ELECTRIC CARS – A NEW DIRECTION

Jeff Allan is a competitor familiar to many having competed for many years with a TVR. More recently however, he has appeared driving his Tesla (just once though!) and Nissan Leaf electric cars.

The Leaf being charged at Prescott. Note the black lightning symbol

In the I-MiEV at Loton

I have a large two ton, five seater, and four wheel drive car. I am sure many of you do. You probably use it to tow a trailer for your sprint/hillclimb car. An ideal sprint or hillclimb car would have maximum torque available off the line, sufficient torque over a wide rev range to allow running to a high speed, say 155mph without the need to change gear, a low centre of gravity for good handling, a light weight body and 4 wheel drive with electronic traction control on all four wheels. My two ton car fits that specification. It has more than a ton of weight below the floor level (mainly the battery) and an aluminium body. It achieves a measured and repeatable 1.92 seconds, 64 foot time on road tyres, a less than 3 seconds 0 to 60 time and it can accelerate to 155 mph in first gear, the only gear, other than reverse. It is a Tesla, an electric car.

I have only sprinted the Tesla once. It achieved similar lap times to TVRs at Rockingham but it proved expensive to insure at track based events. You may have seen my most recent sprint/hill climb car. I have bought a used, much cheaper electric car, a Nissan Leaf, for sprints and hill climbs and self insure, as many do, on track.

This is my second electric car which I have used regularly on hill climbs and sprints since 2014. My previous electric sprint/hill climb car was an even smaller Mitsubishi I-MiEV. The Leaf and I-MiEV are not fast road cars for hill-climbs and sprints. Initial torque in these smaller electric cars is limited by software unfortunately (unlike the Tesla). They are also heavy. The I-MiEV weighs in at 1.45 tonnes with a peak power of 49kW (66BHP) giving a power to weight ratio of only 46 BHP/tonne and a limited top speed of 82 mph. The Nissan Leaf is only slightly heavier at 1.49 tonnes with a much higher peak power of 80kW (114 BHP) and a power to weight ratio of 77 BHP/tonne. The top speed is limited to 92 mph. The Tesla is heavier still at 2.1 tonnes and, in my Tesla, 440kW (628 BHP) of power is available with a power to weight ratio of just less than 300BHP/tonne. Top speed is limited to 155 mph.

The characteristics of my cars are summarised below:

	BHP	Weight (tonnes)	Power to Weight (BHP/ Tonne)	Max Speed (Mph)
Mitsubishi I-MiEV	66	1.45	46	82
Nissan Leaf	114	1.49	77	92
Tesla Model S	628	2.1	299	155

In the Tesla at Rockingham in 2016

Jack Flash Photography

Presently available Teslas can achieve a 0 to 60 time of less than 2.3 seconds

The power to weight ratio explains why the Tesla achieves a similar run time to a TVR but does not explain the more than 1g initial acceleration. This is down to the electric drive providing incredibly high torque at standstill through two motors, front and back, microprocessor controlled to manage amazing traction on road tyres. The chief executive of Tesla, Elon Musk was aiming at a 0-60 time as good as a McLaren F1, which was achieved. It was subsequently improved, initially by software and then by hardware improvements. Presently available Teslas can achieve a 0 to 60 time of less than 2.3 seconds.

So what is different about an electric car for sprints and hillclimbs? Preparation is very similar to any other road car - visible tow points, a timing strut, numbers on the side of the car and an on/off sign on the "ignition" switch. In the case of the Leaf this is a button which needs to be pressed with your foot on the foot brake to get the power on. There is no engine to start, so once the dashboard is lit up it is ready to go. The one item of preparation which is different for electric cars is a black lightning symbol in a yellow triangle which needs to be placed next to the number. You can see it in the photo to the right and above the number 171.

As you can see the car is ready for scrutineering. The purpose of the triangle is to warn marshals in case of a really bad crash - the battery is over 300 volts and in such a situation live terminals may be exposed. Marshals would then need to either know from the driver, if conscious, that the power had been cut off or if unconscious would need to approach the car using insulated gloves. If the car was on fire it would need to be treated as an electrical fire.

The driving experience is a little different from an internal combustion engined car. The Tesla has a launch control for the start line, but in the other two electric cars, I select D(rive), put my left foot on the foot brake and right foot fully down on the accelerator. There is no clutch. This loads the back wheels of the Mitsubishi (rear wheel drive) or the front wheels of the Leaf (front wheel drive). The torque is there from standstill. I then simply release the footbrake. There are no gears so no torque delay which you would get while changing gear with either a manual box or an automatic box on an internal combustion engine car. The other unusual feature is that in electric cars, when you release the accelerator, you get a braking effect from the electric motor, similar in feel to harsh engine braking. The electric motor is acting as a generator feeding energy back into the battery. This means that as you take your foot off the accelerator, you get an immediate braking force, even before you put your foot on the brake. I have forgotten but I am often reminded it takes a little getting used to.

Having come from a background of sprinting and hill climbing in a TVR, it is refreshing competing in the slower Nissan Leaf as there is more time to get the lines better and you work harder with achieving good momentum.

I have enough battery charge to last the short runs in a sprint or hillclimb but if you see me charging the car between runs, this is simply to ensure I have a good battery charge to get me home as I have always driven to events since I started sprints and hillclimbs in 2002. I travel north as far as Croft, east as far as Snetterton and as far south as Wiscombe. Travelling time in the Tesla would be no more than in an internal combustion engine car but the two smaller cars take approximately half the time it takes in an internal combustion engine car due to the need for rapid charging (half an hour) at motorway services every 50 or so miles.

I am confident that as the number of electric cars increase on the roads, more will appear at sprints and hillclimbs. What is apparent from the above is that not all electric cars are similar. As more compete it will be necessary to divide into classes and perhaps a fair way of dividing the classes is in power, as cubic capacity is meaningless. At this stage less than 100kW and greater than 100kW is sufficient. It is probably necessary to distinguish pure electric (battery only) cars from hybrid cars as at present a La Ferrari can enter in the same class as my Nissan Leaf when that class is limited only to electric and hybrid cars. Hybrid cars do have an engine with a cubic capacity in any case.

If you wish to know more about driving an electric car on the road, please down load my free book "Can you drive an Electric Car in Britain?" on my web site www.jeffvehicles.com. I am afraid you will not see me competing much in July as my son and I are attempting to beat a Guinness world record for charging time from the North of Norway to the South of Spain - a distance of 4000 miles. We hope to charge the car during the journey in less than 20 hours so if you want to know how long it takes to charge an electric car, there is your answer!

Preparing for the Norway to Spain record attempt