



An insight into electric karting

Although they are not very different from other karts, those with electric power are bringing a new dimension to racing, hitting the tracks packed with the latest on-board features – which means learning more about how we manage the technology and understand the safety aspects to fully appreciate the unique performance on offer. Let's see what is best to know the first time you climb into a kart like the Rotax E20

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Over the past three race seasons, we have witnessed the obvious improvements in competitiveness, drivability and autonomy of the Rotax eKart, highlighted in 2020 with the introduction of their in-house production Generation 2 Project E20 edition.

In terms of sustainability, nowadays eTechnology is gaining more and more importance in every area of mobility. And this includes racing as well. Due to numerous ecological problems like

the noise and the exhaust emissions caused by traditional engines, it becomes more and more difficult to open new tracks or even run existing tracks. The electric drive categories (like Formula E) are already a fixed part in motorsport now gaining more and more space and success. Although the vehicles are not very different from the others, there are several things to learn at the first approach to driving them. E-karting is offering the first step for racers to get in touch with this new technology.

FOR ROTAX IT IS ALMOST A MISSION

Jean-François Lambert, GM BRP-Rotax, Member of the Management Board and VP R&D Powertrain and EV about the eTechnology developed for the karting business: «BRP-Rotax is a leader in the development and production of innovative 4- and 2- stroke high performance Rotax engines. We are well aware of the current global trends and movement towards a cleaner, more efficient future as a reputable combustion

“DEVELOPING ETECHNOLOGY NOT ONLY ENHANCES THE KART SEGMENT OF OUR BUSINESS , IT ALSO INCREASES OUR KNOWLEDGE EXTENDING TO ALL OTHER BRP RECREATIONAL PRODUCTS.”





The instrument specially developed for the Rotax Project E20 can signal isolation problems of the electrical apparatus even with red lights. It also shows the charge and temperature status of the battery pack, as well as the gear between N, R and D (respectively neutral, reverse and drive) which is activated via the buttons on the steering wheel



ALL RELEVANT SAFETY AND OPERATING INFORMATION IS CLEARLY INDICATED ON THE STEERING WHEEL DASH DISPLAY:

If the vehicle is turned ON in NEUTRAL, DRIVE or REVERSE

Isolation fault (red lights displayed)

Battery charge level and battery temperature

Boost function (lights indicating countdown)

Amount of laps completed

Lap times & split times

Here you can see the “start / stop” switch to turn the kart on and off, the red general safety switch and a “pin” also designed to isolate the entire electrical system



engine manufacturer, with an ongoing commitment to this. By understanding and developing eTechnology, among others, not only enhances the kart segment of our business for potential customers worldwide, it also increases our knowledge extending to all other BRP recreational products.»

«In effect, the Rotax initiative to introduce the eKart as a full racing model, already competing over the past three seasons, is another example of our ability to take the next step in being prepared to meet the demands and expectations of the market. In many countries, noise and pollution emissions have threatened the longevity of our sport, the existence of circuits and the karting industry, and still continue to do so. For Rotax, eKarting should be a sustainable option available for everyone.»

THE PROJECT E20 RIVALS THE ROTAX DD2

At this point we want to focus our attention on the eKart itself, the one selected to support the DEKM (German Electric Kart Championship) by the breakthrough series partners for the third year of the championship in 2020 and again this season.

The Rotax Project E20 is the latest variation of this electric-powered kart, and takes advantage of the experience gained previously with the Rotax THUNDeR model, compared to which it has 25% improved performance and is 7% lighter, also taking advantage of a better weight distribution and greater autonomy. The combined air/liquid-cooled permanent magnet synchronous drive unit delivers 24 kW (about 33hp) with a torque of 190 Nm, allowing you to reach 135 km/h with the fixed gear ratio used. The Rotax powertrain is assembled on the chassis (a Sigma model by Sodikart) exactly as it is for the DD2 class, that is, mounted to replace the right supports of the rear axle. It's a very “clean” solution from all points of view. There

are many similarities with the DD2, starting from the wheelbase and the braking system with discs also at the front, to conclude with performances that in acceleration have proved to be almost equivalent. But we will talk more about their behaviour on the track in a future article, as soon as the weather conditions and the restrictions connected to Covid-19 allow a direct and in-depth approach with this kart. In the meantime, however, all those who have tried it were extremely satisfied, especially for its great torque that “slams you back into the seat” in acceleration from the very first moment.

HOW DOES THE ROTAX PROJECT E20 COMPARE?

Karting that is widely “more traditional” and not powered by eTechnology includes endless variations: different engine capacity, single or gearbox configuration, chassis type and protection systems, weight, tyre compounds, rules and regulations, etc. In the case of the newly introduced Project E20, there are also variables that set it apart from the others, which will change with the constant development as eTechnology evolves. The linear torque characteristics are very impressive; instant acceleration without delay! This is definitely an eKart buzz that every race driver is impressed about. It’s an entirely different feeling to what they are accustomed to with any combustion engine acceleration. There’s also the coolest feature that everyone loves – the “boost” function – that provides an extra 4kw of power you can activate each lap for five seconds of up to 10km extra speed by pressing the blue button on the steering wheel. It regenerates every 30 seconds, so you’re good to go when you need that added power push. Depending on the circuit layout, the average lap times of the eKart are generally somewhere between a Senior Rotax MAX and the Rotax

WHAT THE ROTAX DRIVERS SAY

Xen de Ruwe, race driver & coach, a multiple champion at international and national level having raced in many categories, and on the world podium at the RMC Grand Finals or Rotax MAX Challenge Grand Finals «My first impression after testing the Rotax Project E20 eKart is that it was an amazing experience! It’s been something completely new, very fast instant acceleration, exceptional top speed, stable and quite easy in the handling. It was a very pleasant surprise for me and has been a slightly different experience to other categories that I have raced over the years. As there is no sound, you focus a lot on other things, for example: the wind that blows through the visor, the sound it makes when you run over the curbs and the squealing of the tyres. It’s amazing because with other go-karts you don’t hear these things due to the noise. On day two, we played around a little with various set-ups, analysed the data and tried to get the most out of the go-kart, just as we do normally when testing. With the E20, it’s a different feeling and you can drive in a different way. It was it was a great emotion and experience great emotion!»



Mathilda Olsson (SWE), Rotax MAX European Champion 2019 & 2020, Team Sweden member 2021 – «I’ve been karting for six years now and recently had a go in the electric kart (Project E20) for the first time, which was quite exciting! I wanted to try it and see what the difference was compared to the engine I usually drive with, the Rotax MAX. I really enjoyed driving the Rotax Project E20, it was good fun and it was definitely different. With the eKart you can actually hear everything. The power off the corners was also good compared to what I normally drive and yeah, the speed was great! I didn’t think it would be that fast with the eKart, but as soon as I jumped in the kart and touched the gas, it was like ‘okay this is going to be fast!’ Also, there’s a boost button on the steering wheel and if you push that, it really is even quicker again on track. Electric is something different and of course, there is a place for it because there are people who want to drive with this type of power, just as there are those who want to drive fuel-powered karts too. You miss a little bit the sound and smell of the engine... but at the same time it’s going really fast, so I think you just have to learn how the kart works and then it would be very good. For me, was fun to drive electric! And naturally I would love to have try it in a race as well.»



DD2 classes. The E20 weighs in at 140kg (mainly due to the batteries), compared to about 90kg for an average combustion engine race kart. With the extra weight, the driving feeling is different as the load transfer of the kart (cornering and braking) is noticeably more, however, it's interesting to see that most drivers immediately comment on how exhilarating the driving experience is in all conditions. There are two Lithium batteries mounted on each side with a capacity of approximately 15 minutes or 18 laps on a 1000 meters circuit with around 45 minutes total recharging time.

Following each session, the mechanic can easily manage this by fitting the specially designed streamlined cooling fans to the top of each battery before connecting the cable from the charging unit. Once the charger is turned on, the dash display indicates the amount of charge and battery temperature.

It should be noted that the battery autonomy or length of time the battery will last at a specified load level could change when the kart is driven at a slower speed (e.g. a new driver) resulting in more time on track before they need to be charged again.

While driving, when the battery reaches a level low enough that it will soon need to be recharged, the dash displays a message saying "RETURN TO PIT" which can also be indicated if the system detects an error. There is a specific start-up sequence, as well as for shutting the system down. All participants are given very clear instructions about this procedure, as the kart will not go into drive or accelerate away without following this simple process.

The integrity of the system is monitored by the isolation fault monitoring system (ISO watcher) which is constantly

checking a multitude of parameters to ensure the safety of the eKart. In the event of a failure, the system shuts down and isolates the batteries so there won't be energy present in the chassis or any of its components. If the system does shut down, the driver needs to remove the magnetic ignition key (a green plastic toggle-switch connected by a curly cable to the control panel) then replace it to let it reset, before restarting with the "ON" button. The display will show the ignition is on, so the start procedure should be followed, by pressing both the red and blue buttons together on the steering wheel,



until the system goes from NEUTRAL into DRIVE.

CERTIFICATION & TRAINING

The technology used for the Project E20 is similar to what is found today in electric motorcycles, cars, rallycross and Formula E. Therefore, the Rotax eKart has undergone numerous different tests at the independent DEKRA institute, an FIA approved testing centre, based on the required technical and safety standards. DEKRA has confirmed and certified that the Rotax Project E20 has met the regulations as defined by the DMSB (German Motorsport Federation) working together with FIA Karting.

The Rotax eKart technical team is trained and certified in the use of the new electric kart technology, including the powertrains and Lithium batteries. At any race meetings with the Rotax-produced Project E20 eKart, the team is always there to oversee and support the participants and mechanics. The race director and team of flag marshals undergo a safety briefing prior to every event with regular training provided to ultimately ensure a quick reaction time, if it was necessary to support competitors on track due to racing incidents.

Everyone who attends a track day with the Project E20 is given a safety briefing before they begin to prepare or drive the eKart. This includes a basic introduction to the E20 explaining how the vehicle operates, how to start and stop, how the boost works to assist the performance and also understanding the dash display. By explaining the safety systems built into the vehicle and how this works to protect the driver in the event of any failure, in addition to the recovery procedure out on the circuit, the necessary

features and what can be expected is all made clear from the beginning. This means the participants have more insight, confidence and knowledge about the Project E20 to ensure they can really enjoy this exciting new karting experience. BRP-Rotax is now offering test days in the Project E20 from the middle of March at Prokart Raceland in Wackersdorf, Germany. This is an ideal opportunity for drivers who are interested in competing in the DEKM series in 2021 to experience the special feeling of eKart racing for the first time. Stay tuned for more information on www.rotax-kart.com or check out www.dekm.de for details on how to register today.



The orange electric cables are the ones where the high voltage current passes: it is therefore better to respect them, when you get in and out of the kart or you are working on it... The electric motor developed by Rotax integrates the transmission as already happens for the DD2 engines, so much so that it requires the use of the same type of frame, produced by Sodikart

ROTAX PROJECT E20 TECHNICAL DATA SHEET

Motor	Rotax Permanent Magnet Synchronous Motor (PMSM)
Cooling	Combined air-liquid system
Transmission	integrated into the engine
Batteries	Lithium-ion
Nominal voltage	350 Volts
E-braking/ Recuperation	available
Boost and reverse functions	driver activated extra 4 kW
Max performance	24 kW / 135 km/h
Chassis	Sodi Sigma DD2
Tubes	diameter 30 mm
Wheelbase	1040 mm
Brakes	Hydraulic brakes, 2 front discs and 1 rear disc

