

Crossed Roller Bearings

Rigidity, runout, mounting precision and RFQ guide

For compact arrangements that require combined-load support and controlled rotational accuracy.

What this guide helps you do

Crossed roller bearings arrange cylindrical rollers in alternating directions so a single bearing can support radial, axial and moment loads in suitable designs. Performance depends heavily on mounting accuracy, preload or clearance, raceway geometry, lubrication and the rigidity of the surrounding structure.

At a glance

Question	Why it matters
What is the application?	Defines load direction, duty cycle, environment and required life.
What is the complete arrangement?	Bearing, shaft, housing, seals, lubricant and mounting structure work together.
What must be confirmed before ordering?	Full designation, dimensions, load/speed conditions and approved technical data.

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Prepared for engineering review and RFQ preparation. It is not a released product drawing, guaranteed rating, certificate or substitute for the selected manufacturer's catalogue.

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1. Understand the bearing arrangement

Start by defining the function the bearing must perform. Similar-looking bearings can differ in load direction, stiffness, speed capability, mounting requirements and maintenance needs.

Application fit

- **Compact combined-load support:** Useful in robotics, indexing tables, inspection equipment, machine tools and other mechanisms where space and stiffness are important.
- **Precision depends on the system:** Bearing accuracy alone cannot compensate for poor mounting faces, flexible supports, inaccurate shoulders or misaligned fasteners.
- **Preload/clearance:** The correct setting affects stiffness, friction, temperature and life; use the exact product instructions.

Design variants to compare

Configuration / feature	Selection notes
Integrated outer/inner ring	Common compact arrangement; verify mounting method, split-ring design if present, and fastening sequence.
Split-ring designs	Can simplify assembly in certain arrangements, but ring orientation and tightening sequence must follow the product drawing.
Sealed or open	Select based on contamination, lubrication access, friction and service conditions.
Precision grades	Specify runout, rotation accuracy, stiffness and preload needs; do not use “high precision” without measurable requirements.

Do not compare price or nominal size until the configuration, suffixes and interface dimensions are aligned. If a part is replacing an existing bearing, use the complete designation and drawing rather than appearance alone.

2. Selection inputs and interface checks

The table below is a working checklist. Record known values and mark unknown values for confirmation before quotation or engineering approval.

Input	What to provide / verify
Load	Axial/radial loads, overturning moment, direction, shock and load spectrum.
Accuracy	Radial/axial runout, rotation torque variation, positioning repeatability and stiffness.
Mounting	Face flatness, shoulder perpendicularity, bolt layout, fastener sequence and housing rigidity.
Motion	Speed, oscillation, acceleration, reversal frequency and duty cycle.
Lubrication/sealing	Grease or oil, sealing, contamination, temperature and maintenance access.
Envelope	Bore, outside diameter, height, mounting holes, ring split and interface dimensions.

Questions to resolve before approval

- Are loads steady, intermittent, reversing or shock-loaded?
- Is the stated speed continuous, peak, or a short-duration value?
- Are shaft and housing fits, shoulders and support stiffness known?
- Will temperature, lubricant or sealing requirements change during operation?
- Is interchangeability required, and what drawing or source confirms it?

When data are missing, state the assumption explicitly. Do not turn an unknown load, speed, clearance or preload into an invented numerical value.

3. Installation, lubrication and maintenance

Many early bearing failures are associated with contamination, poor fits, misalignment, inappropriate lubrication or installation damage. Follow the selected product’s installation instructions and document the final setting where relevant.

Installation checklist

- Inspect the mounting faces and shoulder geometry; remove burrs, dirt and raised marks before fitting.
- Handle precision rings carefully and avoid impacts or point loads on thin ring sections.
- Follow the specified tightening sequence and torque/preload procedure, especially for split-ring designs.
- Use the recommended lubricant and quantity; excessive preload or lubricant can increase running torque and heat.
- Measure runout, starting torque and rotation smoothness after mounting, then repeat checks under representative load if required.

Symptom-to-check guide

Observed symptom	First checks
Torque variation	Check mounting-face errors, fastener sequence, preload, contamination and ring distortion.
Runout outside target	Check the bearing grade, support-face geometry, shaft/housing alignment and measurement setup.
High temperature	Review preload, lubricant amount, speed, seal drag and surrounding thermal conditions.
Local noise or roughness	Inspect for contamination, handling damage, raceway defects and uneven mounting stress.
Reduced stiffness	Verify preload/clearance, mounting rigidity, fastener condition and load assumptions.

Record the operating condition when a symptom appears: load, speed, temperature, noise/vibration, lubrication state, recent maintenance and any change to the surrounding structure. This information helps separate a bearing issue from an installation or system issue.

4. RFQ checklist — send the right information

A complete RFQ reduces clarification cycles and helps the supplier check whether the requested bearing and arrangement match the application. Provide drawings or photos where dimensions and interfaces are difficult to describe.

- Full bearing designation, dimensions and ring construction.
- Axial/radial loads, moment, speed, duty cycle and target life.
- Runout, repeatability, stiffness and running-torque requirements.
- Mounting drawing, face flatness, shoulder geometry, fastener layout and housing material.
- Preload/clearance requirements and installation method.
- Sealing, lubricant, temperature, contamination and maintenance access.
- Inspection records, traceability, quantity and delivery destination.

Suggested RFQ email structure

Field	Your information
Product / full designation	_____
Quantity and annual demand	_____
Application / equipment	_____
Loads, speed and duty cycle	_____
Dimensions / drawing number	_____
Operating environment / lubricant	_____
Quality documents / inspection	_____
Delivery destination / target date	_____

Need help confirming a designation or a substitution? Send the full model number, drawing, quantity and operating conditions to service@eimbearing.com or visit www.eimbearing.com.

5. Technical boundaries and final verification

This document provides general selection and procurement guidance. It does not provide product-specific rated loads, fatigue-life guarantees, maximum speeds, permissible misalignment, preload values, fit tolerances or installation torque unless those values are stated in an approved drawing or product-specific data sheet.

Before release to production

- Confirm the full bearing designation, suffixes and dimensional drawing.
- Confirm the source and revision of any load, speed, life or precision rating used in calculations.
- Verify the bearing, shaft, housing, seals, lubricant and mounting fasteners as a complete system.
- Record any deviations, substitutions and approval responsibilities.
- Follow the supplier's current installation, lubrication and maintenance instructions.

Important note

Catalogue values and suffix meanings may vary by manufacturer and product family. Where a guide describes a general bearing arrangement, it should not be interpreted as proof that two products are interchangeable. Confirm final technical suitability with the applicable product drawing and written supplier confirmation.

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