



How to Select and Size Gearmotors for Conveyor Applications

Selecting the correct gearmotor for a conveyor application is crucial to ensure efficient and reliable operation. This guide provides a step-by-step approach to sizing and selecting a gearmotor for a belt-driven conveyor, focusing on a specific example that includes handling a 200 lb load with adjustable speed requirements and frequent starts/stops. By understanding and applying these principles, you can effectively specify a gearmotor that meets your application needs.

Understanding Conveyor System Requirements

Before selecting a gearmotor, it is essential to fully understand the conveyor system's requirements. For our example, the system specifications are as follows:

Load Capacity: Able to handle a 200 lb (90 kg) load.

Speed: Adjustable speed, up to 12 inches per second.

Acceleration: Capable of accelerating to full speed in 1 second.

Power Supply: Powered by 115 VAC.

Roller Diameter: 4 inch (102 mm) diameter rollers.

Operational Demand: Allows for frequent starts and stops.

Maintenance: Requires zero gearmotor maintenance.

With these parameters in mind, the next step is to translate these requirements into specific



garmotor specifications.

Step 1: Determine Speed and Torque Requirements

To correctly size a gearmotor, we first need to establish the necessary speed and torque:

Speed (N): This is the speed required to meet the conveyor's performance specifications.

Acceleration Torque (TACCEL): This torque is needed to reach the desired speed within the specified time (1 second in our case). It is calculated based on the load inertia and the required acceleration.

Friction Torque (TFRICITION): This torque accounts for the resistance from the conveyor components and the load. It must be measured or estimated based on similar conveyor systems.

Breakaway Torque (TBREAKAWAY): This is the torque required to start the conveyor from a standstill. It includes overcoming the static friction of the system.

Gravity Torque (TGRAVITY): Relevant if the conveyor is not horizontal, this torque accounts for the load's weight and the angle of the conveyor belt.

Continuous Torque (TCONT) and Continuous Horsepower (HPCONT): These values are needed for the gearmotor to operate under normal continuous running conditions.

It's important to note that TACCEL may be ignored if acceleration time is not critical. However, for precise applications where it is crucial, it can be calculated using specific engineering equations. TBREAKAWAY is typically only a factor during the initial start of



the conveyor, while TFRICITION and TGRAVITY are used to determine TCONT.

Step 2: Review Gearmotor Options

Once the torque and speed requirements are established, review gearmotor options that can meet these specifications. You'll want to consider the following:

Type of Gearmotor: Choose between AC and DC gearmotors based on your power supply and control requirements. AC gearmotors are typically used for simpler, constant-speed applications, whereas DC gearmotors offer easier speed control and are better for applications requiring frequent starts and stops.

Gear Reduction: The gear reduction ratio will be critical to delivering the necessary torque and controlling the speed precisely. This ratio affects both the motor output speed and torque.

Physical Size and Mounting: Ensure the gearmotor fits within the physical constraints of your conveyor system and can be mounted securely.

Step 3: Select a Stock Gearmotor and Drive

After reviewing the options, select a gearmotor that fits your application's requirements:

Match Specifications: Ensure the chosen gearmotor meets or exceeds the speed, torque, and power requirements identified.



Consider the Drive System: Depending on the gearmotor type, you may need a compatible drive system to control the motor effectively. This is especially important for systems requiring adjustable speed or special control features.

Verify Compatibility: Check that the gearmotor's mounting, shaft size, and other physical characteristics are compatible with the conveyor system.

Selecting the right gearmotor for a conveyor system involves careful consideration of both the application requirements and the motor specifications. By following these steps—determining the required speed and torque, reviewing the gearmotor options, and selecting a suitable model—you can ensure efficient and reliable operation of your conveyor system. Remember to consult with a drive and motor specialist or an engineer if you encounter specific challenges or if your application requires detailed customization.

Related Product: [Three Phase Small AC Electric Reduction Gear Motor for Conveyor Equipment](#)