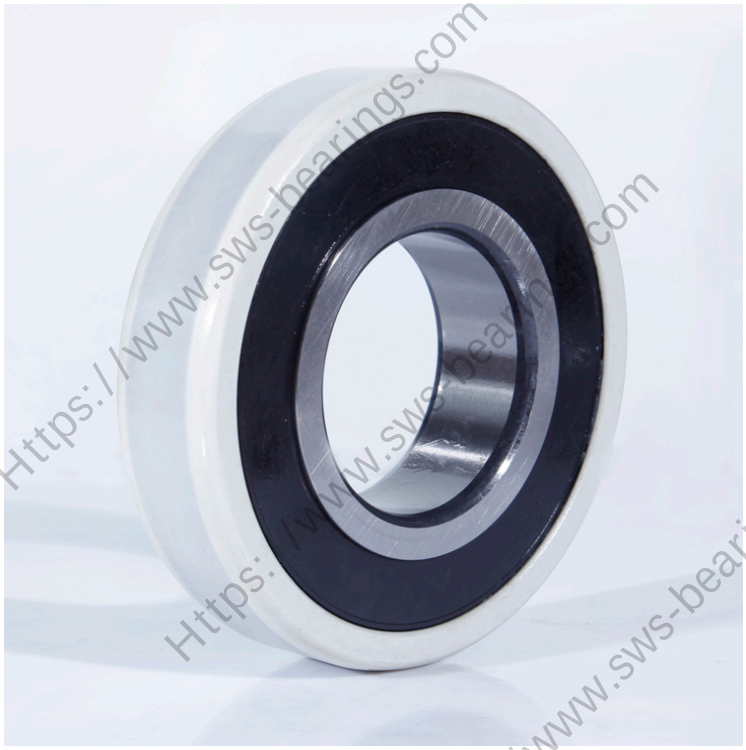
SWS Bearings LTD
High Quality Bearing Manufacturer

SWS Bearings LTD

----- Your Reliable Bearings Factory







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SWS Bearings Limited is one of the most reliable bearings factories and exporters in China. We mainly supply roller and ball bearings.

SWS was founded in 2007, located in Changzhou city,jiangsu Province It just takes around 2 hours from Changzhou to Shanghai by car, and very convenient transportation.



In 2009, SWS has invested three factories in Shandong, and Dalian city. Our products sell worldwide.

Our products and service include:

●Miniature and middle-large size deep groove ball bearing
●Double-row self-aligning roller bearing
●Four-row heavy type cylindrical roller bearing
●Self-aligning roller bearing
●Axial thrust ball bearing, thrust ball and roller bearing
●Single and double taper roller bearing
●Needle roller bearing
●High precision spindle bearing
●Pillow block bearing, bush, steel balls
●Technical support
●Maintenance
●Products training

Bore size range:3mm~6.5m
Weight range:10.5g~2.6ton

SWS bearings are widely used in railway, mining, mechanical equipment, automobile, ship, metallurgy, petrifaction, electric power, agriculture, textile and aviation, etc.

SWS products have sell to Europe, Asia, America, south-east Asia, which are our most important market. We have spent much time on developing new products, and also produce top quality products. We are very popular in domestic and abroad. Welcom e your inquiry and Look forward our cooperation in the future.

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Factory



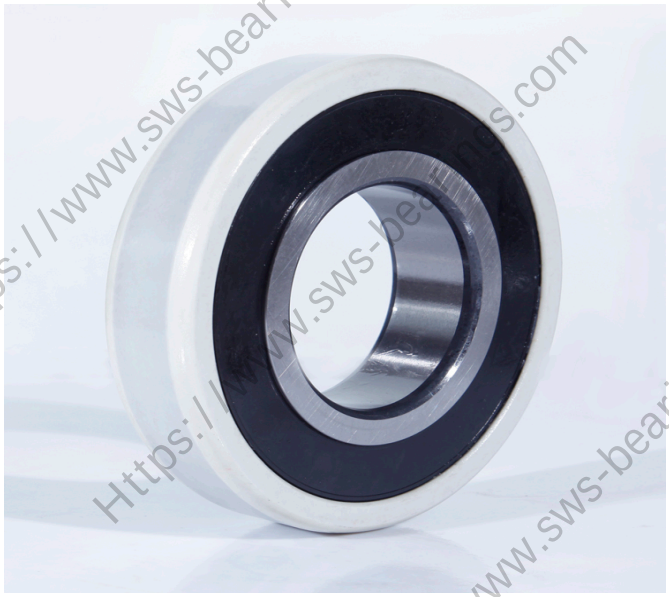
Equipment



Workshop



Office



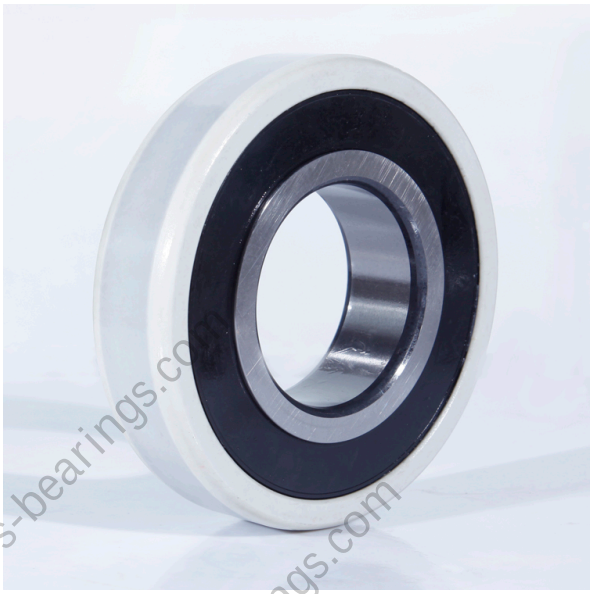
Product



Product

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Electric insulation deep groove ball outer ring



Electrical insulation bearing can prevent DC electric induction for inhibition of bearing, prevention of DC for grease and rolling body raceway, formation damage, bearing using his progress.

Electrical insulation bearings are widely used in motors and generators, especially for variable frequency motors.



Electric insulation deep groove ball inner ring

Electrical insulation bearing with special spraying process, plating quality coated on the outer surface of spray bearing, coating and bonding strength, good insulation properties, can avoid the electric erosion effect on the bearing induced current, prevent current on grease and roller and raceway damage, improve the service life of the bearings.

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Electric insulating cylindrical roller outer ring



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Electrical insulation bearings are widely used in motors and generators, especially for variable frequency motors.



Electric insulating cylindrical roller outer ring

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Damage Caused by Electrical Current and Its Consequences · Current-Insulated Bearings as a Preventive Measure

Damage Caused by Electrical Current and Its Consequences

Rolling bearings used in:
- wheelsets and traction motors (rail vehicles)
- DC and AC motors (drivetrains)
- generators (wind power)

can be exposed to electrical current. In a worst-case scenario, this can damage raceways and rolling elements, which, in turn, causes the motor or generator to fail prematurely and without warning. On top of the extra expenses incurred for repairs, this also means additional costs caused by machine downtime and the resulting production losses.

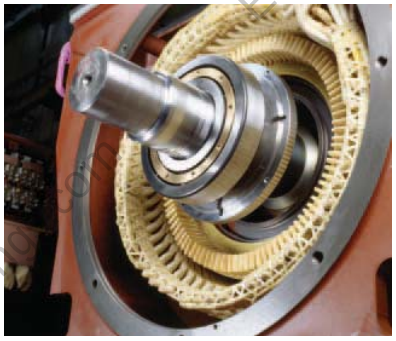
A much more economical solution is to provide for the use of current–insulated bearings during the planning stage. This reduces maintenance and repair costs, and increases machine availability – all of which means greater value for the customer.

In most cases, it is sufficient to interrupt the electric circuit between the housing and shaft, in order to mount current-insulated bearings at one or both bearing locations, depending on the application.

Generally, current-insulated bearings (ceramic-coated or hybrid) exhibit significantly higher resistance to electrical current than standard bearings.









Current-Insulated Bearings as a Preventive Measure

As a rule, it is very difficult to eliminate the causes of bearing **voltages** that are induced by the motor. Nevertheless, it is possible to avoid damage to the bearing, if the **flow of current** can either be prevented or at least significantly reduced. Many types of current-insulated rolling bearings are available today for this very purpose. Which components SWS to be insulated depends on the type of voltage involved:

Induced Voltage along the Shaft

This produces a circular current, which is closed via bearing 1, the housing, and bearing 2. Such shaft voltages are often the result of an asymmetrical distribution of the magnetic flux within the motor. This is especially evident in motors with only a few pairs of poles. If this is the case, it is sufficient to disrupt the flow of current by insulating one of the two bearings.

Voltage between the Shaft and the Housing

In this case, electrical currents flow through each of the two bearings in the same direction. The most likely cause is the converters' common-mode voltage. This type of a situation might require insulating both bearings.
Which type of electrical insulation is to be used depends on the time response of the given voltages. With **DC voltage** and low-frequency AC voltage, the choice depends on

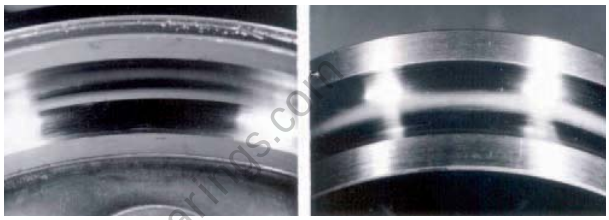
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Current-Insulated Bearings as a Preventive Measure · Typical Damage Caused by Electrical Current Passing through the Bearing

the **ohmic resistance** of the bearing. With higher-frequency AC voltage (often encountered in converters!), it depends on the capacitive reactance of the bearing. Basically, a current-insulated bearing acts like a resistor and capacitor connected in parallel. To ensure good insulation, the ohmic resistance should be as high as possible, and the capacitance should be as low as possible.

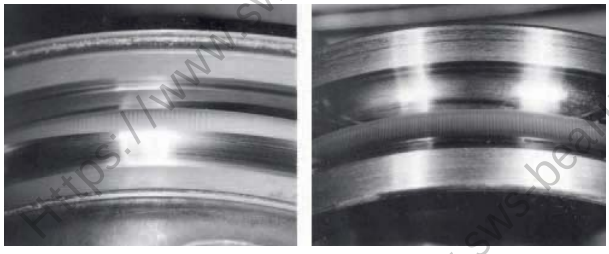
Typical Damage Caused by Electrical Current Passing through the Bearing

Regardless of whether a bearing was exposed to direct current or alternating current (up to frequencies in the MHz range), the resulting changes to the surface are always the same: Uniformly dull, gray marks in the raceways (Fig. 1) and on the rolling elements. These marks are not very specific and can also be caused by other factors (e. g. lubricating oil containing abrasives).



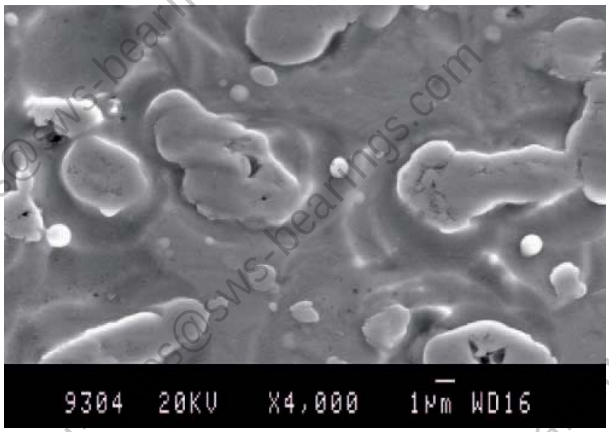
1: Dull and Gray Marks
left raceway outer ring, right raceway inner ring

"Fluting" refers to the washboard patterns that develop along the raceway surface in the direction of rotation (Fig. 2). This type of damage usual indicates that electrical current has passed through the bearing.



2: Fluting
left raceway outer ring, right raceway inner ring

An examination under a scanning electron microscope (SEM) reveals that the damage shown in figures 1 and 2 is characterized by densely-packed craters (caused by localized melting) and welding beads with micrometer-sized diameters covering the raceways. This definitively proves that electrical current has passed through the bearing.



3: SEM micrograph of the Damage Structure

These **craters** and **welding beads** are the result of electrical discharges between the microscopic peaks that are always found in raceways and on rolling-element surfaces. When a spark penetrates a fully-developed lubricating film at a bottleneck, it causes the adjacent surfaces to momentarily melt. In the mixed-friction range (metal-to-metal contact), the affected surfaces are temporarily fused together, then immediately broken apart again by the rotation of the bearing. In both cases, material also separates from the surfaces, where it immediately solidifies to form welding beads. Some of these beads get mixed in with the lubricant, the rest are deposited on the metal surfaces. Craters and welding beads can be flattened and smoothed as the rolling elements continue to pass over them. If there is a continuous flow of current, the (thin) surface layers, over time, repeat this melting and solidifying process over and over again.

Most bearing failures, however, are caused by **fluting** (Fig. 2). These washboard patterns in raceways and on rollers form as a result of the combined effects of a continuous flow of electrical current and the vibrational

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Typical Damage Caused by Electrical Current Passing through the Bearing · Ceramic-Coated Bearings

properties of the bearing components. Each time the rolling element comes into contact with a sufficiently-large crater, it becomes radially displaced; the extent of the element's displacement depends on the bearing's internal geometry and speed, as well as on the loads acting on the bearing. As the rolling element swings back, the thickness of the lubricating film is eroded, resulting in more sparkovers in this area – a self-sustaining process has been triggered. After a while, the entire circumference of the ring's raceway can become covered with fluting damage. This causes more pronounced bearing vibrations, finally leading to bearing failure.

Calculated current density – i.e., the effective amperage divided by the total area of contact between the rolling elements and the bearing's inner ring and outer ring (which is dependent on the type of bearing and on the operating conditions) – has proven itself in the field as a reliable criterion for assessing the level of danger posed by electrical current. When current densities are less than approx. 0,1 A_{eff}/mm^2, there is no risk of fluting, according to our present level of understanding. Densities at or above 1 A_{eff}/mm^2, however, are likely to cause this type of damage.

Effect of Current on Lubricant

Electrical current also **negatively affects the lubricant**, whose base oil and additives oxidize and develop cracks. (This is clearly evident under the infrared spectrum.) The lubricating properties are compromised by premature aging as well as by an increased concentration of iron particles, which can cause the bearing to overheat.

Ceramic-Coated Bearings



4: Ceramic-Coated Deep Groove Ball Bearings

Features and Benefits of Coated SWS Bearings

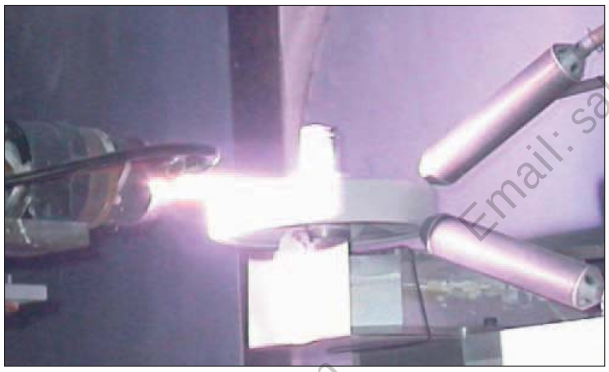
- Oxide ceramic coatings (**J20...**) provide a high level of insulation. Plasma spraying is used to apply these coatings to the bearing surfaces (Fig. 5).
- Thanks to a special sealant, the **J20AA coating** retains its insulating properties even in a damp environment.
  The resulting oxide ceramic coating is very hard, wear resistant, and a good thermal conductor.
- The external dimensions of the current-insulated rolling bearings are in accordance with DIN 616 (ISO 15). This means that they are interchangeable with standard bearings.
- For special applications, such as those with a rotating outer ring, we recommend using an inner ring coated with J20C.
- Starting with the 62-series and up, coated deep-groove ball bearings are available in both open and sealed versions (with lip seals on one or both sides). This enables the user to also benefit from the advantages offered by for-life lubrication.

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The Coating Process · Electric Resistance

The Coating Process

The plasma spraying process involves generating an arc between two electrodes to ionize a noble gas that is issued from the plasma torch. The resulting plasma jet is used to carry the injected aluminum oxide powder. This powder is melted by the heat and sprayed at high speed onto the outer or inner ring. When applied in this manner, the oxide layer adheres extremely well to the base material. It is then sealed and ground to size.



5: Plasma-Spraying

Electric Resistance

The coatings are subjected to a 100% quality inspection and guarantee a dielectric strength of at least 1 000 VDC (J20AA, J20C) or 500 VDC (J20B), respectively.

Below this voltage, the insulating layer permits only extremely low levels of current to flow through the bearing. It offers resistance to DC currents and to AC currents.

DC resistance
At room temperature, the layer typically has a DC resistance of 1–10 GOhm, depending on the bearing size. As the temperature increases, the DC resistance decreases exponentially, typically by approx. 40–50 % per 10 K. But even at operating temperatures of 60 °C or even 80 °C, the insulating layer still has a resistance of several MOhm. According to Ohm's law (I = U/R), this means that voltages of up to 1 000 V only produce currents that are significantly below 1 mA, which are not critical for bearings.

AC resistance
The insulated unit acts like a capacitor (C) which can accumulate charges. When exposed to an AC voltage, this causes an alternating current to flow through the contact area between the rolling element and raceway. In the case of a harmonic time dependence with angular frequency ω, the rms values for current and voltage are calculated using the formula

$I = U \cdot \omega \cdot C.$

Analogous to Ohm's law, $Z = 1/\omega C$ is the capacitive reactance of the bearing. A bearing with an oxide ceramic coating typically has a capacitance of 2–20 nF, depending on the bearing size. So, at a frequency of 50 Hz, it has a capacitive reactance of 0,15–1,5 MOhm, which is significantly lower than its DC resistance. At higher frequencies, this value decreases even further. Still, in most cases it will be signifi-cantly **higher than the resistance of a non-insulated bearing**, which, at voltages higher than 1 V, is very low (1 Ohm and less).

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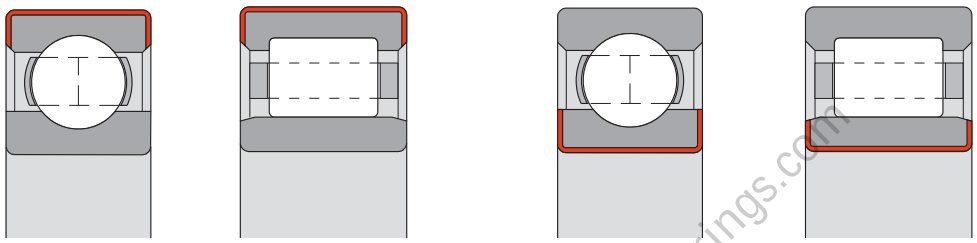
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Types of Coatings · Range of Sizes



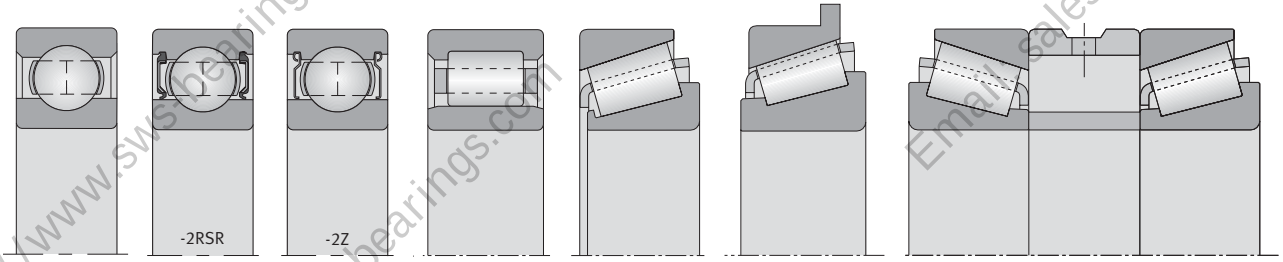
J20B / J20A / J20AA J20C

	J20B	J20A *)	J20AA	J20C
Disruptive Voltage	500 VDC	1 000 VDC	1 000 VDC	1 000 VDC
Environment	dry	dry	dry/damp	dry/damp
Coating Thickness	<100 µm	>200 µm	≈200 µm	≈200 µm
Applicable Dimensions	70…1 400 mm outside diameter	70…1 400 mm outside diameter	70…500 mm outside diameter	70…340 mm inner ring bore

*) Preferably used for bearings with an outside diameter of at least 500 mm.

The surfaces of the rings to be coated must be cylindrical; they must not be interrupted by lubricating holes or grooves.

Bearing Designs with a Ceramic Coating:



only with J20C-coating

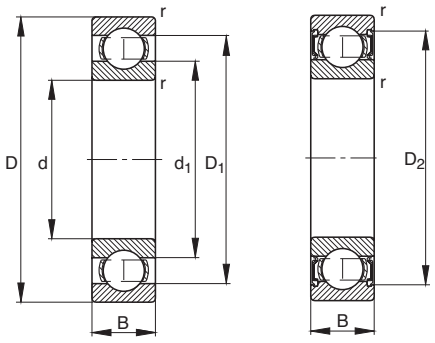
If desired, other bearing designs can be also be coated (upon consulting with the appropriate technical department).

Recommended SWS rolling bearings with a ceramic coating are listed on pages 6–8.

Ordering examples:
6220-2RSR-J20AA-C3 Deep groove ball bearing with a coated outer ring, with seals on both sides and radial clearance C3.
NU214-E-M1-F1-J20B-C4 Cylindrical roller bearings with a coated outer ring and radial clearance C4.
6330-J20C Deep groove ball bearings with a coated inner ring

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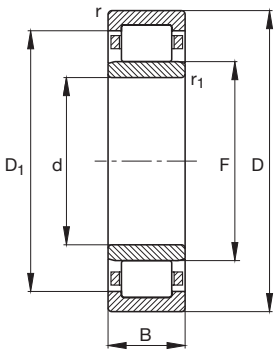
Ball Bearings with a Ceramic Coating



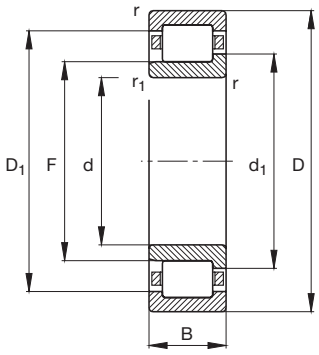
Designation	Mass	Dimensions							Load Rating		Fatigue Limit Load	Limiting Speed	Reference Speed
	m	d	D	B	r min	D	D_2 ≈	d_1 ≈	dyn. C_r	stat. C_{0r}	C_u	n_G	n_B
SWS	kg	mm							kN	kN	kN	min^{-1}	min^{-1}
6212-M-J20B-C4	0,98	**60**	110	22	1,5	95,6		76,1	52	36	2,24	14 000	6 800
6213-J20B-C4	1	**65**	120	23	1,5	103,1		82,3	60	41,5	2,55	13 000	6 300
6313-M-J20AA-C5	2,55	**65**	140	33	2,1	117,5		88,6	93	60	3,95	11 000	6 400
6214-2RSR-J20AA-C3	1,11	**70**	125	24	1,5		110,7	86,8	62	44	2,9	12 000	6 100
6215-M-J2B-C4	1,42	**75**	130	25	1,5	112,8		92,5	65,5	49	3,35	11 000	5 900
6215-M-P6-J20AA-R85-105	1,42	**75**	130	25	1,5	112,8		92,5	65,5	49	3,35	11 000	5 900
6315-M-J20AA-C3	3,74	**75**	160	37	2,1	133,2		101,8	114	76,5	4,65	9 500	5 800
6016-M-J20AA	0,997	**80**	125	22	1,1	111		94	47,5	40	2,34	12 000	6 500
6216-J20AA-C3	1,46	**80**	140	26	2	121,3		98,8	72	54	3,45	11 000	5 500
6316-J20AA-C3	3,75	**80**	170	39	2,1	141,8		108,6	122	86,5	5,2	9 000	5 500
6316-M-J20B-C4	4,44	**80**	170	39	2,1	141,8		108,6	122	86,5	5,2	9 000	5 500
F-808916.6316-J20AA	3,69	**80**	170	39	2,1	141,8		108,6	122	86,5	5,2	9 000	5 500
6317-M-J20AA-C3	5,05	**85**	180	41	3	151,6		114,4	132	96,5	5,8	8 000	5 300
6218-J20AA-C3	2,21	**90**	160	30	2	139,4		112,3	96,5	72	4,2	9 000	5 100
6318-M-J20AA-C3	6,14	**90**	190	43	3	157,1		123,8	134	102	5,8	8 000	5 100
6319-M-J20AA-C4	7,05	**95**	200	45	3	166,9		129,1	146	114	6,4	7 500	4 950
6220-J20C-C3	3,3	**100**	180	34	2,1	154,8		124,7	122	93	5,4	8 000	4 800
6220-M-J20AA-R95-120	3,9	**100**	180	34	2,1	154,8		124,7	122	93	5,4	8 000	4 800
6320-M-J20AA-C3	8,64	**100**	215	47	3	179		138,6	163	134	7,4	7 000	4 650
16021-M-J20AA-C5	1,42	**105**	160	18	1	141,2		124,2	54	54	2,39	9 500	3 950
6322-M-J20AA-C3	11,7	**110**	240	50	3	197,4		153,4	190	166	8,6	6 300	4 150
6324-M-J20AA-C3	15	**120**	260	55	3	214,9		165,1	212	190	9	6 000	3 850
6326-M-J20AA-C3	18,3	**130**	280	58	4	231,2		178,9	228	216	9,8	5 600	3 500
6230-J20AA	10,3	**150**	270	45	3	229,1		191,6	176	170	7,8	5 600	3 350
6336-M-J20AA-C4	43	**180**	380	75	4	317		245,2	355	405	16,3	3 800	2 440

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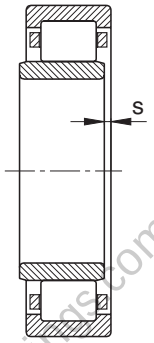
Cylindrical Roller Bearings with a Ceramic Coating

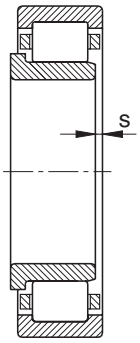


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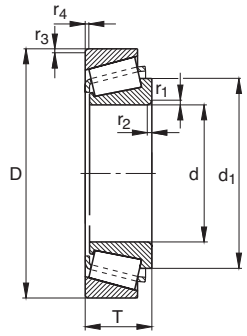




Designation	Mass	Dimensions									Load Rating		Fatigue Limit Load	Limiting Speed	Reference Speed
	m	d	D	B	r min	r min	s_1 [1]	F	$_1D$ ≈	d_1 ≈	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	n_B
SWS	kg	mm									kN	kN	kN	min^{-1}	min^{-1}
NJ312-E-M1-F1-J20B-C4	2,14	**60**	130	31	2,1	2,1	1,8	77	109,6	84,4	177	157	26,5	5 000	5 300
NU214-E-M1-F1-J20B-C4	1,29	**70**	125	24	1,5	1,5	1,6	83,5	109,4		140	137	19	5 300	4 750
NU314-E-M1-F1-J20B-C4	3,16	**70**	150	35	2,1	2,1	1,7	89	126,8		242	222	30	4 500	4 550
NU215-E-TVP2-J20AA-C3	1,27	**75**	130	25	1,5	1,5	1,2	88,5	114,4		154	156	21,7	5 300	4 500
NU215-E-M1-F1-J20B-C4	1,41	**75**	130	25	1,5	1,5	1,2	88,5	114,4		154	156	21,7	5 300	4 500
NU216-E-M1-F1-J20B-C4	1,71	**80**	140	26	2	2	1,3	95,3	122,9		165	167	22,6	4 800	4 250
NJ316-E-M1-F1-J20B-C4	4,48	**80**	170	39	2,1	2,1	0,7	101	143,9	110,4	300	275	46	3 800	4 150
NU218-E-TVP2-J20AA-C3	2,36	**90**	160	30	2	2	1,5	107	139,7		215	217	28,5	4 300	3 950
NUP218-E-TVP2-J20AA-C3	2,46	**90**	160	30	2	2	–	107	139,7	114,3	215	217	35	4 300	3 950
NJ219-E-TVP2-J20AA	2,94	**95**	170	32	2,1	2,1	–	112,5	148,6	120,5	260	265	41,5	3 800	3 700
NU219-E-M1-F1-J20B-C4	3,25	**95**	170	32	2,1	2,1	0,7	112,5	148,6		260	265	34	3 800	3 700
NU220-E-TVP2-J20AA-C3	3,49	**100**	180	34	2,1	2,1	1,5	119	156,9		295	305	38,5	3 800	3 500
NU320-E-M1-F1-J20AA-C4	8,77	**100**	215	47	3	3	1,2	127,5	182		450	425	53	3 200	3 400
NU224-E-TVP2-J20AA-C3	5,8	**120**	215	40	2,1	2,1	1,4	143,5	187,8		390	415	52	3 200	3 100
F-809035.NU228-E-J20AA	9,39	**140**	250	42	3	3	2	169	216,7		460	510	59	4 800	2 600

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Tapered Roller Bearings with a Ceramic Coating



Designation	Mass	Dimensions						Load Rating		Fatigue Limit Load	Limiting Speed
								dyn.	stat.		
	m	d	D	T/2B [1]	$r_{1,2}$ min	$r_{3,4}$ min	d_1 ≈	C_r	C_{0r}	C_{ur}	n_G
SWS	kg	mm						kN	kN	kN	min^{-1}
F-803477.TR1-J20B	2,64	**89,945**	146,975	40	3,6	1,5	119	232	355	50	4 800
F-804565.30220-A-J20B	3,7	**100**	180	37	3	2,5	135	231	290	32	4 300
F-803478.TR1-J20B	9,4	**117,475**	212,725	63,5	8,1	3,3	162,2	490	720	93	3 000
F-803889.32224-A-J20B	9,15	**120**	215	61,5	3	2,5	175,2	445	650	84	3 000
F-809028.TR1-J20B	10,2	**130**	225	67	4	3	174,6	480	710	94	2 800
F-804550.01.TR2S-J20B [1]	6,8	**140**	190	99	2	1,5	150,1	365	780	74	3 400
Z-577634.01.TR2S-J20B [1]	13,5	**140**	210	130	2,5	2	175,8	585	1 180	75	2 800
Z-580065.30228-A-J20B	8,6	**140**	250	45,75	4	3	187	390	520	60	2 600
K36990-36920-J20B	3,18	**177,8**	227,012	30,162	1,5	1,5	203,8	186	400	30	2 600
F-809055.TR1-J20AA [2]	9,34	**198,298**	282,575	46,038	3,6	3,3	249	345	750	87	2 200
Z-566566.TR1-J20AA	9,28	**199,949**	282,575	46,038	3,6	3,3	249	345	750	87	2 200
F-807411.TR1-J20B	8,23	**240**	320	42	3	3	278	380	670	73	2 000
F-809146.TR1-J20AA	18,6	**240**	336,55	65,088	6,4	3,3	284	640	1 250	137	1 800
F-808428.TR1-J20AA	17,2	**240,5**	336,55	65,088	6,4	3,3	284	640	1 250	137	1 800
F-808428.TR1-J20B	17,2	**240,5**	336,55	65,088	6,4	3,3	284	640	1 250	137	1 800
Z-547733.TR1-J20AA	22,3	**254**	358,775	71,438	3,3	1,5	302,8	720	1 370	148	1 700
Z-547733.02.TR1-J20AA	22,3	**254**	358,775	71,438	3,3	1,5	302,8	720	1 370	148	1 700

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Hybrid Bearings

As an alternative to coated rolling bearings, SWS offers hybrid bearings that have ceramic rolling elements and rings made from rolling-bearing steel. Hybrid bearings have the suffix HC.
The rolling elements are **absolutely wear-free** and provide the requisite current insulation.
In addition to ball bearings (Fig. 6), we also offer hybrid versions of our cylindrical roller bearings (Fig. 7).



6: Deep Groove Ball Bearing with Ceramic Rolling Elements



7: Cylindrical Roller Bearing with Ceramic Rolling Elements

Features and Benefits of Hybrid Bearings

- Greatest resistance to passage of current. Even at higher temperatures, DC-resistance is in the GOhm range. Hybrid bearings typically have a capacitance of about 40 pF, which is lower than for ceramic-coated bearings by a factor of 100.
- Higher speeds with less friction, which translates into lower operating temperatures
- Better dry-running properties

Hybrid bearings have a longer grease life than traditional “lubricated for life” bearings (see TI WL 43-1210).
For small rolling bearing sizes, hybrid designs are more cost-effective than ceramic-coated bearings.

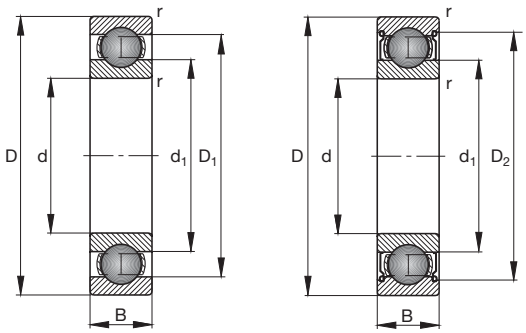
Ordering examples:
HC6214-M-P6-C3 Deep groove ball bearing with ceramic balls; machined brass cage; increased accuracy P6 and bearing clearance C3.
HCN1020-K-M1-SP Cylindrical roller bearing with ceramic rollers; tapered bore; machined brass cage; increased accuracy SP.

Our field-service engineers will be happy to assist you in selecting the most suitable and cost-effective designs for your applications.

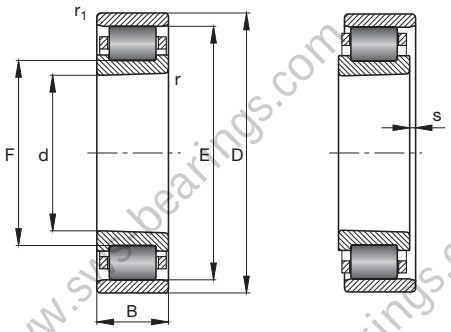
Properties	Unit	Ceramic (silicon nitride Si_3N_4)	Steel (100Cr6)
Resistivity	$\Omega \cdot mm^2/m$	10^{17}	10^{-1}
Density	g/cm^3	3,2	7,8
Thermal Expansion Coefficient	$10^{-6}/K$	3,2	11,5
Modulus of Elasticity	MPa	315 000	210 000
Poisson’s Ratio	–	0,26	0,3
Hardness	HV10	1 600…800	700…150

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Hybrid Bearings - Table



Designation	Mass	Dimensions							Load Rating		Fatigue Limit Load	Limiting Speed
	m	d	D	B	r_{1D} min	≈	D_2 ≈	d_1 ≈	dyn. C_r	stat. C_{0r}	C_{ur}	n_G
SWS	kg	mm							kN	kN	kN	min^{-1}
HC6002-2Z	0,031	**15**	32	9	0,3		28,4	20,5	4 150	2 000	102	30 000
HC6003	0,038	**17**	35	10	0,3	29,5		22,7	6 000	3 250	157	21 000
HC6212-C4	0,694	**60**	110	22	1,5	95,6		76,1	40 500	31 000	1 590	14 000
HC6014	0,614	**70**	110	20	1,1	9,3		82,8	29 000	25 500	1 850	10 000
HC6214-M	1,23	**70**	125	24	1,5	108		87,1	48 000	39 000	2 050	12 000



Taper 1:12

Designation	Mass	Dimensions						Load Rating		Fatigue Limit Load	Limiting Speed
	m	d	D	B	$_1r$ min	s [1]	E	dyn. $_rC$	stat. C_{0r}	C_{ur}	n_G
SWS	kg	mm						kN	kN	kN	min^{-1}
HCN1006-K-M1-SP	0,115	**30**	55	13	0,6	1,9	48,5	16 000	17 000	2 330	36 000
HCN1007-K-M1-SP	0,149	**35**	62	14	0,6	2	55	19 000	20 400	2 700	28 000
HCN1008-K-M1-SP	0,182	**40**	68	15	0,6	2,1	61	23 600	27 000	3 700	28 000

[1] axial displacement

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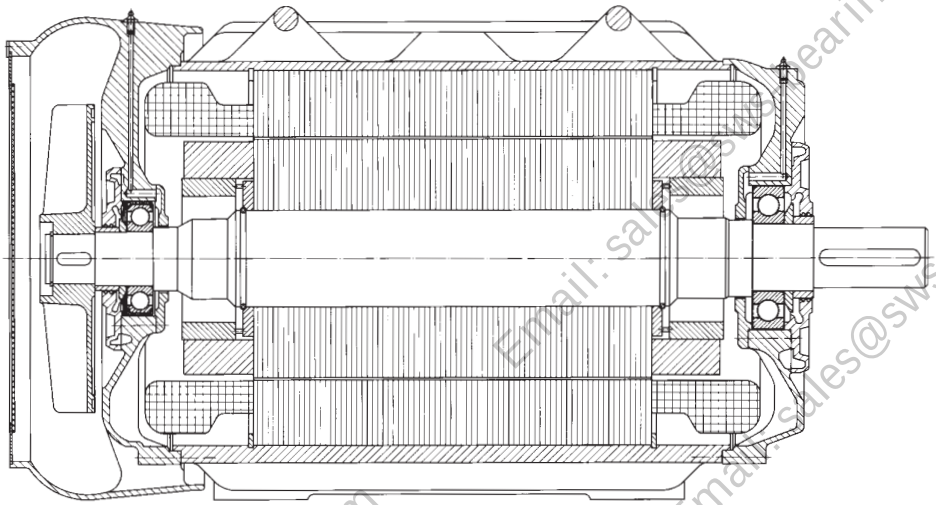
Mounting Examples

1. Three-phase motor

Deep groove ball bearing with a J20AA coating

Technical data:
Three-phase motor, converter-fed
Power 375 kW
Design four-pole

A current-insulated deep groove ball bearing **6316-J20AA-C3** is installed at the ventilation end, and a deep groove ball bearing **6320-C3** is installed at the drive end. Both bearings are lubricated with grease. A relubrication device is provided.

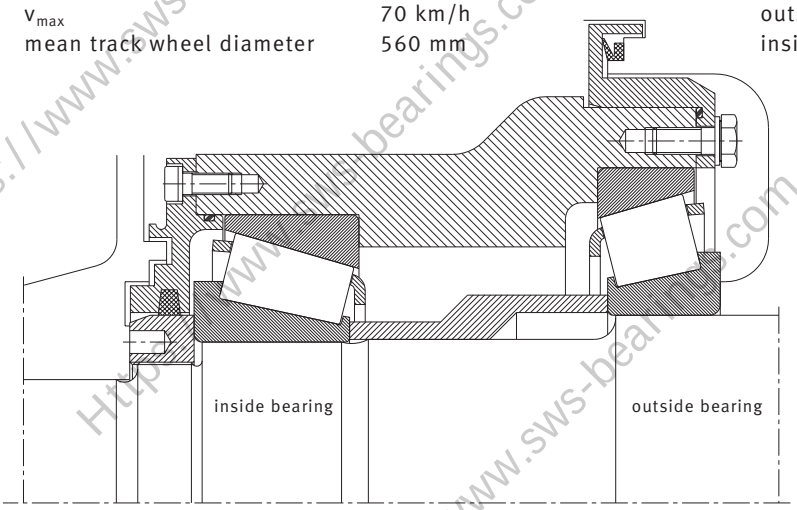


2. Axle box roller bearing

Tapered roller bearings with a J20B coating
Idler mounting in Combino low-floor articulated tramcar, one-meter gauge / Freiburg (Germany)

Technical data:
v_{max} 70 km/h
mean track wheel diameter 560 mm

Tapered roller bearings (O arrangement):
outside **Z-580065.30228-A-J20B**
inside **F-803889.32224-A-J20B**



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Mounting Examples

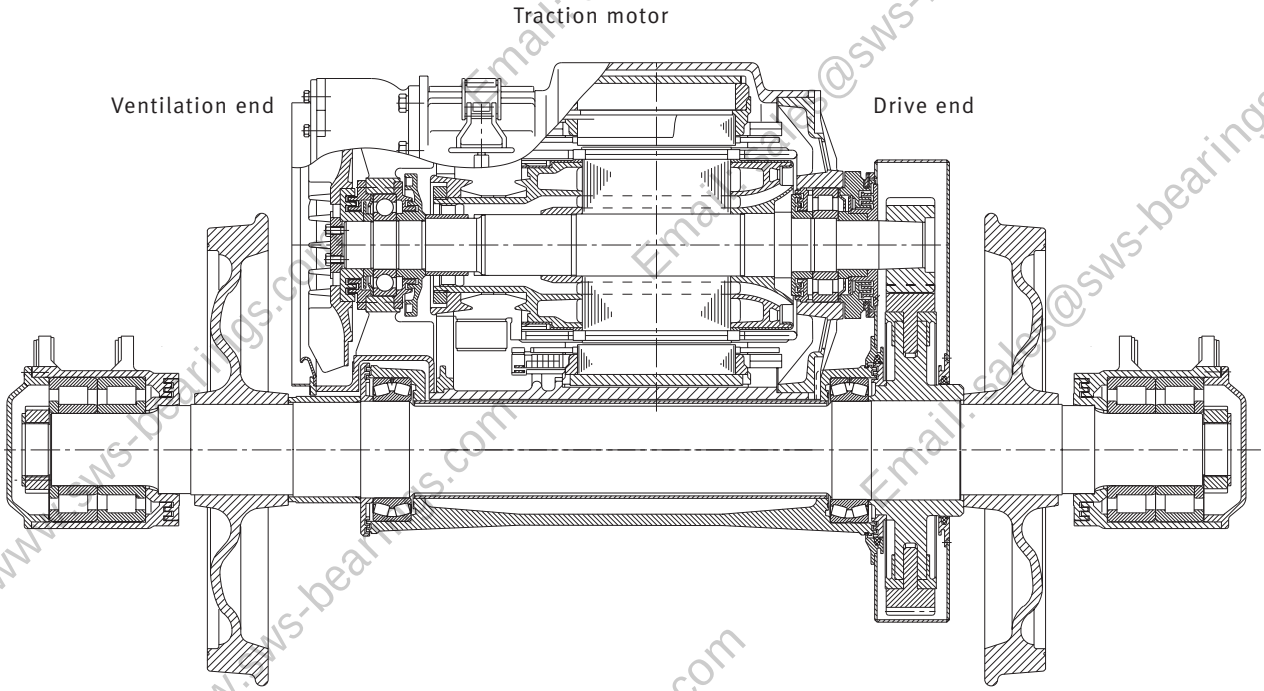
3. Traction motor bearing mounting in an electric tramcar

Deep groove ball bearing and cylindrical roller bearing (both with J20AA coating)

500 kW three-phase motor

A deep groove ball bearing **6316-J20AA-C3** is installed at the ventilation end, and a cylindrical roller bearing **NU320-E-M1-F1-J20AA-C4** is installed at the drive end of the rotor shaft.

Both bearings are lubricated with grease and protected from dirt and environmental influences by labyrinth seals.
A relubrication facility was provided.



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