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Oil Minimum
IKO Gentle to The Earth

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IKO
Innovation, Know-how & Originality

New Product

High Rigidity Type Crossed Roller Bearing V

CRBHV

Mounting Holed Type High Rigidity Crossed Roller Bearing V

CRBFV



NIPPON THOMPSON CO., LTD.

IKO's New CRBHV / CRBFV Models of High Rigidity Crossed Roller Bearings!

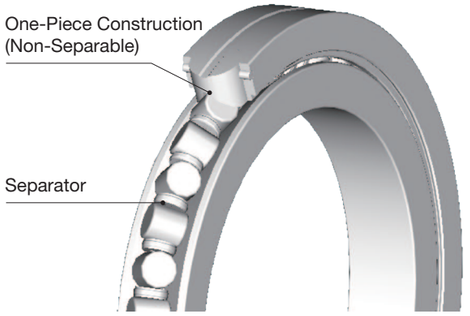
Quick delivery and affordable cost Crossed Roller Bearings are now available from IKO.



CRBHV / CRBFV Features

High Rigidity / High Accuracy

Both inner and outer rings have solid one-piece construction that minimizes mounting errors and allows these bearings to easily achieve high rigidity and high accuracy.
Separators incorporated between the cylindrical rollers allow for smooth rotation, and making them suitable for applications with comparatively high rotational speed.



Quick Delivery / Very Affordable

CRBHV/CRBFV are manufactured at a dedicated site. This newly developed site allowed us to shorten lead-times and reduce production cost by making improvements to the whole processes from design to manufacturing. With our continued efforts to support our customers, we now offer these bearings with excellent cost value. This product will contribute to cost reductions and shorter production lead time when integrated into various machines we incorporate.

Special models for your applications

We offer Crossed Roller Bearings with individual specifications customized to our customers' usages and or applications. We have abundant manufacturing experience of special specification products so if you have any requirement for a special product application, please contact IKO.

IKO Crossed Roller Bearings

IKO Crossed Roller Bearings are compact bearings with their rollers alternately crossed at right angles to each other between an inner and outer ring. This allows them to sustain loads such as radial, thrust and moment from any direction at the same time. The rollers make line-contact with raceway surfaces, thus elastic deformation due to bearing loads is very small.

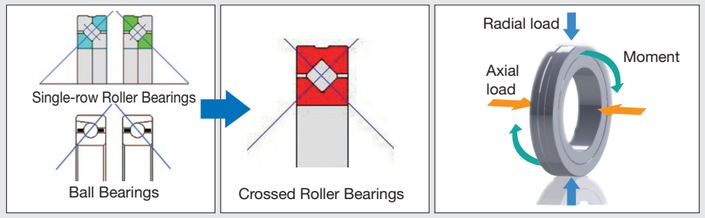


IKO Crossed Roller Bearing advantages.

IKO Crossed Roller Bearings are high performance bearings with a variety of characteristics not seen in other bearings.

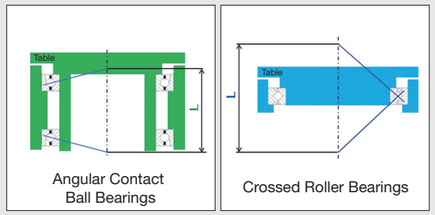
Compact

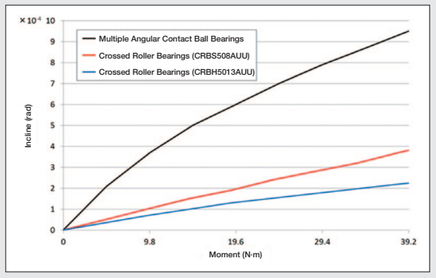
The orthogonal array of rollers makes it possible to simultaneously receive complex loads from various directions with just a single bearing. When compared to opposed mounting single row roller or ball bearings, the contact area can be reduced thus contributing to compactness and space-saving equipment.

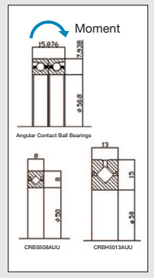


High Rigidity

The figure at right is a cross-section of a rotating turntable. The application point distance from the time a moment load applied to the turntable is L, and the allowable moment load of the bearing is proportional to application point distance L. If increasing application point distance L to increase the moment rigidity of the turntable, two Angular Contact Ball Bearings are required. Because of the need for distance between the bearings, the equipment size increases as well. However, even a single Crossed Roller Bearing can increase application point distance L, keeping equipment compact and improving moment rigidity.





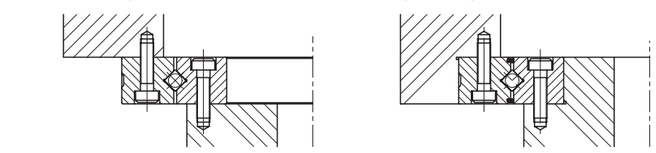


Because of the line contact structure of Crossed Roller Bearings, when using rollers for the bearing inner rolling elements, rigidity is greatly improved compared to ball type bearings. For example, rigidity is increased 3 to 4 times while achieving more compact cross-section dimensions compared to a double row Angular Contact Ball Bearing.

Easy Mounting

Mounting Holed Type High Rigidity Crossed Roller Bearings feature mounting holes to allow direct mounting to the mounting surface without requiring the use of a housing or pressure plate as with conventional Crossed Roller Bearings.
It is recommended to use a housing for applications with large loads or moments.

Mounting Holed Type Crossed Roller Bearing Mounting Example



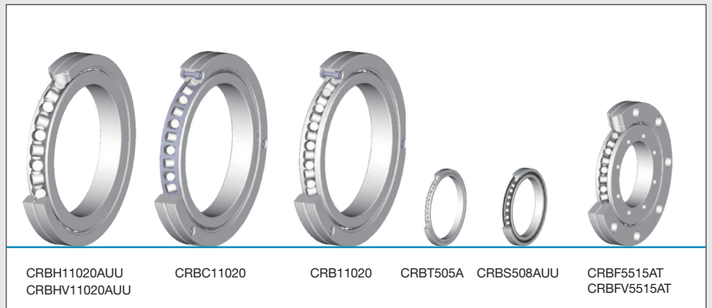
Quality

Many years of experience with roller type bearings allows IKO the ability to produce highly accurate Crossed Roller Bearings due to our manufacturing know-how and rigorous quality standards.



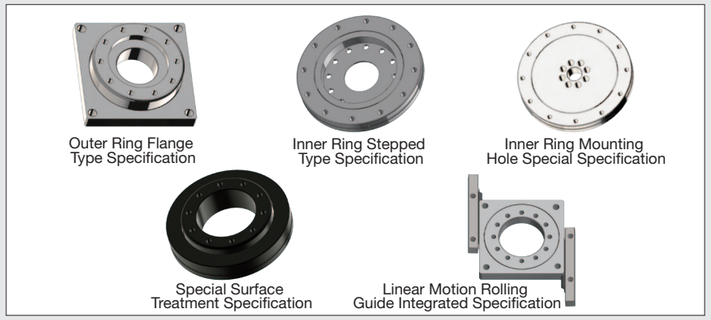
Diversity

IKO Crossed Roller Bearings are available in a wide variety of types. For machine tools, large robots, medical, and general industrial equipment, optimal types are CRBH/CRBHV, with its inner and outer ring combined integral structure, and CRB/CRBC, with outer rings split in two in the axial direction. For electric and electronic automated equipment such as small/medium robotic joints or semiconductors, the Slime Type CRBS with its small cross-sectional dimension works best. For even smaller precision equipment, the Super Slim Type CRBT is optimal with its minimized cross-sectional area. The high rigidity CRBF/CRBFV is also available, with mounting holes to simplify the mating with the housing structure.



Flexibility

IKO's unique flexibility and diverse production allows us to offer customized Crossed Roller Bearings to fit the customers' applications. IKO has a sound record of producing a wide variety of special products with non-standard shapes, sizes, surface treatments and other unique features. Please contact IKO when your application requires certain special features that are not on our stock products.

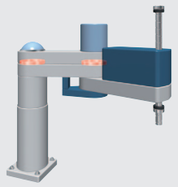


IKO Crossed Roller Bearings application examples.

High performance and compact IKO Crossed Roller Bearings had been integrated into various machines and devices, resulting in improved efficiency, reliability and compactness.
Here are some great examples of Crossed Roller Bearings in action:

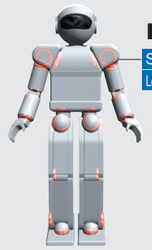
Robot

Increasingly a number of customers are switching out conventional ball bearings with IKO Crossed Roller Bearings on their robots in order to reduce size and weight.



■ Pick-up robot

Structure	Horizontal articulation
Location used	Joint swivel part



■ Androids

Structure	Android Robots
Location used	Joints

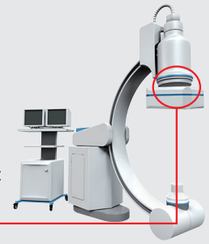


■ Welding robot

Structure	Vertical articulation
Location used	Swivel Joints, Gearboxes

Medical equipment

Many various of IKO Crossed Roller Bearings, including those with special specifications, are available for applications requiring smooth operation with high rotational accuracy. Some are designed to be used in environments where rust prevention oil is not allowed or in medical equipment.

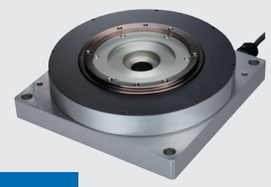


■ X-Ray Diagnostic Equipment

Structure	C-Type Arm Operation
Location used	X-Ray Detector Rotors

Motor

High Rotational Accuracy IKO Crossed Roller Bearings also have a proven track record for use on Theta-Axis Rotary Drive units. A key attribute is IKO's ability and flexibility to accommodate special shapes such as flanges and steps.

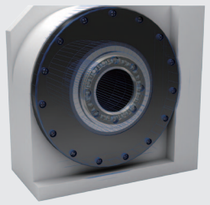


■ DD Motor

Structure	Direct Drive Motor
Location used	Output Shaft

Machine tools

Bearings supporting rotation often need minimal deflection even when operating in tough environments. High Rigidity IKO Crossed Roller Bearings provide minimal deflection and are especially suited for use in machine tools.



■ Machine Tool Tables

Structure	NC Lathes
Location used	Table Rotating Parts

Windmills

Bearings in windmills are forced to work in harsh environments. They need to stand up to moment loads caused by the wind as well as high rotational speed. It is in the harsh environments that IKO Crossed Roller Bearings show their true potential.



■ Power Generating Windmills

Structure	Compact Wind Generator
Location used	Systems

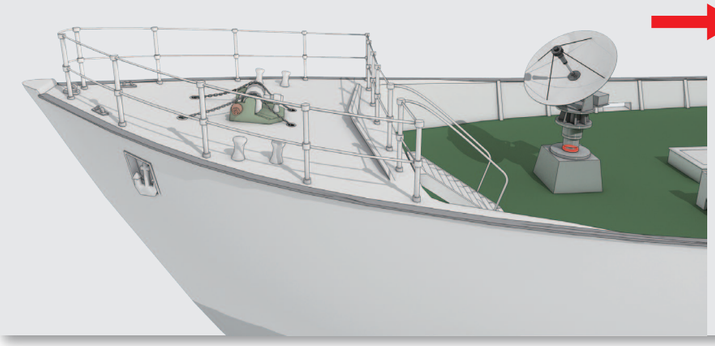
Swivel Parts

Capabilities of Crossed Roller Bearings proposed by IKO.

IKO Crossed Roller Bearings are ideally suited for robotics, so IKO proposes using them in the following applications:

Marine Antenna

Marine antennas are constantly battered by strong winds. The support for these antennas require bearings that are very rigid to be able to stand up to these winds. IKO High Rigidity Crossed Roller Bearings are ideal for this application.



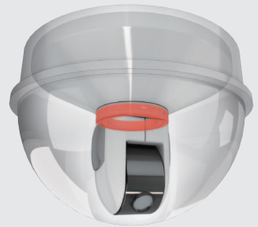


■ Marine Antenna

Structure	Marine Parabola Antenna
Location used	Base swivel part

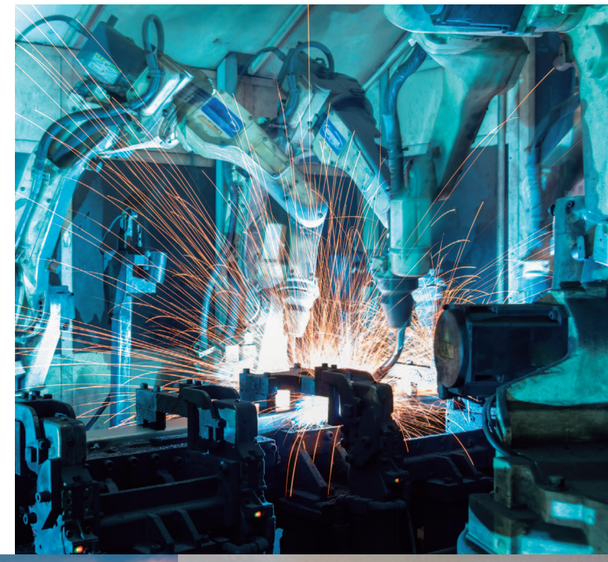
Security Camera

Security cameras move horizontally and vertically nonstop all year round. Extreme reliability is required for this continuous compound operation. IKO Crossed Roller Bearings can receive complex loads from multiple directions, making them ideal for use in security cameras.



■ Security Cameras

Structure	Movable Security Cameras
Location used	Camera Drive Parts







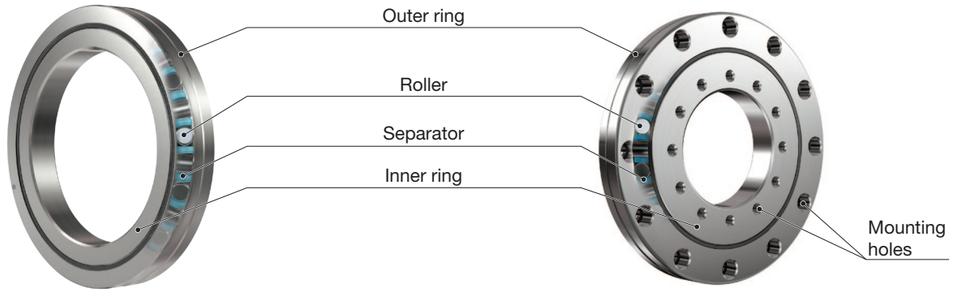








CRBHV / CRBFV Structure



CRBHV

Variation					
Size	Shaft dia. 30-250 mm(1)				
Seal	Yes			None	
Clearance	T1 (Preload)	C1 (Slight)		C2 (Medium)	No symbol (Normal)
Accuracy class	Class 0	P6 RP6	P5 RP5	P4 RP4	P2 RP2
Accuracy	→ High				

Notes (1) Sizes with a shaft diameter greater than 120mm are scheduled to be produced starting December 2016.

CRBFV

Variation					
Size	Shaft dia. 35-115 mm(1)				
Seal	Yes			None	
Clearance	T1 (Preload)	C1 (Slight)		C2 (Medium)	No symbol (Normal)
Accuracy class	Class 0	P6 RP6	P5 RP5	P4 RP4	P2 RP2
Accuracy	→ High				

Notes (1) Sizes with a shaft diameter greater than 80mm are scheduled to be produced starting December 2016.

Identification number

The identification number of Crossed Roller Bearings consists of a model code, dimensions, any supplemental codes and a classification symbol. Examples are shown below.

Example → CRBFV 35 15 A T UU C1 RP6

Model code	
CRBHV···A	High Rigidity Type Crossed Roller Bearing V (With separator)
CRBFV···A	Mounting Holed High Rigidity Type Crossed Roller Bearing V (With separator)

Dimensions
The dimension indicates the bore diameter of the bearing. (unit: mm)
The dimension indicates the bearing width. (unit: mm)

Supplemental code - 1 (1)	
T	With female threaded mounting holes on the inner ring
No symbol	With counter-bored mounting holes on both inner ring and outer ring in the same direction.
D	With counter-bored mounting holes on both inner ring and outer ring in the opposite direction.

Note (1) Applicable only to CRBFV.

Supplemental code - 2	
No symbol	Open type
UU	Sealed Type
U	One Side Sealed Type (2)
UD	One side sealed in the opposite direction to counter bored mounting holes on outer ring

Note (2) For CRBFV···A, sealed at the side with counter bored mounting holes of outer ring.

Supplemental code - 3	
T1	T1 clearance
C1	C1 clearance
C2	C2 clearance

Classification symbol	
No symbol	Accuracy class 0
P6	Accuracy class 6
P5	Accuracy class 5
P4	Accuracy class 4
P2	Accuracy class 2
RP6	Rotation accuracy class 6
RP5	Rotation accuracy class 5
RP4	Rotation accuracy class 4
RP2	Rotation accuracy class 2

Rotational accuracy class ··· classes specifying accuracy standards for only rotational accuracy (radial runout / axial runout)

Accuracy

CRBHV Accuracy

Table 1 Tolerance and allowance of inner ring — unit: [μm]

d Nominal bore diameter mm		*△dmp* Deviation of mean bore diameter in a single plane								*△Bs, △Cs* Width of Inner/Outer Rings		*Kia* Radial runout					*Sia* Axial runout				
		Class 0 RP6 to RP2		P6		P5		P4, P2				Class 0	P6 RP6	P5 RP5	P4 RP4	P2 RP2	Class 0	P6 RP6	P5 RP5	P4 RP4	P2 RP2
Exceeding	Incl.	High	Low	High	Low	High	Low	High	Low	High	Low	Maximum					Maximum				
18	30	0	-10	0	- 8	0	- 6	0	- 5	0	- 75	13	8	4	3	2.5	13	8	4	3	2.5
30	50	0	-12	0	-10	0	- 8	0	- 6	0	- 75	15	10	5	4	2.5	15	10	5	4	2.5
50	80	0	-15	0	-12	0	- 9	0	- 7	0	- 75	20	10	5	4	2.5	20	10	5	4	2.5
80	120	0	-20	0	-15	0	-10	0	- 8	0	- 75	25	13	6	5	2.5	25	13	6	5	2.5
120	150	0	-25	0	-18	0	-13	0	-10	0	-100	30	18	8	6	2.5	30	18	8	6	2.5
150	180	0	-25	0	-18	0	-13	0	-10	0	-100	30	18	8	6	5	30	18	8	6	5
180	250	0	-30	0	-22	0	-15	0	-12	0	-100	40	20	10	8	5	40	20	10	8	5

Table 2 Tolerance and allowance of outer ring — unit: [μm]

D Nominal outside diameter mm		*△Dmp* Deviation of mean outside diameter in a single plane								*Kea* Radial runout					*Sea* Axial runout				
		Class 0 RP6 to RP2		P6		P5		P4, P2		Class 0	P6 RP6	P5 RP5	P4 RP4	P2 RP2	Class 0	P6 RP6	P5 RP5	P4 RP4	P2 RP2
Exceeding	Incl.	High	Low	High	Low	High	Low	High	Low	Maximum					Maximum				
30	50	0	-11	0	- 9	0	- 7	0	- 6	20	10	7	5	2.5	20	10	7	5	2.5
50	80	0	-13	0	-11	0	- 9	0	- 7	25	13	8	5	4	25	13	8	5	4
80	120	0	-15	0	-13	0	-10	0	- 8	35	18	10	6	5	35	18	10	6	5
120	150	0	-18	0	-15	0	-11	0	- 9	40	20	11	7	5	40	20	11	7	5
150	180	0	-25	0	-18	0	-13	0	-10	45	23	13	8	5	45	23	13	8	5
180	250	0	-30	0	-20	0	-15	0	-11	50	25	15	10	7	50	25	15	10	7
250	315	0	-35	0	-25	0	-18	0	-13	60	30	18	11	7	60	30	18	11	7

CRBFV Accuracy

Table 3 Tolerance and allowance of inner ring — unit: [μm]

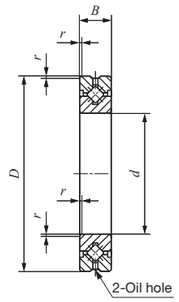
d Nominal bore diameter mm		*Δdmp* Deviation of mean bore diameter in a single plane								*ΔBs* Deviation of a single inner ring width		*Kia* Radial runout					*Sia* Axial runout				
		Class 0 RP6 to RP2		P6		P5		P4, P2				Class 0	P6 RP6	P5 RP5	P4 RP4	P2 RP2	Class 0	P6 RP6	P5 RP5	P4 RP4	P2 RP2
Exceeding	Incl.	High	Low	High	Low	High	Low	High	Low	High	Low	Maximum					Maximum				
30	35	0	-12	0	-10	0	- 8	0	-6	0	-75	15	10	5	4	2.5	15	10	5	4	2.5
35	50	0	-12	0	-10	0	- 8	0	-6	0	-75	20	10	5	4	2.5	20	10	5	4	2.5
50	65	0	-15	0	-12	0	- 9	0	-7	0	-75	20	10	5	4	2.5	20	10	5	4	2.5
65	80	0	-15	0	-12	0	- 9	0	-7	0	-75	25	13	6	5	2.5	25	13	6	5	2.5
80	100	0	-20	0	-15	0	-10	0	-8	0	-75	25	13	6	5	2.5	25	13	6	5	2.5
100	120	0	-20	0	-15	0	-10	0	-8	0	-75	30	18	8	6	2.5	30	18	8	6	2.5

Table 4 Tolerance and allowance of outer ring — unit: [μm]

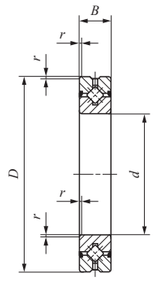
D Nominal outside diameter mm		*ΔDmp* Deviation of mean outside diameter in a single plane								*ΔCs* Deviation of a single outer ring width		*Kea* Radial runout					*Sea* Axial runout				
		Class 0 RP6 to RP2		P6		P5		P4, P2				Class 0	P6 RP6	P5 RP5	P4 RP4	P2 RP2	Class 0	P6 RP6	P5 RP5	P4 RP4	P2 RP2
Exceeding	Incl.	High	Low	High	Low	High	Low	High	Low	High	Low	Maximum					Maximum				
80	95	0	-15	0	-13	0	-10	0	- 8	0	-75	25	13	8	5	4	25	13	8	5	4
95	120	0	-15	0	-13	0	-10	0	- 8	0	-75	35	18	10	6	5	35	18	10	6	5
120	140	0	-18	0	-15	0	-11	0	- 9	0	-75	35	18	10	6	5	35	18	10	6	5
140	150	0	-18	0	-15	0	-11	0	- 9	0	-75	40	20	11	7	5	40	20	11	7	5
150	165	0	-25	0	-18	0	-13	0	-10	0	-75	40	20	11	7	5	40	20	11	7	5
165	180	0	-25	0	-18	0	-13	0	-10	0	-75	45	23	13	8	5	45	23	13	8	5
180	210	0	-30	0	-20	0	-15	0	-11	0	-75	45	23	13	8	5	45	23	13	8	5
210	240	0	-30	0	-20	0	-15	0	-11	0	-75	50	25	15	10	7	50	25	15	10	7

CRBHV Dimensions

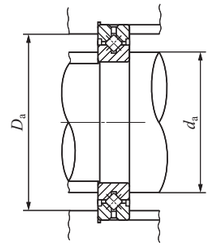




CRBHV···A



CRBHV···A UU



Mounting Diagram

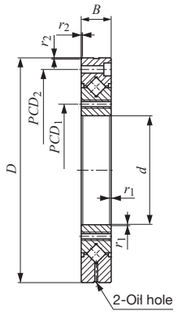
Shaft diameter mm	Identification number Open Type	Identification number Sealed Type	Mass (Ref.) kg	Boundary dimensions mm d	D	B	(1) r_{min}	Mounting related dimensions mm d_a	D_a	Basic dynamic load rating C N	Basic static load rating C_0 N
30	**CRBHV 3010 A**	**CRBHV 3010 A UU**	0.12	30	55	10	0.3	36.5	48.5	7 600	8 370
35	**CRBHV 3510 A**	**CRBHV 3510 A UU**	0.13	35	60	10	0.3	41.5	53.5	7 900	9 130
40	**CRBHV 4010 A**	**CRBHV 4010 A UU**	0.15	40	65	10	0.3	46.5	58.5	8 610	10 600
45	**CRBHV 4510 A**	**CRBHV 4510 A UU**	0.16	45	70	10	0.3	51.5	63.5	8 860	11 300
50	**CRBHV 5013 A**	**CRBHV 5013 A UU**	0.29	50	80	13	0.6	56	74	17 300	20 900
60	**CRBHV 6013 A**	**CRBHV 6013 A UU**	0.33	60	90	13	0.6	66	84	18 800	24 300
70	**CRBHV 7013 A**	**CRBHV 7013 A UU**	0.38	70	100	13	0.6	76	94	20 100	27 700
80	**CRBHV 8016 A**	**CRBHV 8016 A UU**	0.74	80	120	16	0.6	88	112	32 100	43 400
90	**CRBHV 9016 A**	**CRBHV 9016 A UU**	0.81	90	130	16	0.6	98	122	33 100	46 800
100	**CRBHV 10020 A**	**CRBHV 10020 A UU**	1.45	100	150	20	0.6	110	140	50 900	72 200
110	**CRBHV 11020 A**	**CRBHV 11020 A UU**	1.56	110	160	20	0.6	120	150	52 400	77 400
120	**CRBHV 12025 A**	**CRBHV 12025 A UU**	2.62	120	180	25	1	132	168	73 400	108 000
130	**CRBHV 13025 A**	**CRBHV 13025 A UU**	2.82	130	190	25	1	142	178	75 900	115 000
140	**CRBHV 14025 A**	**CRBHV 14025 A UU**	2.96	140	200	25	1	152	188	81 900	130 000
150	**CRBHV 15025 A**	**CRBHV 15025 A UU**	3.16	150	210	25	1	162	198	84 300	138 000
200	**CRBHV 20025 A**	**CRBHV 20025 A UU**	4.0	200	260	25	1	212	248	92 300	169 000
250	**CRBHV 25025 A**	**CRBHV 25025 A UU**	4.97	250	310	25	1.5	262	298	102 000	207 000

Notes (1) Minimum allowable single value of chamfer dimension r

Starting December 2016

CRBFV Dimensions

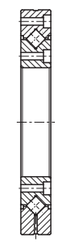




CRBFV···AT



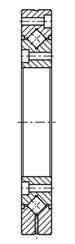
CRBFV···AT UU



CRBFV···A



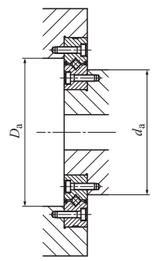
CRBFV···A UU



CRBFV···AD



CRBFV···AD UU



Mounting Diagram

Shaft diameter mm	Identification number Open Type	Identification number Sealed Type	Mass (Ref.) kg	Boundary dimensions mm d	D	B	(1) r_{1min}	(1) r_{2min}	Mounting hole related mm PCD_1	Inner Ring Mounting Hole	PCD_2	Outer Ring Mounting Hole	Mounting related dimensions mm d_a	D_a	Basic dynamic load rating C N	Basic static load rating C_0 N
35	**CRBFV 3515 AT**	**CRBFV 3515 AT UU**	0.66	35	95	15	0.6	0.6	45	8-M4 through	83	8-ϕ4.5 through ϕ8 counter bore depth 4.4	56	74	17 300	20 900
55	**CRBFV 5515 AT**	**CRBFV 5515 AT UU**	0.96	55	120	15	0.6	0.6	65	8-M5 through	105	8-ϕ5.5 through ϕ9.5 counter bore depth 5.4	76	94	20 100	27 700
80	**CRBFV 8022 AT**	**CRBFV 8022 AT UU**	2.63	80	165	22	0.6	1	97	10-M5 through	148	10-ϕ5.5 through ϕ9.5 counter bore Depth 5.4	107	137	51 100	72 000
	CRBFV 8022 A	**CRBFV 8022 A UU**	2.60							10-ϕ5.5 through ϕ9.5 counter bore Depth 5.4						
	CRBFV 8022 AD	**CRBFV 8022 AD UU**														
90	**CRBFV 9025 AT**	**CRBFV 9025 AT UU**	4.83	90	210	25	1.5	1.5	112	12-M8 through	187	12-ϕ9 through ϕ14 counter bore Depth 12	132	168	73 400	108 000
	CRBFV 9025 A	**CRBFV 9025 A UU**	4.67							12-ϕ9 through ϕ14 counter bore Depth 12						
	CRBFV 9025 AD	**CRBFV 9025 AD UU**														
115	**CRBFV 11528 AT**	**CRBFV 11528 AT UU**	6.81	115	240	28	1.5	1.5	139	12-M8 through	217	12-ϕ9 through ϕ14 counter bore Depth 13.5	162	198	84 300	138 000
	CRBFV 11528 A	**CRBFV 11528 A UU**	6.63							12-ϕ9 through ϕ14 counter bore Depth 13.5						
	CRBFV 11528 AD	**CRBFV 11528 AD UU**														

Notes (1) Minimum allowable single value of chamfer dimension r

Starting December 2016

Lubrication

These bearings are generally lubricated with grease. Grease is supplied by applying a grease gun nozzle to various locations on the periphery of the clearance between the inner ring and the outer ring. Grease is packed into sealed types (UU) only. ALVANIA GREASE EP2 (SHOWA SHELL SEKIYU K.K) is prepacked as the lubrication grease.
For bearings without prepacked grease, supply grease or oil before use. Operating without lubrication will increase the wear on the rolling contact surfaces and lead to short bearing life. For the sealed type, be careful with pressure when applying grease so that the seals do not come off. When using a special grease, carefully examine the grease properties and contents such as base oil viscosity and extreme pressure additives. In this case, please contact IKO.

Oil groove

For Crossed Roller Bearings, oil holes and oil grooves can be provided on bearing rings on request. When an oil hole is required on the outer ring, attach "-OH" before the clearance symbol in the identification number. When an oil hole and an oil groove are required on the outer ring, attach "-OG" at the same place in the identification number.
For an oil hole on the inner ring, attach "/OH", and for an oil hole and an oil groove on the inner ring, attach "/OG", at the same place in the identification number. CRBHV and CRBFV have an oil groove and two oil holes on the outer ring as standard. The table below shows availability of oil holes for each bearing type.

Table 5 Oil Hole Availability

Model code	Oil hole code / nOH	/ nOG	-nOH	-nOG
CRBHV···A	○	○	-	-
CRBFV···A	-	-	-	-

Remarks n denotes the number of oil holes not exceeding 4. For one oil hole, number is not indicated.
When preparing multiple oil holes, please contact IKO.

Allowable rotational speed

The allowable rotational speed of CRBHV / CRBFV is affected by mounting and operating conditions. The table below can be used as a guide for $d_m n$ under general operating conditions.

Table 6 Crossed Roller Bearings $d_m n$ Values (1)

Model of bearing \ Lubrication	Grease lubrication	Oil lubrication
Open type	75 000	150 000
Sealed Type	60 000	-

Notes (1) $d_m n$ vale = $d_m \times n$
Here, d_m: Mean value of bearing bore and outside diameters, mm
n: Rotational speed, min^{-1}

Operating Temperature Range

The permissible temperature range of CRBHV / CRBHFV is -20 - +110°C. However, for continuous use, keep the temperature at 100°C or below.