

High Power Electrostatic Motor with 95% Efficiency

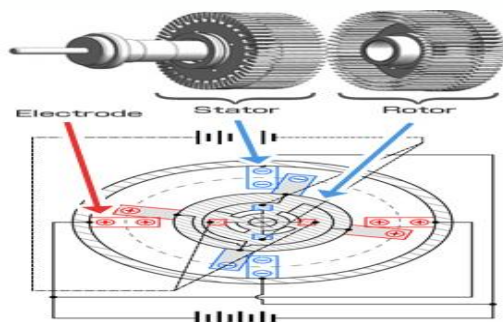
This small motor packs some punch at 100 watts and weighs only 200 grams giving it a power to weight ration of 500 watts to the kilogram



I took a liking to this motor on a recent review I was doing on new Electric motor technology. Although 100 watts and 200 grams weight may not sound impressive, it is when you need power for robotics and other specialist uses the power to weight ratio is important. This is also important for electric vehicle applications where weight is critical. Existing small motors are less than 200 watts per kilogram.

According to SHINSEI CORPORATION, The High Power Electrostatic Motor (ESM65-TR1) was made as an trial production model is very lightweight compared with the electromagnetic motor of the same power. Since there is almost neither a friction part nor an exothermic part, energy efficiency is more than 95%. Moreover, ESM65-TR1 can show high performance in a vacuum environment. Furthermore, ESM65-TR1 can also be used in a nonmagnetic environment.

How Does it Work?



With all the motor technologies being developed this one stood out to me on a recent review. The High Power Electrostatic Motor consists of a rotor, a stator and a shaft.

Many electrodes are arranged on the rotor and the stator. An electric charge is electrified at this electrode and a shaft rotates by the attraction and repulsion of those electrodes.

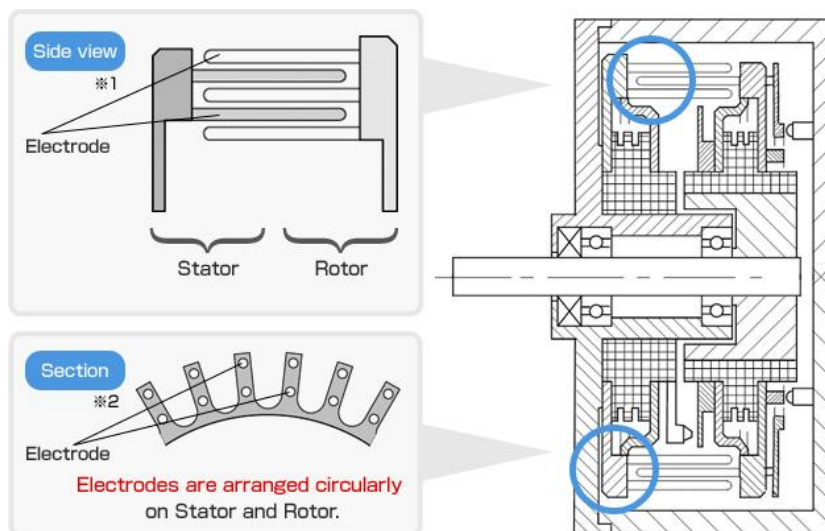
It is possible to control operation of a motor by controlling the timing which changes the electric charge impressed to an electrode. This is an image which shows the state of the electric charge of the electrode on a rotor and a stator. It opposes, when the polarity of the electrode on a rotor and a stator is +, +, -, and -. And pulls against each other when the polarity is opposite. By changing the polarity of the electrode on a rotor with sufficient timing, control of the rotational speed, brake, reversal operation off a motor is possible.

I am not sure Electrostatic Motor is the right terminology to be using with this technology as most experimenters may have different ideas and conceptions of what an Electrostatic Motor is. However the performance of this little motor is very impressive and opens many doors to developers where lightweight high power is essential.

I would like to see how far they can push this technology and how large a motor could be developed. I am sure a lot of other dynamics come into the picture that I am way under qualified to comment on or even know about.

I highly recommend visiting the site as they have some embedded videos and a lot more information on testing and performance.

Source: <http://www.shinsei-motor.com/English/techno/>



Source: <http://revolution-green.com/high-power-electrostatic-motor-95-efficiency/>