

# User Manual: NexBot Harmonic Gearbox HR-30

SKU: NXB-GBX-HRM-030 | 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:** Risk of electrocution. This unit is powered by 400-480VAC 3-Phase electricity. Disconnect and lock out power before any service. Failure to comply will result in death or serious injury.

**WARNING:** Unexpected motion of connected machinery can cause severe injury. Always ensure the entire robotic cell is in a safe, de-energized state and follow all Lockout/Tagout procedures before entering the workspace.

**WARNING:** The NXB-GBX-HRM-030 weighs 820.0 kg. Use only certified lifting equipment and trained personnel for any lifting or repositioning tasks to prevent a lethal crush hazard.

**CAUTION:** The gearbox surface can become hot during operation, posing a burn risk. Allow the unit to cool to ambient temperature before performing maintenance.

**NOTICE:** The use of non-specified lubricants or spare parts will void the product warranty and can lead to catastrophic failure. Only use genuine NexBot Robotics components and consumables.

## 2. Product Overview

NexBot Harmonic Gearbox HR-30 (NXB-GBX-HRM-030) is a harmonic gearboxes used in industrial robotics equipment where category-specific fit, electrical or mechanical compatibility, and predictable serviceability are important to buyers. The product should be understood as the exact component named by its category path, not as a complete robot or a generic service item. It supports installation, replacement, and maintenance workflows in robotic production cells by giving procurement and maintenance teams a clearly defined part class, relevant engineering specifications, and application context that matches the actual hardware being purchased.

## 3. Getting Started

### 1. Product Overview

The NexBot Harmonic Gearbox HR-30 (SKU: NXB-GBX-HRM-030) is a high-precision, zero-backlash drive component designed for industrial robotics. Its robust Cast Aluminum Alloy construction and IP67 rating ensure reliable performance in demanding manufacturing environments. This manual covers the operation and maintenance of this specific gearbox unit.

### 2. System Integration via PROFINET

This gearbox is a PROFINET-compliant device, enabling seamless integration with modern automation control systems. It provides real-time diagnostic feedback and allows for dynamic parameter adjustments. Ensure the correct GSDML file for the HR-30 is installed in your engineering software for proper configuration.

### 3. Initial Power-On and Homing

Upon first power application, the gearbox's internal controller will perform a self-test, indicated by a flashing status light. Once the light turns solid green, the unit is ready and has established PROFINET communication. The host controller must then perform its homing or referencing routine to establish a known position.

## 4. Operation

### Normal Operating Mode

In normal operation, the HR-30 functions as a motion transmission device, responding to commands from the master controller. Operators should remain aware of the system's auditory and vibrational characteristics, reporting any significant changes to maintenance personnel.

## Monitoring Diagnostic Data

The HR-30 continuously monitors internal parameters such as temperature, vibration, and total operating hours. This data is accessible over PROFINET and should be monitored to facilitate predictive maintenance and prevent unexpected downtime.

**Tip:** Configure your HMI or SCADA system to log key parameters and set alarms for when values exceed recommended thresholds.

## Fault Response

If a critical fault is detected (e.g., over-temperature, severe vibration), the gearbox will report the fault to the master controller. The system integrator is responsible for programming a safe stop response in the master controller based on these fault signals.

## Load and Duty Cycle Considerations

The HR-30 is designed for a specific range of loads and duty cycles. Consistently operating the gearbox beyond its rated specifications will drastically reduce its operational lifespan and may lead to premature failure.

**Tip:** Periodically review application cycle data to ensure it has not changed and still aligns with the gearbox's design limits.

## 5. Maintenance Schedule

Interval	Task	Notes
Daily	Visually inspect the gearbox for any lubricant leaks, especially around the input and output seals. Check for any loose or damaged cables.	This should be a key part of the operator's pre-shift inspection checklist.
Weekly	Listen for changes in operational noise during a standardized test movement. Document any new or increased whining, grinding, or clicking sounds.	Acoustic monitoring can be an early indicator of bearing or gear wear.
Quarterly	Clean the external housing and cooling fins of any accumulated dust or grime to ensure optimal thermal performance.	Use compressed air or a soft cloth. Do not use high-pressure liquids which could bypass seals.
Annually	Perform a torque check on all external fasteners, including mounting bolts for the gearbox, motor, and output load.	Refer to the installation guide for correct torque values and patterns.

Interval	Task	Notes
Annually / 8,000 Hours	Extract a lubricant sample for laboratory analysis to assess its condition. Replace lubricant if analysis indicates degradation or contamination.	Always use NexBot-approved grease. Improper lubrication is a leading cause of failure.
Every 3 Years	Inspect the condition of all external seals for signs of cracking, hardening, or wear. Replace any seal that appears compromised.	Seal replacement is a preventative measure to maintain the IP67 rating and prevent lubricant loss.

## 6. Troubleshooting

Symptom	Possible Cause	Solution
Excessive vibration or a new humming sound	Motor/gearbox misalignment, unbalanced load, or internal bearing wear.	De-energize and lock out. Re-check shaft alignment. Inspect the attached load for imbalance. If the issue persists, contact service for internal inspection.
Gearbox is overheating or triggers an over-temperature fault	Blocked cooling fins, excessive ambient temperature, continuous operation beyond rated duty cycle, or low/degraded lubricant.	Ensure housing is clean and has adequate airflow. Verify application parameters are within spec. Check lubricant level and condition.
No PROFINET communication with the controller	Damaged/unplugged cable, network configuration error (IP address conflict), or fault in the network switch.	Inspect the cable and connectors. Use a network diagnostic tool to check for IP conflicts or ping the device. Verify the link/activity lights on the switch port are active.
Noticeable backlash or positional inaccuracy	Loose bolts on the output flange, worn internal flexspline, or a loose motor coupling.	De-energize and lock out. Check the torque on all mounting bolts on the load side. If all are tight, the wear is likely internal and requires professional service.
Loud, high-pitched whining		Immediately stop the machine using a controlled stop. Do not

Symptom	Possible Cause	Solution
noise during operation	Severe bearing wear or complete lubrication failure.	operate the system further, as this indicates imminent catastrophic failure. Schedule immediate replacement.
Visible lubricant leak from shaft seals	Worn or damaged oil seal.	Clean the area to identify the exact source of the leak. Schedule maintenance to replace the specific seal. Monitor lubricant levels until the repair is complete.
The motor runs, but the gearbox output does not turn	Sheared input shaft key, failed input coupling, or catastrophic internal gear failure.	Perform an emergency stop. After LOTO, attempt to turn the input shaft by hand (if possible); if it spins freely without output motion, a major internal failure has occurred. The unit requires replacement.

## 7. Technical Specifications

Parameter	Value	Unit
Weight	820.0	kg
Material	Cast Aluminum Alloy	
Voltage	400-480VAC 3-Phase	
IP Rating	IP67	
Country of Origin	US	
Protocol	PROFINET	