Rolling Along With Quiet DC Power

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The Project: Determine the best DC motor with which to drive a power wheelchair or mobility scooter.

The Solution: Using the innovative web tools and design expertise of one supplier of DC motors, manufacturers can be assured of making the best choice.

The baby boomer generation has always been a highly mobile group of men and women. As they continue to age and possibly become physically disabled, many will turn to electric-powered wheelchairs and home mobility scooters not only to help overcome their physical limitations, but also for convenience and continued easy mobility—helping to drive up sales for the makers of power wheelchairs and scooters.

Although U.S. sales of electric wheelchairs are relatively low compared to that of manual wheelchairs*, the power segment of the wheelchair industry is extremely vital to the well being of the men, women, and children who rely on them for everyday mobility. Many of these individuals are physically incapable of using manual wheelchairs, but are able to operate power wheelchairs by means of the device’s joystick controls or by blowing into a straw which activates and controls the equipment.

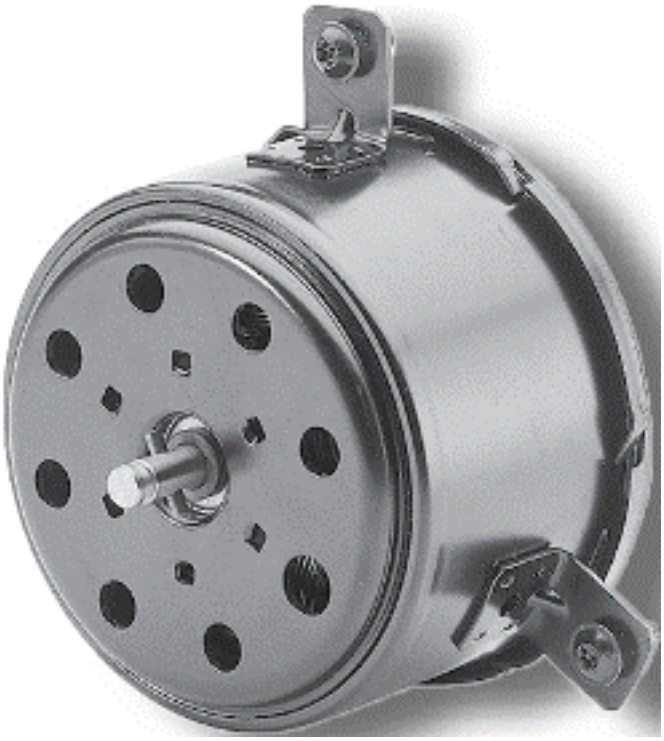
Freedom Veiculos Eletricos LTDA), a Brazilian manufacturer of electric wheelchairs, uses Bosch fractional horsepower DC electric motors for models like the Freedom "L" motorized wheelchair, shown here. (Photo Courtesy of Freedom Veiculos Eletricos LTDA)

Power wheelchairs offer convenience and ease of mobility, not only indoors at homes, shopping malls and workplaces, but also outdoors where wheelchair users may need to navigate hilly streets, or irregular or rugged terrain. Today's advanced power wheelchair designs include transportable models that can be quickly folded and placed in the trunks of automobiles, power-base wheelchairs that offer a low center of gravity for a smoother ride, and heavy-duty power wheelchairs that feature large wheels and are designed to operate on smooth or uneven surfaces. There are also models of electric wheelchairs on the market that are designed to climb stairs.

Without a doubt, electric wheelchair technology has come a long way since George Johann Klein, a Canadian who worked for the National Research Council of Canada, invented the electric wheelchair in the 1950s. A key component of today's advanced wheelchair designs, as well as that of home mobility scooters, is the fractional horsepower DC electric motor. Not only is the wheelchair's DC motor called upon to run smoothly and quietly and to help ensure overall satisfaction among electric wheelchair operators, but the motor must also be able to provide

sufficient motive power for the application at hand.

There are many variables that come into play when selecting DC motors for wheelchair applications. It is important for product design engineers to consider how the motor's power and design characteristics will stack up against the totality of factors that determine the application's power requirements, including the total weight of the wheelchair's frame, suspension, axles, and wheels, as well as the kinds and number of optional accessories provided with the wheelchair.



Bosch offers a wide range of fractional horsepower DC electric motors for medical and healthcare equipment applications. The 12 V, 84 W Bosch "GPB" motor—part # 0 130 303 003, shown here, is one of several different models that can be used to power electric wheelchairs.

Within the Bosch i-Business [1]catalog of fractional horsepower DC electric motors, there are several different models of 12 and 24 V motors that are particularly well suited for meeting the power needs of front-wheel drive, mid-wheel drive, and rear-wheel drive electric wheelchairs and home mobility scooters. One example of a robust, quiet-running Bosch [2]motor for electric wheelchairs and home scooters is the 24 V, Bosch "GPB" DC electric motor (part number F 006 KM0 60F). Weighing approximately 1.5 kg, this Bosch GPB motor can be installed horizontally. The 175-watt motor is available with a wide range of shaft styles and sizes, ensuring easy installation for almost any design of electric wheelchair and home mobility scooter.

Other design characteristics of the Bosch "GPB" motor–part number F 006 KM0 60F

include:

- Nominal current: 10.5 A
- Nominal speed: 2200 min^{-1}
- Nominal torque: 75 Ncm
- Breakaway torque: 480 Ncm
- Direction of rotation: Right

The Bosch fractional horsepower DC motor catalog includes more than 500 different part numbers for 12-24 V Bosch DC electric motors that can be used to power or control a wide range of consumer, industrial, and medical equipment applications. With such a large selection of motors to choose from, it is easy to understand why product developers, working alone, might find the task of choosing an appropriate motor for a particular application somewhat challenging. But, that doesn't have to be the case because the Bosch i-Business team is available to work with product developers to streamline the motor selection process. Given the design parameters for the application, the Bosch i-Business team can help make the motor selection process much simpler, faster and more cost efficient for product developers.

The Bosch i-Business Group offers a convenient, easy-to-use online search tool that enables product developers to quickly and efficiently search the extensive Bosch DC electric motor catalog to find a targeted selection of motors that match their unique application requirements.

Another way the Bosch i-Business Group offers assistance for quickly and

conveniently zeroing in on Bosch DC motors suitable for a particular application is through its proprietary motor search tool that is featured online at the Bosch i-Business website. The search tool addresses five motor specifications that are key to narrowing down the search within Bosch's extensive DC electric motor catalog. The five motor specification parameters indicated by the online search prompts are rated voltage (12, 18, 24 V), rated torque (Nm or Ncm), rated speed (RPM), nominal power (W), and mode (short-time operation and/or long-time operation).

The Bosch i-Business Group is well positioned to meet the DC motor needs of healthcare equipment manufacturers throughout North America. Not only can the company meet their product development and production needs with robust quiet-running Bosch DC electric motors and related components, but the Bosch i-Business Group also offers personalized design consultation and engineering support that makes for a faster, more efficient product development cycle.

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***According to a technical brief published by the Agency for Healthcare Research and Quality (July 1, 2010), a 1994-1995 survey of wheelchair use by non-institutionalized Americans indicated that 155,000 people used electric wheelchairs; 1.5 million people used manual wheelchairs. A 2005 survey estimated that number of users of manual and electric wheelchairs and similar devices had grown significantly in the U.S. to 3.3 million people. Source:** http://bit.ly/dJQIpL **[4]**

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