



4. Electric Power Tools

Electric power tools are one of the most competitive industries with new models coming out every day. Manufacturers are trying to develop new technology to meet customers' demand for comfort and higher efficiency.

More than one third of premature bearing failures in this industry are caused by incorrect lubricant and/or inadequate application of the lubricant. By using recommended HCH lubricants, tools and techniques, downtime and maintenance requirements can be significantly reduced. Lubricants can be specified according to demands on vertical shafts and resistance to solids, pressure, temperatures, loads, chemical aggression, etc.

Moreover, to serve the best interests of electrical power tools industry, we have tailored our resources to meet your needs, so that your objectives become our objectives. To help you develop new products more quickly, we have introduced simultaneous engineering to give you immediate and open access to our process, product development and applications expertise.



As one of the most traditional industry, the electric power tools are common all over the world. Nevertheless, the demand for rolling bearings with higher performance and reliability is increasing year by year for this application. Working with world renowned electric power tools manufacturers, HCH could provide you reliable bearings with cost efficiency.



General requirement for electric power tools

Maintenance free solutions

Electric power tools' long-term performance and maintenance free are important and critical since the repair is costly and not convenient. Consequently, long bearing life is a key requirement. Low operating temperature, high quality raw material, adequate lubrication and avoiding contamination are important factors in extending bearing service life. As the world's leading manufacturer of bearing solutions, HCH has a wide range of solutions and services to extend bearing service life and improve application profitability.

Long service life

Electric power tools long term performance is critical for manufacturers' image for consumers. Special materials, special heat treatment, a range of special seals and the HCH life theory, which points the way to infinite life of a bearing, are the major tools to optimize your applications. HCH bearings for power tools are also available for special requirements: bearings with high-temp grease and special designed clearance and raceway radius for higher speed.



Prevention from dust

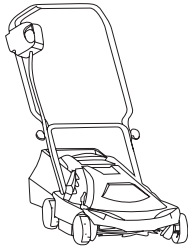
For electric power tools, no matter that applied indoors or outdoors, they are facing difficult environment situation. The environment for electric power tools is highly contaminated with dust etc. Hence, it is necessary to ensure good contamination protection. HCH proper lubrication greases that prevent water and dust are usually applied. HCH offers a range of sealed bearings with labyrinth design to further prevent dust ingress.



Environment

Environmental care is one of today's main issues. The more legal requirements become diverse and complex, the more swiftly and accurately we must respond. Consequently, the electric power tool industry is demanding more and more environmental friendly solutions. For this application, HCH offers low friction bearings with optimized seal structure and low friction grease to further meet reduced power consumption requirements.

4.1 Electric Lawn Mowers & Garden Tools



Electric lawn mowers

Corded and cordless versions are available. The market demand for cordless machines is increasing. The modern cordless machine combines the low noise and low maintenance of corded versions with the movement flexibility of petrol equivalents. The typical design of an electric lawn mower has an armature shaft (vertical axis electric motor) on

which the cutting blade is mounted through a safety clutch device.

 Blower/Vacuums They are used as both a blower and a vacuum-clearing leaves, driveways, etc.	 Chain saw A hand-held power saw. The blade is chain driven and is mainly used to cut tree limbs.	 Grass shears and hedge cutters The operation principle for both is the same - two metal blades moving in opposite directions.
 Grass trimmer This tool uses a fast spinning line (plastic or wire) to trim grass etc.	 Power sprayer A tool consisting of a pump providing consistent high pressure of water or other liquids.	



The products can be analyzed in the HCH's modern measuring laboratories to investigate additional potential for improvements in the finished product. By supporting our customers with frequency analyses of the complete system, we can achieve significant vibration reduction and dust preventing for the complete system in cooperation with our customers.

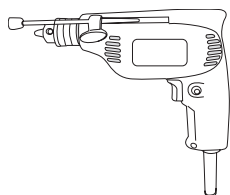


HCH bearings for garden tools

Since the garden tools are usually working in outdoors, HCH bearings are typically fitted with contact rubber seals on both sides to prevent ingress of dust/grass and grease leakage. Bearings are life lubricated with greases capable of operating at temperatures among -30/+130 °C with dust and water ingress characteristics. An internal radial clearance dependant upon the fitting tolerances - normally ISO CN or C3. In

the cordless applications, low friction and good contaminant protection are required. HCH bearings can be fitted with light contact rubber seals together with pressed steel cages. HCH also offer non-contact rubber seals and metal shields when high speed is required in these tools.

4.2 DIY Power Tools



The "Do It Yourself" market asks for reliability, economy and easy handling (low weight). The market for cordless products continues to grow with users looking for tools that can offer low weight for ease of handling and high power output combined with low power loss to optimize performance. The environment for DIY power tools is highly contaminated with dust etc. Hence, it is necessary to ensure good contamination protection.



DIY drills

The drill family covers standard drills, hammer drills, impact drivers and wrenches. Screwdrivers could also be included. Drills were the first tools to be marketed in the cordless revolution.



DIY angle grinders

This type of power tool is very versatile and can be used for polishing, burnishing, removing rust and deburring. The bearing arrangement and running conditions depend on the location within the tool.



Hand saws

A wide variety of designs exist including reciprocating saws, circular saws, jig saws, miter saws, table saws, scroll saws and band saws, to name a few. Reciprocating, circular and jig saws are included in hand saws.



HCH bearings for DIY electric power tools

HCH deep groove ball bearings are normally used to support the armature and output shafts. They can be fitted with metal shields or light contact rubber seals (dependant upon dust exclusion properties required) to satisfy high speed and friction torque requirements. Grease is selected to give good performance at temperatures in the range -30/+ 130 °C and give good performance with low leakage under high vibration conditions. Internal radial clearance will depend on the fitting tolerances required.

HCH bearings give improved service life due to:

- > Extended grease life
- > Good performance in air-streams and condensation
- > High wear resistance against particulate contamination (sand, pigments, abrasives, steel, iron oxides etc.)
- > Resistance to electric current

To serve the best interests of DIY electrical power tools industry, we have tailored our resources to meet your needs, so that your objectives become our objectives. To help you develop new products more quickly, we have introduced simultaneous engineering to give you immediate and open access to our process, product development and applications expertise.

4.3 Industrial Power Tools

Professional end users ask for the same features with additional requirement of a high power output while maintaining a low operational power loss. Thus, longer life, higher power and enhanced safety features are required by industrial power tools. Moreover, high performance professional hand tools also need to meet the requirements of high-speed capability and resistance to the passage of electric current.



Industrial drills

The environment for industrial drills is contaminated with dust etc. Hence the need to ensure good contamination protection. In heavy duty professional hammer drills, the electric motor is usually mounted vertically and gives the motion to the spindle shaft through a series of gears.



Machinery saws

Table saws, scroll saws and band saws tend to be used by professional craftsmen. The critical usage parameters should be reliable as well as the precision of the cut. Important issues are therefore dust protection capability and resistance to heavy loads and misalignment.



Industrial angle grinders

The angle grinder consists of an electric motor connected through a pinion gear to an output spindle where the grinding wheel is mounted. This type of power tool is very versatile and can be used for polishing, burnishing, removing rust and deburring.



HCH bearings for industrial power tools

For industrial power tools, HCH can offer bearings with characteristics of dust prevention and higher speed. The deep groove ball bearings used are usually fitted with contact rubber seals, which combine low friction with good dust exclusion properties. To ensure good performance at high speed, special greases are available in HCH that perform well at high speed and have low leakage characteristics. The grease also

has to be selected to meet the demand of high temperature with dust and water ingress characteristics since these professional power tools may work in tough environment.



Special challenges such as high speeds, high loads in small design spaces or special environmental conditions have always been motivation for HCH to further develop or redevelop its bearings. We create solutions that secure a competitive advantage for our customers.

4.4 Bearings work in different parts of electric power tools



For different parts of electric power tools, the bearings' characteristics will vary accordingly as well. Take the angle grinders for example, the bearings in this application will mainly be divided into three parts: the bearings for fan end, the bearings for commutator end as well as the bearings for grinder output spindle. Check the details for these three applications as following:

Fan end

The bearing will need to cope with a combination of high speed, high temperature, heavy loads and a dusty environment. The HCH solution is a single row deep groove ball bearing fitted with light contact Rubber seals or metal shields (the choice is dependant upon the environmental conditions). Special greases with high-speed capability and low grease leakage properties are used.

Commutator end

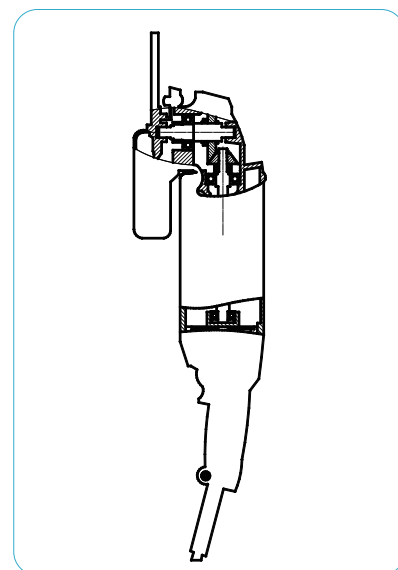
The bearing will need to cope with high speed, high temperatures and a dusty environment. The HCH solution is a single row deep groove ball bearing fitted with light contacting rubber seals to ensure good dust resistance and high-speed capability. Special greases with high-speed capability and low grease leakage properties are used.

Grinder output spindle

On the tool side, bearings shall sustain the cutting loads (axial and radial), with risk of high misalignment in a dusty environment. HCH bearings for this application are equipped with heavy contact rubber seals that ensure a very good resistance to pollution as well as special greases for high speed and low leakage performances. Also, our product range offers extra benefits to the manufacturers of electric power tools:

- > High reliability and long life through proven product design, excellent material quality and production technology
- > Reduced energy consumption due to special bearing solutions and lightweight design
- > High power density due to space-saving solutions
- > Safety in bearing selection through the proven knowledge of our application experts
- > Customized solutions developed in close cooperation with the customer using the latest technologies and continuous further development

In all, HCH understands your requirements for longer service life, no relubrication, low vibration, energy saving, low weight and low heat generation for electric power tools. HCH high quality raw material with most advanced heat treatment technology as well as a range of optimized seals solutions are the major tools to optimize your applications.



Technology for analyzing bearing performance is important to optimization of the electric power tools running performance. At the same time, shorter development period and lower development costs are also being sought. Equipped with most advanced analysis tools, HCH will supply you the latest bearing technology for this application.