
Keyed Drive Wheels for Rail-guided Vehicle (RGV) Systems

Title	Keyed Drive Wheels for Rail-guided Vehicle (RGV) Systems
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Description

A keyed drive wheel is an active wheel that achieves synchronous rotation with the drive shaft via a keyed connection. Its structural characteristic lies in the standard keyway machined into the wheel hub's bore or side. By engaging with a matching key on the shaft, it directly transmits motor-generated torque to the wheel tread without slip and with high efficiency, converting it into the traction force that drives the RGV forward, backward, or enables precise braking.



Compared to connection methods such as friction drive or press fits, the keyed connection, with its exceptional shear resistance, precise phase positioning, and highly reliable torque transmission, has become the preferred solution for heavy-duty, high-precision RGV drive systems.

Why Must an RGV Drive System Utilize Keyed Drive Wheels?

- **Zero-Slip Precision Positioning:** In application scenarios requiring docking accuracy of $\pm 0.5\text{mm}$ or even higher, absolutely no relative rotational slip between the drive wheel and the drive shaft can be tolerated. The keyed connection provides rigid synchronization, ensuring that every rotational angle of the motor corresponds precisely to the travel distance of the wheel, thereby achieving unparalleled repeatability in positioning accuracy.
- **Handling Heavy Loads and Impact Forces:** During RGV startup, braking, and while carrying loads weighing several tons, the drive system withstands enormous torsional and impact loads. The keyway design transmits torque through the shear plane of the key, offering a load-bearing capacity far exceeding that of shrink disc or press-fit structures, which rely solely on friction. This effectively prevents overload-induced slippage where "the shaft turns but the wheel does not," ensuring operational reliability under heavy-duty

conditions.

- **Exceptional Reliability and Long Service Life:** The keyed connection features a simple structure and stable mechanical properties. High-quality drive wheels employ processes such as alloy steel through-hardening or tread high-frequency induction hardening, ensuring extreme hardness and wear resistance for both the keyway area and the wheel tread. Combined with precisely machined keys and keyways, this maintains connection accuracy even under long-term alternating loads, significantly reducing maintenance frequency and the risk of unplanned downtime.
- **Facilitated Installation, Maintenance, and Replacement:** The standardized keyway design makes the installation and disassembly procedures for the drive wheel regulated and straightforward. When wheel replacement or system maintenance is required, simply removing the shaft-end locking device allows for replacement, greatly reducing maintenance difficulty and time costs, thereby enhancing the overall availability of the logistics system.

Core Advantages of Our Keyed Drive Wheel Products

Our products are specifically designed for demanding RGV and various rail-guided transport equipment, striving to exceed standards in every detail:

- **Precision Manufacturing, Perfect Fit:** The wheel hub bore and keyway are precision-machined using CNC equipment, ensuring perfect fit with standard shafts and keys, enabling zero-backlash power transmission.
- **Materials Science, Rugged Durability:** The core utilizes high-strength alloy steel (e.g., 42CrMo), with differentiated heat treatment schemes provided based on the application scenario. Standard tread hardness reaches HRC 55-60 for extreme wear resistance; the keyway area undergoes special reinforcement treatment for exceptional shear fatigue resistance.
- **Diverse Design, Comprehensive Compatibility:** We offer a variety of specifications (diameter, width), tread profiles (flat tread, V-guide tread), and keyway types (square key, spline). Integration with sealed deep groove ball bearings or tapered roller bearings is available, adapting to the full range of scenarios from high-speed light loads to low-speed heavy loads.
- **One-Stop Solution:** We not only supply the drive wheel unit but can also provide

matching high-precision drive shafts, custom keys, and complete wheel set assemblies. This ensures optimal synergistic performance of all transmission system components, saving customers integration time and costs.

To select or customize the most suitable drive wheel solution for your RGV project, our engineering team is on standby to provide you with professional technical support and product services.