

HEINZMANN, the pioneer in the electric bike business, expands with PERM Motor into the light vehicle drives sector

The German company Heinzmann GmbH & Co. KG expands into new technologies in its business branch „Electric Drives“.

The acquisition of the majority of PERM Motor GmbH coincided in the year 2008 with HEINZMANN’s 111 company anniversary. It is a strategic decision to enlargen HEINZMANN’s product portfolio. PERM is leading in brushless electric disc motors and has a good name with its AC –Synchronous-Disc-Motors and the well known permanent magnet DC Motors in the promising market of electrically driven vehicles. HEINZMANN is strong in electric drive units for bikes (e-bikes, pedelecs) and manufactures also the corresponding control units. Fig. 1 shows an e-bike for postal services (German post), equipped with the powerful HEINZMANN drive system.

PERM Motor GmbH was founded by Mr. Karl-Heinz Knoerzer in 1996 and developed steadily to the current size of 25 employees. Fig. 2 presents the design of a typical brushless disc motor of PERM. The motors are built with different rotor diameters up to a continuous power of 18 kW (air cooled) and 23 kW (water cooled), respectively. Highest torque and a high power-to-weight ratio is obtained with two stators for the worldwide patented permanent magnet rotor technology. These motors are the basis for different electric drive solutions with highest efficiency. The efficiency may well exceed 90 % depending on the control algorithm and the load. Thus, the motors guarantee highest range for the given battery capacity. Two of the latest developments are wheel-hub drive solutions that can deliver high torque at low speeds .

Fig. 3 is a special electric vehicle called “ Kenguru”, that provides individual mobility to handicapped persons. The driver enters the vehicle from behind in his wheelchair. It is powered by two of the new PERM wheel hub motors of 2 kW power and 150 Nm peak torque each.

From the end of 2009 forward, company “Kenguru Car Ltd” in Europe (www.kenguru-car.com) will market this vehicle.

PERM is involved in various development projects for electrical light vehicles, hybrid-solutions and fuel-cell applications. A multitude of prototypes have been manufactured to demonstrate the technical and economical feasibility. Typical applications are electric vehicles like Fig. 4 (NEV’s), lawn movers, tractors, e-motor bikes like Fig. 5, scooters, mobile cleaning machines, electric boat drives, equipped



Fig. 1: Postal e-bike, equipped with HEINZMANN electric drive and control

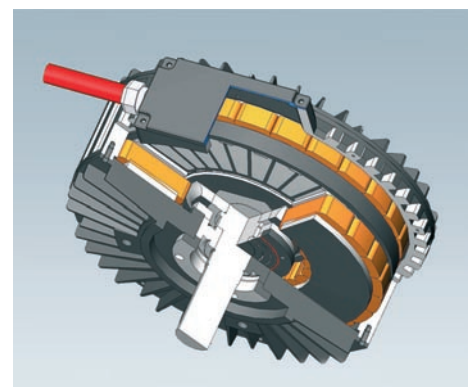


Fig. 2: Principal design of a brushless electric motor of PERM Motor GmbH: stator and rotor



Fig. 3: Electrically driven „Kenguru“ vehicle for handicapped people, equipped with PERM motors

with PERM motors in different power classes up to 23 kW continuous power. The battery voltage can be in the range of 24 to 96 V. The electric motors give an excellent drive characteristic as the torque is highest at low speeds providing high accelerations. PERM also delivers the matching controllers together with the sensor systems, all perfectly tuned to the customer's application.

HEINZMANN with well over 300 employees and PERM join forces in technical developments which include custom-made brushless motors and control units for various vehicles. PERM's production capabilities will be greatly improved in the coming months by the investments in production machines (coiling & winding, sheet metal punching) under the umbrella of the Heinzmann group. From February 2009 on, PERM will have been relocated into the direct vicinity of Heinzmann's headquarter in Schoenau/Black Forest. With joint forces, PERM and HEINZMANN aim to become a leading manufacturer of Electric Vehicle Drives in an era of a new, perhaps zero-emission mobile society.

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Fig. 4: European electric Vehicle "ZEST" equipped with one PERM PMS 156 motor



Fig. 5: Electric MX-Motor-Bike application with one PERM PMS 120