

GOLFCAR

A D V I S O R

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**Electrical Motor Products, Inc.
Specializes in DC Motor Redesign.**

The Economical Approach to Getting the Performance You Need!

COVER STORY

ELECTRICAL MOTOR PRODUCTS, INC. IS ENGINEERING DC MOTORS TO MEET TODAY'S PERFORMANCE DEMANDS!

It's spring and golf car owners are demanding the newest accessories and latest products in the golf car industry. Over the last decade, desire for fancier golf cars and specialized performance has changed the nature and size of the golf car market. DC golf car motors are no exception to this growing trend, especially where modified cars are concerned. Electrical Motor Products, Inc. (EMP) has taken a unique and very economical approach to the industry trend by providing enhanced motor performance at a budget friendly price.

EMP begins with the stock golf car motor and significantly alters the performance to meet customer specifications. The bonus, in many situations, is no controller upgrade is needed. This keeps upgrade cost to the end user remarkably low.

Perhaps you've heard that motor redesign is not feasible. Pat "Chuck" Koehl, owner of Electrical Motor Products, Inc. in Fort Wayne, Indiana, knows there are doubters out there. He and co-owner/brother, Ed Koehl, have successfully redesigned over 7000 motors for personal golf cars. Each year they have seen that number go up as DC motor redesign catches on.

Those new to motor redesign often ask if a new controller is necessary for vehicle performance.

"The car's whole system; motor, controller, tire size, and axle, must be considered before making any upgrade," Chuck says.

Often EMP can create a design that runs within the stock con-

ployees in motor theory courses.

Chuck has designed motors for nearly every golf car manufacturer including E-Z-GO, Club Car, Yamaha, and GEM. He has also worked closely with control systems from Alltrax, Curtis, GE, and holds patents in electrical propulsion for golf cars. He's designed motors for industrial applications such as material handling, maintenance vehicles, boom and scissor lifts. While working with numerous GE customers in the field, Chuck saw a need for more custom solutions in the DC motor industry. He knew that these solutions could not be met practically in mass manufacture and was compelled to



Custom ventilated end shields and frames allow for heat escape on high performance redesigns.

troller's capabilities and meets the customer's needs for vehicle performance.

Who Are These Guys?

Pat "Chuck" Koehl has been involved in DC motor design and manufacturing for his entire career as an electrical engineer. While studying for his engineering degree at Purdue University, Chuck was a student co-op at GE motors. After graduation he was hired and worked for 20 years in the GE motors division in Fort Wayne, Indiana. His tenure at General Electric included lamination design, application engineering, manufacturing engineering, and equipment development. He also instructed GE em-

ployees in motor theory courses.

start Electrical Motor Products, Inc. Chuck's brother and co-owner Ed Koehl has a background in motor and alternator rebuilding, electronic component manufacturing, and other mechanical roles. Along with Chuck's designs, Ed's know how and effort is another driving force behind EMP.

A Simple Solution Catching On Fast

Since opening in 1998, Chuck has developed over 400 "recipes" for custom motor redesign on various stock motor models. The redesign recipes were created by customer request. "Custom golf car shops

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and dealers want electric motors that fit specific needs,” says Chuck. Most golf car companies approach Electrical Motor Products, Inc. when they are unable to find economical solutions in the golf car aftermarket. “It’s a fact that redesign can change a stock motor to meet the same performance as many aftermarket motors. Redesign is a suitable, simple solution for most customer applications,” Chuck says.

Because demand for redesign is so high, EMP usually has a lead-time in their shop. Customers can either send working motors for redesign or order a motor from EMP’s vast core inventory. If you simply need a motor repaired, EMP can do that too.

Lightning Redesign

EMP’s Lightning Redesign process starts with a customer interview. Details about the car’s features, motor model, system details, and the area where a car will be used (topography) are considered. Next, they determine the customer’s performance goals. “With this information we will determine or create a redesign recipe specifically for the customer’s needs. During the redesign process, we pay particular attention to motor components and their reliability in the application,” Chuck says.

A standard motor upgrade or Lightning Redesign often involves top speed improvements. If speed is the goal, EMP routinely achieves top speeds from 20-25 mph on golf cars with series wound motors. Other speed ranges are available

depending on customer desires and application.

An increasingly popular redesign is the 2-speed Switchable Lightning Redesign. If customers with modified cars desire a motor with both speed and ultimate torque, the



Pat “Chuck” Koehl considers another redesign idea.

Switchable Lightning Redesign may be the answer. In this redesign, Chuck customizes any series wound motor for two modes. There is a low-speed mode when ultimate torque is needed and a high-speed mode for flat surface driving. The Switchable Lightning Redesign is an all in one motor. A switch may be installed to shift “on the fly” while driving the cart.

Lightning Redesign recipes are also available for separately excited systems such as Club Car IQ, REGEN, E-Z-GO DCS, and PDS cars. For instance, a recent redesign created for the Club Car IQ, allows the motor to go 25 mph with no changes to the controller.

Some applications may need customized motor frames and end shields. These parts can be ventilated to allow heat escape and prevent controller shut down.

“We are a custom operation,” Chuck states. “If we haven’t

invented a redesign recipe that solves a problem, we are willing to engineer a new one for any customer.” Customers can count on EMP when they need special solutions that are not economically available from aftermarket motor suppliers. In some cases where motor redesign won’t accomplish a customer’s needs, EMP will suggest a different solution.

EMP Forward Thinking

Electrical Motor Products, Inc. is now developing a motor redesign and controller reprogramming for the GEM car. This new motor/controller redesign increases car speed and improves motor reliability. Chuck says, “EMP is all about motors and their related components. We are not going to sell cart accessories or divert from what we are able to do best.” Eventually EMP will sell new motors. The company’s long-term plan also includes armature rewinding and other controller reprogramming.

“In this business, efficiency is a must,” Chuck states. To help EMP stay competitive, he finds ways to make the redesign process less time consuming. One way is by developing specialized motor winding equipment and other processing equipment. “We need to stay competitive in the market. Our customers need to know the price for motor redesign will always be the right price.”

To contact Electrical Motor Products, Inc. call their toll free number 1-877-455-1599 or you can find them on the web at www.empinc.biz.