

# User Manual: NexBot Robotics 711-004 Tapered Roller Bearing

SKU: NXB-GEN-711-004 | Version: 1.0 | Brand: NexBot Robotics

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## 1. Safety Information

**READ ALL SAFETY INSTRUCTIONS BEFORE OPERATION.** Failure to follow safety procedures may result in serious injury or equipment damage.

**DANGER:** Never attempt to install or service this component without first de-energizing the robot and implementing full Lockout/Tagout (LOTO) procedures. Failure to do so can result in electrocution, crushing, or death.

**WARNING:** The NXB-GEN-711-004 is a critical load-bearing component. Incorrect installation can lead to catastrophic joint failure, causing the robot arm to drop its payload or move unexpectedly.

**WARNING:** When heating the bearing for installation, use proper PPE including heat-resistant gloves and safety glasses. Hot components can cause severe burns on contact.

**CAUTION:** Do not strike the bearing with a hammer or any other blunt instrument. Impact forces can create microscopic dents (brinelling) in the raceways, leading to noise, vibration, and premature failure.

**NOTICE:** Store bearings in their original packaging in a clean, dry, and temperature-controlled environment. Do not wash or remove the factory-applied preservative until the moment of installation.

## 2. Product Overview

The NexBot Robotics 711-004 is a high-precision tapered roller bearing designed as a direct replacement component for critical, high-load robot joints. This component is essential for maintaining the operational accuracy and extending the service life of compatible NexBot robotic arms, ensuring consistent performance in demanding industrial environments. Constructed from high-carbon chromium steel (GCr15), this bearing offers exceptional hardness and wear resistance, which is critical for components under continuous mechanical stress. The tapered roller design is specifically engineered to accommodate both high radial and axial loads simultaneously, a common condition in multi-axis articulated robots during acceleration and deceleration. This design minimizes friction and heat generation, contributing to greater energy efficiency and preventing premature wear on adjacent joint components. With a dynamic load rating of over 150 kN, it provides a robust solution for heavy-duty applications. The bearing features a 70 mm bore diameter and a 110 mm outer diameter, manufactured to exacting tolerances to eliminate play or backlash within the joint assembly. This precision is fundamental to achieving the robot's specified repeatability. This component is frequently used in applications such as automated welding, CNC machine tending, and heavy payload palletizing, where positional accuracy directly impacts product quality and throughput. For proper maintenance, this bearing should be installed as part of a scheduled service plan, following the procedures outlined in the robot's technical manual. Replacing critical wear parts like the 711-004 bearing at recommended service intervals is key to preventing unplanned downtime and maintaining peak operational safety and efficiency.

## 3. Getting Started

### 1. Product Identification

The NexBot Robotics 711-004 Tapered Roller Bearing is identified by SKU NXB-GEN-711-004, which is marked on the packaging and laser-etched on the component itself. Always confirm this identifier against the robot's bill of materials or service manual before installation to ensure compatibility.

### 2. Storage and Handling

To prevent corrosion and contamination, store this bearing in its original unopened packaging in a vibration-free, low-humidity environment. Handle the bearing with clean, lint-free gloves to avoid transferring moisture and debris to its precision surfaces.

### 3. Component Overview

This component consists of an inner ring (cone), an outer ring (cup), a cage, and tapered rollers. This design allows it to accommodate high combined radial and axial loads, making it essential for the rigidity and precision of the robot joint.

## 4. Operation

### Load Management

The NXB-GEN-711-004 is designed for high-load applications. Its operational life is directly related to the loads it experiences. Operating the robot beyond its rated

payload or duty cycle will accelerate wear and significantly reduce the bearing's service life.

## Role of Lubrication

A micro-film of grease separates the rolling elements from the raceways, preventing metal-to-metal contact, reducing friction, and dissipating heat. The health of this lubrication film is the single most important factor in the bearing's performance and longevity.

**Tip:** Establishing a consistent re-lubrication schedule based on the robot's operational intensity is more effective than waiting for symptoms of wear to appear.

## Thermal Characteristics

During operation, the bearing will generate some heat due to friction. A stable, elevated temperature is normal. However, a sudden spike in temperature is a key indicator of a problem, such as lubrication failure or overload.

## Wear Characteristics

As a wear part, this bearing has a finite service life. Normal wear occurs gradually over time. The primary goal of proper maintenance is to prevent premature failure from external factors like contamination, improper lubrication, or overloading.

# 5. Maintenance Schedule

Interval	Task	Notes
Weekly	Auditory Check: Listen for any abnormal noises such as grinding, squealing, or rumbling emanating from the joint during operation.	Perform this check while the robot is running a routine motion path at various speeds.
Monthly	Thermal Monitoring: Use a non-contact infrared thermometer to measure the temperature of the bearing's housing. Log the temperature to track trends over time.	A sudden increase of more than 15-20°C above the established baseline warrants further investigation.
Quarterly	Vibration Analysis: If available, use vibration analysis equipment to capture a signature of the joint. This is the most effective method for early detection of subsurface bearing damage.	Compare current readings against a baseline taken after the bearing was first installed.
Per Service Manual (Typically 2000-4000 hours)	Re-lubrication: Replenish or replace the grease according to the robot's specific maintenance schedule.	Use only the grease type specified by NexBot Robotics. Ensure grease fittings are clean before applying new grease to prevent contamination.
Annually	Seal Inspection: Visually inspect the joint's external	Pay close attention to seals in environments

Interval	Task	Notes
	seals for any signs of cracking, tearing, or degradation. Damaged seals allow contaminants to enter and destroy the bearing.	with high levels of dust, moisture, or chemical exposure.
As Needed	Check for Looseness: During any scheduled downtime, manually attempt to move the robot arm to feel for any looseness or 'play' in the joint. This can indicate excessive internal clearance from wear.	This should be performed with the robot powered down but brakes disengaged, if possible.

## 6. Troubleshooting

Symptom	Possible Cause	Solution
Excessive temperature in the robot joint.	Insufficient or excessive lubrication; advanced wear; continuous operation beyond rated load.	Verify lubrication amount is correct. If so, reduce the robot's duty cycle or payload. If temperature remains high, schedule a replacement for the NXB-GEN-711-004.
High-pitched whining or squealing sound.	Lack of lubrication film between rollers and raceway.	Immediately apply the correct lubricant. If the noise persists after a short run-in period, the bearing has likely sustained damage and must be replaced.
Rumbling, grinding, or clicking noise.	Contamination (dirt, metal particles) inside the bearing or physical damage (spalling) to the raceways.	This indicates irreversible damage. Remove the robot from service immediately and replace the bearing to prevent catastrophic failure.
Reduced positional accuracy or noticeable 'play' in the joint.	The bearing has worn beyond its internal clearance tolerance.	Confirm the looseness originates at the bearing. Replace the NXB-GEN-711-004 to restore joint rigidity and precision.
Visible grease leakage from joint seals.	Failed seals, over-lubrication, or use of incorrect grease type.	Clean the exterior and monitor. If leakage continues, replace the joint seals. Verify the correct grease and quantity are being used per the service manual.
Increased power draw for the joint's servo motor.	High friction in the bearing due to lubrication breakdown or advanced wear.	Investigate lubrication status first. If lubricant is present and correct, the increased friction is likely due to internal wear, requiring bearing replacement.
		Immediately perform an emergency stop and LOTO.

Symptom	Possible Cause	Solution
Joint seizure or rough, cogging motion.	Catastrophic bearing failure.	The joint must be completely disassembled to replace the failed bearing and inspect for collateral damage to the shaft or housing.

## 7. Technical Specifications

Parameter	Value	Unit
Weight	1.8	kg
Material	High-Carbon Chromium Steel (GCr15)	
Country of Origin	SE	
Dimensions	70 mm Bore x 110 mm OD x 25 mm Width	