



Rako Studios » Media » Tech » System-engineering » Mission Motors electric motorcycle

Mission Motors electric motorcycle

Slapping an electric motor into a motorcycle requires a lot of system engineering.



In 2013 there was yet another media frenzy about a electric motorcycle company in San Francisco. Mission Motors was set to storm the world with a genius design. Thing is, I was an auto engineer, and I have built and electric car conversion. Anyone can stuff a motor and some batteries on a wheeled vehicle. Its a lot harder to do the system design to make a practical safe vehicle. Mission Motors went bankrupt in 2015, never shipping anything. I wrote this comment, too late to save the investors hides, I fear.

Dear Folks:

As an electrical engineer, former auto engineer, and someone that converted a Honda Civic to all electric, I am a bit skeptical of the claims in this article. Nothing that weighs as much as an Electra Glide is "nimble" in the corners. I don't care if it powered by electricity or propane or farts. It will handle like a dog.

One paragraph talks about how the bike uses all the same stuff as a Ducati, and the very next paragraph says its all custom one-off hardware. Charging 16kW in one hour will require 68 ampere 220V service. Actually more like 100A, since the charger can't be 100% efficient, especially at these excessive currents. Most dryer 220 outlets have a 20-ampere circuit breaker.

A 200hp induction motor? You can use aircraft motors made for 400Hz and that reduces size and weight by a factor of 10. I found a 400Hz permanent magnet alternator that has 20kVA but it weights 365 pounds. Then we have the motor control. I have seen a Tesla Roadster motor controller. It is about 4 inches by 6 inches and almost the width of the car. Does this thing do flux-vector control?

They say that they do regenerative braking. That is pretty scary on a motorcycle, where racers are putting overrunning clutches on the drive-train so that engine compression does not break loose the rear tire when they let off the throttle. My racer buddies say you never use the rear brake other than parking. So is Mission really going to do significant regeneration off the rear tire?

Using the motor as a charging transformer is really brilliant, wish I had thought of it. Only its pretty hard to see how you can make a motor into a transformer without that troublesome spinning of the rotor. Maybe they just use a single phase, but then you get all the losses of the induced current in the rotor squirrel cage.

More likely, they are using the motor as a choke, or inductor, for the dc charging current. And so not to be Mr. Total Cynic, the data acquisition system looks great and this is what Mission will end up selling instead of eBikes. What I would like to ask Mission:

1. What is the charge time of this vehicle from dead-flat to 100% when connected to a standard United States wall outlet with a 15A circuit breaker? (Nominally 7.5 hours to go 20% to 100% but that is perfect efficiency and ignores you have to "tail off" the charging current into li-ion while holding the charging voltage at 4.2V.) My guess is 12 hours.
2. How long can this vehicle maintain 60mph on a flat road in no wind (With the charge time you give for #1)
3. What is the continuous maximum power output of the motor, in still air? What is the hp rating when the motor is in a 70mph airflow?
4. Can you ride this motorcycle over Route 17 from Las Gatos to Santa Cruz, and back, on a single charge?
5. If I take the bike down Lawrence Expressway, to Quito Road, and stop at every light, and do maximum acceleration from every light to 50mph, how many times can I take the trip?
6. What bikes do you specifically claim this eBike will out-race at Leguna Seca?
7. Can this bike make the circuit from Alum Rock Road and 680, to Livermore, up Mines Road, down Mt Hamilton Road, and back to Alum Rock and 680?
8. What specific breakthroughs and intellectual property does Mission claim that makes this vehicle superior to anything devised by Zero, Harley, Honda, Tesla and the electrics from Emerson, Westinghouse, and General Electric?
9. If I charge and discharge the battery in one hour each, how many cycles do I get until the battery only holds 50% charge?
10. Hey, can I buy that instrument panel separately?

files