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MOTION & CONTROL™

**NSK**

# BEARINGS FOR AGRICULTURAL MACHINERY



Image: Kuhn

BRANDS OF **NSK EUROPE**

**NSK**

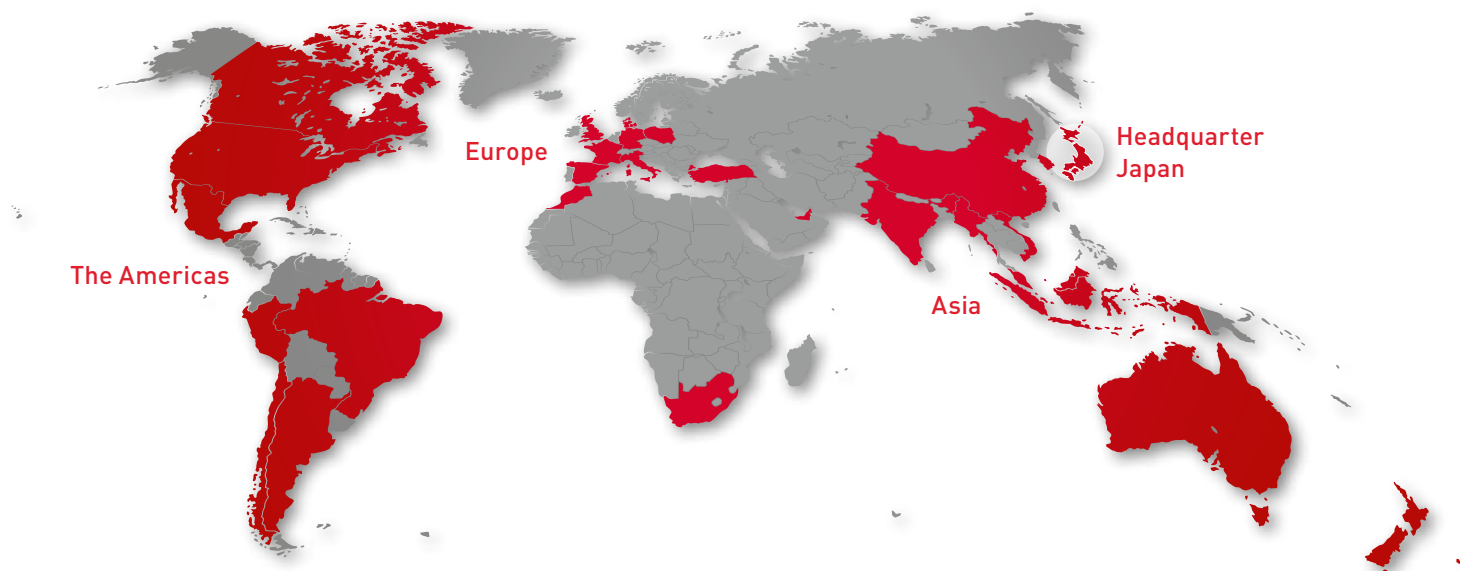
RHP bearings



neuweg

# SETTING THE FUTURE IN MOTION

We are among the leading manufacturers for rolling bearings, linear technology components and steering systems worldwide. We can be found on almost every continent – with production facilities, sales offices and technology centres – because our customers appreciate short decision-making channels, prompt deliveries and local service.



## The NSK company

NSK commenced operations as the first Japanese manufacturer of rolling bearings back in 1916. Ever since, we have been continuously expanding and improving not only our product portfolio but also our range of services for various industrial sectors. In this context our worldwide research and production facilities are linked together in a global network. Here we concentrate not only on the

development of new technologies, but also on the continuous optimisation of quality – at every process stage. Among other things, our research activities include product design, simulation applications using a variety of analytical systems and the development of different steels and lubricants for rolling bearings.

Trademarks: All NSK product and service names listed in this catalogue are trademarks or registered trademarks of NSK Ltd.

# OUR MOST IMPORTANT PRODUCT: OUR CUSTOMERS' SATISFACTION

One thing keeps us moving: we want to help you increase the reliability of your vehicles and equipment, not only with excellent products, but above all with excellent service. Our experienced engineers have a deep understanding of systems – together with you, they work to optimise products and processes and develop solutions for the future. The goal that we are dedicated to every day is ensuring that you remain competitive over the long run.

More about NSK on [www.nsk europe.com](http://www.nsk europe.com)



# INTRODUCTION

Agricultural applications present considerable challenges for all mechanical components. Contamination, moisture, vibration and shock loads are just some of the factors which these components have to cope with. As one of the world's leading bearing manufacturers, NSK has risen to this challenge. In addition to a wide range of standard components, the company is highly flexible when it comes to developing special, customised solutions for its customers. NSK's Neuweg production site in Munderkingen, Germany, in particular specialises in bespoke solutions of this kind.

Established in 1954, Neuweg has a tradition of manufacturing bearings, primarily for agricultural machinery. Neuweg became part of the NSK Group in 1990. Staff at the site now develop NSK, RHP and NWG (Neuweg) branded products and produce them in line with NSK's premium standards of quality.



# AGRI DISC HUB BEARING UNITS

The NSK Agri Disc Hub bearing units use Double-Row Angular-contact ball bearings which are capable of accommodating heavy radial and axial loads.

The units are screwed straight onto the discs, with an O-ring set into the bearing housing (fig. 2) or cover (fig. 4) protecting the bearing from contamination and moisture on this side.

On the arm side of the unit, the bearing is protected by a cassette seal developed specially for this use (fig. 1). This seal has successfully withstood extensive testing and can even handle tough operating conditions like the use of liquid manure.

In addition to this, the cassette seal prevents moisture and water from getting into the unit, even if the machine is cleaned with pressure washers after use (fig. 3).

The bearings are also protected by a 2nd cassette or a DU seal. This stops also lubricant from escaping, ensuring maintenance-free running.

The Agri Disc Hubs use a high-performance lubricant developed by NSK specifically for conditions of this kind.



Figure 1: Cassette seal

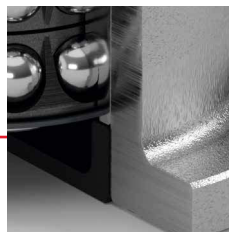


Figure 2: Cap seal



At the end of the test, there was no sign of water having penetrated the cassette seal.

Figure 3: Tested using a water jet for 200 hours

# PRODUCT ADVANTAGES: THE AGRI DISC HUB

## Advantages for machine manufacturers:

Factor	Description	Savings
Development	In addition to standard ranges, NSK offers solutions for specific customers and applications. The machine manufacturer does not need to invest in in-house development.	Engineering capacity, development costs
Testing	Thanks to NSK's experience and core specialisms such as seal technology, bearing design and the development of bearing assemblies there is no need for extensive tests on individual components and assemblies. The use of tried and tested technology provides additional safeguards.	Engineering capacity, test benches – in some cases for individual components as well – field testing
Procurement and logistics	Clients source a complete solution. There is no need for different suppliers and individual components to be audited and approved. Storage and materials planning for these individual components is also eliminated.	Purchasing and procurement capacity, storage
Assembly	There is no time-consuming assembly of various individual components: the Agri Disc Hub is mounted straight to the machinery.	Assembly time
Guarantee	Defect analyses, diagnostics, etc. become superfluous.	Defect analyses, repairs, guarantee

## Advantages for farmers:

Factor	Description	Savings
Productivity	No need for repairs due to bearing failures caused by insufficient lubrication and contamination. This increases the machinery's availability.	Downtime, spare parts, repair service
Contamination	Field tests have proved that the cassette seal developed specially for the NSK Agri Disc Hubs provides reliable protection from contamination such as clay, sand, dust, plant fibres, liquid manure and other fertilisers, water and moisture ingress. The cassette seal is also protected from stones by a steel disc.	Bearing failures caused by contamination (increases service life by between five and ten times*)
Lubrication/grease	NSK Agri Disc Hubs are sealed bearing units with lifelong lubrication. This means there is no need for regreasing.	Saves time and prevents grease leakage in the field (saves approx. 25 kg of lubricant a year and approx. ½ hour per day of use, depending on the machine*)

\* All figures are the result of field tests in close collaboration with customers and internal investigations.

## Nomenclature

NSK currently makes Agri Disc Hubs for disc diameters of up to 800 mm. Various flanged and shaft types are available. The product range is constantly being expanded in close collaboration with our customers. Bespoke solutions can usually also be developed without any problems.

## Example references for Agri Disc Hubs

Example: **AHU** | **28** | **117** | **A (S)** | **-** | **01**

AHU	Agri Disc Hub
28	Shaft / bore diameter
117	Flange diameter
A (S)	Shaft type A/AS = external thread B = internal thread C = no shaft
01	Serial number



Agri Disc Hub - AS series

# TILLAGE / SEEDING / MULCHING

Tillage, seeding and mulching requests more and more resistance from the mechanical components and especially for the Agri Discs Hub supporting the discs. Contamination, shocks added to higher speed and dryness have led to very hard conditions. Our premium product has the most efficient sealing system (5 lips cassette seal), developed with a leading seals manufacturer in Germany (Freudenberg), tested everywhere in the world in all types of conditions for

hundred thousand of hectares. The tough design of the flanges associated with the best bearings coming from our NSK plants, (double row angular with 40° angular contact), lubricated with a special grease (NSK property) improve again life and significantly reduce maintenance costs for the farmers. Some of our customers have chosen our AHU and give a warranty of three years on their machines !

## Product range tillage

NSK Ref No.	<i>d</i>	<i>D</i>	<i>D</i> <sub>1</sub>	<i>D</i> <sub>2</sub>	<i>J</i>	<i>d</i> <sub>1</sub>	<i>d</i> <sub>2</sub>	<i>d</i> <sub>3</sub>	<i>t</i>
AHU24135A-01	24	135	89	72	110	35	35	M12 x 1.75	4 x 90°
AHU28117AS-01	28	117	83	72	98	35	35	M12 x 1.25	4 x 90°
AHU28117AS-02	28	117	83	72	98	35	35	M12 x 1.25	5 x 72°
AHU28117AS-03	28	117	83	72	98	35	35	M12 x 1.25	6 x 60°
AHU28117C-01	-	117	89	72	98	20.5	20.5	M12 x 1.25	4 x 90°
AHU28117C-02	-	117	89	72	98	37	35	M12 x 1.25	4 x 90°
AHU28140A-01	28	140	89	72	107.95 (4 1/4")	35	35	M12 x 1.25	5 x 72°
AHU28140A-05	28	140	89	72	115	35	35	M12 x 1.25	5 x 72°
AHU28169A-01	28	169	98	83	133.35	45	45	13.5	4 x 90°
AHU30117A-01	30	117	89	72	98	37	35	M12 x 1.25	4 x 90°
AHU30140A-01	30	140	89	72	112	35	35	M12 x 1.50	5 x 72°
AHU30140A-02	30	140	89	72	113	35	35	M12 x 1.25	5 x 72°
AHU30140A-04	30	140	89	72	113	35	35	M12 x 1.25	5 x 72°
AHU35169B-01	34.9	169	98	83	133.35 (5 1/4")	45	45	13.5	4 x 90°
AHU35169TB-01	34.9	169	98	82	133.35 (5 1/4")	45	45	13.5	4 x 90°
AHU34120B-01	34	120	89	72	100	35	35	M10 x 1.5	6 x 60°
AHU34140B-02	34	140	89	72	120	35	35	M10 x 1	4 x 90°
AHU44140B-01	44	140	100	83	122	45	45	M12 x 1.75	6 x 60°
AHU45175B-01	45	175	100	82	133.35 (5 1/4")	45	45	12.7	5 x 72°
AHU45175TB-01	45	175	100	82	133.35 (5 1/4")	45	45	12.7	5 x 72°
AHU60117DS-01	60	117			100	35	35	M10 x 1.5	6 x 60°

Disc Diameter\* The disc diameters provided only serve as a point of reference because the suitability of the Agri Disc Hubs depends to a large extent on the application and operating conditions.

B\*\* Double-Row Tapered Roller Bearing for high load carrying capacity



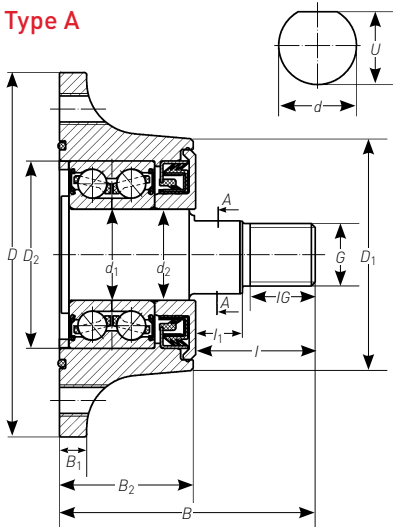


<i>U</i>	<i>I</i>	<i>I</i> <sub>1</sub>	<i>B</i>	<i>B</i> <sub>1</sub>	<i>B</i> <sub>2</sub>	<i>G</i>	<i>IG</i>	Disc Diameter*	Design	Tightening Torque
22.7	55.0	19.0	132.0	11.0	77.0	M24 x 1.5	36.0	up to 700 mm	A	350 Nm
25.5	42.0	13.0	102.0	10.0	60.0	M22 x 1.5	25.0	up to 700 mm	A	350 Nm
25.5	42.0	13.0	102.0	10.0	60.0	M22 x 1.5	25.0	up to 700 mm	A	350 Nm
25.5	42.0	13.0	102.0	10.0	60.0	M22 x 1.5	25.0	up to 700 mm	A	350 Nm
-	-	-	60.0	10.5	60.0	-	-	up to 700 mm	C	350 Nm
-	-	-	60.0	10.5	60.0	-	-	up to 700 mm	C	350 Nm
25.5	42.0	13.0	94.5	10.5	51.5	M22 x 1.5	25.0	up to 700 mm	A	350 Nm
25.5	46.5	10.5	106.5	10.5	51.5	M22 x 1.5	32.0	up to 700 mm	A	350 Nm
25.5	42.0	13.5	123.0	14.0	66.1	M22 x 1.5	23.0	up to 700 mm	A	350 Nm
27.5	46.0	13.0	106.0	10.5	60.0	M22 x 1.5	25.0	up to 700 mm	A	350 Nm
28.0	46.0	18.0	98.45	10.5	51.5	M24 x 2	25.0	up to 700 mm	A	350 Nm
26.0	27.0	4.0	107.45	10.5	51.5	M24 x 2	24.0	up to 700 mm	A	350 Nm
26.0	50.0	23.5	102.45	10.5	51.5	M24 x 2	24.0	up to 700 mm	A	350 Nm
31.0	15.0	-	81.4	14.0	66.1	3/4"-16 UNF	40.0	up to 700 mm	B	400 Nm
31.0	15.0	-	82.0	14.0	66.1	3/4"-16 UNF	40.0	up to 800 mm	B**	400 Nm
31.0	14.0	-	66.5	13.0	52.5	M20 x 1.5	26.0	up to 700 mm	B	350 Nm
31.0	19.0	-	101.5	10.5	50.0	M20 x 1.5	26.0	up to 700 mm	B	350 Nm
40.0	14.0	-	79.8	10.0	64.8	M24 x 2	26.0	up to 800 mm	B	400 Nm
41.0	37.0	-	103.8	14.0	103.8	M24 x 2	40.0	up to 800 mm	B	400 Nm
41.0	37.0	-	103.8	14.0	103.8	M24 x 2	40.0	up to 1000 mm	B**	400 Nm
			109.6	10.0	59.0	M20 x 1.5		up to 700 mm	D***	350 Nm****

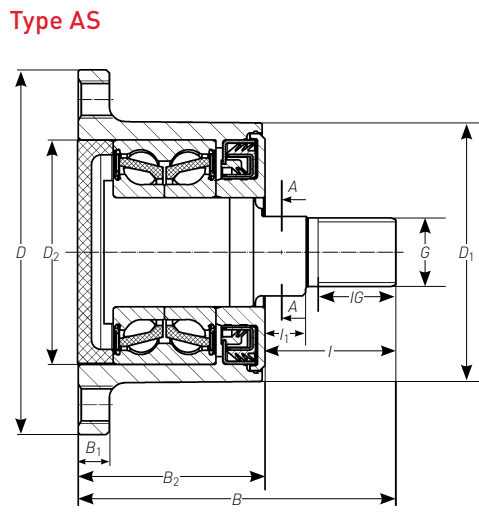
D\*\*\* Customer-specific type  
350Nm\*\*\*\* Tightening torque adjusted by NSK

## Drawings tillage and seeding

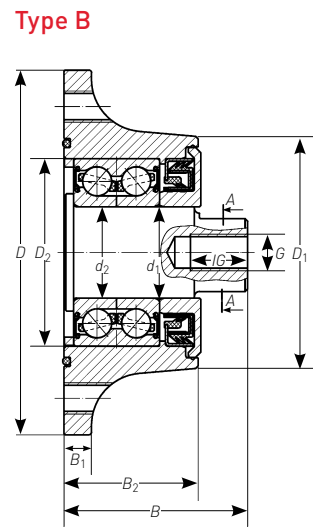
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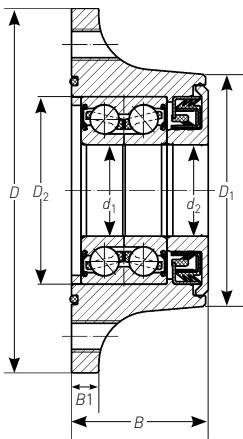
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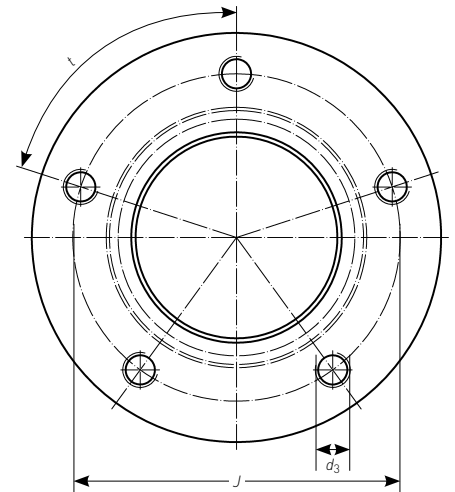
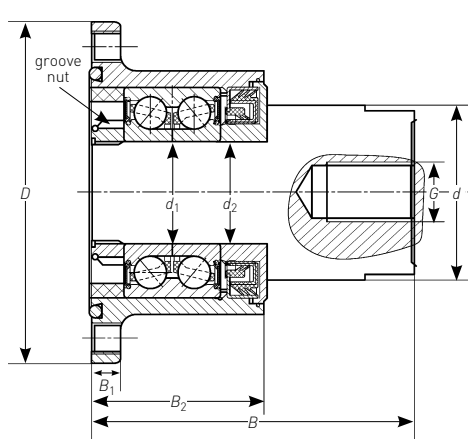
**Type B**



**Type C**



**Type D**



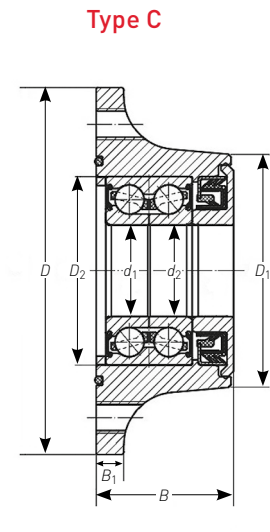
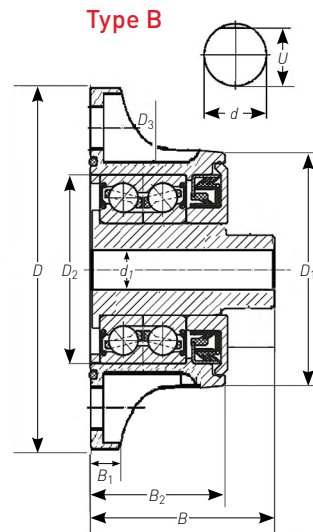
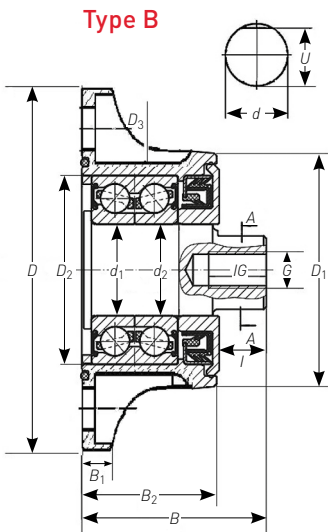
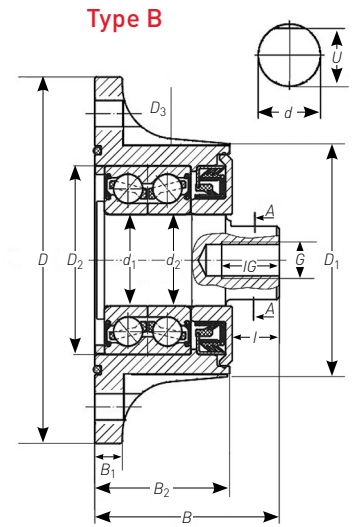
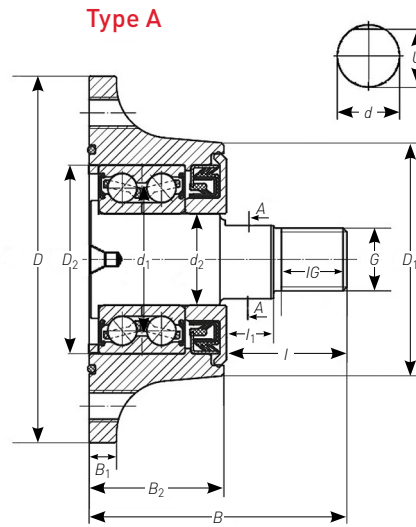
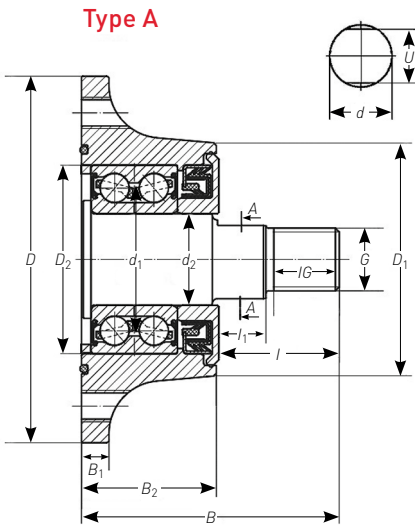
## Product range seeding

NSK Ref No.	$d$	$D$	$D_1$	$D_2$	$D_3$	$J$	$d_1$	$d_3$	$t$	$U$
AHU16074C-01	-	74	51	38.5		62	16.027	M8 x 1.25	5 x 72°	-
AHU20100A-01	20	100	60	47	-	80	20	M10 x 1	5 x 72°	18.5
AHU20100A-03	20	100	60	47	-	80	20	8.5	6 x 60°	18.5
AHU20100A-04	20	100	60	47	-	80	20	M8 x 1.25	5 x 72°	18.5
AHU20100B-01	20	100	60	47	-	80	20	M10 x 1	5 x 72°	18.5
AHU18110A-01	18	110	60	47		84	20	M10 x 1.5	4 x 90°	-
AHU20110A-01	20	110	60	47	-	84	20	M10 x 1.5	4 x 90°	18.5
AHU20120A-01	20	120	60	47	-	100	20	M10 x 1.5	6 x 60°	18.5
AHU20120B-01	20	120	60	47	-	100	20	M10 x 1.5	6 x 60°	18.5
AHU20120B-02	20	120	60	47	-	95	20	9.0	3 x 120°	18.5



<i>I</i>	<i>I</i> <sub>1</sub>	<i>B</i>	<i>B</i> <sub>1</sub>	<i>B</i> <sub>2</sub>	<i>B</i> <sub>3</sub>	<i>B</i> <sub>4</sub>	<i>B</i> <sub>5</sub>	<i>G</i>	<i>IG</i>	Disc Diameter*	Design	Tightening Torque
-	-	25.2	5.0	23.5	25.2	-	-	-	-	400 mm	C	100 Nm
35	10.5	73.0	7.0	38.0	-	-	-	M16 x 2	22.5	500 mm	A	135 Nm
35	10.5	73.0	7.0	38.0	-	-	-	M16 x 2	22.5	500 mm	A	135 Nm
35	10.5	73.0	7.0	38.0	-	-	-	M16 x 2	22.5	500 mm	A	135 Nm
9	-	47.0	7.0	38.0	-	-	-	M14x1.5	20.0	500 mm	B	135 Nm
30	10	68.0	8.0	38.0	-	-	-	M18x1.5	20.0	500 mm	A	135 Nm
35	10.5	73.0	8.0	38.0	-	-	-	M16 x 2	22.5	500 mm	A	135 Nm
35	10.5	73.0	8.0	38.0	-	-	-	M16 x 2	22.5	500 mm	A	135 Nm
9	-	47.0	8.0	38.0	-	-	-	M14x1.5	20.0	500 mm	B	135 Nm
35	-	47.0	8.0	38.0	-	-	-	M14x1.5	20.0	500 mm	B	135 Nm

## Drawings mulching



## Product range mulching

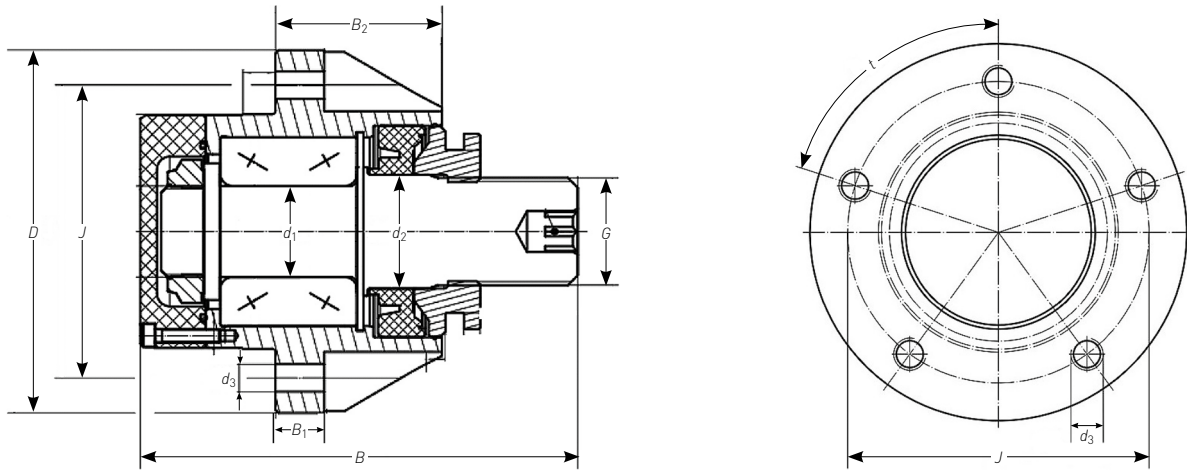
NSK Ref No.	$d$	$D$	$D_1$	$D_2$	$J$	$d_1$	$d_2$	$d_3$	$t$
AHU30140A-04	30	140	89	72	113	35	35	M12 x 1.25	5 x 72°
AHU30140A-05	30	140	89	72	115	35	35	M12 x 1.75	4 x 90°
AHU33112D-01	33	111.5			90	28	35	8.5	6 x 60°
AHU34120B-02	34	120	89	72	100	35	35	8.5	6 x 60°
AHU34120B-03	34	120	89	72	100	35	35	10.5	6 x 60°
AHU34120B-04	34	120	89	72	100	17.5	17.5	10.5	6 x 60°
AHU44140C-01	-	140	100	83	122	45	45	M12 x 1.75	6 x 60°

Disc Diameter\* The disc diameters provided only serve as a point of reference because the suitability of the Agri Disc Hubs depends to a large extent on the application and operating conditions.

D\*\* Customer-specific type



Type D



U	I	I <sub>1</sub>	B	B <sub>1</sub>	B <sub>2</sub>	G	IG	Disc Diameter*	Design	Tightening Torque
26.0	50.0	23.5	102.5	10.5	60.0	M24 x2	24	up to 700 mm	A	350 Nm
27.0	46.0	18.0	98.5	10.5	51.5	M24 x2	25	up to 700 mm	A	350 Nm
33.0			134.4	15.0	51.2	M33 x2		up to 700 mm	D**	350 Nm***
31.0	14.0	-	66.5	13.0	51.5	M20 x1.5	26	up to 700 mm	B	350 Nm
31.0	14.0	-	66.5	5.0	51.5	M20 x1.5	26	up to 700 mm	B	350 Nm
31.0	14.0	-	66.5	5.0	51.5	M20 x1.5	26	up to 700 mm	B	350 Nm
-	-	-	64.8	10.0	64.8	-	-	up to 800 mm	C	400 Nm

350Nm \*\*\* Tightening torque adjusted by NSK

# EXAMINATION FOLLOWING FIELD TESTING



Agri Hub seal concept



Typical picture of a compact disc harrow covered in dirt following the use of liquid manure



No dirt was able to get through the cassette seal. The seal is in outstanding condition



Once the bearing had been dismantled, no dirt was found inside the bearing or in the lubricant



An NSK employee removing the unit from the machine arm



The picture shows that no contamination or rust is present beyond the O-ring



There is no sign of damage or wear to the raceways

### Dust sealing in NSK's Agri Disc Hubs



[https://www.youtube.com/watch?v=x\\_9sGHlyuQ4](https://www.youtube.com/watch?v=x_9sGHlyuQ4)

#### Result of the examination:

Although the Agri Disc Hub bearing unit was used in extreme operating conditions in a compact disc harrow incorporating liquid manure, the bearing showed no signs of contamination, damage or wear. The Agri Disc Hub – and therefore the compact disc harrow – could have remained in use with no problems at all.

\*Fieldtest 3.000ha

# HARVESTING / FORAGE

More than ever, climate changes have reduced time slot to harvest and to prepare the forages. In these conditions, the machines need tough and reliable bearings. NSK has developed standards and special solutions for Double-Row Angular-Contact Ball Bearings, pulleys, pillows and Spherical Roller Bearings. We are daily working with big harvesting manufacturer providing technical solutions, increase their product life and reliability as well as farmers satisfaction. We are providing clever solutions using our best sealing technologies combined to different material (standard and stainless steel) and special seals and grease resistant to shocks, moisture and dust.

## Angular contact thin section bearings

Double row, bore 12 - 40 mm

Abbreviation	Dimensions (mm)				Open	Abbreviation			Load rating	
	$d$	$D$	$B$	$r_{1,2 \text{ min}}$		with shields	with seals	$C_r$	$C_{r0}$	
								kN		
3001B	12	28	12	0.3	3001BTNG	..B2ZRTNG	..B2RSRTNG	7.80	4.50	
3002B	15	32	13	0.3	3002BTNG	..B2ZRTNG	..B2RSRTNG	8.50	5.30	
3003B	17	35	14	0.6	3003BTNG	..B2ZRTNG	..B2RSRTNG	9.10	6.10	
3004B	20	42	16	0.6	3004BTNG	..B2ZRTNG	..B2RSRTNG	14.25	9.40	
3005B	25	47	16	0.6	3005BTNG	..B2ZRTNG	..B2RSRTNG	15.20	10.90	
3006B	30	55	19	1.0	3006BTNG	..B2ZRTNG	..B2RSRTNG	20.00	15.40	
3007B	35	62	20	1.0	3007BTNG	..B2ZRTNG	..B2RSRTNG	24.50	19.40	
3008B	40	68	21	1.0	3008BTNG	..B2ZRTNG	..B2RSRTNG	25.50	21.60	

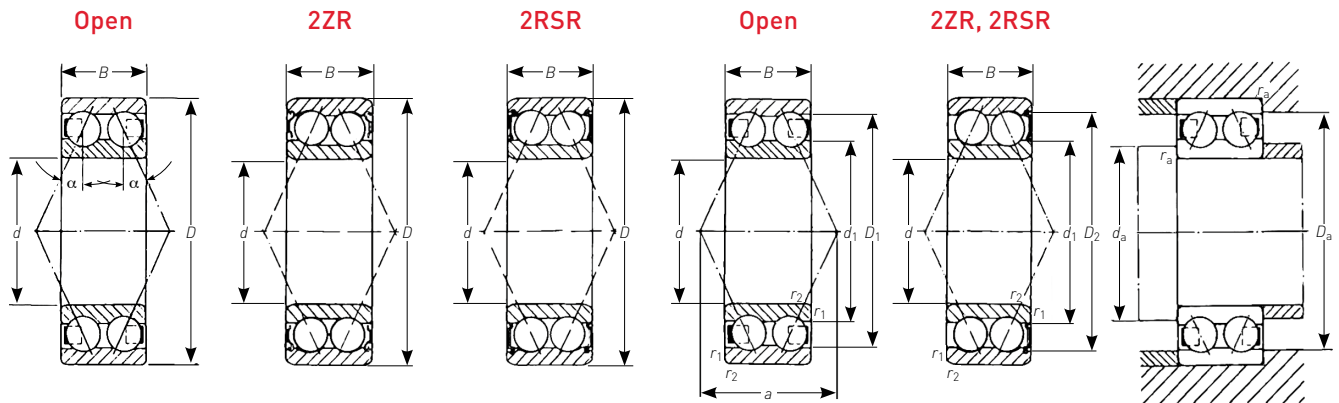


Forage, support roller - double row



Forage, Angular-Contact Ball Bearings - double row





Speed limits		Dimensions (mm)				Abutment Dimensions (mm)			Weight	Abbreviation
Grease 1/min	Oil 1/min	$d_1$	$D_1$	$D_2$	a mm	$d_a$ min	$D_A$ max	$r_a$ max	kg	
16000	22000	16.7	23.2	24.6	14.2	15	25.5	0.3	0.031	3001B
14000	18000	20.5	26.5	28.5	16	18	29.5	0.3	0.043	3002B
13000	17000	23.0	29.0	31.2	17.2	20.5	32.5	0.3	0.055	3003B
11000	14000	26.6	35.0	37.5	21.1	24.5	38.5	0.6	0.090	3004B
9000	12000	31.6	40.0	42.5	23.4	29.5	43.5	0.6	0.100	3005B
7500	10000	38.3	47.1	49.5	27.3	35.5	50	1.0	0.165	3006B
6700	9000	43.2	53.6	55.7	30.9	40.5	57	1.0	0.213	3007B
6000	8000	49.3	58.8	61.8	33.4	46	63	1.0	0.265	3008B



Harvesting, flanged bearing



Harvesting, trackroller - double row

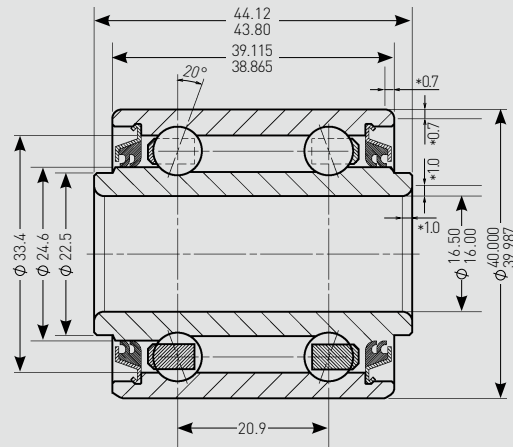


Harvesting, Spherical Roller Bearings with eccentric collar

# SPECIAL BEARINGS FOR SEEDING



Gauge Wheel Bearings

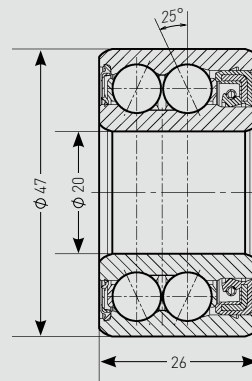


Double lip seal

**Part no.:** DAC164044  
**Description:** Extra wide Double-Row Angular-Contact Ball Bearing  
**Load ratings:** C: 15 kN  
 Co: 9.25 kN  
**Use:** Cylinders, wheels, rollers, etc.



Double-Row Angular-Contact Ball Bearing

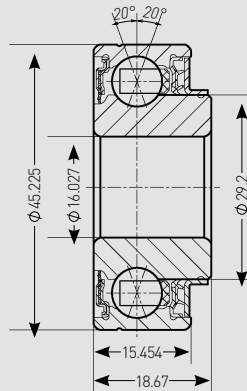


Radial shaft seal

**Part no.:** 3204BRSRWDRB26TNG  
**Description:** Double-Row Angular-Contact Ball Bearing with a radial shaft seal on one side  
**Load ratings:** C: 19.6 kN  
 Co: 12.5 kN  
**Use:** Sowing machines, strip tilling, tilling in general



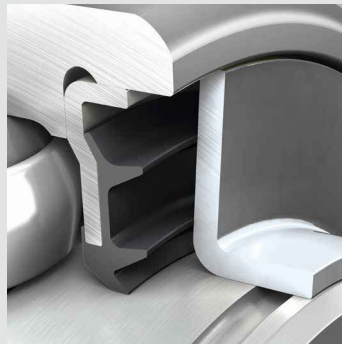
Four-Point Contact Bearing



**Part no.:** QJ6204S03LSLB-2  
**Description:** Four-Point Contact Bearing with an extended inner ring, various special seals and a flinger on one side  
**Load ratings:** C: 20 kN  
 Co: 12.7 kN  
**Use:** Sowing machines, strip tilling, tilling in general



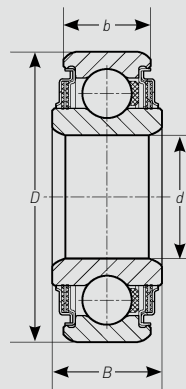
Single lip



Triple lip



DGBB with double lip seal



**Part no.:** 204-DLS  
**Description:** Deep Groove Ball Bearing with double-lip seal on each side and wider inner ring  
**Load ratings:** C: 12.80 kN  
 Co: 6.60 kN  
**Use:** Sowing machines



Double lip seal

Ref. No.	$d$ (mm)	$D$ (mm)	$b$ (mm)	$B$ (mm)	$C$ (kN)	$C_0$ (kN)
202-DLS	15	35	11	14.4	7.65	3.75
204-DLS	20	47	14	17.7	12.80	6.60

# EXAMPLES OF CUSTOMER-SPECIFIC SPECIAL BEARINGS

Besides producing special bearings for general agricultural applications, NSK also develops customer-specific special bearings. These are individually tailored to meet the machine manufacturer's specification for the application in question. The focus here is often on bespoke seal designs, but in some cases specific flange concepts are also required. Especially NSK's Neuweg site focuses on customer-specific special bearings, which it also produces in small and medium batch sizes.



Tillage, Agri Disc Hub - tightening torque adjusted by NSK



Tillage, Agri Disc Hub - with Tapered Roller Bearing



Seeding, Deep Groove Ball Bearing with double lip seal



Seeding, Insert Ball Bearings

# NSK STANDARD PRODUCTS USED IN THE AGRICULTURAL INDUSTRY



Spherical Roller Bearings



Cylindrical Roller Bearings



Tapered Roller Bearings



Deep Groove Ball Bearings



Ball Bearing Units

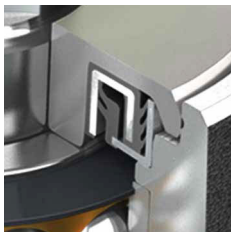
# SEAL TECHNOLOGY

Designing suitable seals is one of the most fundamental challenges when it comes to developing bearings for agricultural machinery. The inside of the bearing needs

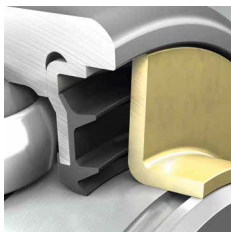
reliable protection from dirt, plant remnants, fertilisers and moisture. The seals even have to withstand pressure washers.

Here are a few examples of different seal concepts:

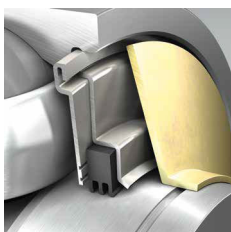
Rating											
10	Very good	8	Good	6	Fairly good	4	Satisfactory	2	Poor	1	Not suitable
9		7		5		3					



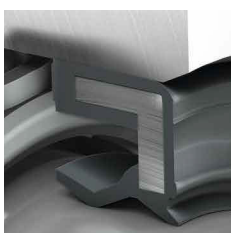
Cassette seal with a steel disc				Application
Protection from coarse dirt:	10	Bearing types: Agri Disc Hub		Tillage Seeding Mulching
Protection from dust:	10	Seal speed capability: 4		
Protection from water:	10			
Grease retention:	10			



Triple-lip seal with a packing disc				Application
Protection from coarse dirt:	9	Bearing types: Four-point Bearings		Seeding Forage
Protection from dust:	9	Seal speed capability: 5		
Protection from water:	9			
Grease retention:	9			



Triple-lip seal with a flinger				Application
Protection from coarse dirt:	9	Bearing types: Self Lube Bearing Units		Harvesting Forage Tillage Seeding
Protection from dust:	9	Seal speed capability: 5		
Protection from water:	9			
Grease retention:	9			



Integrated radial shaft seal				Application
Protection from coarse dirt:	9	Bearing types: Double-Row Angular-Contact Ball Bearings		Seeding Harvesting
Protection from dust:	9	Seal speed capability: 8		
Protection from water:	7			
Grease retention:	7			



Triple-lip seal reinforced with sheet steel		Application
Protection from coarse dirt: 9	Bearing types: Inserts for Ball Bearing Units	Seeding Harvesting
Protection from dust: 9	Seal speed capability: 5	
Protection from water: 9		
Grease retention: 9		



Double-lip seal		Application
Protection from coarse dirt: 9	Bearing types: Pulley	Seeding Harvesting Forage
Protection from dust: 7	Seal speed capability: 7	
Protection from water: 6		
Grease retention: 7		



Single-lip seal with an adjacent flinger		Application
Protection from coarse dirt: 8	Bearing types: Inserts for Ball Bearing Units	Seeding Forage Harvesting
Protection from dust: 7	Seal speed capability: 8	
Protection from water: 7		
Grease retention: 6		



Single-lip seal		Application
Protection from coarse dirt: 8	Bearing types: Ball Bearings	Forage Seeding
Protection from dust: 7	Seal speed capability: 8	
Protection from water: 7		
Grease retention: 6		



Axial contact seal / DU Seal		Application
Protection from coarse dirt: 6	Bearing types: Ball Bearings	Forage Seeding
Protection from dust: 7	Seal speed capability: 9	
Protection from water: 7		
Grease retention: 5		

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