80.5     | 5.98                       | 9.80    | 0.10      |
| RAU8008   | 80              | 96             | 87                           | 8                 | 1.5            | 0.5       | 83.5            | 90.5     | 6.37                       | 11.3    | 0.11      |
| RAU9008   | 90              | 106            | 97                           | 8                 | 1.5            | 0.5       | 93.5            | 100.5    | 6.76                       | 12.4    | 0.12      |
| RAU10008  | 100             | 116            | 107                          | 8                 | 1.5            | 0.5       | 103.5           | 110.5    | 7.15                       | 13.9    | 0.14      |
| RAU11008  | 110             | 126            | 117                          | 8                 | 1.5            | 0.5       | 113.5           | 120.5    | 7.45                       | 15      | 0.15      |
| RAU12008  | 120             | 136            | 127                          | 8                 | 1.5            | 0.5       | 123.5           | 130.5    | 7.84                       | 16.5    | 0.17      |
| RAU13008  | 130             | 146            | 137                          | 8                 | 1.5            | 0.5       | 133.5           | 140.5    | 7.94                       | 17.6    | 0.18      |
| RAU14008  | 140             | 156            | 147                          | 8                 | 1.5            | 0.5       | 143.5           | 150.5    | 8.33                       | 19.1    | 0.19      |
| RAU15008  | 150             | 166            | 157                          | 8                 | 1.5            | 0.5       | 153.5           | 160.5    | 8.82                       | 20.6    | 0.20      |
| RAU16013  | 160             | 186            | 172                          | 13                | 2              | 0.8       | 165             | 179      | 23.3                       | 44.9    | 0.59      |
| RAU17013  | 170             | 196            | 182                          | 13                | 2              | 0.8       | 175             | 189      | 23.5                       | 46.5    | 0.64      |
| RAU18013  | 180             | 206            | 192                          | 13                | 2              | 0.8       | 185             | 199      | 24.5                       | 49.8    | 0.68      |
| RAU19013  | 190             | 216            | 202                          | 13                | 2              | 0.8       | 195             | 209      | 24.9                       | 51.5    | 0.69      |
| RAU20013  | 200             | 226            | 212                          | 13                | 2              | 0.8       | 205             | 219      | 25.8                       | 54.5    | 0.71      |

## ● Accuracy standards

### ● Rotational accuracy

- Rotational Accuracy of the Inner Ring

Unit:  $\mu\text{m}$

| 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:  $\mu\text{m}$

| 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 P6                             | 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:  $\mu\text{m}$

| 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 <sub>1</sub> |             |
|---------------------------|---------|---|-------------|---|-------------|---|-------------|
| 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        |

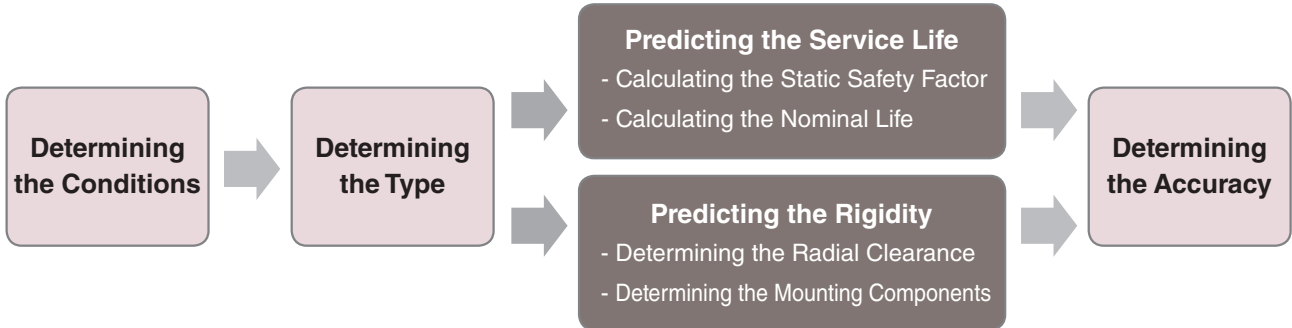
- dm and Dm represent the arithmetic averages of the maximum and minimum diameters obtained by measuring the inner and outer diameters of the bearing at two points.

### ● Radial clearance standard

Unit:  $\mu\text{m}$

| 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



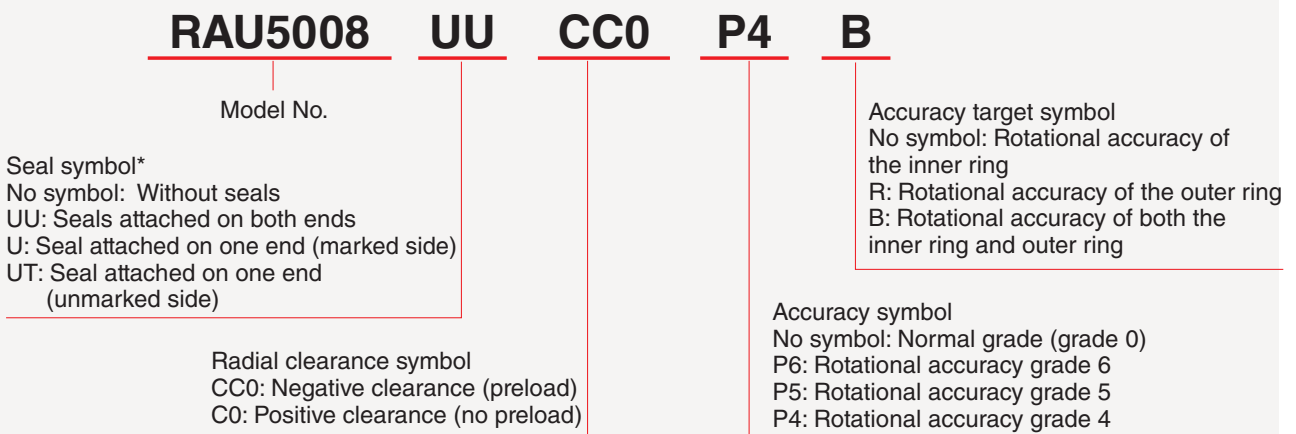
For details, see the THK technical support site.  
There you can also download 2D and 3D CAD data.

For details, visit THK at [www.thk.com](http://www.thk.com)

\*Product information is updated regularly on the THK website.

## ● Model composition

### Model Number Coding



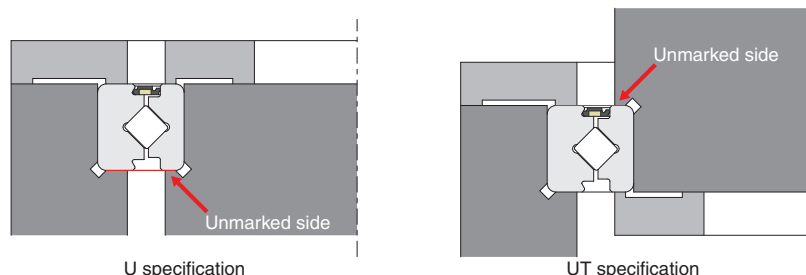
Considerations for model RAU (Small-diameter thin type. Width: 5mm)

\*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



## Micro Cross-Roller Ring Model RAU



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# THK CO., LTD.

Head Office 3-11-6 Nishigotanda, Shinagawa-ku, Tokyo 141-8503 JAPAN  
International Sales Department Phone:+81-3-5434-0351 Fax:+81-3-5434-0353  
Global site : <http://www.thk.com/>

### NORTH AMERICA

- THK America, Inc.  
● HEADQUARTERS  
Phone:+1-847-310-1111 Fax:+1-847-310-1271  
● CHICAGO OFFICE  
Phone:+1-847-310-1111 Fax:+1-847-310-1182  
● NORTH EAST OFFICE  
Phone:+1-631-244-1565 Fax:+1-631-244-1565  
● ATLANTA OFFICE  
Phone:+1-770-840-7990 Fax:+1-770-840-7897  
● LOS ANGELES OFFICE  
Phone:+1-949-955-3145 Fax:+1-949-955-3149  
● SAN FRANCISCO OFFICE  
Phone:+1-925-455-8948 Fax:+1-925-455-8965  
● DETROIT OFFICE  
Phone:+1-248-858-9330 Fax:+1-248-858-9455  
● TORONTO OFFICE  
Phone:+1-905-820-7800 Fax:+1-905-820-7811

### SOUTH AMERICA

THK BRAZIL INDUSTRIA E COMERCIO LTDA.  
Phone:+55-11-3767-0100 Fax:+55-11-3767-0101

### EUROPE

- THK GmbH  
● EUROPEAN HEADQUARTERS  
Phone:+49-2102-7425-555 Fax:+49-2102-7425-556  
● DÜSSELDORF OFFICE  
Phone:+49-2102-7425-0 Fax:+49-2102-7425-299  
● STUTTGART OFFICE  
Phone:+49-7141-4988-500 Fax:+49-7141-4988-888  
● U.K. OFFICE  
Phone:+44-1384-47-1550 Fax:+44-1384-47-1551  
● ITALY OFFICE  
Phone:+39-02-9901-1801 Fax:+39-02-9901-1881

- SWEDEN OFFICE  
Phone:+46-8-445-7630 Fax:+46-8-445-7639  
● AUSTRIA OFFICE  
Phone:+43-7229-51400 Fax:+43-7229-51400-79  
● SPAIN OFFICE  
Phone:+34-93-652-5740 Fax:+34-93-652-5746  
● TURKEY OFFICE  
Phone:+90-216-362-4050 Fax:+90-216-569-7150  
● PRAGUE OFFICE  
Phone:+420-2-41025-100 Fax:+420-2-41025-199  
● MOSCOW OFFICE  
Phone:+7-495-649-80-47 Fax:+7-495-649-80-44  
THK Europe B.V.  
● EINDHOVEN OFFICE  
Phone:+31-040-290-9500 Fax:+31-040-290-9599  
THK France S.A.S.  
● PARIS OFFICE  
Phone:+33-1-7425-3800 Fax:+33-1-7425-3799

### CHINA

- THK (CHINA) CO.,LTD.  
● HEADQUARTERS  
Phone:+86-411-8733-7111 Fax:+86-411-8733-7000  
● SHANGHAI OFFICE  
Phone:+86-21-6219-3000 Fax:+86-21-6219-9890  
● BEIJING OFFICE  
Phone:+86-10-8441-7277 Fax:+86-10-6590-3557  
● CHENGDU OFFICE  
Phone:+86-28-8526-8025 Fax:+86-28-8525-6357  
● GUANGZHOU OFFICE  
Phone:+86-20-8523-8418 Fax:+86-20-3801-0456  
● SHENZHEN OFFICE  
Phone:+86-755-2642-9587 Fax:+86-755-2642-9604

- XIAN OFFICE  
Phone:+86-29-8834-1712 Fax:+86-29-8834-1710  
THK (SHANGHAI) CO.,LTD.  
Phone:+86-21-6275-5280 Fax:+86-21-6219-9890

### TAIWAN

- THK TAIWAN CO.,LTD.  
● TAIPEI HEAD OFFICE  
Phone:+886-2-2888-3818 Fax:+886-2-2888-3819  
● TAICHUNG OFFICE  
Phone:+886-4-2359-1505 Fax:+886-4-2359-1506  
● TAINAN OFFICE  
Phone:+886-6-289-7668 Fax:+886-6-289-7669

### KOREA

- SEOUL REPRESENTATIVE OFFICE  
Phone:+82-2-3468-4351 Fax:+82-2-3468-4353

### SINGAPORE

- THK LM System Pte. Ltd.  
Phone:+65-6884-5500 Fax:+65-6884-5550

### THAILAND

- THK RHYTHM(THAILAND) CO., LTD. LM System Division  
● Bangkok Branch  
Phone:+66-2751-3001 Fax:+66-2751-3003

### INDIA

- THK India Pvt. Ltd.  
● HEADQUARTERS & Bangalore Branch  
Phone:+91-80-2340-9934 Fax:+91-80-2340-9937  
● Pune Branch  
Phone:+91-20-4120-8742  
● Chennai Branch  
Phone:+91-44-4042-3132  
● Ahmedabad Branch  
Phone:+91-79-6134-4444