

Regulations of the International Educational Meeting e-Kart 2016

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Section 1 - Definition of the Meeting e-Kart 2016 Limoges

Article 1.1 Definition

The Limoges French International Pedagogical Meeting of Electric Kart e-Kart 2016 is a friendly meeting of students and teachers who worked on an electric vehicle. It is by no means a competition. The main objective of this event is the exchange of experiences of each in a friendly atmosphere.

Article 1.2 Dates

The meeting e-Kart 2016 Limoges will take place from Wednesday, May 25, 2016 at 09:00 AM to Friday, May 27, 2016 02:00 PM. It will be possible to carry out storage on Friday, May 27, 2016 until 06:00 PM.

Article 1.3 Place

The meeting e-Kart 2016 Limoges will take place on the electrical go-karts track of the company RMT, 19 Rue de Douai, 87000 Limoges, France, Tel : +33 (0)5 55 09 18 93.

Article 1.4 Safety regulations

Participants in the meeting e-Kart 2016 Limoges attest to having read the rules specific track and meeting educational, as well as the safety instructions contained in the safety briefing.

Article 1.5 Organization

Meeting the e-Kart 2016 Limoges is organized by the e-Kart Association and IUTeKART:

- 1) The e-Kart Association - Director: Thierry Lequeu
152, rue de Grandmont - 37550 Saint Avertin - France
Mobile: 06 89 73 80 58
E-mail: thierry.lequeu@gmail.com
Website: <http://www.e-kart.fr>
- 2) The Association IUTeKART – Director: Axel BARRIERE
IUT du Limousin, Allée André MAUROIS 67100 LIMOGES –France
Contact : Christophe LAPOIRIE
Portable : +33 (0)6 49 95 06 62
E-mail : christophe.lapoirie@unilim.fr
Site web : <http://www.iut.unilim.fr/les-formations/dut/genie-mecanique-et-productique/>
- 3) The company Kart Masters – Manager: Valéry DEWANCKER
9 rue Saint Denis – 72300 Sablé sur Sarthe – France
Portable : +33 (0)6 12 72 34 07
Site web : <http://www.kartmasters.fr/>

Article 1.6 Websites

The website of the e-Kart Meeting 2016 is at the location <http://www.e-kart.fr/2016/limoges/>.

Article 1.7 Registration fee per person

Registration for the Meeting e-Kart 2016 Limoges is by contacting Christelle by mail to:
asso.ekart@gmail.com

and until Friday, February 5, 2016 for a normal rate.

Registration fees are automatically calculated from the number of kart(s) registered(s), the number of meals and overnight stays. Meals are required in the registration form.

**From February 6, 2016, the fee is increased by 1% per day of delay
and the hotel booking isn't possible.**

In case of cancellation before Friday, March 25, 2016, 50% of registration fee will be refunded.

After March 25, 2016, no entry fee will be refunded and the bill is due.

The deadline for registration is Friday, March 25, 2016.

Based formulas chosen entries cover the costs of accommodation (hotel, 2-4 persons per room) for the night of Wednesday, May 25, 2016, Thursday, May 26, 2016 and Friday, May 27, 2016 (optional), and meals from dinner on Wednesday evening May 25, 2016, breakfast + lunch and evening of Thursday, May 26, 2016 and breakfast on Friday, May 27, 2016. The evening meal on Friday, May 27, 2016, the night of Friday, May 27, 2016 to Saturday, May 28, 2016 and breakfast on Saturday, May 28, 2016 are optional.

Participants have the opportunity to make their specialty area within the test of "Buffet Gaulois" after the evening meal on Wednesday, May 25, 2016.

Article 1.8 Registration forms and record kart

Each participant will have to complete a registration form of a computer file type Microsoft OFFICE WORD 2007. The photo should allow easy identification of the participant (recent color photo). Essential information is: NAME, First Name, date of birth, photo, phone number, and e-mail.

The file name should include the number of the team this year, the NAME of the person and his name, for example "37H-2016-LEQUEU-Thierry.doc." This allows the automatic classification of files.

For minors, permission to participate in the Meeting e-Kart 2016 Limoges signed by parents must also be provided. This document will allow medical intervention in case of an incident or accident.

The same applies to the information sheet of the kart, the photo must be recent and match this to the kart that run at the Meeting e-Kart 2016 Limoges.

**The deadline for receipt of registration forms and details of the kart
is fixed at Friday, March 25, 2016**

Article 1.9 Insurance

The kart must be insured as a recreational vehicle motor (French green card).

Students must have a certificate of liability under the covering educational activities.

The e-Kart Association, organizer of the meeting e-Kart 2016 Limoges, take an insurance specific to the event to MAIF.

Article 1.10 Collection of photos and videos

The Data Processing Department of the organization of the Meeting e-Kart 2016 Limoge collect photos and videos made by different teams.

The deadline for receipt of photos is set for Friday, June 3, 2016

at the following address: Thierry Lequeu - 152, rue de Grandmont - 37550 Saint Avertin – France

One or more DVD of the meeting e-Kart 2016 Limoge will be made after the event.

Article 1.11 Building a team

A team consists of 0-5 teachers and / or personal coaching and 1-30 students.

The team have a team name.

A team leader should be appointed.

The team has only one kart (how many teams as karts).

Article 1.12 Safety circuit breaker lanyard

A circuit breaker lanyard is required for registration and authorization driving karts present at the meeting e-Kart 2016 Limoges. This point will be checked during the technical inspection of the kart.

The system will switch off the power relay and / or the drive power supply.

It must be installed in the pilot's left, right hand raised for reporting an incident or a reduced speed during reentry into the stands.

A fastening system scratch tape will be provided by the organization for the connection between the cord and the left wrist of the driver.

The circuit breaker lanyard can be found on Kart Masters Shop by following the link:

<http://kartmasters.fr/shop/fr/accélérateurs-et-boutons/587-coupe-circuit-de-securite-a-fourchette.html>



Article 1.13 Numbering kart

The kart will wear his number legibly on the front panel nostril on the two sides and rear. The kart number is the number of the team, 37H, for example, if there is only one kart. It is followed by a number if there are several karts in the team: 37H1 and 37H2.



The Nassau panel



On pontoons



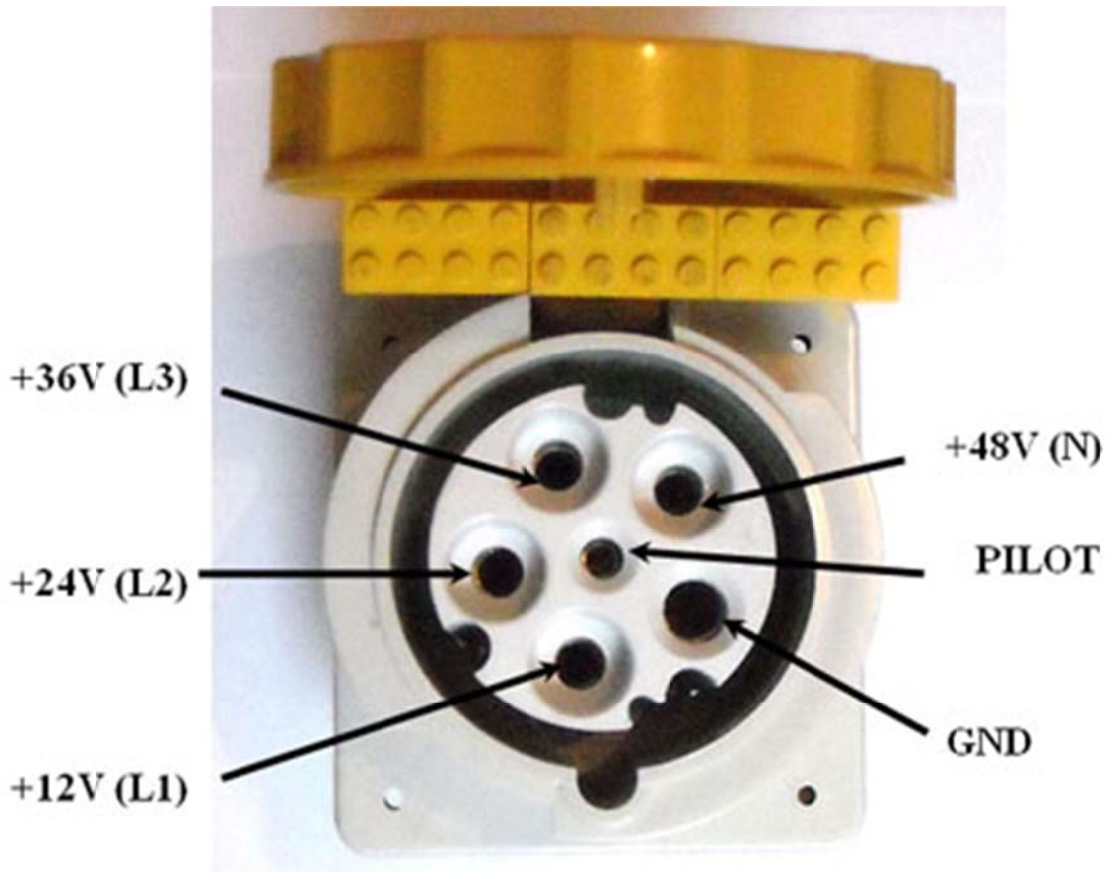
On the rear panel of the kart

Article 1.15 Charge plug connecting

1.15.1 Connecting taken the 5pin 63A YELLOW PK

This is the standard plug that all the go-kart has to be equipped. This allows the easy connection of the chargers the team have.

This plug allowed the fast charge with 48V 80A and/or the charge of each battery with 4 x 12V chargers from 40A to 80A. The link between the female plug on the kart and the batteries have to be done with 16mm² isolated cable copper, in order to withstand the fast charge at 80A rate.



The sockets PK YELLOW 5 pin 3P + N + E 63A mounted on the kart allow the unit load from 4 chargers 12V 80A maximum.

1.15.2 Connecting the charger 48V 50A SPEEDOMAX

The indoor trak RMT Karting have 24 48V 50A chargers. In order to use these kinds of charger, it can be interesting to have a female REMA 80 plus on the kart.



The sockets are asymmetrical and have a flat face. For mounting on the LEFT side of the kart (rear view in the direction of travel), the positive terminal 48 V is found in UP, and the auxiliary contact. The negative-0V is found in LOW.

The auxiliary contact is to be connected to ground so that the SPEEDOMAX charger can start.

When the plug of the charger is plugged into the LEFT side of the kart (rear view in the direction of travel), the positive terminal 48 V is found in UP, and the auxiliary contact. The negative-0V is found in LOW. The handle can be found outside.

1.15.3 Connecting 48V 100A ZIVAN chargers

Female REMA 160A plus are used to connect the three phase 48V 100A ZIVAN chargers and are allowed on the kart.



Article 1.16 Timing system

No timing system is available.

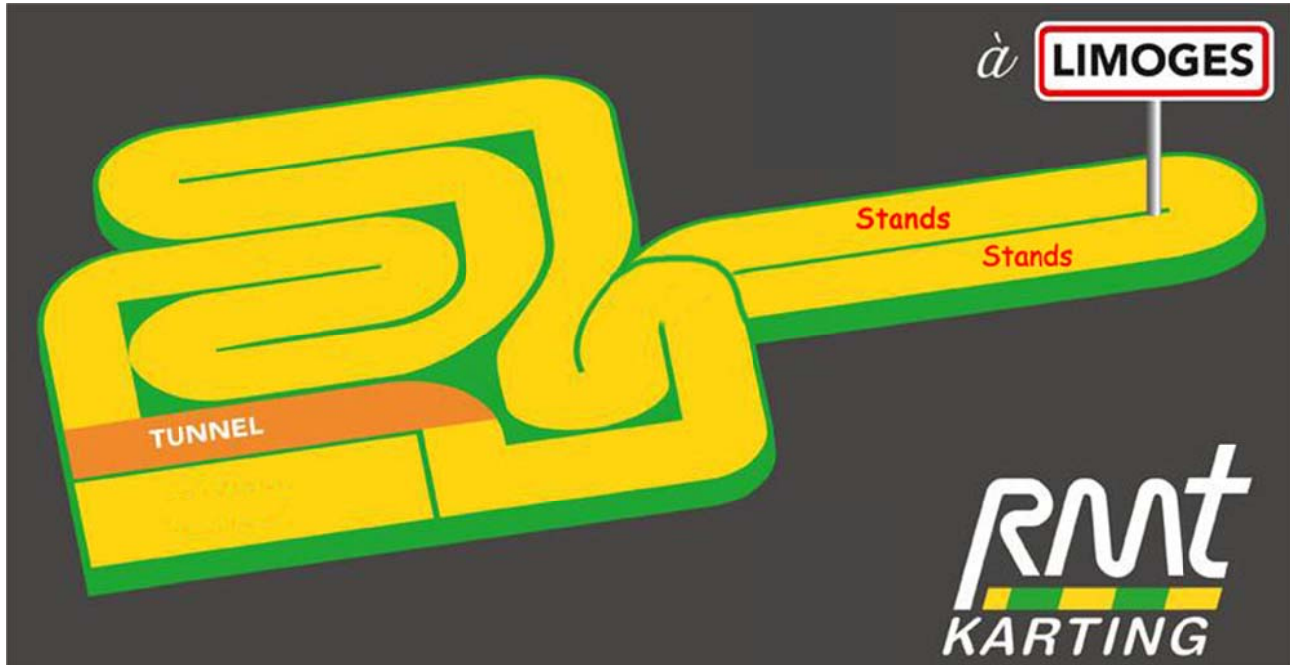
The teams have to measure the time laps by their own and count the number of turns of the kart.

Article 1.17 The indoor RMT Karting Limoges track

The track is built on a 3700 m² area, for a linear length of $411\text{m} - 90\text{m stand} = 321$ meters, 302 meters measure on the track.

Le track have special asphalt for go-kart, very dense, with an excellent grip.

The width of the track is 6 meters.



Article 1.18 Size of the stands

An area called "stand", 3m x 4m, is made available for 1 or 2 team (s) and 2 karts maximum. The stands are "mixed" can accommodate a team of "old" and a team of "new."

The stand has the department number of the team, a letter and possibly a number.

The posters have to be presented at back of the stand.

Article 1.20 Electric power of the stand

The stand is equipped with a double power plug grounded 230V 16A and 25A fuse 10x38 mm AM Legrand to the main charge and the auxiliary equipment's (PC, phone, camera, ...).

The overall current must not exceed 25A.



Some stands can be equipped with three phase plug 400V 20A PLEXO Legrand, with neutral and ground for three phases chargers. The fuses on the 3 phases are AM 20A 10x38 mm Legrand.

You must ask for this kind of plug when you register.



Section 2 - Educational events

Article 2.1 Objective tests

- Evaluate the educational work of the students who worked on the electric kart.
- Test characteristics of the kart on the e-Kart 2016 Limoges track.

Article 2.2 The study subjects

- Manufacturing and assembly of mechanical electric kart.
- Research sponsors.
- Organization and teamwork.
- Technical study related to the electric kart: dynamic behavior, performance, justification of technological choices, economic studies, market research ...
- Realization of the drive and / or charger.
- Realization of embedded electronics: display speed, voltage current, temperature, ...
- Transmission of data to a desktop PC.
- Software development useful electric kart (website, simulator, ...).
- ...

Article 2.3 Documents to provide

- 1) For schools, it is called a synthesis paper work.

The number of pages is set between 1 and 10 pages. There will be a maximum of 6 authors.

An example of a file in Microsoft Office Word 2007 and PDF format is available on the website <http://www.e-kart.fr/2016/limoges/>

Will be provided in PDF format before Friday, April 8, 2016

at thierry-lequeu@gmail.com.

A jury will evaluate the project presentation. The presentation will focus on the completed project, as well as future development, highlighting the collaboration sought.

Of documents can be provided (students report, appendices, ...) (not limited number of pages).

- 2) A poster presentation is also required.

Grid support for dimensions 1.00 m wide by 2.00 m high.

Article 2.4 Composition of the International Jury

The jury is composed of (non exhaustive list):

- 1) Piotr BICZEL, Université de Varsovie, Président du Jury.
- 2) François MAEGHT, IUT GEII de Béthune, Président du Jury.
- 3) Sylvain PATELOUP, IUT GMP de Limoges.
- 4) Sylvain CLOUPET, ISTIA d'Angers.

Article 2.5 Tests and declaration of winners

The jury of the 2016 Meeting e-Kart evaluate teaching achievements. Medals awarded to the following events:

- 1) **Best time on a lap: Price RMT Karting**
The 3 best times are rewarded.
- 2) **The "2 hours endurance racer" Price CENTRADIS-OPTIMA**
The three teams that carry the greatest number of laps win a prize.
- 3) **The "Meeting of Gazelles" Prize KART MASTERS**
The three fastest female pilots carry a price.
- 4) **The "4 hours Great Prize of Limoges" Price "Ville de Limoges"**
The three teams that carry the greatest number of laps win a prize.

Concerning educational assessment, the Board will assess each student development from the point of view of the design and the implementation.

The team will highlight the part of the work due to the students due to the teacher. In addition, the evaluation will consider the quality and level of achievement vis-à-vis the skills related to the educational level of students forming the team.

It will be important to specify the state of the kart before handling the projects, list the work, the duration of these changes, the work environment (free time and / or project hours allocated by the institution).

The jury members will move to the stands to interact with teams on the various points within the scope of the criteria taken into account in the allocation of educational prizes.

Thank you to their teams a good welcome and prepare material to present.

We can cite the following topics (non-exhaustive list) will be rewarded.

- 1) Communication systems / telemetry between the machine and the team, between machines between them, between the driver and the team.... Integrating or not monitoring applications.
- 2) Designs and / or electrical and mechanical engineering achievements. The achievement by students of electrical, electronic and / or mechanical will be highly appreciated. We can cite for example:
 - a. Realization of inverter
 - b. Realization of battery charger,
 - c. Realization of the elements of the mechanical structure,
 - d. Realization of the power transmission chain,

e. Boiler....

- 3) Development module (s) active (s) or passive (s) increasing safety kart will be appreciated by the jury. We can cite for example: system detecting the presence of the driver warning system-on heater / Batteries, signaling ...
- 4) The work done by the team to formalize communication media to present developments on the kart. These supports may be reports, posters, websites... with a special mention "sharing scientific and technical information."
- 5) Design and aesthetic changes the kart will be highlighted.
- 6) Structure put in place to finance the project, to bring together different institution may be reward (s) by the jury: association or not, solely by funding departments and / or research sponsors, ad hoc approach ...
- 7) Accessibility for persons with reduced mobility will be especially rewarded.
- 8) Innovations in eco-design, the use of recycled materials will be evaluated by the jury.
- 9) The ergonomics of the stand, the friendly staff and the support of participants will be taken into account extra points for the jury.
- 10) Prices for passion, for exchange with foreign institutions ... will be defined locally.

The jury is sovereign and retains the freedom to enjoy developments not mentioned to reward all work in connection with the electric kart.

The "e-Kart Trophy" will be awarded to the team accumulating the most points.

The "e-Kart Trophy" is retained for one year by the winning team and put into play the following year.

Section 3 - Specifications

Article 3.1 The electric motor

The electric motor can be of direct current technology, asynchronous or synchronous, the energy supplied by a power supply board to the chassis. The voltage generated by the power supply and control system for the engine, is classified into three categories:

- Catégorie 1) Voltage below 48 VDC.
- Catégorie 2) Rated voltage of 48 VDC.
- Catégorie 3) Voltage greater than 48 VDC.

Cooling the motor can be air or water. In the case of a cooling liquid, the circuit must be closed with a separate radiator.

**Noise kart driving to a higher speed 10 km/h,
shall not exceed 60dB.**

Article 3.2 The battery power

If power is achieved with batteries, these must be sealed. Three types of bases are planned:

- Catégorie 1) Maintenance-free batteries sealed lead (Pb).
- Catégorie 2) Nickel-Cadmium (Ni-Cd).
- Catégorie 3) It will bring together other battery technologies (eg lithium, zinc-bromine, sulfur, sodium, NIMH, etc ...) if at least one of them is used during the event.

The maximum weight of the batteries is 90 kg weight judged by the manufacturer description (to be submitted with the application form).

A maximum of two sets of batteries per event is allowed to stand with disassembly.

Article 3.3 Battery holder

Batteries must be securely fastened to the chassis. They will be charged through a specific power connector (socket) permanently installed on the kart.

The battery holder with a strap system is PROHIBITED.

Following the test of putting the kart on the side at 90 ° to the right AND left no room or liquid must fall to the ground and the kart will remain operational.

In any case the batteries are removed to be loaded into the stand.

Disassembly of batteries is allowed in case of failures.

Article 3.4 The battery charger

It must be connected to 230V with a 16A plug with a grounding plug. It must meet all the requirements of electrical safety, especially if it is not a commercial product (not 'CE').

The charger should be able to take into account the risk of explosion if the battery voltage and / or temperature rise.

The jury reserves the right to prohibit the use of the charger and batteries in case of danger.

Article 3.5 Transmission

In category "kart series", the transmission is direct or gear on the engine. It should not include transmission but may include a clutch.

In category prototype, the gearbox is permitted.

Article 3.6 Mechanical protection

The rotating parts of the transmission, ie the output of the engine, transmission, rear axle and the brake system should be hooded. Wheels (tires and rims) are not affected by this measure.

Article 3.7 The chassis

It must be equipped with its original accessories, in particular with the braking system, front hubs, rims front / rear, steering components. If the rear axle is changed (independent rear wheels for a differential effect), there shall be a rear wheel braking.

It may be derived from trade and meet the standards CIK / FIA underway. The brand and type of frame are free. Changes related to the installation of batteries and their protection against shocks are permitted.

Article 3.8 Tires

Homologated CIK / FIA 5 inches¹ set during the event. Reserve a tire is allowed before or after.

Article 3.9 Security kart

In general, the model of chassis and tires must be chosen depending on the performance of the engine and the weight of the kart complete to ensure maximum safety to the driver a view handling and braking. This last point is particularly monitored by the scrutineers of the Meeting e-Kart 2013.

Power protection against short-circuits must be installed and a general circuit breaker, type "coup-de-poing" emergency stop.

Each team must have a fire extinguisher carbon dioxide CO₂ for Class C fires (formerly Class E) Electrical power.

The powder is also effective but the adjacent material is fatal: the powder is corrosive and difficult to clean.

Article 3.10 Body

The following body parts: spoiler, bumper underride guard should comply with FMK / FIA. Pontoons that contain batteries themselves are the subject of a particular technical regulation (see EU regulation).

Article 3.11 Decoration kart

The decoration of the kart shall not show trademarks of alcohol or tobacco, there have message for degrading the condition of any socio-cultural group. Logos and images used must be royalty free or have received a prior authorization.

Article 3.12 Weight of the kart

The maximum weight of the kart without the driver, and with the means of propulsion and batteries should not exceed 240 kg with no front brake and 250 kg with front brake.

Article 3.13 Class "kart series"

A kart is classified as "kart series" if it appears in the list of manufacturers listed below. These should be left unchanged.

The list of manufacturers is:

- Kart Masters
- Speedomax
- Sodikart
- Alpha Karting
- MG Kart
- Asmo
- Otl
- Lintec
- Bowman
- International Indoor Grand Prix
- Shaller
- Swiss Hutless
- Worldkarts
- Electra Motorsports
- Shaller
- Go Kart
- Gravitron
- Formula K
- Freekart
- Alel
- Zytec

Article 3.14 Class "prototype kart"

This class includes the production of free kart meet the following conditions:

Dimensions:

- Length: 2300 mm.

- Width: 1400 mm.

Features:

- **3 or 4 wheels.**
- Number of wheels: free.
- Number of wheels: free.
- Maximum weight 250 kg in working out the pilot.

Electrical characteristics:

- Number of motors: free.
- Maximum voltage 400VDC limited to 10%.
- Isolation 1500 VDC electrical parts.
- Obligatory presence of protective insulation of the battery.
- Mandatory presence of insulation controller for nominal voltage over 72V.
- Powered by number and type of batteries: free.
- Means onboard battery charging allowed (solar panels, fuel cells ...) and energy recovery (braking).

Article 3.15 Class "X-Trium"

This class includes vehicles like X-Trium (thermal and electrical) meets the definition set by Alain DEVEZE.