

IV INTERNATIONAL COMPETITION

MOTO STUDENT

2015 – 2016



Competition Regulations

Ref.01.2015

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IV International Competition MotoStudent

SECTION A: ADMINISTRATIVE REGULATIONS

ARTICLE 1: MOTOSTUDENT 2015-2016

A.1.1 Event Promoter

The MotoStudent competition, promoted by the Moto Engineering Foundation (hereinafter MEF) and TechnoPark Motorland, is a challenge between teams from different universities around the world.

A.1.2 MotoStudent Objective

A.1.2.1 The MotoStudent Competition is a university challenge that consists in designing and developing a competition motorcycle prototype, which, after being evaluated, shall race during specific competition days to be held at the MotorLand Aragón facilities.

A.1.2.2 The competition itself is a challenge to the students. During a period of three semesters, they will have to put their creativity and innovation capacity to the test, showing their abilities as future engineers or specialized technicians, against those of other teams from all around the world.

A.1.2.3 MotoStudent allows the teams maximum flexibility for the design, with few restrictions as regards the "decision making" for the overall design of the motorcycle. Therefore, the vehicles or projects taking part in the competition shall fulfil certain minimum requirements in terms of safety and dimensions in specific areas.

A.1.2.4 The challenge for the teams is to develop a motorcycle that will successfully pass all trials and tests during the MotoStudent Competition. MotoStudent gives the teams the chance to show and put their talents to the test in terms of engineering, creativity and business abilities, competing against other universities from all around the world.

A.1.3 Aspects to be assessed

Aspects like acceleration, braking, handling and durability shall be assessed during the MotoStudent Event at the MotorLand Aragón road racing track. Other aspects to be considered are: manufacturing, financial aspect, ergonomics, aesthetics, maintenance, design innovation and reliability.

- ✓ The prototypes will be submitted to bench testing and shall fulfil the minimum requirements in terms of braking, frame resistance, etc.
- ✓ A final test will be carried out to assess the riding quality of the prototype on the main racetrack. For the final test, the motorcycles will take part in an "engineering race" on the MotorLand Aragón road racing track.

A.1.3.1 Each Project will be evaluated to determine the best Industrial Project and the best bike.

A.1.4 Categories

The Competition has two different categories

- Category "MotoStudent Petrol"
- Category "MotoStudent Electric"

A.1.4.1 The Category "MotoStudent Petrol" is mainly characterized by that the participating bikes must use an internal combustion engine as propulsion system.

A.1.4.2 The Category "MotoStudent Electric" is mainly characterized by that the participating bikes must use a 100% electric propulsion system.

A.1.5 Entries

The MotoStudent organisation has established an open entry policy and accepts entries from student teams representing universities from all over the world.

- A.1.5.1 The Pre-registration period starts on 1 of December 2014 and ends on 31 Of January 2015. During this period the teams may pre-register through the website www.motostudent.com. For the Pre-registration, the teams must fill in the corresponding form for the desired category, included in Article H.1.1 of these Regulations.
- A.1.5.2 The Registration period starts on 1 of February 2015 and ends on 31 of May 2015. The necessary Registration forms are available on the website www.motostudent.com. The contact and identification details of the students that are going to be part of the team have to be indicated on the form. For the Registration, the teams must fill in the corresponding form included in article H.1.2 of these Regulations.
- A.1.5.3 The entry fee for a team amounts to €2,450 + VAT (value added tax). This fee covers the entry of the 7 compulsory team members. Each additional team member must pay an additional fee of €250 + VAT (value added tax).
- A.1.5.4 To consider a team as registered, it will be necessary to have paid the corresponding entry fees. The entry fees must be paid to the MotoStudent Organisation not later than the due date stated on the respective invoice.
- A.1.5.5 The entry fees are not refundable.
- A.1.5.6 The payment of the registration fee includes:
- The rights to participate at the IV Edition of the International Competition MotoStudent as an official team.
 - The "full access" passes and corresponding insurance for the Final Event in 2016 for the registered team members.
 - The MotoStudent Kit that includes common compulsory parts for all teams that must be installed in the bike. The shipping cost of the Kit is also included. There are not included the duties or special taxes of the destination countries, states or other zones.
 - The right to access to free CAD design software, discounts in services and parts by the sponsor companies and other advantages.

A.1.6 Changes to the Regulations

The Organization has the right to change the Regulations, if it considers it necessary. However, the design requirements shall be kept the same. Any change to the regulations, will be added in Section I: Modifications glossary, and they will be published on the website.

A.1.6.1 The Organising Committee reserves the right to review the calendar of the Competition and/or to change the Regulations of the Competition at any time, and to use the means considered as most suitable to make the changes known. Regardless of the means used, the changes will always be published on the website of the Competition.

A.1.7 Official publications and Event information

All news, Regulations, appendices, etc. will be published on the official website of the Competition: www.motostudent.com

A.1.7.1 All teams must read and become familiar with all the publications on the MotoStudent website.

A.1.7.2 The Organization may use the email system to send news about the Competition.

A.1.8 Official languages

The official languages of the event are English and Spanish.

A.1.8.1 Documents, information and all kinds of documentation must be submitted in the official languages established in Art. A.1.8.

ARTICLE 2: MOTOSTUDENT REGULATIONS AND ORGANISATION

A.2.1 Rules of the organisation

The Regulations of the MotoStudent Competition are under the responsibility of MEF and shall be published with their authorisation.

A.2.2 Regulatory ambiguities

Possible ambiguities or questions as regards the meaning or intention of the regulations will be solved exclusively by the MotoStudent Organisation.

A.2.3 Validity of the Regulations

The Regulations of the MotoStudent Competition published on the website www.motostudent.com, are the only Regulations valid for the IV International Competition MotoStudent 2015/2016. Any previous Regulations are not valid for the coming Edition.

A.2.4 Observance of the Regulations

By taking part in the MotoStudent Competition, the team, the team members as individuals, the tutors and any other university staff member accept and submit themselves to the observance of the Organisation's Rules and Regulations.

A.2.5 Understanding the Rules

All participating teams, team members, tutors, teachers and staff members declare that they understand all Rules and Regulations of the Organization, as well as those of the facilities in which the Final Event will be staged.

A.2.6 Infringement of the Rules

Any infringement of the Rules or Regulations, regardless of whether they were established by the Organization or the staff of the facilities, may imply a penalty.

A.2.7 Right of confiscation

The Organization reserves the right to confiscate, on site and at any moment during the Event, any motorcycle that does repeatedly infringe the Rules and Regulations.

A.2.8 General Authority

The MotoStudent Organization reserves the right to change the schedule of the Competition and/or the Regulations at any time, in any way, at their own discretion.

ARTICLE 3: REQUIREMENTS FOR INDIVIDUAL PARTICIPATION

A.3.1 Eligibility

The main objective of this Competition is focused on the engineering work of the created prototypes; it is not a speed race. Therefore the only participants eligible for the competition are university graduate or post-graduate students, or students from vocational technology institutes that are not or have not taken part in any event related to competition in any way whatsoever.

A.3.1.1 There is no limit in the number of teams set for each University. Each University may submit as many teams as they like for any category of the Competition.

A.3.1.2 Each team may only submit one project and one prototype.

A.3.2 Liability Waiver

All participants, including students and tutors, must sign a liability waiver when entering the Competition. The rest of the people attending the Final Event with the teams will be considered as general public.

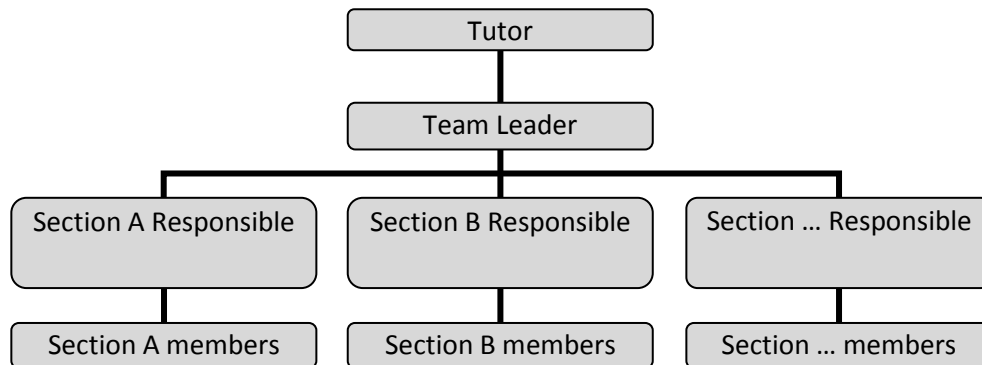


A.3.3 Supervisor or head of the team

Every team must have a designated tutor.

- A.3.3.1 The team tutor should accompany the team during the Final Event and will be considered as the highest responsible person for the team. Should the tutor not be able to attend, the responsibility will be delegated to the team leader.
- A.3.3.2 Tutors may advise their teams on general engineering and theoretical aspects of their projects.
- A.3.3.3 In no case may the tutors design any part of the motorcycle, or take part in the development of any document or presentation.
- A.3.3.4 Tutors are not allowed to assemble or manufacture any component of the motorcycle, and they shall not even repair or help during repairs at the Final Event. For the avoidance of doubt, tutors are not allowed to handle the motorcycle.

A.3.3.5 The internal hierarchy of the teams is the responsibility of the internal organization of each team, but it is advisable to establish the following hierarchical order in the taking of decisions or actions:



A.3.4 Participants

Entered teams and team members registered in the Competition will be considered as "participants of the event" from the moment they enter until the end of the Final Event.

A.3.4.1 Each team will have at least 7 participants.

A.3.4.2 Every university team participating in MotoStudent must include in their team name the name of the University or College they belong to.

A.3.4.3 Other technical colleges, such as vocational training centres can also collaborate with the team, as they could complement the participating university due to their special facilities and equipment.

A.3.4.4 However, during the Event days, only the officially entered students will be allowed to access the different working areas.

A.3.4.5 The consideration of the Competition and its compatibility with the curriculum will be decision of each university. The represented University has no obligation of including MotoStudent Competition in its curriculum, not even as free-elective formation.

A.3.4.6 To participate at the Competition, in the academic aspect is required only for students to be enrolled in 2014/2015 and/or 2015/2016 courses, regardless of the percentage of subjects or credits passed.

A.3.5 Cancellations and replacements

The deadline to change the composition of the teams is 31 December 2015. Until that date, teams may add more members, replace students with other students or remove members, always bearing in mind that the minimum number of team members must be 7. From that date only replacements or additions of members will be accepted under justified causes.

A.3.5.1 The substitution of team members does not entail any additional cost.

A.3.5.2 The fees for the removal of team members will not be refunded.

A.3.5.3 The tutor and/or the team leader must notify the Organization about any change regarding the participating students from time to time.

A.3.5.4 Modifications on the participating students must apply or communicate via email through the registry email direction: registry@motostudent.com

A.3.6 Rider

Each team must nominate a rider who will be in charge of riding the motorcycle during the tests. In order to equalize advantages between teams, and since the goal of the competition is to evaluate the bike and the work done by the teams from the engineering side, the Organization has taken the following considerations about the chosen pilot.

A.3.6.1 The rider is considered as a team member from the moment he/she is approved by the Organisation, and he/she shall have the same rights and obligations as any other team member, except for the academic requirements, which are not applicable to him/her.

A.3.6.2 The rider does not need to pay any entry fee for the competition.

A.3.6.3 The rider must be of age (18 years or older) at the day of start of the 2016 Final Event.

- A.3.6.4 The participation of riders who have raced in international competitions recognized by the FIM, of any discipline of motorcycle racing, will not be allowed, except participation in previous editions of MotoStudent.
- A.3.6.5 A student can federate or be federated, and participate as a rider. However, if it is not registered as a team member he will be able to ride the bike, but not to manipulate it as mechanic or team member. If such student wants to become a rider and also to manipulate the bike as a team member, the he must be registered and pay the required fees to do so.
- A.3.6.6 The rider must be able to prove that he/she is affiliated to a motorcycle federation at the moment of his/her presentation to the Organization.

Federation and choice requirements affecting the rider will be published soon.

A.3.7 Insurances

The entered universities must include the work carried out in the teaching plan, so that this competition is included within the activities covered by the education insurance.

- A.3.7.1 However, the Organization will have a private insurance covering all of the team members in case of an accident.
- A.3.7.2 The Event will have the medical resources and the required security in terms of the sportive requirements.

ARTICLE 4: MANUFACTURING THE MOTORCYCLE

A.4.1 Fabricación

The motorcycles taking part in MotoStudent must be created, designed and manufactured by the students and team members without the direct involvement of professional engineers, race engineers, professional mechanics, etc. The team must submit a certificate of manufacture, certifying this aspect. The Organization will provide for a respective certificate form.

A.4.2 Sources of information

Teams may use all kinds of literature, knowledge related to the design of motorcycles and information from professionals.

A.4.3 Professional help

Professionals are not allowed to make decisions about the design. The tutor shall also sign the declaration of compliance.

A.4.4 MotoStudent Kit

The Organization will provide all teams with a kit including all parts that are compulsory to be installed in the prototypes. The Technical Regulations relating to this Kit is defined in Sections B, C and D hereto.

A.4.4.1 The MotoStudent Kit for the teams entered in the Category "MotoStudent Petrol" consist of the following components:

- Internal combustion engine 250cc 4 stroke water cooled.
- 1 set of slick tires front and rear.
- 1 set of front and rear rims.
- Main components of the braking system.

A.4.4.2 The MotoStudent Kit for the teams entered in the Category "MotoStudent Electric" consist of the following components:

- Electric Motor AFPM air cooled.
- Insulation Monitoring Device (IMD) **(Pending of confirmation)**.
- 1 set of slick tires front and rear.
- 1 set of front and rear rims.
- Main components of the braking system.

A.4.4.3 The supply of the MotoStudent Kit is included in the registration fees of the team.

A.4.4.4 The shipping cost of the MotoStudent Kit to the facilities indicated by the teams is also included. There are not included the duties or special taxes of the destination countries, states or other zones, that shall be borne by the transport receiving team.

A.4.4.5 The teams must be informed previously to the sending of the kits about tariff policies and logistical limits derived of the shipping destination to avoid retentions of the material.

A.4.4.6 It is possible that depending on the shipping zone will not allowed the sending of any of the components included in the MotoStudent Kit. In that case, the Organization will contact the team to find alternative solutions to deliver these components.

ARTICLE 5: NON-EUROPEAN TEAMS

A.5.1 Transport of the bike and material

The shipment of vehicles in commercial transport must comply with the laws and regulations of the countries to which the motorcycle is being sent. We recommend the teams to ask a shipping company in order to make sure that the shipment complies with all of the requirements regarding shipment, customs, import/export and aviation.

It is recommended to manage the delivery of the bike well in advance to avoid delays that prevent the prototype be in time to compete in the Final Event.

A.5.2 Reception of the bike and material

The vehicles and materials must be sent to the team or the university they belong to. In no case may the Organisation or the venue of the event be the recipient of the shipment.

A.5.3 Reception direction

We recommend shipping the bike, materials, tools, etc. to a university or a partner Company with physical facilities in Spain. However, if you want to send directly to the place of the event, the shipment should be performed with the following guidelines:

- Addressee: Team or University name.
- Adress: Motorland Aragón - Circuito de Velocidad, Ctra. TE-V-7033 km.1, 44600 Alcañiz

A.5.4 Visa

Organization cannot grant any type of visa to participants from outside the EU. The teams themselves must get their own visas. The Organization may not intervene or contact any agency, Embassy or Consulate to resolve any issue concerning the visa of the members of each team.

However, in the MotoStudent Competition registration documents and other proof of participation in the competition, can be used as justification or demonstration for issuing visas, if the relevant agency may require it.

The organization recommended to the teams not belonging to the EU that ensure all aspects on the visa and the trip in general as soon as possible, to avoid last-minute unforeseen.

Information and questions about the requirements for travel to Spain are collected on the website of the Ministry of Foreign Affairs and cooperation of the Government of Spain: www.exteriores.gob.es

ARTICLE 6: DOCUMENTATION OF THE PROJECT AND DEADLINES

A.6.1 Calendar of the Competition

La International Competition MotoStudent takes place during the period 2015-2016. During this period there are some milestones that all teams must meet to complement the final evaluation of the Competition.

The official calendar of the Competition will be published soon.

A.6.2 Milestones and documents to be submitted

The Milestones and documents to be submitted will be published soon.

ARTICLE 7: QUESTIONS ABOUT THE RULES OR RUNNING OF MOTOSTUDENT

A.7.1 Publication of questions

By sending a question to the Organisation, the teams acknowledge that the Organisation has the right to publish the question in part or as a whole, as well as the official answer, on the official website www.motostudent.com, as well as in other official publications.

A.7.2 Types of questions

The Organization will give an answer to all the questions that cannot be answered with the regulations or the FAQ section, or that need the interpretation of new or innovative rules.

The Organization cannot answer a question that is clearly explained by means of the Competition Regulations.

A.7.3 Frequently Asked Questions: FAQ file

The Organization will provide a section on its website and via email, where publish interesting or necessary questions for a perfect compliance of the Regulations.

A.7.4 Format

All questions addressed to the Organization must comply with the following format:

- Full name and email address of the person asking the question
- Bike number
- Name of the team
- The question

Any attached picture, drawing or file shall not exceed 500KB in size. The size limit for any question, file included, is 2MB.

A.7.5 Response time

The Organisation undertakes to answer all questions as soon as possible. Considering the fact that some questions may need more time to be answered, due to the complexity or need for outpatient, the estimated maximum response time will be 15 natural days.

A.7.6 Destination address

Depending on the content of the questions they must send to the appropriate Department:

Questions of technical content: faq@motostudent.com

Questions of administrative content and info: info@motostudent.com

ARTICLE 8: CATEGORIES

MotoStudent Competition has two different categories:

- MotoStudent Petrol
- MotoStudent Electric

A.8.1 MotoStudent Petrol

This category is characterized by using as method of propulsion a 250cc 4 stroke internal combustion engine provided by the Organization.

The Rules relating to the Category "MotoStudent Petrol" are defined over this Regulations in their respective sections.

A.8.2 MotoStudent Electric

This category is characterized by using as method of propulsion a 100% electric motor provided by the Organization.

The Rules relating to the Category "MotoStudent Electric" are defined over this Regulations in their respective sections.

A.8.3 Scoring of each Category

Each Category will be developed in parallel throughout the entire Competition and during the Final Event.

A.8.3.1 Each category will have its corresponding evaluation and rating, as well as testing and milestones to be met.

A.8.3.2 During the Final Event, may not coincide both categories simultaneously on the track.

ARTICLE 9: PHASES OF THE COMPETITION

Both the motorcycles and the industrial projects will be judged and assessed in a series of different tests, divided into different phases, called MS1 and MS2.

A.9.1 Levels to be passed

The different levels that the projects will have to pass are shown in the following table:

PHASE	EXCLUSIVE	SCORING
Pre-event tests	Yes	-
Pre-event scrutineering	Yes	No
MS1	Yes	Yes
MS2	Yes	Yes

A.9.1.1 In order to be assessed in any of the categories, all participating teams must comply with the minimum level required for both categories, i.e. MS1 and MS2. For the avoidance of doubt, no team can enter the competition with the objective of participating in only one of the categories.

A.9.1.2 The milestones and delivery of documentation prior to the Event (Described in Art. A.6.2) are not judged as a separate tests, but will have direct influence on the overall score of the MS1 Phase and may incur penalties for non-compliance or non-delivery.

A.9.2 Pre-Event phases

The Pre-Event phases consist in a series of milestones and deliveries of documentation explained in Art. A.6.2 of these Regulations.

A.9.3 Scrutineering

In order for the motorcycles and projects to be able to take part in the competition, they must comply with the previous requirements in terms of resistance, safety and functioning stated in Sections B, C and D (Technical Regulations) herein.

A.9.3.1 The methodology and process of making the scrutineering are defined in Section E of this Regulations.

A.9.3.2 The teams that passed scrutineering at the Event will be able to compete in the following phases.

A.9.4 MS1 Phase: Industrial Project

The MS1 phase is a demonstrative phase during which the participating teams must show and explain the design of the prototype and the industrialisation projects for mass production.

A.9.4.1 The Rules and information regarding the MS1 Phase, for both categories of the Competition are described in section F of this Regulation.

A.9.5 MS2 Phase: Dynamic tests and race

A.9.5.1 The Rules and information regarding the MS2 Phase, for both categories of the Competition are described in section G of this Regulation.

A.9.6 Protests and suggestions

A.9.6.1 Right to protest

The Organization does recognise that there might be discrepancies when making some decision or interpreting the rules, so that the teams have the right to protest and suggest. The Organisation will do everything reasonably possible to review every doubt, breach or penalty in a quick and fair way

A.9.6.2 Cause of the protest

A team may protest against any interpretation of the rating or official action that they consider as causing damage to their team or to their score.

A.9.6.3 Any team may lodge a protest against another participating team if they observe anomalies.

A.9.6.4 Protest format and scores

All protests must be lodged to the Organisation in written, stating the article of the Regulations which is considered to have been breached, with enough proof to be verified. The protest form is reflected in Art.H.2.1 of these Regulations.

In order for a protest to be considered in that moment, the team will have to put 50 points at stake. If the decision is favourable to them, the 50 points shall be given back to the protesting team. If not, and the protest is refused, the team shall lose the 50 points.

A.9.6.5 Time to lodge a protest

Protests related to any aspect of the performed tests must be lodged not later than 30 minutes after the publication of the results of the respective test.

A.9.6.6 The Organisation will be responsible for the final decision on the protest. This decision will be final and cannot be appealed.

A.9.7 Penalties

The Organisation has the right to penalise all those teams breaching aspects of the Regulations and established schedules, as well as all those teams that show a non-sportsmanlike behaviour or that may put people and facilities at risk.

A.9.7.1 The Organization shall establish sanctions according to the following criteria:

- Minor infraction: penalty of 10 points at the test stage to evaluate.
- Serious infraction: Exclusion of the phase to evaluate or even exclusion of the Competition.

A.9.7.2 It is considered as minor infraction timely breach of the defined schedule, delivery of documentation, specific non-compliance of paddock and pit lane rules, or similar acts.

A.9.7.3 It is considered as serious infraction repetitive breach of the cases set out in the Article A.9.7.2, disobedience to orders given by the Organization or Race Direction, unsportsmanlike or aggressive behavior, acts prejudicial to the people attending, etc...

IV International Competition MotoStudent

SECTION B: GENERAL TECHNICAL REGULATIONS

ARTICLE 1: TECHNICAL REQUIREMENTS OF THE MOTORCYCLE AND RESTRICTIONS

B.1.1 Introduction

The bikes presented to compete in MotoStudent must be self-made prototypes.

B.1.1.1 The design and manufacture of the presented prototypes must comply with the Rules imposed by these Regulations, to participate in the scoring Phases of Competition.

B.1.1.2 The prototypes must maintain all the specifications required in the Technical Regulations for all tests of the Final Event.

B.1.1.3 Any failure to comply with the technical requirements and restrictions should be corrected and re-inspected before the bike can participate in any test of the Event.

B.1.1.4 The rules reflected in this Section B of the Regulations equally affects both the Category "MotoStudent Petrol" and the Category "MotoStudent Electric" of the Competition.

B.1.2 Changes and repairs

Once the static and dynamic scrutineering of the Event (See Section E) have been passed and the motorcycle has been validated for the MotoStudent Competition, any structural change without the supervision of the Technical Staff of the Organization will be strictly forbidden. Before making any structural modification shall make known to the Organization, which must give approval and recheck the prototype after the modification.

The changes allowed after the technical verifications that does not involve supervision by the Organization are:

- a) Chain adjustment
- b) Brake adjustment
- c) Changes in the data recording
- d) Tyre pressure adjustment
- e) Refilling fluids
- f) Set-up adjustments
- g) Engine set-up adjustments.

Should a motorcycle need to be repaired after an accident, collision or breakdown, the repair must be approved by a technical official. Once the motorcycle has been repaired, the supervising technical official must have to give his approval to let the motorcycle return to the competition.

B.1.3 Other Competitions

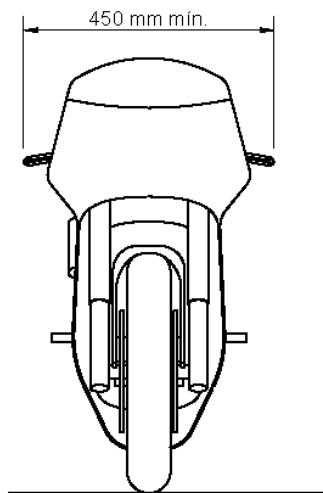
The present Technical Regulations has been created exclusively for the MotoStudent Competition, so motorbikes manufactured according to the specifications reflected on these Regulations do not have to adhere to the requirements of other speed competitions outside MotoStudent. The organization is not responsible for the use that the different teams can make with the prototypes presented at MotoStudent in other competitions.

ARTICLE 2: GENERAL DESIGN REQUIREMENTS

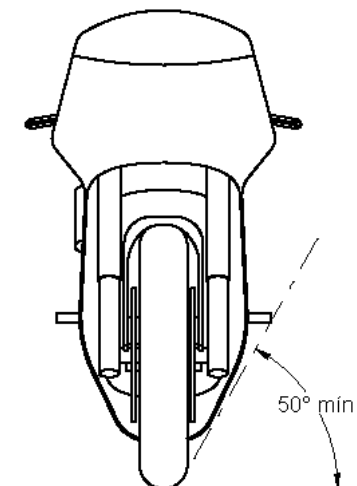
B.2.1 Dimensions

The dimensions of the motorcycle are free, except for the following basic requirements.

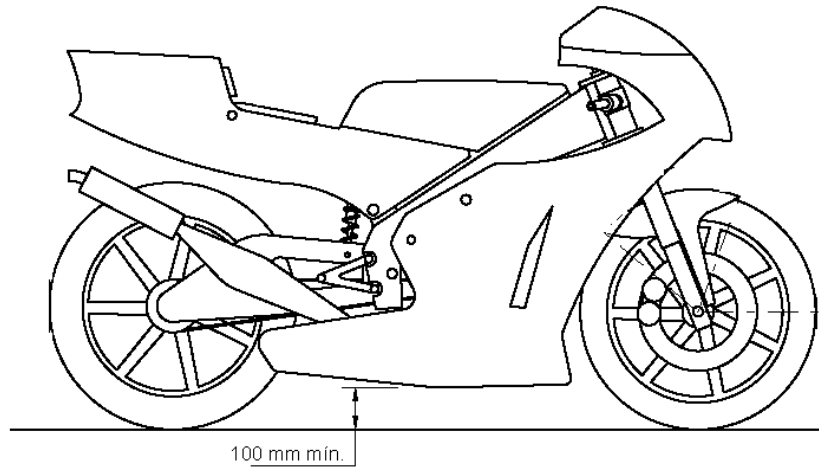
- B.2.1.1 The minimum width between the ends of the semi-handlebars must be 450mm.



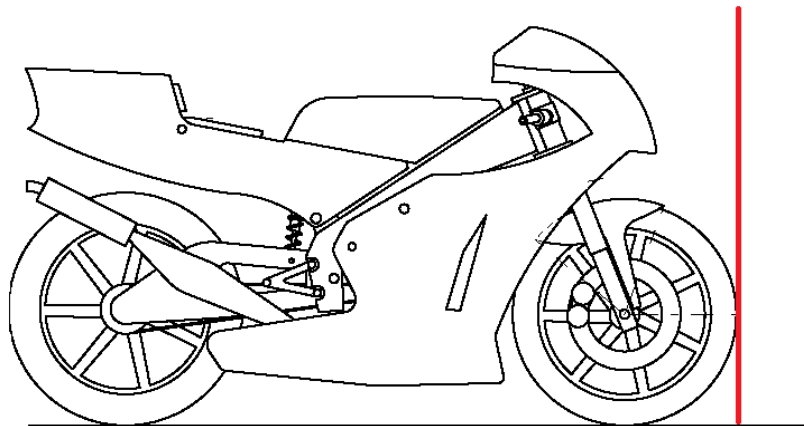
- B.2.1.2 The minimum tilt angle of the motorcycle without any of its elements (except the tyres) touching the road surface must be 50° . This measurement will be made with an unloaded motorcycle (i.e. without the rider) but fully equipped, fluids included, and in working condition.



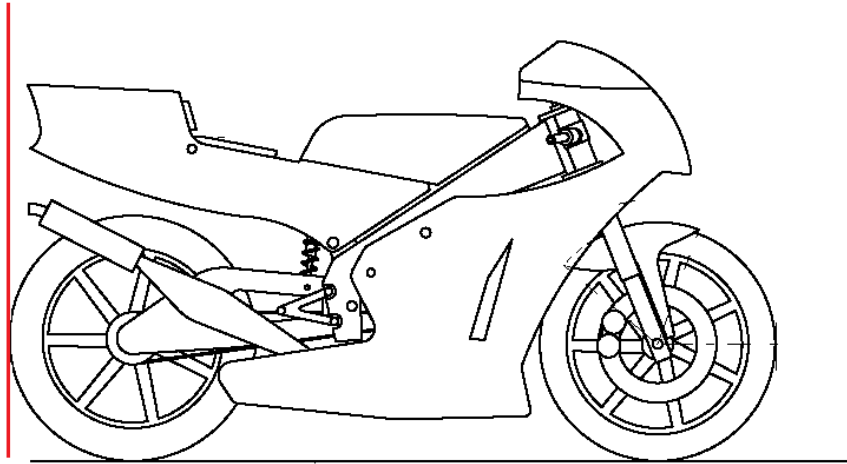
B.2.1.3 The minimum distance between the motorcycle in upright position and the road surface must be of at least 100mm in any suspension compression situation or with any geometry set-up.



B.2.1.4 Front limit: No element of the motorcycle shall protrude from the front vertical line drawn tangentially with respect to the external circumference of the front tyre.

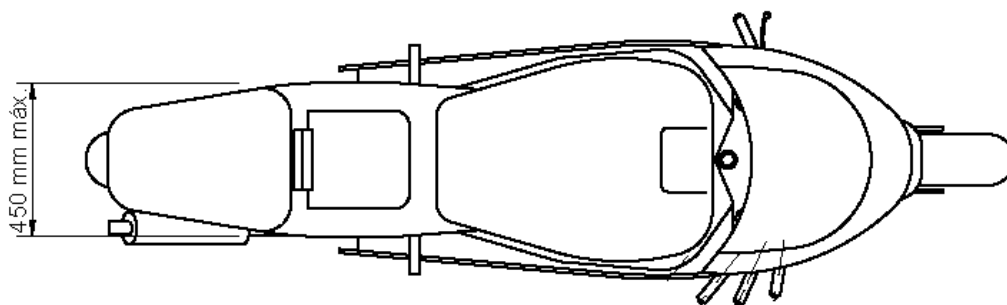


B.2.1.5 Rear limit: No element of the motorcycle shall protrude from the vertical line drawn tangentially with respect to the external circumference of the rear tyre.

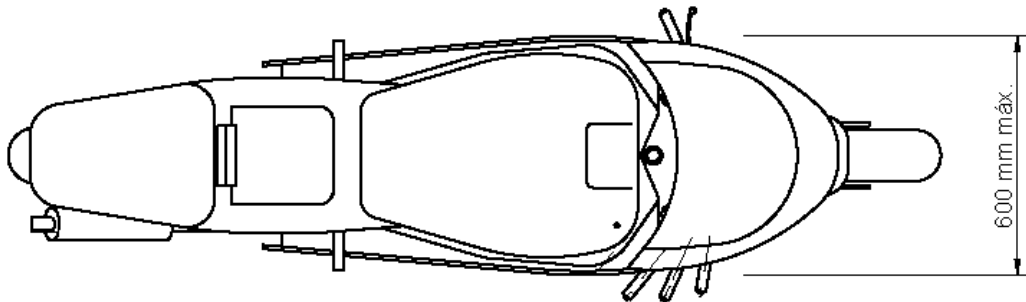


B.2.1.6 There must be a minimum distance of 15mm between the tyres and any element of the motorcycle, except the rims, with the motorcycle in any position and with any geometry set-up.

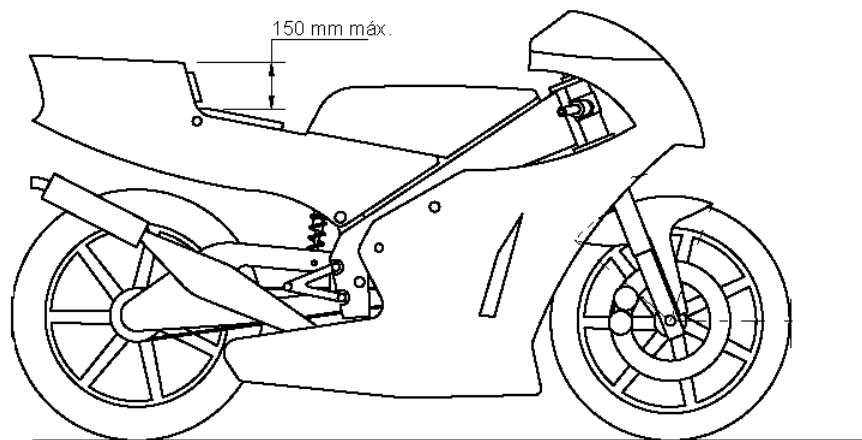
B.2.1.7 The minimum width of the saddle must not exceed 450mm. No other element of the motorcycle shall protrude from this width from the saddle to the rear except for the exhaust system for bikes of the Category "MotoStudent Petrol".



B.2.1.8 The maximum width of the fairing shall be 600mm.



B.2.1.9 The maximum height difference between the height of the saddle and the highest part of the tail shall be 150mm.



B.2.2 Weight

B.2.2.1 The total minimum weight of the motorcycle without the rider shall be 95kg for both categories, including all fluids that may be necessary for the correct operation of the bike. For bikes of the Category "MotoStudent Petrol" at least one liter of fuel must be included within this weight.

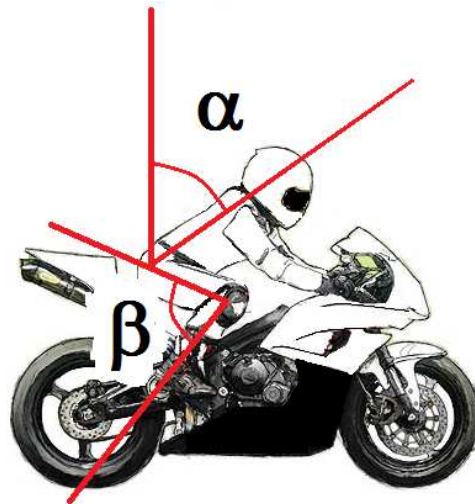
- B.2.2.2 The weight of the complete motorcycle shall not be below the minimum weight indicated in Art. B.2.2.1. at any time during the Final Event.
- B.2.2.3 During the final scrutineering, at the end of the race, the chosen motorcycles will be weighed in the same conditions as they finished the race, and the weight limit shall be measured in this condition. Nothing can be added to the motorcycle. This includes all fluids.
- B.2.2.4 The riders might be called-in to weigh their motorcycles during the timed practises. The riders must attend to this call in any case.
- B.2.2.5 The use of ballast to reach the minimum weight is allowed. The ballast must be declared to the technical officials during the scrutineering.
- B.2.2.6 Mobile ballast must be properly fixed to the chassis, so it cannot become detached from the bike in case of shock or fall. It can be installed by zipties or screwed.

B.2.3 Ergonomics

The design of the motorcycle must be within the ergonomic limits for a rider of an average size and weight.

- B.2.3.1 It is allowed to install adjustable steering elements to improve ergonomics and comfort for the rider.
- B.2.3.2 The elements and symbols reflected in the instrument panel and controls, as well as indicators in the display must be perfectly legible in the normal riding position.

B.2.3.3 Taking the percentile of sizes P95 (comprising 95% of the population), the position of riding of a standard sports motorcycle, in normal driving (not in a position of maximum speed) position, is comprised by the following angles:



Where:

- α : Angle between the Vertical and the rider's back. Angles between 19 and 40 degrees are recommended for a sports motorcycle.
- β : Knee flexion angle. Angles between 65 and 77 degrees are recommended for a sports motorcycle.

ARTICLE 3: FRAME

B.3.1 Objective

The use of a commercial frame is not allowed, not even a modified unit. It must be a new, self-manufactured frame prototype.

The main frame, the subframe and the swingarm is included in this article.

B.3.1.1 There are no restrictions in the type of design of the frame, swingarm or subframe, provided that the result complies with the Rules imposed by these Regulations.

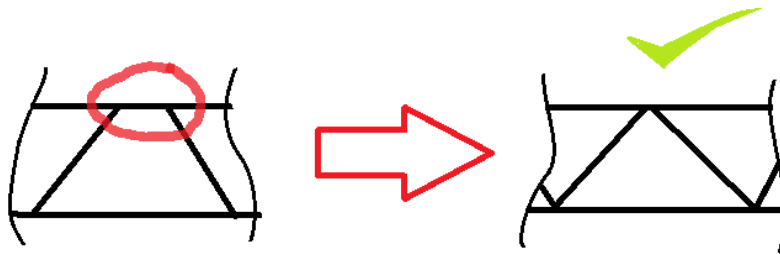
B.3.2 Materials

It is not allowed to manufacture the frame with titanium or titanium alloys. Regarding the rest of materials there are no restrictions.

B.3.3 Welding and unions

Welding of structural elements by any means is permitted, but must be a consistent structure.

B.3.3.1 Structures of jalousie type must search the correct triangulation in the nodes of the structure.



B.3.4 Crash protectors

B.3.4.1 It is mandatory to use protection caps made of Nylon, fiber or materials of similar hardness, to protect the chassis and engine laterally in case of fall.

B.3.4.2 The crash protectors may be installed both inside and outside the fairing.



ARTICLE 4: FAIRING

B.4.1 General requirements

- B.4.1.1 All edges and finishes of the fairing must be rounded. Minimum radius 1mm.
- B.4.1.2 The fairing cannot cover the rider sideways, except for the forearms (this exception only applicable in minimum aerodynamic resistance position of the rider).
- B.4.1.3 There are no restrictions regarding the manufacturing material of the fairing.

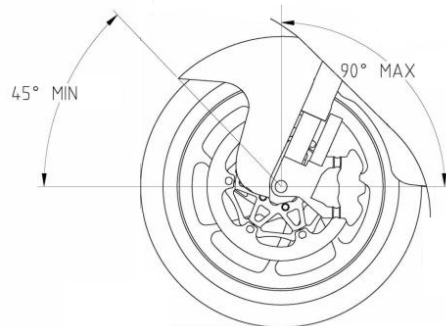
B.4.2 Lower fairing

- B.4.2.1 The lower fairing must be manufactured to contain, in case of an incident in the engine, at least half of the total oil and the engine's cooling fluid (minimum 2.5 litres).
- B.4.2.2 The lower fairing must include a hole with a diameter of 25mm, located in the lowest part of the fairing. This hole must remain closed with a tap in dry conditions and must only be opened in case of rain. This empty tap must be wire-sealed to prevent loss of caps or the fall of these to track on failure of closing

B.4.3 Mudguards

- B.4.3.1 The use of mudguards is not compulsory

B.4.3.2 In case of installing a front mudguard, it cannot cover more than 135° of the wheel circumference measured from the rear part of the tyre; the origin of the angle being on the horizontal line crossing the wheel shaft.



B.4.3.3 The rear rim cannot be covered in more than 180° .

B.4.4 Protection against trapping

B.4.4.1 If by design, the swingarm does not cover the inferior part of the chain or transmission belt, a guard must be fitted in such a way as to prevent trapping between the lower drive chain run and the final drive sprocket.

ARTICLE 5: STEERING: HANDLEBAR AND FOOTRESTS

B.5.1 Handlebars and manual controls

B.5.1.1 The use of handlebars or semi-handlebars made of light alloys, such as magnesium or titanium is not allowed.

B.5.1.2 The supports of the handlebar or semi-handlebar must be designed so as to minimise the risk of a fracture in case of a crash.

B.5.1.3 Minimum radius of 2 mm must be used at the parts that constitute the handlebars and their anchorages.

- B.5.1.4 The throttle must include an auto return feature in order to make sure that the throttle will be shut down whenever the rider lets it go.
- B.5.1.5 The manual levers for clutch or brake are free, provided the distance between the pivot point and the outer end not exceed 200mm and edges and terminations are rounded.
- B.5.1.6 It is allowed to install hand lever protectors to prevent accidental activation by unexpected contacts.
- B.5.1.7 The electric ignition button, if available, must be located on the handlebar.

B.5.2 Footrests and their controls

- B.5.2.1 The footrests can be fixed or folding type, in which case they must be fitted with a device that will make them return to their normal position avoiding any easy folding during the race.
- B.5.2.2 The end of each footrest must present round ends, until a minimum spherical radius of 8mm.
- B.5.2.3 It is recommended the installation of a tap at the outer end of footrests, made of aluminium, plastic, Teflon® or any other equivalent material in terms of strength, permanently fixed
- B.5.2.4 The footrests must be fitted with side protections to avoid the rider's boot to interfere with mobile elements such as the chain or the rear tyre.
- B.5.2.5 The rear brake pedal choice of is free.
- B.5.2.6 The choice of the gear shift pedal is free.

ARTICLE 6: BRAKE SYSTEM

The motorcycle must be fitted with a disc brake system both in the front and in the rear shaft.

The Organization will provide, among other components, front and rear brake calipers. The specifications of the Kit provided by the Organization will be published soon.

B.6.1 Comand and control

B.6.1.1 The braking system for the front wheel should be commanded by a hand lever installed next to the throttle grip on the right handlebar.

B.6.1.2 The braking system for the rear wheel must be commanded by foot by a cam system installed in the area of the right footrest.

B.6.2 Discs

B.6.2.1 The brake discs are free.

B.6.2.2 The brake discs must be made of steel alloys. The use of carbon and ceramic compound brake discs is strictly forbidden.

B.6.2.3 The use of discs with inner ventilation is forbidden.

B.6.3 Callipers

The use of the brake callipers provided by the Organisation, both for the front and the rear shaft, is compulsory.

B.6.3.1 The rear brake caliper must be fitted fixed to the swing arm and the minimum quality of the screw shall be 8.8 according to the EN ISO 898-1 standard.

B.6.3.2 The support of the rear calliper can be fitted to the swing arm by means of welding, screws or helicoil.

- B.6.3.3 It is allowed to mount the rear caliper over a non-fixed support system placed by the rear wheel axle, provided that the system has at least one direct fixing for the swingarm.
- B.6.3.4 The front and rear brake pads are free.
- B.6.3.5 The pins of the front and rear brake pads can be changed. Quick change systems are allowed.
- B.6.3.6 No supplementary cooling pipes on the calliper are allowed.
- B.6.3.7 In order to reduce the heat transfer to the brake fluids, it is allowed to add metallic plates to the brake callipers, between the pads and the callipers and/or to replace the original pistons.
- B.6.3.8 The modification of the body of the brake calipers provided by the Organization is forbidden. The realization of recesses or chamfers is not allowed. Therefore, teams must adapt anchorages for proper installation of the supplied callipers.

B.6.4 Brake pumps

The Rules regarding the brake master cylinders will be published soon.

B.6.5 Brake ducts

- B.6.5.1 The brake lines are free
- B.6.5.2 The passage of the line for the front brake calliper must be made above the lower steering plate.
- B.6.5.3 Quick connectors may be used with the brake lines

B.6.6 ABS System

The use of an anti-block system (ABS) is not allowed.

B.6.7 Brake fluid

The hydraulic fluid of the brake system is free.

ARTICLE 7: SUSPENSION SYSTEM

Suspension systems are free configuration, except for the rules set forth below.

B.7.1 General aspects

B.7.1.1 All active or semi-active suspension systems and/or electronic controls of any type for the suspension, including those that control the height adjustment are forbidden.

B.7.1.2 The settings of the suspension and the steering dampers can only be made manually and by means of mechanic/hydraulic adjustments.

B.7.2 Front suspension

The specific rules regarding the front suspension system will be published soon.

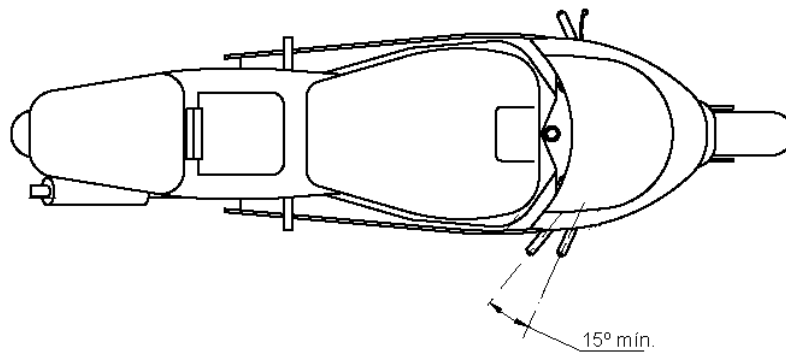
B.7.3 Rear suspension

The specific rules regarding the rear suspension system will be published soon.

ARTICLE 8: STEERING SYSTEM

B.8.1 Restrictions and geometry

B.8.1.1 The minimum turning angle of the steering must be 15° measured on either side of the longitudinal axis of the motorcycle.



B.8.1.2 The turning angle must be limited with stoppers on both sides. These stoppers should be made of nylon, aluminum or materials of similar hardness. Neither the chassis, or any other part of the bike may act as a steering stopper.

B.8.1.3 There must not be any element interfering in a tolerance of 30mm around the handles of the handlebars and actuators, all along the steering stroke. The aim is to avoid damage to the hands and fingers of the rider in case of a crash.

B.8.2 Steering dampers

B.8.2.1 The fitting of steering dampers is allowed.

B.8.2.2 The settings of the steering dampers can only be made manually and by means of mechanic/hydraulic adjustments.

B.8.2.3 The steering damper cannot act as a device that limits the turning angle.

ARTICLE 9: RIMS AND TIRES

B.9.1 Rims

The use of the rims provided by the Organisation is compulsory.

The specifications of the rims supplied by the Organization will be published soon.

- B.9.1.1 The use of nylon protectors at the ends of the shafts for possible crashes is allowed. These protectors must be rounded, with a diameter that is equal or larger than the used shaft.
- B.9.1.2 The ends of the wheel shafts cannot protrude more than 30mm from their housing. Possible nylon protectors are not considered in this measure.
- B.9.1.3 The machining or adaptation of the rims supplied by the Organization is not allowed, not even in the shaft accommodation. The only modification allowed is the repainting.

B.9.2 Tires

Only those tyres supplied by the Official Tyre Supplier of the respective competition year can be used at MotoStudent. The Organization will supply a set of dry-condition slicks to each team with the original kit.

The specifications of the tires supplied by the Organization will be published soon.

- B.9.2.1 Should the team wish to have more tyres, both for dry and wet conditions; they will be able to purchase them through the Organisation.
- B.9.2.2 The use of tire warmers is allowed.

ARTICLE 10: ELECTRONIC SYSTEMS

B.10.1 Driving assistance electronic systems

B.10.1.1 It is forbidden to use electronic control or assistance systems that provide for a clear riding advantage, such as traction control, ABS, anti-wheelie systems, etc.

B.10.2 Information systems for the rider

B.10.2.1 The information systems and alerts in the dashboard for the rider are free.

B.10.3 Data recording

The use of systems to record data related to engine parameters, motorcycle dynamics and rider behaviour is allowed.

B.10.3.1 The systems allowed to be used are commercial systems or systems adapted from other types of vehicles.

B.10.3.2 All components and wiring of the data acquisition system must be properly fixed and placed in safe areas.

B.10.3.3 The software used may be of a commercial type or self-created.

B.10.3.4 The live reading systems of telemetry are prohibited. The data acquisition may only be read at the stops in box.

B.10.3.5 All components and wiring of the data acquisition system must be properly fixed and placed in safe areas.

B.10.4 Transponder

Prior to performing the MS2 tests during the Final Event, the Organization will supply a transponder to all the teams to be installed on the front of the bike.

B.10.4.1 To receive the transponder, at the time of the delivery, the team must leave a deposit of 50€ to the Organization, which will be returned if there is no damage or accident by way misuse at the end of the test.

B.10.5 On-board cameras

For the use of on-board cameras during the tests, teams must request permission previously to the Competition Organization.

B.10.5.1 The installation of on-board cameras during MS2 tests must be approved by both the Technical Organization and by the Race Direction.

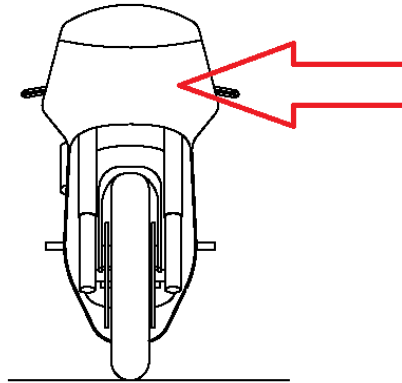
B.10.5.2 If the installation is allowed, it must be verified by a Scrutineer before entering the track.

ARTICLE 11: IDENTIFICATION AND COMPETITION NUMBERS

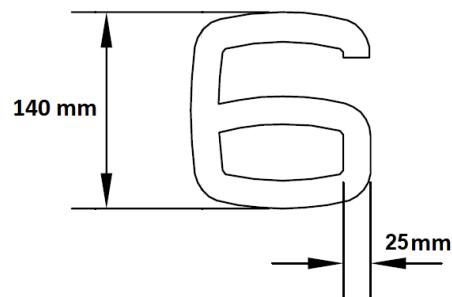
B.11.1 Numbers

The Organization will provide each team a bike number assigned for the Competition. Each motorcycle must carry 3 identifying competition numbers on the fairing.

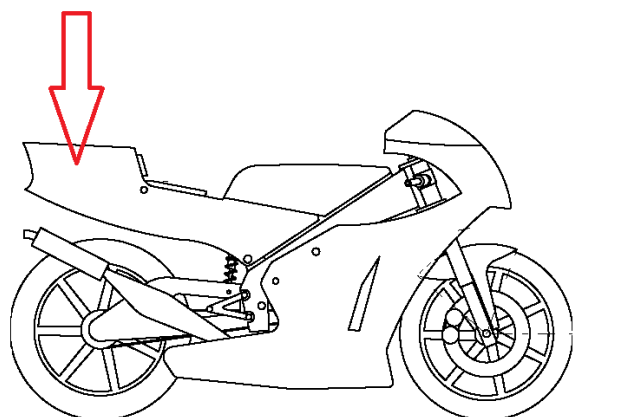
B.11.1.1 The front number must be placed on the front part of the fairing. It may be located in the central part or lopsided, provided that be perfectly legible.



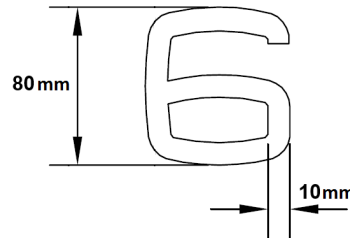
B.11.1.2 In the front number, the minimum dimension of each character must be 140mm in height and the minimum stroke width of each character must be 25mm. The minimum distance between characters must be 10mm.



B.11.1.3 A competition number must be placed on either side, to be precise, on the rear side of the fairing (tail).



B.11.1.4 In the side numbers, the minimum dimension of each character must be 80mm in height and the minimum stroke width of each character must be 10mm. The minimum distance between characters must be 5mm.



B.11.1.5 The numbers must be exclusively black color. No combination of colors is allowed.

B.11.1.6 The background behind the numbers should be a continuous homogeneous white area, and shall cover an area encompassing at least 25 mm around the numbers.

B.11.1.7 The only numbers to be used are 1 to 99, excluding number 13. The competition numbers of each team will be established by the Organisation.

B.11.1.8 Each team will be responsible for placing the competition number on the motorcycle.

B.11.2 Identification

B.11.2.1 The name of the university, its logo or its initials must appear on all prototypes. The characters must be at least 50mm in height and 30mm in width.

B.11.2.2 There must be a space on the chassis for the inspection labels (static, administrative and dynamic inspections). The labels will be added on the right part of the bike (On way direction), and they must be visible with the mounted fairing. There will be 3 rectangular labels with a maximum size of 4 x 5 cm.



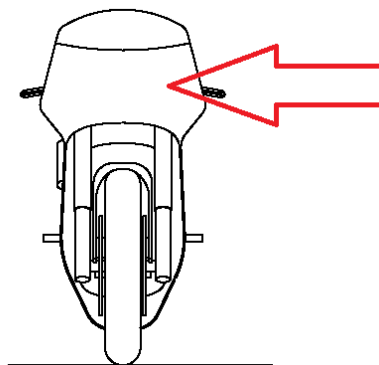
B.11.2.3 Every prototype must have an identifying number engraved in the frame. The said number/code will be provided by the Organisation and engraved by the team on the left side of the bike, and must be perfectly visible with the fairing fitted.

B.11.2.4 None of the identifying elements of the components provided by the Organisation can be covered with paint or adhesive film.

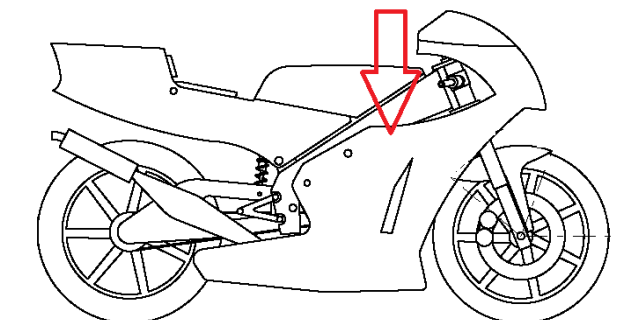
B.11.3 Competition Logos and Advertising

B.11.3.1 Three spaces should be available to include stickers with the logo of the organization. These adhesives will have a maximum area of 15 cm wide x 10cm high and will be provided by the organization. Its location will be:

- A sticker in the front part of the fairing, near the front number.



- A sticker on each side of the fairing at the top front zone.



B.11.3.2 Is strictly forbidden to include advertising of alcoholic drinks or snuff on the bike or any other corporate environment of the team.

ARTICLE 12: RIDER EQUIPMENT

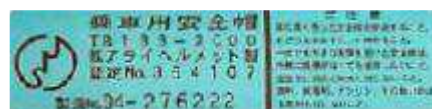
B.12.1 Helmet

B.12.1.1 The rider must wear a helmet that meets any of the following certifications or equivalent:

- Europe: ECE 22-05 'P'



- Japan JIS T 8133: 2007



- USA SNELL M 2010



B.12.1.2 Helmet must be of integral type, for speed track use. The use of a "motocross" type helmet is prohibited.



B.12.1.3 The use of disposable screen covers is allowed (tear-off).

B.12.1.4 The screen must be made of a shatterproof material.

B.12.1.5 The helmet must be well fastened and adjusted during the MS2 tests.

B.12.2 Clothing

B.12.2.1 The rider must be fitted with a whole one piece suit, preferably made of leather or other great resistance material, which cover full torso and extremities, and provides special protection of elbows and knees.



B.12.2.2 The use of suit with backbone protector is recommended.

B.12.2.3 The use of boots of leather or similar material protection is mandatory.

B.12.2.4 The use of leather gloves is mandatory with protections for fingers.

B.12.2.5 The use of underwear homologated for competition is recommended.

IV International Competition MotoStudent

SECTION C: SPECIFIC TECHNICAL REGULATIONS FOR THE CATEGORY "MOTOSTUDENT PETROL"

ARTICLE 1: ENGINE

The Organization will supply an internal combustion engine common for the teams entered in the Category "MotoStudent Petrol"

C.1.1 Sealing

The use of the engine provided by the Organisation is compulsory. The engine provided by the Organisation will be sealed and it is strictly forbidden to manipulate it. Any broken or damaged seal shall be reason to declare a technical nonconformity.

C.1.1.1 In case of breakdown or malfunction of any internal part to which the team is not allowed to access, the team shall inform the Organisation, who shall take the convenient steps.

C.1.2 Features of the engine

An internal combustion engine with the following main specifications will be delivered:

- Displacement: 250 cc
- Type: Single cylinder 4 stroke
- Cooling: Liquid

The technical specs of the engine will be published soon.

C.1.3 Crankcase and engine block

C.1.3.1 Modifications in the crankcase are not allowed, not even in its covers.

C.1.3.2 Modifications in the engine block are not allowed, not even in its anchorages. The frame supports for the engine should be designed according to the original geometry.

C.1.3.3 Modifications in the original cooling ducts of the engine are not allowed. The external cooling system should be developed according to the original cooling ducts of the engine.

C.1.3.4 Modifications in the intake and exhaust housing of the engine are not allowed. Intake and exhaust systems should be developed according to the original geometry of the engine.

C.1.4 Fuel supply system

C.1.4.1 The original fuel supply system of the provided engine can be replaced or changed. Either carburetion or injection systems are allowed.

C.1.4.2 The use of ceramic carburetors is forbidden.

C.1.4.3 Only one throttle control valve is allowed, which must be exclusively controlled by mechanical elements and shall only be handled by the rider.

C.1.4.4 The fuel injector must be installed before the admission valves of the cylinder. Direct injection into the combustion chamber is not allowed.

C.1.4.5 It is allowed to install only one injector.

C.1.5 Changes

C.1.5.1 Any change or modification that is not specified in this article is not allowed.

C.1.5.2 In case of a dispute about these changes, the decision of the Organization will be final.

ARTICLE 2: INTAKE

C.2.1 Intake pipes

The composition, dimension and position of the air intake pipes are free, provided that they comply with the dimensional requirements of the general dimensions of the motorcycle.

C.2.1.1 It is not allowed to install mobile devices in the intake system before the intake valves of the combustion chamber, except for the carburettor or injector.

C.2.1.2 The presence of an air-fuel-mix and recycled engine gases is only allowed in the intake pipes. The additional injection of other elements, such as ethanol, methanol, water, etc. is not allowed.

C.2.2 Intake flap

C.2.2.1 Only one flap is allowed, to be activated only by mechanical means (e.g. cable) handled by the rider. No other mobile elements are allowed in the intake pipe.

C.2.2.2 No interruption of the mechanical connection between the activation of the rider and the throttle is allowed.

C.2.3 Overpressure systems

The use of "turbo" systems to increase the gas pressure in the intake is forbidden. It is only allowed to make use of the aerodynamics of the motorcycle's movement by means of air intakes.

C.2.4 Airbox

The design of the airbox is free.

C.2.5 Air filter

The filter element of the intake air is free.

C.2.5.1 The air filter must fit in the original motor housing.

C.2.6 Recycling of gases

It is allowed to mount a tank between the cylinder head cover and the airbox, with the only function of collecting excess gases of the engine. No other function is allowed (such as the change of the created pressure) and only the engine vents may be connected between the cylinder head cover, the said tank and the airbox. It must be possible to check this tank and its connections at any time and therefore they must not be mounted hidden behind the frame making them difficult to check.

ARTICLE 3: TANK AND FUEL PIPES

C.3.1 Fuel tank

C.3.1.1 It is mandatory to install a breathing tube in the tank to prevent excessive pressure. This pipe should pour into a suitable container with a capacity of 200cc. This breathing tube shall be provided with a check valve.

C.3.1.2 There is no additional requirement if a homologated tank is used.

C.3.1.3 The own-design fuel tanks must be lined with flame retardant material or be fitted with an additional flexible internal safety tank (bladder).

C.3.1.4 For own-design "non-metallic" tanks, the use of this second additional rubber or resin tank is compulsory. The aim of this safety bladder is no other than avoiding the spilling of fuel if the tank breaks.

C.3.1.5 It is forbidden to pressurize the fuel tank.

C.3.1.6 The exit of fuel from the tank must be above the height of the engine intake valves.

C.3.1.7 The fuel tank tap(s) must be fitted with a threaded opening/closing system. The fuel tank tap must be watertight and be fitted with a safe closing system to avoid the tap from falling off in case of a crash.

C.3.2 Fuel pipes

All fuel pipes going from the tank to the carburettor or to the injection system must be fitted with watertight safety nipples, so that if the tank becomes detached from the motorcycle it will be the nipple that gets disconnected and no other connections of the pipe. The strength needed to open the nipple must be 50% of the strength needed to loosen any other connection or breakage of the pipe material.

C.3.3 Cooling

The artificial cooling of the fuel is not allowed. Only the aerodynamic design may be used for cooling the fuel system

C.3.4 Pressure

The fuel pressure must not be over 5.0 bar in any part of the circuit.

ARTICLE 4: FUEL AND LUBRICANTS

C.4.1 Fuel

The rules regarding the fuel to be used in the Competition for the Category "MotoStudent Petrol" will be published soon.

C.4.2 Engine oil

The lubricating oil to be used is free.

C.4.2.1 The addition of radiators to cool the oil is not allowed.

ARTICLE 5: COOLING SYSTEM

C.5.1 Cooling systems

C.5.1.1 The design and manufacturing of the external cooling system is free.

C.5.1.2 The number, position, size and composition of the cooling liquid radiators are free, provided that they comply with the dimensional requirements of the general dimensions of the motorcycle.

C.5.2 Cooling fluids

C.5.2.1 Only distilled water may be used as cooling fluid.

C.5.2.2 The use of additives in the distilled water is forbidden.

ARTICLE 6: EXHAUST SYSTEM

C.6.1 Exhaust system

C.6.1.1 The exhaust system design is free, provided that it complies with the general dimensional requirements of the motorcycle and the noise regulations.

C.6.1.2 No mobile parts are allowed in the exhausts starting from the exhaust valves of the engine (i.e. valves, deflectors, etc.).

C.6.2 Noise

The maximum noise level allowed for the exhaust is 115 dB measured statically at 5,500 RPM.

ARTICLE 7: CLUTCH AND TRANSMISSION

C.7.1 Clutch

The clutch type (oil lubricated) should be maintained.

C.7.1.1 Clutch disks can be replaced.

C.7.1.2 Clutch springs can be replaced

C.7.1.3 Clutch basket can be replaced.

C.7.1.4 Stock clutch can be modified with slipper clutch systems.

C.7.2 Gearbox

The original gear box integrated in the engine supplied by the Organization cannot be replaced or modified.

C.7.3 Secondary transmission

C.7.3.1 Only secondary transmission systems by chain are allowed.

C.7.3.2 The exit pinion of the box, the rear wheel rim and the chain are free.

C.7.3.3 Fast gear change systems (quickshift) are authorized.

C.7.4 Changes

Any change of the transmission system or the gearbox which is not mentioned in this section is not allowed.

ARTICLE 8: ELECTRIC INSTALLATION

C.8.1 ECU

The configuration of the Electronic Control Unit (ECU) of the engine is free.

C.8.1.1 The configuration of the Electronic Control Unit (ECU) of the engine is free. Commercial or self-configuration devices can be used.

C.8.1.2 The configuration of the electronic engine management map is free.

C.8.2 Battery

It is compulsory to fit a battery with an operating voltage of between 8V and 18V.

C.8.3 Electric installation

C.8.3.1 The preparation of the electric installation by the teams is free.

C.8.3.2 The use of other commercial installations is allowed.

C.8.3.3 The type of cable, the design and the wiring are free, provided that they are properly insulated.

C.8.3.4 The connector type is free. Teams should bear in mind that the electric functioning of the motorcycle must also be guaranteed in wet conditions.

C.8.3.5 The use of commercial components is allowed (coil, batteries, regulators, connectors, etc.).

C.8.3.6 All motorcycles must be fitted with a safety stop button on the left-hand side of the handlebar. This button must be highlighted in red to be easily locatable in case of emergency. The button must cut the electric supply of all components of the motorcycle.

C.8.3.7 The use of a single ignition coil is allowed.

C.8.3.8 The electrical installation must be perfectly integrated into the whole of the motorbike, it is forbidden leaving distances larger than 15cm of wires unfixed to the chassis.

C.8.3.9 The length of the cable must be the proper one, so that it is forbidden to coil the excess cable length.

C.8.3.10 It is recommended to remove the electrical installation as much as possible of the hot spots of the engine, as well as cooling and exhaust systems.

C.8.4 Start systems

C.8.4.1 Electric or mechanical start systems are allowed.

C.8.4.2 The removal of the original starting system is permitted, in which case only can start the engine by pushing or with an external starter acting on the rear tire

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SECCIÓN D: SPECIFIC TECHNICAL REGULATIONS FOR THE CATEGORY “MOTOSTUDENT ELECTRIC”

ARTICLE 1: DEFINITIONS AND GENERAL ASPECTS

D.1.1 High Voltage - HV, Low Voltage - LV, Volts Direct Current – VDC.

Any circuit with a potential difference above 40 VDC, will be part of the High Voltage (HV) system of the vehicle. Below this voltage, it will be considered as part of the Low Voltage (LV) system.

D.1.1.1 The maximum permitted voltage of the HV system shall be 110 VDC (fully charged batteries).

D.1.2 High Voltage System – HVS

The High Voltage System (HVS) is made-up of all the electric pieces that form part of the motor, controller, accumulator or any other electric part connected to them. The HVS shall be a High Voltage (HV) system according to the specifications of Art. D.1.1 of these Regulations.

D.1.2.1 The HVS must be electrically separated from the vehicle chassis or ground.

D.1.2.2 The accumulator of the HVS is defined as any cell, battery or supercapacitor (or a group of them), able to store electric energy for the electric propulsion system.

D.1.2.3 The HVS must have a controller fitted in between the motor and the accumulator, so that there cannot be a direct connection between the motor and the accumulator.

D.1.2.4 It is compulsory to place clearly visible labels indicating danger on housings or areas near the components working with High Voltage (HV). These labels must include the text “HIGH VOLTAGE”.



D.1.2.5 The dashboard must be fitted with a display showing the voltage between terminals in the HVS at any given time. The voltage of the HVS may be measured during the technical scrutineering in order to check whether or not the value shown on the display corresponds to the real voltage value of the HVS.

D.1.3 Ground Low Voltage System – GLVS

The Ground Low Voltage System (GLVS) is made-up of any circuit or electrical part of the vehicle (chassis) and hence is not part of the HVS.

D.1.3.1 The GLVS must be a LV system, i.e. with a voltage below 40 VDC.

D.1.4 Insulation between HVS and GLVS

D.1.4.1 The HVS and the GLVS shall be galvanically separated.

D.1.4.2 Should a DC/DC converter be used, it will have to comply with this specification.

ARTICLE 2: ELECTRIC MOTOR AND POWER DEMAND

The Organisation will provide a common electric motor for the teams that have entered the MotoStudent Electric category.

D.2.1 Sealing

The use of the motor provided by the Organisation is compulsory. The Organisation will provide a sealed motor and it is absolutely forbidden to manipulate it. Any broken or damaged seal will be reason for technical non-conformity.

In case of breakdown or malfunction of any internal part, the access to which is forbidden, please contact the Organisation to let them take the appropriate measures.

D.2.2 Characteristics of the electric motor

The main characteristics of the electric motor that will be provided are:

- Type: AFPM Motor
- Cooling: by air
- Rated power: 10-15 Kw
- Rated torque: 18-24 Nm

The technical specifications of the motor will be published soon.

D.2.3 Energy regeneration

Energy regeneration is allowed using the motor as a generator during braking.

D.2.3.1 For safety reasons, no energy regeneration is allowed at a speed below 5 km/h.

D.2.4 Throttle potentiometer

It is compulsory to include a throttle potentiometer which is controlled from the right-side handle of the motorcycle. The signal of the potentiometer shall serve to configure the demand of torque or speed from the motor.

D.2.4.1 It is allowed to configure the motor brake with the same potentiometer, mapping it in a range below the acceleration range.

D.2.4.2 A second signal from the throttle handle (for example a micro-switch) must be implemented in such way that in case of a demand of torque (or speed) through the potentiometer, without this second signal being activated, an error-signal is produced that makes it impossible to deliver power to the vehicle.

ARTICLE 3: ENERGY STORAGE

D.3.1 Permitted storage systems

Any type of battery may be used as energy storage system, except for molten salt batteries (thermal batteries) and fuel cells.

D.3.1.1 The use of supercapacitors is allowed.

D.3.1.2 The voltage supplied by the batteries shall be a maximum of 110 VDC with fully charged accumulator, as described in Art. D.1.1.

D.3.1.3 The connection diagram used shall be submitted to the Organisation (cells in series and in parallel).

D.3.2 Battery container

All battery cells and supercapacitors that form part of the accumulator must be installed inside a battery container or case.

D.3.2.1 The use of several battery containers is allowed. Each one of them must comply with the same prescriptions established for a single battery container.

D.3.2.2 If the battery container is not easily accessible, the Organisation may request pictures of the layout and the assembly at any time.

D.3.3 Electrical configuration of the accumulator

D.3.3.1 If the container is made of an electricity conducting material, the terminals of the cells or supercapacitors must be correctly protected and insulated with an electrically insulating material.

D.3.3.2 Each container must include at least one fuse inside, the rated intensity of which must be below the cutting power of the contactor.

- D.3.3.3 Each container must include, at least, two NO-type line contactors, one of them installed in the positive terminal and the other in the negative terminal of the accumulator.
- D.3.3.4 The closing of the line contactors, and consequently the presence of High Voltage (HV) at the exit of the accumulator, must be signalled by means of a red flashing light signal located on the dashboard, according to the standards given in Art. D.10.1.1.
- D.3.3.5 It is not allowed to join cell terminals by means of welding. It is allowed to weld the BMS conductors to the terminals.

D.3.4 Mechanical configuration of the accumulator

- D.3.4.1 The battery containers must be built with a mechanically resistant material and be installed correctly anchored to the chassis.
- D.3.4.2 The battery containers must be protected against side impacts by the chassis of the motorcycle.
- D.3.4.3 The container cannot form part of the chassis.
- D.3.4.4 The cells must be duly protected and fixed to avoid any relative movement (horizontally and vertically) inside the container.
- D.3.4.5 The only communication holes allowed between the inside and the outside of the container are those needed to pass duly insulated conducting cables and those that serve for cooling and ventilation.
- D.3.4.6 Ventilation openings cannot cover a complete side of the container.
- D.3.4.7 Ventilation openings must include some type of filtering element in order to avoid the entry of dust, particles and liquids into the container.
- D.3.4.8 Should a container be completely and tightly sealed, it must include an escape valve to prevent the gas concentration from reaching critical pressure.
- D.3.4.9 The use or adaptation of commercially available containers or cases is allowed, provided that they comply with the characteristics established in this article.

D.3.5 Battery Management System - BMS

- D.3.5.1 The installation of a battery management system (BMS) is compulsory.
- D.3.5.2 The BMS must read the voltage of each cell in order to keep the cells within the voltage limits established by the manufacturer.
- D.3.5.3 In the case of centralised BMS (several cells for a single printed circuit), each communication conductor between battery terminals and the printed circuit of the BMS must include a fuse to protect the conductor against possible shortcuts.
- D.3.5.4 For distributed BMS (one printed circuit for each cell), the protection fuse may form part of the printed circuit or, otherwise, be fitted to the conductor.
- D.3.5.5 The BMS must at least read the temperature of the cells in their hottest point by means of a compatible temperature sensor. It is compulsory to read the temperature of, at least, 30% of the installed cells.
- D.3.5.6 For distributed BMS cells, if the original printed circuit includes a temperature sensor, it may be considered as the temperature sensor of the cell, if it is located at a reasonably near distance from the hottest point of the cell. Otherwise, this sensor will not be considered as valid in terms of cell temperature control.
- D.3.5.7 Should a cell balancing system be used, there must also be a temperature sensor next to each dissipation resistance, to make sure that during the balancing period, the temperature indicated by the manufacturer of the resistance (or the BMS) is never exceeded, and that it does not affect the neighbouring battery cells or printed circuits.
- D.3.5.8 To improve the balancing speed, it is allowed to activate the artificial cooling of the battery container during the balancing process.
- D.3.5.9 The use of the same temperature sensor for the balancing control function and the cell temperature control will only be valid if the conditions as regards the nearness to the hottest point of the batteries and the nearness to the dissipation resistance are complied with.
- D.3.5.10 The BMS system must deactivate the vehicle traction if the voltage of one of the cells is discharged to the critical minimum voltage or if the critical maximum temperature of the cell is exceeded, according to the values indicated by the manufacturer. This deactivation is compulsory and must happen at the same as the contactors of the battery accumulator open. (See diagram in Art. D.5.1.2).

D.3.5.11 In addition to the conditions set-out in Art. D.3.5.10, it is allowed to progressively limit the electric power delivered to the motor until being equal to zero in the critical voltage point of the cell or the maximum temperature of the cell.

D.3.5.12 The BMS must also deactivate the recharge system when the maximum voltage or temperature levels of the cell are reached. This deactivation may be progressive or prompt.

ARTICLE 4: CONTROLLER

D.4.1 Motor controller or motor variator

The motor controller or motor variator is the hardware device that controls the speed and torque of a synchronous motor.

The controller is part of the HVS and can be part of the GLVS.

D.4.1.1 It is allowed to use any type of commercially available controller.

D.4.1.2 It is allowed to develop the controller or to adapt any commercially available device.

D.4.1.3 The hardware components (IGBT, etc.) shall be compatible with the working voltage and intensity values.

D.4.1.4 The controller must comply with all the prescriptions that may apply to it in these Technical Regulations.

D.4.2 Control software

The configuration of the control software of the motor is free. Both commercially available and own developed software tools may be used for this purpose.

ARTICLE 5: GENERAL ASPECTS OF THE HIGH VOLTAGE SYSTEM (HVS)

D.5.1 Separation of the HVS and the GLVS

D.5.1.1 The HVS and the GLVS must be physically separated.

D.5.1.2 There cannot be any contact between the HVS and the chassis of the vehicle or any metallic part that is exposed to the outside.

D.5.1.3 If any part or piece of the HVS and the GLVS must be together inside a container, they must respect the minimum separation distance according to the table below:

Voltage HVS	Separation distance
< 100 VDC	10 mm
> 100 VDC	20 mm

D.5.1.4 The components of the HVS and the GLVS must be separated by a humidity insulating barrier with a temperature resistance degree of 150 °C or higher.

D.5.1.5 If some parts or pieces of the HVS and the GLVS should coincide in the same PCB board, they shall be placed in clearly differentiated areas, marked as such on the board. They shall be separated by at least 6,4 mm over the surface, 3,2 mm through the air and 2 mm if they are under coating (these distances may not be respected in cases of optocouplers with a rated voltage equal or higher than the voltage of the HVS).

B.5.2 Positioning of the HVS

All components of the HVS must be located inside a reinforced structure that ensures their integrity in case of an accident.

D.5.2.1 The chassis of the motorcycle may be considered as a protective structure of the HVS, provided that the design and the construction fully protect the system in case of an accident.

B.5.3 Grounding

All metal parts of the vehicle that may be able to conduct electricity because they are located less than 100 mm from the HVS or the GLVS must be grounded to the motorcycle.

B.5.4 Insulation and cabling

All components of the HVS must be duly insulated and protected against direct contact.

D.5.4.1 The protection of the HVS must be granted, so that it becomes impossible to access the HVS connections with a cylindrical probe of 100 mm in length and 6 mm in diameter.

D.5.4.2 The HVS connections must be encapsulated in insulating components.

D.5.4.3 The cables or conductors pertaining to the HVS must be non-flammable, grade UL-94V0, FAR25 or equivalent.

B.5.5 Precharge circuit

It is compulsory to install a precharge circuit before the second contactor of the accumulator closes.

D.5.5.1 The minimum precharge level must reach 90% of the real voltage of the accumulator.

D.5.5.2 When the disconnection circuit described in article D.5.1 opens, the precharge circuit must open as well, so that any new activation manoeuvre of the disconnection circuit always leads to the previous precharging manoeuvre.

B.5.6 HVS activation warning

A red warning light shall be installed that will remain on and flashing while the HVS is active, i.e. while at least one of the two contactors of the accumulator is closed.

ARTICLE 6: DISCONNECTION SYSTEMS AND CIRCUITS

D.6.1 HVS disconnection circuit

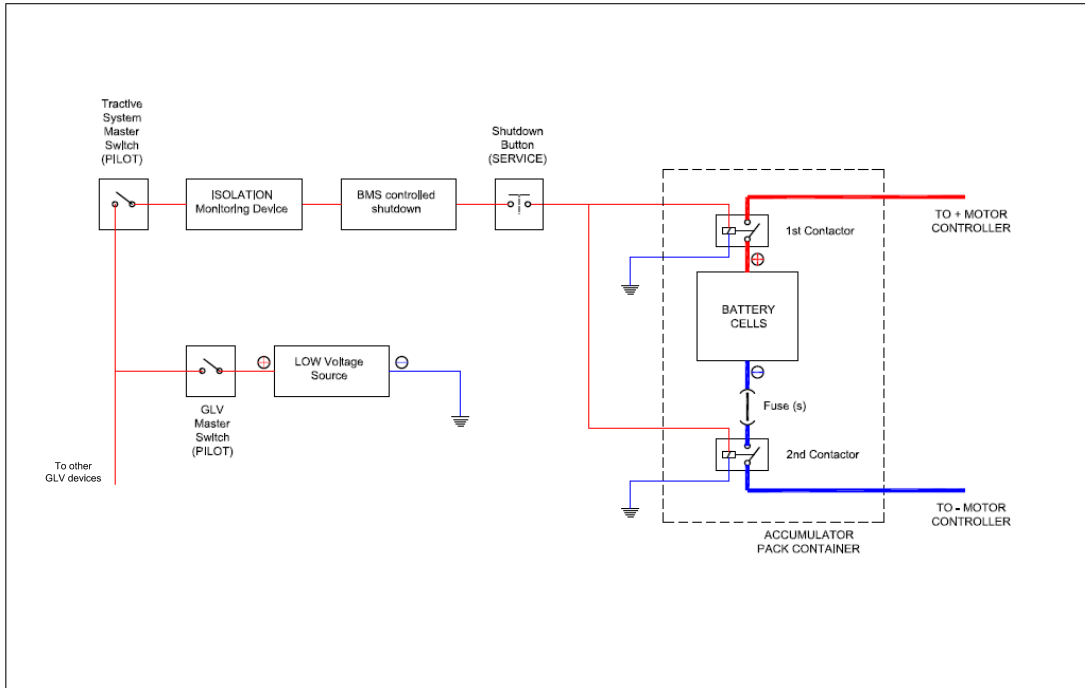
The disconnection circuit manages the opening and closing of the line contactors.

D.6.1.1 The disconnection circuit will consist of at least:

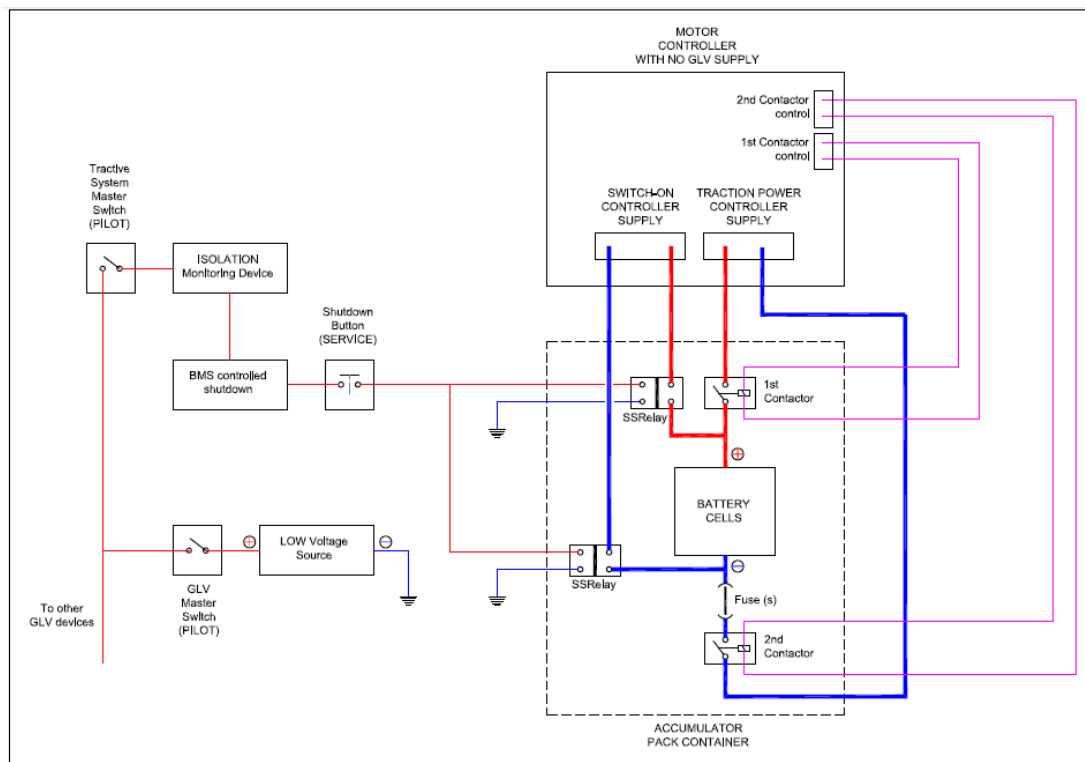
- A Tractive System Master Switch (TSMS).
- A Shut-down button.
- An Insulation monitoring device (IMD).
- The disconnection system managed by the BMS.

D.6.1.2 The disconnection system must follow one of the systems described below:

- Disconnection system with contactors that are directly controlled by the disconnection circuit:



- Disconnection system with contactors that are directly controlled by the controller:



D.6.1.3 Should the coil of the contactors of the battery accumulator be controlled directly by the motor controller (or any other device), the disconnection circuit has to ensure the shut-down of the controller (or the respective device) and consequently the shut-down of the contactor coil, its opening being guaranteed as described in diagram D.5.1.2.

D.6.1.4 Once the disconnection circuit is open (contactors open) as a consequence of the action of any of the designated devices (TSMS, Shut-down button, BMS or IMD), the system will remain in “not ready to ride” condition and the rider will have to reactivate it manually and voluntarily (e.g. restarting the controller), before the disconnection circuit closes again.

B.6.2 Disconnection of the GLVS

To make sure that the GLVS is able to turn on and off independently, a Grounded Low Voltage Master Switch must be installed.

D.6.3 Type of switches

D.6.3.1 The Emergency/Shut-down button(s) must be red mushroom-type push-rotary buttons.



D.6.3.2 The Master Switch(es) must be rotary-type.

B.6.4 Deactivation of the DC/DC converter

- D.6.4.1 Should a DC/DC converter be used as LV energy source, an additional switch or any other device to ensure the complete shut-down of the converter must be installed.
- D.6.4.2 If the choice is a switch on the HV supply of the converter, it must cut-off the positive and the negative side of the converter's HV supply and be placed in a way that there cannot be any HV outside the container of the accumulator whenever the switch is disconnected. In addition, a warning light must be placed next to the switch, indicating that the converter is being fed.

B.6.5 Insulation Monitoring Device (IMD)

The Organisation will provide an insulation monitoring device included in the MotoStudent Kit. **(To be confirmed).**

The Technical Specifications of the insulation monitoring device will be published soon.

ARTICLE 7: FUSES

D.7.1 HV Fuses

The circuit on the HV side must be protected by at least one fuse, according to the conditions stated in Art. D.3.3.2

- D.7.1.1 The rated current of the fuse shall be lower than the calculated shortcut current, and higher than the maximum service current.
- D.7.1.2 If several cell strings are mounted in parallel, each of these strings must be protected with an own independent fuse.
- D.7.1.3 The fuse or fuses must be installed inside the battery container or case.

B.7.2 GLVS fuses

All circuits on the GLV side must have a fuse to protect the conductor and the device it is supplying, avoiding their maximum permitted current to be reached.

ARTICLE 8: ACCUMULATOR RECHARGING

D.8.1 Chargers

D.8.1.1 All types of chargers with a rated power of between 3 kW and 7 kW are permitted.

D.8.1.2 The charger must be fitted with a respective ground conductor which must be duly connected to the case of the charger.

D.8.2 Mains connection

The mains connection can be single-phase (230 VAC, 50 Hz) or three-phase (400 VAC, 50 Hz).

D.8.2.1 The connection of the ground conductor to the socket base is compulsory.

D.8.3 Connection to the motorcycle

The connection between charger and motorcycle must comply with specific minimum safety conditions.

D.8.3.1 The charging connector located on the motorcycle must be fitted with an automatic shut-down system.

D.8.3.2 The charging connector of the motorcycle must have a tightness degree of IP-67 when closed.

D.8.3.3 The charging connector must be located in a protected area of the motorcycle to prevent damages due to possible crashes, contacts or impacts.

D.8.4 Recharging process

The recharging process of the accumulators must be carried out in a safe way.

D.8.4.1 During the recharging process of the motorcycle during the final Event it will be compulsory to have at least one team member present, who is familiar with every detail of the recharging process.

D.8.4.2 The team member in charge of the recharging process must be prepared to face any kind of action during the process (manual disconnection, deactivation, etc.) in order to insulate the vehicle from the network in case of any contingency.

D.8.4.3 A fire extinguisher for electric fire (extinguishing agent CO₂ or similar) must be located at a distance of less than two meters from the motorcycle during the recharging manoeuvre.

D.8.4.4 The BMS must be fitted with a recharge control device, as described in Art. D.3.5.

ARTICLE 9: GENERAL INSTALLATION AND CABLING

D.9.1 General insulation

D.9.1.1 All conducting cables and connectors must be covered with insulating material, except for direct ground connections.

D.9.1.2 The areas, elements and systems with a high electric risk must be correctly protected against possible contact and manipulations. It is recommended to install rigid insulating housings for a higher protection.

D.9.2 Dimensioning

D.9.2.1 All conducting cables and connectors must be correctly dimensioned according to the requested current levels.

D.9.3 Protection against humidity

D.9.3.1 The components of the propulsion system shall be highly protected against humidity. The recommended protection degree is IP65.

D.9.4 Wiring

D.9.4.1 The cable length must be exact, and therefore it is not allowed to roll excessive cable lengths.

D.9.4.2 The passage of the electric installation through possible hot points must be avoided as far as possible.

D.9.4.3 The electric installation must be perfectly well integrated into the motorcycle assembly, and the distance between cable fixing points shall not be longer than 15 cm.

D.9.4.4 Any possible interference between the electric installation and any mechanic system of the motorcycles must be taken into account and avoided, in any possible geometry range (during the complete route of the steering, suspensions, etc.).

ARTICLE 10: CONTROL AND CONTROL ELEMENTS

D.10.1 Dashboard

The dashboard shall be perfectly visible for the rider when in riding position.

D.10.1.1 The dashboard must include a red flashing warning light that must be lit when the HVS is activated, as indicated in Art. D.5.6.

D.10.1.2 The dashboard must include a green warning light that must be lit when the motorcycle is in condition to be started with the order given through the handle. If there is only the minimum master switch as regulated in Art. D.5.1. as shut-down and start command switch, this green warning light will be lit at the same time as the red flashing warning light described in Art. D.9.1.1.

D.10.1.3 The dashboard must have a display showing the voltage between HVS terminals at all times, as established in Art. D.1.2.5.

D.10.1.4 If a switch is installed next to the DC/DC converter which is used as energy source, there must be a warning light next to the switch to show when the converter is being fed, as described in Art. D.6.4.2.

D.10.2 Control elements

D.10.2.1 The driver must be able to activate, reactivate or reset the electric propulsion system completely, without the help of other people and without the need to get off the motorcycle, from the standard riding position.

D.10.3 Shut-down button

This article affects the shut-down button(s) described in Art. D.6.1 of these Regulations.

D.10.3.1 The shut-down button must be installed in a place in which it is protected against a crash or accidental contact by the rider, but at the same time accessible and recognisable for the track marshals.

D.10.3.2 The shut-down button may not be installed on any quick-removable component, such as the fairing. It should be installed preferably on supports that are fixed to the chassis.

D.10.3.3 If the installation of the shut-down button on the side of the motorcycle is under consideration, there must be two buttons, i.e. one on either side.

D.10.3.4 The installed shut-down button or buttons must have red colour.

ARTICLE 11: TRANSMISSION

D.11.1 Types of transmission

The configuration of the transmission system used for the “MotoStudent Electric” category is free.

D.11.1.1 Any type of primary transmission system is allowed: gearbox, CVT variator, etc.

D.11.1.2 Direct transmission between the output shaft of the motor and the rear wheel is allowed.

D.11.1.3 There are no limitations as regards the installation of clutch elements between components of the transmission system.

D.11.2 Secondary transmission

D.11.2.1 There is no limitation as regards the type of secondary transmission used: chains, belt, etc.

D.11.2.2 Any element of the transmission that might imply a trapping risk for the rider must be covered with a rigid housing.

ARTICLE 12: COOLING

D.12.1 Cooling systems

D.12.1.1 The design of the cooling system for the different components is free.

D.12.1.2 The cooling of components by air and by liquid cooling systems is allowed, except in the case of the motor, which can only be cooled by air.

D.12.2 Air cooling systems

D.12.2.1 The cooling by means of aerodynamic air conduction is permitted.

D.12.2.2 Forced-air cooling by means of fans or other methods of air impulsion or extraction is allowed.

D.12.3 Liquid cooling systems

D.12.3.1 Only distilled water may be used as cooling liquid.

D.12.3.2 The use of additives in the distilled water is forbidden.

D.12.3.3 The number, location, size and composition of the cooling liquid radiators are free, provided that they comply with the dimensional requirements of the general measurements of the motorcycle.

ARTICLE 13: DOCUMENTATION OF THE VEHICLE

D.13.1 Documents to be submitted

The Organisation may request the teams to show the following documents of the electric propulsion system.

- Basic electric diagram of the HVS.

- Pictures of the battery accumulator assembly if it cannot be opened easily for inspection.

- Connection diagram used with the accumulator (cells in series and in parallel), total number of cells and rated and maximum voltage of the complete accumulator.

- Datasheet of the accumulator cells, showing at least the following information:
 - o Chemistry type
 - o Minimum voltage
 - o Rated voltage
 - o Maximum voltage
 - o Temperature range (minimum and maximum temperature)
 - o Capacity
 - o Maximum charging and discharging temperature

- Datasheet, given the case, of the supercapacitors used, quantity and type of connection (units in series and in parallel).

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SECTION E: SCRUTINEERING

ARTICLE 1: OBJECTIVE AND METHODOLOGY

E.1.1 Objective

The objective of the pre-event scrutineering is to check that the motorcycles that have been submitted to the Competition by the participating teams comply with the specifications in terms of performance and safety as established in the General Technical Regulations (Sections B, C and D).

E.1.1.1 The pre-event scrutineering will not score towards the MotoStudent Competition, but it may entail the exclusion if any deviation from the regulations is detected or if the motorbike is not considered as safe enough to take part in the tests.

E.1.1.2 The pre-event scrutineering will be carried out by licenciate scrutineers and qualified Technical Staff of the Organisation.

E.1.1.3 In case of dispute over the non-compliance of the rules reflected in the Technical Regulations, or the safety of the bike on track, the decision of the Technical Staff of the Organization will be definitive.

E.1.2 Responsibility of the teams

Teams are responsible for making sure that their motorcycle complies with all the rules established in the General Technical Regulations.

E.1.2.1 When presenting the motorcycle for scrutineering, the team acknowledges that they have made sure that the motorcycle complies with the regulations established by the Organisation.

E.1.3 Procedure

The scrutineering consists of three phases:

- Static safety check.
- Safety check on a test bench.
- Dynamic safety check on the track.

ARTICLE 2: STATIC SAFETY CHECK

E.2.1 Application

The static scrutineering described in this article affect the motorcycles presented for both the category "MotoStudent Petrol" and the category "MotoStudent Electric".

E.2.2 Procedure

The motorcycle will be checked by the scrutineers according to all the rules in the order that they appear in the Technical Regulations.

E.2.2.1 The teams may have all spare elements (any component or part of the motorcycle) that they may seem fit. These spare parts must be presented to the Organisation together with the prototype in order to have them verified.

E.2.2.2 The static checks will be carried out in the Technical Pit Garage, located under the control tower, next to the PGO.

E.2.2.3 The motorcycle must be presented ready-to-race, so that, complying al the rules reflected in the Technical Regulations of the Competition.

E.2.2.4 The use of components that have not been checked by the Organisation will entail the immediate exclusion from the competition.

E.2.2.5 For the static checks, only 2 team members shall be present in the Technical Pit Garage. These team members will be in charge of transporting the motorcycle and any type of stand to present the bike in static position for its examination.

ARTICLE 3: SAFETY CHECK ON TEST BENCH

E.3.1 Application

The scrutineering on test bench described in this article affect the motorcycles presented for both the category "MotoStudent Petrol" and the category "MotoStudent Electric".

E.3.2 Procedure

The motorcycle will be submitted to checks on a test bench. The tests to be carried out are detailed below.

E.3.2.1 The safety checks on the test bench will be carried out in the Technical Pit Garage, located under the control tower, next to the PGO.

E.3.2.2 The safety checks on the test bench will be carried out right after the static safety check.

E.3.3 Test bench

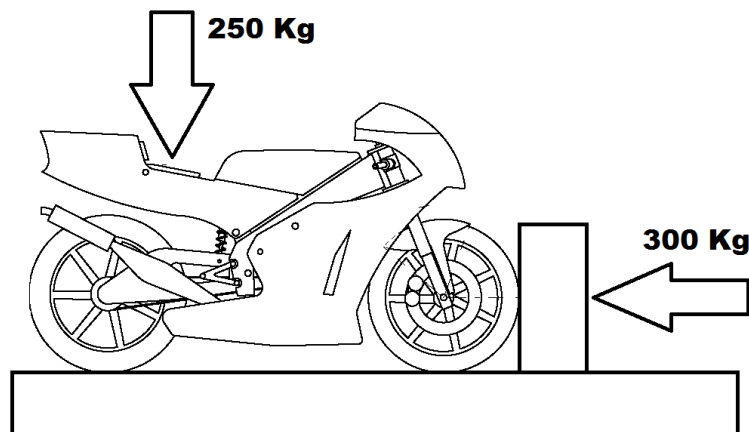
If the Organization considered necessary, the motorcycle can be subject to horizontal and vertical forces on the test bench in order to check the rigidity of the frame, the correct assembly and the working of suspensions.

E.3.3.1 The following forces will be applied on the motorcycle:

- Progressive horizontal load on the front wheel: 300 kg
- Progressive vertical load on the seat: 250 kg

E.3.3.2 These loads will be applied successively, two consecutive times and it will be checked that the value measured is repetitive in terms of deformation, with a measurement error below 10%, and that there is no failure or fissure in the structural components or the joining elements.

E.3.3.3 Graphic description of the test:



E.3.4 Brake check

The correct working of the front and rear brakes is going to be checked on a roller brake tester.



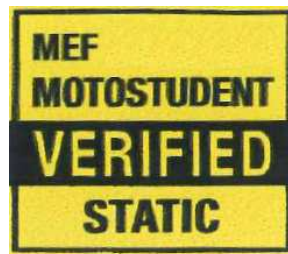
E.3.4.1 In order for the motorcycle to be considered as having passed this test, it shall provide brake strength values above the following figures:

- Front: 0.30 kN

- Rear: 0.25 kN

E.3.5 Approval

E.3.5.1 If the motorcycle passes the static and test bench checks, it will be marked with the respective sticker and taken to the dynamic checks on the track.



ARTICLE 4: SPECIFIC STATIC TECHNICAL CHECKS FOR BIKES OF THE CATEGORY "MOTOSTUDENT PETROL"

The present article affects only the bikes presented for the Category "MotoStudent Petrol".

E.4.1 Exhaust noise

The exhaust noise will be measured.

E.4.1.1 The maximum permitted exhaust noise is stated in Art. C.6.2. of the Technical Regulations.

E.4.1.2 The noise will be measured at approx. 50 cm from the exhaust exit, in the flow direction of exhaust gas, in a place which shall be as silent as possible, with no walls or obstacles within 3m around the exhaust exit.

ARTICLE 5: SPECIFIC STATIC TECHNICAL CHECKS FOR THE “MOTOSTUDENT ELECTRIC” CATEGORY

This article does only affect the prototypes participating in the “MotoStudent Electric” category of the Competition, with a 100% electric propulsion motor.

E.5.1 Insulation Monitoring Device Test (IMDT)

A test will be carried out in order to check the correct working of the insulation monitoring device (IMD).

E.5.1.1 During the test, a 50 k Ω resistance will be placed between the HV side and the chassis in order to check the correct electric insulation.

E.5.1.2 In order for a motorcycle to pass the test, the measuring system should open the disconnection circuit not later than 30 seconds after it has been connected to the prototype.

E.5.2 Insulation Measurement Test (IMT)

A test will be carried out in order to check the correct working of the insulation between HVS and GLV.

E.5.2.1 During the test, the insulation between HVS and GLV will be measured.

E.5.2.2 In order for a motorcycle to be considered as fit to take part in the Competition, the value measured between both systems must be equal or higher than 100 k Ω .

E.5.3 Disconnection Circuit Test

A test will be carried out in order to check the correct working of the disconnection circuit.

E.5.2.1 The correct working of the Main Switch and of the Shut-Down Button will be checked. Shutting down any of them must open the contactors of the battery accumulator.

E.5.2.2 When shutting down these switches, the voltage shown on the display of the dashboard must be zero.

ARTICLE 6: DYNAMIC SAFETY CHECK ON THE TRACK

E.6.1 Application

The dynamic scrutineering described in this article affect the motorcycles presented for both the Category "MotoStudent Petrol" and the Category "MotoStudent Electric".

E.6.2 Procedure

A test rider nominated by the Organisation will carry out a series of dynamic tests on the track to check the correct working of the motorcycle.

In order for the motorcycle to be approved for the participation in MotoStudent it shall comply with the following:

E.6.2.1 The bike must start up and move under its own power

E.6.2.2 The motorcycle must brake correctly both when riding softly and aggressively.

E.6.2.3 The motorcycle must be able to carry out a series of turns at different speeds.

E.6.2.4 The test rider will determine if the bike meets the basic safety requirements to participate in the Competition.

E.6.3 Lap around the track

After having checked the different aspects, the test rider of the Organisation will make a complete lap around the Road Racing Track.

E.6.4 Approval

- E.6.4.1 If the motorcycle passes the dynamic test, it will be marked with the respective sticker and the team will be able to take part in the MS1 phase.



ARTICLE 7: RECTIFICATION IN CASE OF PROBLEMS

E.7.1 Rectification time

- E.7.1.1 If the motorcycle is considered as "not approved" after the static or dynamic tests, the Organisation will provide for a time period of 45 minutes to allow the team to rectify the failures marked by the Organisation in their own pit garage. After this period of time the motorcycle shall be presented again at the technical garage to verify whether it complies with the regulations or not.

- E.7.1.2 If after the second check the motorcycle is still considered as "not approved", the team will be excluded from the MS2 phase but will be able to continue taking part in MS1.

E.7.2 Favourable solution of problems

- E.7.2.1 If the motorcycle is considered as approved after the dynamic test, it will be marked with the respective stickers and the team will be able to take part in the following phases.

ARTICLE 8: ADMINISTRATIVE CHECKS

Riders must perform administrative checks, in which the Organization will review its documentation is in force and meets all the requirements, as well as the equipment is according to the regulations to participate in the competition. Once approved these aspects it will be granted the corresponding verification sticker.



IV International Competition MotoStudent

SECTION F: MS1 REGULATIONS

ARTICLE 1: OBJECTIVES

The MS1 Phase is a demonstrative phase during which the participating teams must show and explain the design of the prototype and the industrialisation projects for mass production. This phase intends to be an opportunity for participating students to apply the knowledge acquired during their education in a "real" project, showing the aspects and difficulties that an industrial manufacturing project can entail and how to launch a product into the market.

F.1.1 General idea of the project

The project is based on the design, the development and the manufacturing process of a racing motorcycle for a road racing track, with a mass production estimate of 600 units per year.

F.1.1.1 For the Category "MotoStudent Petrol" is established a manufacturing cost of 4.850 €

F.1.1.2 For the Category "MotoStudent Electric" is established a manufacturing cost of 9.750 €

F.1.2 Structuring of the project

The main aspects to be reflected by the project, in which the project must also be divided into, are:

A.- Vehicle design

B.- Analysis and technical calculations

C.- Innovation Project

D.- Definition of the manufacturing and industrialisation system

E.- Analysis of the development costs and the industrial process for mass production

ARTICLE 2: PARTS OF THE PROJECT

F.2.1 Vehicle design (Part A)

The design of the motorcycle must be based on the guidelines set out below.

F.2.1.1 The specifications to be complied with by the production motorcycle must be similar to those stated in the Technical Regulations of the Competition, except for the components provided by the Organisation for the real prototype, which, in the case of the production motorcycle, will be free.

F.2.1.2 This mass production motorcycle will be derived from the motorcycle prototype with the minimum differences required by mass production processes and by the adaptation to the components of a mass production motorcycle which do not have to be the same as those of the prototype.

F.2.1.3 The explanation or justification of the choice of the design criteria, be it with calculations, theories or outlines, will be valued.

F.2.1.4 The minimum sections to be included in this part are:

- Objectives.
- Statement: The statement shall include the design criteria of the different parts that make up the motorcycle and the overall design, as well as the justification of the designs, the used materials and the purchased components.
- Specification sheet: Quality of the used materials and standard pieces.
- Plans and drawings: General and of the construction details. 3D drawings. Must be correctly dimensioned.
- Conclusions.

F.2.1.5 The inclusion of the following aspects will be valued:

- Analysis of other models.
- After-sales maintenance operations.
- Benchmarking.
- Study of the material selection.
- Ergonomics

F.2.2 Analysis and technical calculations (Part B)

This part must reflect all the calculations made to design the motorcycle, as well as the operations for the structural and dynamic analysis, etc.

F.2.2.1 The analysis operations with computer simulation programmes may be reflected in the project by means of screenshots of the programmes.

F.2.2.2 The inclusion of the following aspects will be valued:

- Structural analysis and calculations of the frame, subframe, swing arm, suspensions, etc.
- Study of the dynamics of the motorcycle and the centres of mass.
- Calculation and justification of the performance.
- Aerodynamic study and analysis.
- Fluid dynamics calculations.
- Thermodynamic calculations.
- Comparison of different materials.
- Conclusions.

F.2.3 Technological Innovation Project (Part C)

The project must include some remarkable innovation aspect as regards the design of the motorcycle.

F.2.3.1 It is not compulsory to apply this innovation in the motorcycle prototype manufactured by the team, but doing it will have a positive effect on the score.

F.2.3.2 This innovation aspect does not have to comply with the rules established in the Technical Regulations, but if it does, it is forbidden to apply it in the motorcycle presented at the Competition.

F.2.3.3 If this innovation aspect is taken to manufacturing or to the prototype, even if it not installed in the participating motorcycles, it can be shown in the presentation.

F.2.3.4 Any innovation project presented by any team in previous editions of MotoStudent will not be considered as an innovation.

F.2.3.5 The minimum sections to be included in the Innovation Project are:

- Start situation: Explanation of where the idea to develop this innovation and the need to implement it came from.
- Objectives.
- Feasibility of its implementation in the market: Study of the possibility to launch it into the market of race motorcycles, street motorcycles or implementation in other motorcycling disciplines.
- Specification sheet: Reflecting the quality of the materials used for this innovation and the execution and manufacturing standards to carry it out.
- Plans and simulations.
- Conclusions.

F.2.4 Definition of the manufacturing and industrialisation system (Part D)

This part of the project must reflect the industrial structuring established to carry out the mass manufacturing process of the motorcycle.

F.2.4.1 The minimum sections to be included in the Industrialisation Project are:

- Objectives.
- Flow analysis of the manufacturing process: Study of the different processes and their succession along the productive chain. Layouts of the production plant.
- Description of the manufacturing process: Detailed explanation of the manufacturing of each component, as well as the complete assembly of the motorcycle, with the used materials, tools and means.
- Description of the assembly posts and tools.
- Material and service providers: Materials and components provided by external manufacturers.
- Situation, location and repercussion.
- Storing, logistics and packaging.
- Human resources: Workforce, positions, roles within the company.
- Quality control plan.

F.2.4.2 The inclusion of the following will be valued:

- Marketing strategy
- After-sales service
- Legal aspects (company registration, formalities as regards employees, subventions, equipment and adaptation of facilities, etc.)

F.2.5 Cost analysis of the development and the manufacturing process (Part E)

Submission of a financial report with estimates of costs, benefits and amortization.

F.2.5.1 For the cost calculation of the mass production motorcycle, the Organisation will set the price of certain components and materials.

The manufacturing costs used for the Cost Analysis will be published soon.

F.2.5.2 For the calculation of the real costs of the prototype motorcycles, the prices shown must be real prices, regardless of whether they match the prices published by the Organization.

F.2.5.3 This part must include at least the following sections (underlined):

- Objectives.
- Market research.
- Real realization costs of the motorcycle: Breakdown of the costs of the different components, materials, external services.
- Estimated costs of the mass production motorcycle: Calculation of the manufacturing costs of each mass production motorcycle for the company.
- Budget, investment and funding: Breakdown of the expenses, investments and profits and estimation of the benefits and their trend.
- Conclusions.

F.2.5.4 Additional aspects that will be valued:

- Estimation level.
- Use of manufacturing process simulators.
- Study of the production flow.

ARTICLE 3: SUBMISSION OF THE PROJECT

Before the Final Event, on a date specified in the calendar of Art. A.6.1 the Organisation must receive a copy of the complete finished project in digital format. Moreover, on the day of the Event, at the beginning of the presentation in front of the jury, each team must hand out the industrial project to the Organisation.

F.3.1 Submission method

F.3.1.1 The complete project must be submitted in digital format, in a PDF-format file (version 5.0 or higher) with a maximum limit of 150 pages.

F.3.1.2 Together with the project in PDF-format, the teams may submit the CAD-files, videos and simulations they may seem fit.

F.3.1.3 A paper print of the project must also be submitted.

F.3.1.4 It is recommended to use Arial font, minimum font-size 10px.

ARTICLE 4: PRESENTATION IN FRONT OF THE JURY

For the Evaluation of the MS1 Phase, during the Final Event there will be two presentations in front of a jury:

- Design and innovation
- Industrialisation

F.4.1 Presentation: Design and Innovation

The first presentation called Design and Innovation shall reflect the following parts of the project:

- A.- Vehicle design
- B.- Analysis and technical calculations
- C.- Innovation Project

F.4.2 Presentation: Industrialisation

The second presentation called Industrialisation shall reflect the following parts of the project:

- D.- Definition of the manufacturing and industrialisation system
- E.- Analysis of the development costs and the industrial process for mass production

F.4.3 Presentation method

F.4.3.1 The teams shall nominate one or two different students for the exposition of each presentation (Design and Innovation and Industrialisation), i.e. the same students are not allowed to make both presentations. Each presentation shall be made by a maximum of 2 students, while the rest of the team may stay in attendance. No external public is allowed.

- F.4.3.2 Each presentation will have a maximum duration of 20 minutes + 5 minutes for questions by the jury.
- F.4.3.3 The presenting students may use a digital presentation as a support. The Organisation will provide for a projector and a screen.
- D.4.3.4 Students must bring their own laptop for the presentation.
- D.4.3.5 The teams may bring their digital presentation on an extractable hard disc or CD-ROM.
- D.4.3.6 The digital presentation may include images and videos.
- D.4.3.7 During the presentation it will be allowed to show pieces or elements which the students consider as adequate for the explanation, as well as using other means of dissemination as the digital presentation (leaflets drawings, etc.).
- D.4.3.8 At least one of the slides of each presentation must show the final conclusions of the authors in the respective fields.

F.4.4 Assessment

- F.4.4.1 The evaluation of the MS1 Phase will be carried out by a Jury formed made up of experts from the industrial sector, experts in innovation, automotive and MotorSports.
- F.4.4.2 For the assessment of MS1 Phase, the jury will be based on both the presentations and the projects presented.
- F.4.4.3 The jury will value above all the clearness of the explanation, of the objectives and a drawn-up graph.
- F.4.4.4 The teams must follow the order and the schedule of the presentation. If not, they will get a minor fault which will have an influence on the final score.

ARTICLE 5: ASSESSMENTS

F.5.1 Scoring

The MS1 phase will be assessed based on a total of 500 achievable points, distributed as follows:

PRESENTATION	ASPECT	SCORE
Design and innovation	A. Vehicle design	75
	B. Analysis and technical calculations	125
	C. Technological Innovation Project	100
Industrialisation	D. Definition of the manufacturing and industrialisation system	125
	E. Analysis of the development costs and the industrial process for mass production	75
TOTAL		500

F.5.1.1 Although the way in which the presentation is carried out will have an effect on the assessment, the largest part of the score will depend on the content of the project.

F.5.1.2 The assessment by the jury will be final.

F.5.2 Prizes

The awards for the MS1 Phase will be published soon.

IV International Competition MotoStudent

SECTION G: MS2 REGULATIONS

ARTICLE 1: OBJECTIVES

The MS2 phase consists of a series of tests aimed at assessing the dynamic behaviour and the performance of the manufactured motorcycles, as well as the skills of the teams in terms of mechanics and organisation.

G.1.1 Requirements

The participating teams must pass a minimum of 40% of the score of Phase MS1, to score in MS2 Phase.

ARTICLE 2: GENERAL REGULATIONS DURING THE EVENT

G.2.1 Weather conditions

The Organisation reserves the right to change the schedule and even the assessment methods due to unforeseen weather conditions.

G.2.1.1 In case of rain the Organisation may establish three different rain levels:

- Light
- Moderate
- Intense

G.2.1.2 If the Organisation establishes that there is "light" rain:

- For the Category "MotoStudent Petrol", there will be no problem in carrying out the outdoor tests, but it may become advisable to use wet weather tyres.
- For the Category "MotoStudent Electric", it won't be possible to carry out the outdoor tests and all motorcycles that are outside their respective pit garages must return to their garages immediately.

G.2.1.3 If the Organisation establishes that there is "moderate" rain:

- For the Category "MotoStudent Petrol", the use of wet weather tyres will be compulsory for the outdoor dynamic tests.
- For the Category "MotoStudent Electric", it won't be possible to carry out the outdoor tests and all motorcycles that are outside their respective pit garages must return to their garages immediately.

G.2.1.4 If the Organisation establishes that there is "intense" rain, it won't be possible to carry out the outdoor tests for any category and all motorcycles that are outside their respective pit garages must return to their garages immediately.

G.2.1.5 In case of "intense" rain, the Organisation will decide and notify the participants if a test is cancelled or postponed.

G.2.1.6 For any other situation or unforeseen weather, the Organization along with Race Direction will decide and announce any postponement or cancellation.

G.2.2 Facilities

All participating teams commit themselves to look after the facilities in which the Event is going to take place. If not, the Organisation shall have the right to impose sanctions or to exclude the offender from the event.

G.2.2.1 The Organisation will prepare and allocate an area or garage to each team. The garage will be the place to carry out repairs and set-ups on the motorcycle. Each garage will be shared by two teams. The garage will be divided into area A and area B. The teams will thus have each an approximately area of 70 m².

G.2.2.2 The garages are equipped with 220V European standard 220 power sockets or industrial 220V sockets and 380V three-phase sockets. They are also fitted with TV outlets to watch the live times, compressed air and water sockets and a toilet.

G.2.2.3 The personal and transport vehicles must be parked in the respective dedicated areas. Only vehicles of the Organisation are allowed to drive on the track and the test areas.

G.2.3 Movement of the motorcycle

For reasons of safety, the start of the motorcycle must follow the rules stated below. Not complying with these rules may entail a penalty or even the exclusion from the Competition.

G.2.3.1 The motorcycle cannot be started by propelling the lifted driving wheel with the hand.

G.2.3.2 It is allowed to use a starter to start the engine, either already fitted to the motorcycle or an external portable starter.

G.2.3.3 During the scheduled tests, the motorcycle shall only move by its own means. For the rest of the movements around the paddock, it must be pushed or moved with the engine turned off.

G.2.4 Spare parts shop

During the Event, the Organisation will set up a shop for the teams to buy spare parts of the original kit provided by the Organisation. The shop will also offer tyres both for dry and wet weather conditions. MEF will provide for a tyre cutting and balancing service.

G.2.4.1 The payments at the shop during the Event may be made in cash (€) or with a credit card. The accepted credit cards are:



G.2.5 Supplementary Regulations of the Circuit

The Supplementary Regulations of the Circuit will be published soon.

G.2.6 Contact telephone during the Final Event

The telephone number to contact the Organisation during the Final Event will be 978 83 55 48.

G.2.7 Identification

On their arrival at the Event, the Organisation will provide identification wristbands to team members, riders and tutors. These wristbands will serve the Organisation as identification for the follow-up during the tests and interventions of the motorcycle.

G.2.7.1 Team members must wear the identification wristbands when accessing the Event site and keep them throughout the Event.

G.2.7.2 The access to the Pit Lane will be restricted to persons wearing a wristband, i.e. to persons who have entered the Competition. The access to all the other areas (Paddock, cafeteria, area of the pit garages, etc.) is free for general public.

G.2.8 Paddock rules

The Paddock rules will be published soon.

G.2.9 Communication with the rider

Radio communication between the team and the rider during the tests or the race is forbidden.

G.2.9.1 The communication between the team and the rider is only allowed by means of a board shown on the pit wall and only during the practise sessions and the race.

G.2.9.2 The information board must be light, with a maximum size of 1m in width and 1.5m in height.

G.2.9.3 The information board must be shown by only one team member, who must hold the board firmly in order to avoid the board from crashing onto the track.

ARTICLE 3: DYNAMIC TESTS

G.3.1 Objectives and procedure

The dynamic tests consist of a series of exercises prepared to show and assess the behaviour and performance of the motorcycles.

G.3.1.1 MS2 dynamic tests described in this section correspond to the two categories of the Competition: "MotoStudent Petrol" and "MotoStudent Electric". Each category will have its own separate score.

G.3.1.2 The dynamic tests on the track will be carried out by the rider presented by the team.

G.3.1.3 The dimensions, speed, schedules, and measurement indicated in this article may vary and change in the Event, if the Organization so had to determine for any reason.

Soon more indications concerning the procedure for conducting the tests be published.

G.3.2 Test 1: Brake test

The brake test will consist in an assessment of the distance needed to bring the motorcycle to a complete halt from a minimum speed of 80 km/h.

G.3.2.1 The test will be carried out on a straight with a total length of 350m.

G.3.2.2 The maximum track length available for the motorcycle to reach a speed equal or higher than 80 km/h is 200m. The Organisation will fit the specific point with a speed measurement device to verify that the speed has been reached.

G.3.2.3 After passing the end mark of the acceleration straight (speed trap point), the rider will have to try to bring the motorcycle to stop in the shortest possible distance.

G.3.2.4 The marshals will measure the point of the vertical tangent of the front tyre (foremost part of the motorcycle).

G.3.2.5 The distance between the point described in Art. G.3.2.4 and the braking start line will be considered as the braking distance for the assessment of the test result.

G.3.2.6 The score of the braking test will be awarded after recording the braking distance of all teams.

G.3.2.7 The assessment of the test will be made by means of an extrapolation with the achieved results.

$$\frac{M_F - D}{M_F - P_F} = \frac{60 - P}{59}$$

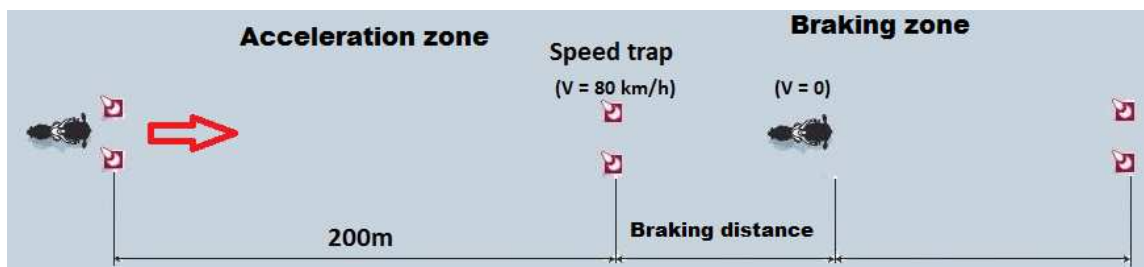
Where:

- M_F : The most efficient braking distance.
- P_F : The less efficient braking distance.
- D: Distancia of the braking to evaluate.
- P: Score of the braking to evaluate.

G.3.2.8 The figure resulting from article G.3.2.7 will be rounded to the corresponding integer. The score of the test will be awarded based on this rounded number and may range from one point for the less efficient braking to 60 points for the best braking.

G.3.2.9 It will not be considered as valid those results that exceed 185% of the value of more efficient braking, receiving in this case 1 point score for this test.

G.3.2.10 Graphic description of the test.



G.3.2.11 If the speed at the speed trap is lower than 80 km/h, the following penalties will be applied, which shall be added to the achieved braking distance.

<u>Speed (km/h)</u>	<u>Penalty</u>
79	+ 2 m
78	+ 3 m
77	+ 4 m
76	+ 5 m
75	+ 6 m
70-74	+ 10 m
<70	Null measurement

G.3.3 Test 2: Gymkhana

The second test will be a little timed gymkhana. The map below shows the route to be followed and its measurements.

G.3.3.1 The start will be given by lowering a flag.

G.3.3.2 The time needed to cover the complete route will be recorded.

G.3.3.3 The table below shows the penalties for failures. They are time penalties that will be added to the total time of the test.

<u>Failure</u>	<u>Penalty</u>
Move or pull a cone	+ 5 seconds
Not exceed a cone for the right place	+ 10 seconds

G.3.3.4 The scores for the test will be awarded according to the times registered by all of the teams and with the following extrapolation.

$$\frac{M_T - T}{M_T - P_T} = \frac{100 - P}{99}$$

Where:

- M_T : Best time.
- P_T : Slowest time.
- T: Time to evaluate.
- P: Score of the time to evaluate.

G.3.3.5 The figure resulting from article G.3.3.4 will be rounded to the corresponding integer. The score of the test will be awarded based on this rounded number and may range from one point for the slowest time to 100 points for the quickest time.

G.3.3.6 It will not be considered as valid those results that exceed 170% of the value of the fastest time, receiving in this case 1 point score for this test.

Course and dimensions of Test 2: "Gymkhana" will be published soon.

G.3.4 Test 3: Best acceleration

During this test, the maximum acceleration of each motorcycle from a complete stop on a 150m-long straight will be measured.

G.3.4.1 The start will be given by lowering a flag. The rider must try to start as quickly as possible.

G.3.4.2 The rider must try to cover the 150m of the track in the least possible time (maximum acceleration).

G.3.4.3 The Organisation will record the total time needed to cover the track section with a timing system.

G.3.4.4 Once the times of all motorcycles have been recorded, the figures will be extrapolated:

$$\frac{M_T - T}{M_T - P_T} = \frac{60 - P}{59}$$

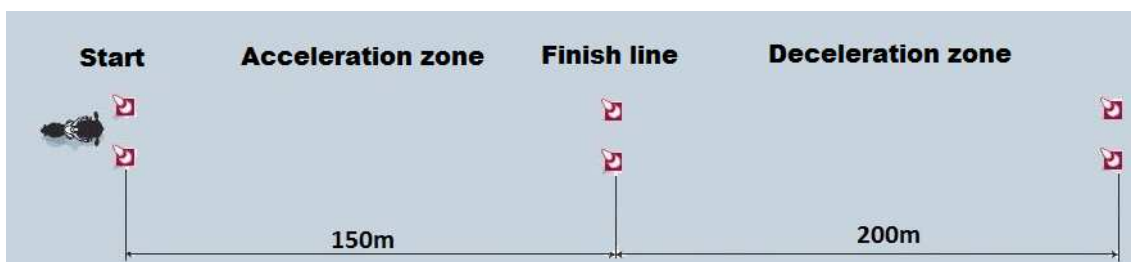
Where:

- M_T : Fastest time.
- P_T : Slowest time.
- T: Time to evaluate.
- P: Score of the time to evaluate.

G.3.4.5 The figure resulting from article G.3.4.4 will be rounded to the corresponding integer. The score of the test will be awarded based on this rounded-up number and may range from one point for the slowest acceleration to 60 points for the fastest acceleration.

G.3.4.6 It will not be considered as valid those results that exceed 140% of the value of the fastest acceleration time, receiving in this case 1 point score for this test.

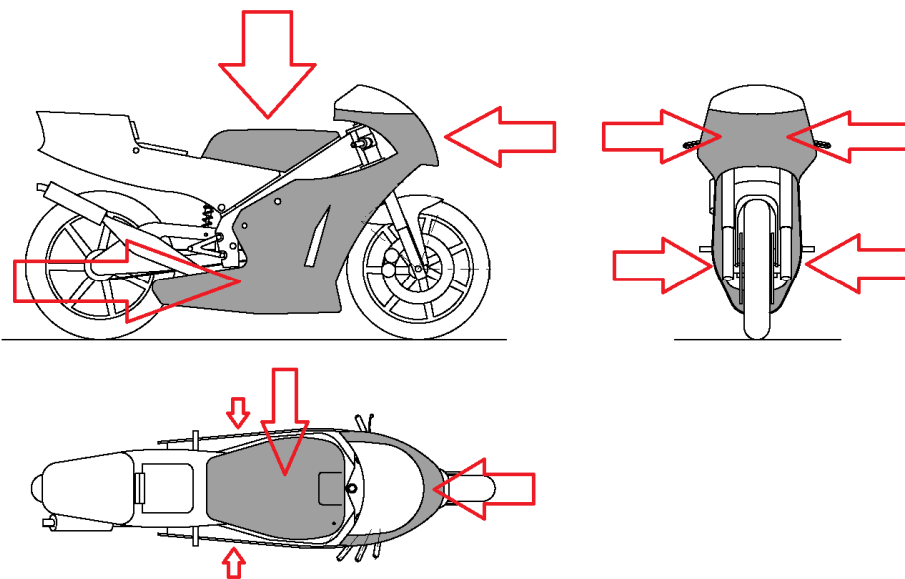
G.3.4.7 Graphic description of the test.



G.3.5 Test 4: Mechanical test for teams

This test is about assessing how quick the team works in the pit garage, and whether or not this aspect has been taken into account in the design of the motorcycle.

G.3.5.1 The test will consist in completely dismantling and assembling upper fairing (fuel tank included in Category “MotoStudent Petrol”) and the fairing of the motorcycle (not including the tail). Guidance figure:



G.3.5.2 The dismantling time will be recorded by a marshal, who will also check that the process is carried out completely.

G.3.5.3 At the beginning and at the end of the test, the motorcycle must be assembled exactly how it has been conceived to ride on the track. This aspect will be checked exhaustively by the marshals.

G.3.5.4 Only two team members will be allowed to take part in this test. The remaining team members may stay in the pit garage as spectators, but without interfering in the activities of their colleagues.

G.3.5.5 The use of any kind of tools and systems is free.

G.3.5.6 The pieces will be considered as dismantled when the marshal following the test clearly sees that there is no contact element between the motorcycle and the pieces.

G.3.5.7 The following extrapolation will be made after recording the times of all teams:

$$\frac{M_T - T}{M_T - P_T} = \frac{30 - P}{29}$$

Where:

- M_T : Fastest time.
- P_T : Slowest time.
- T: Time to evaluate.
- P: Score of the time to evaluate.

G.3.5.8 The figure resulting from article G.3.5.7 will be rounded to the corresponding integer. The score of the test will be awarded based on this rounded number and may range from one point for the slowest time to 30 points for the quickest time.

G.3.5.9 It will not be considered as valid those results that exceed 900% of the value of the best time, receiving in this case 1 point score for this test.

ARTICLE 4: PRACTISE SESSIONS

G.4.1 Free practices

The teams will have a 40-minute free practise session on the racetrack.

A course for the Category "MotoStudent Petrol" and other one for the Category "MotoStudent Electric" will take place independently.

G.4.1.1 After these 40 minutes a chequered flag will be shown at the finish line and no motorcycle will be allowed to access the track. The motorcycles that are on the track and take the chequered flag must leave the track after the following lap.

G.4.2 Timed practises

The teams will have a 40-minute timed practise session on the racetrack.

A course for the Category "MotoStudent Petrol" and other one for the Category "MotoStudent Electric" will take place independently.

- G.4.2.1 The lap times clocked by the motorcycles during these practises will be recorded by the Organisation.
- G.4.2.2 After these 40 minutes a chequered flag will be shown at the finish line and no motorcycle will be allowed to access the track. The motorcycles that are on the track and take the chequered flag must leave the track after the following lap.
- G.4.2.3 If a motorcycle is making a timed lap at the end of the 40-minute session the rider may complete the lap and the time clocked will be considered as valid.
- G.4.2.4 The lap times of the timed practise will be broadcasted live through a TV signal. Teams may install a TV monitor in their pit garage to watch them. The times will also be shown on the screens installed in the restaurant of the Circuit.

ARTICLE 5: SCORING TESTS DURING THE PRACTISES

G.5.1 Test 5: Maximum speed at Speed trap

This test consists in achieving the maximum speed at a specific point of the racetrack.

- G.5.1.1 The Organisation will place a speed measurement device at the point known as Speed Trap.
- G.5.1.2 The speed recordings for this test will be made during the free practise session.
- G.5.1.3 Once the 40-minute free practise session has finished no further time recording will be made at the speed trap, and the best of the recorded speeds will be used to score the test performance.

G.5.1.4 The scoring of the maximum speed test at speed trap will be carried out after recording the top speeds of all teams.

G.5.1.5 In order for the scoring to be valid, the time of the lap during which the top speed at speed trap was recorded must be within 120% of the fastest lap time clocked during the free practise session.

G.5.1.6 The following extrapolation will be made with the recorded speeds:

$$\frac{V_{MAX} - V}{V_{MAX} - V_{MIN}} = \frac{30 - P}{29}$$

Where:

- V_{MAX} : Max. Speed.
- V_{MIN} : Minimum speed.
- V: Speed to evaluate.
- P: Score.

G.5.1.7 The figure resulting from article G.5.1.6 will be rounded to the corresponding integer. The score of the test will be awarded based on this rounded number and may range from one point for the slowest speed to 30 points for the fastest.

G.5.1.8 It will not be considered as valid those results below than 80% of the value of the best Vmax, receiving in this case 1 point score for this test.

G.5.2 Test 6: Pole position

This test consists in clocking the fastest lap time on the racetrack.

G.5.2.1 The times for this test will be recorded during the timed practise session.

G.5.2.2 The following extrapolation will be made after recording the times of all teams:

$$\frac{M_T - T}{M_T - P_T} = \frac{40 - P}{39}$$

Where:

- M_T : Fastest time.
- P_T : Slowest time.
- T: Time to evaluate.
- P: Score.

G.5.2.3 The figure resulting from article G.5.2.2 will be rounded to the corresponding integer. The score of the test will be awarded based on this rounded-up number and may range from one point for the slowest time to 40 points for the quickest time.

G.5.2.4 It will not be considered as valid those results that exceed 125% of the value of the best time, receiving in this case 1 point score for this test.

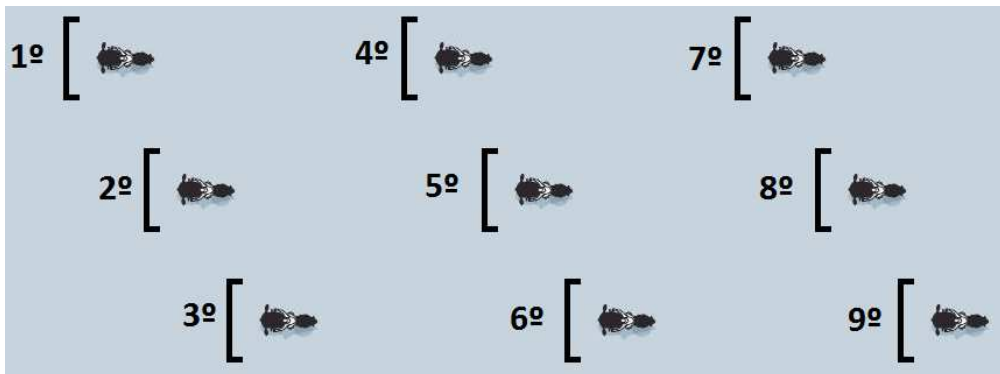
ARTICLE 6: RACE

It will run independently:

- The final race of the Category "MotoStudent Petrol".
- The final race of the Category "MotoStudent Electric".

G.6.1 Starting grid

The starting grid will have a formation of 3 motorcycles per line, and all spaces from the starting line to the back will be completed.



G.6.1.1 The starting order will be established according to the fastest times clocked by each motorcycle during the timed practice session.

G.6.2 Development of the race

G.6.2.1 The starting order will be established according to the fastest times clocked by each motorcycle during the timed practice session.

G.6.2.2 The motorcycles will be ridden by the riders nominated by the teams and approved by the Organisation as established in section A.3.6.

G.6.2.3 After the race, the motorcycles can be scrutineered by the Organisation in order to check weights and other technical aspects.

The information about the Race development (Time specifications, layout, etc) will be published soon.

G.6.3 Race scores

G.6.3.1 Teams will receive scores after the final classification of the race, based on the following criteria:

Position	Score	Position	Score
1st	150	16th	18
2nd	125	17th	16
3th	105	18th	14
4th	90	19th	12
5th	80	20th	10
6th	70	21th	8
7th	60	22th	7
8th	55	23th	6
9th	50	24th	5
10th	45	25th	4
11th	40	26th	3
12th	35	27th	3
13th	30	28th	3
14th	25	...	3
15th	20	40th	3

G.6.4 Test 7: Fastest lap during the race

The fastest lap during the race will be scored.

G.6.4.1 The Organisation will record the lap times of all motorcycles during the whole race.

G.6.4.2 Once the race has finished, the fastest laps recorded during the race will be scored according to the following extrapolation:

$$\frac{M_T - T}{M_T - P_T} = \frac{30 - P}{29}$$

Dónde:

- M_T : Fastest time.
- P_T : Slowest time.
- T: Time to evaluate.
- P: Score of the time to evaluate.

G.6.4.3 The figure resulting from article G.6.4.2 will be rounded to the corresponding integer. The score of the test will be awarded based on this rounded number and may range from one point for the slowest time to 30 points for the quickest time.

G.6.4.4 It will not be considered as valid those results that exceed 115% of the value of the best time, receiving in this case 1 point score for this test.

ARTICLE 7: ASSESSMENTS

G.7.1 Scores

The assessment of the MS2 tests, with the highest possible scores is shown in the following table.

<u>Class</u>	<u>Sesión</u>	<u>Prueba</u>	<u>Puntuación</u>
Dynamic tests	Track tests	1.- Brake test	60
		2.- Gymkhana	100
		3.- Best acceleration	60
	Box test	4.- Mechanical test	30
Race	Free practices	5.- Maximun speed at ST	30
	Timed practices	6.- Pole position	40
	Race	7.- Fastest lap during race	30
		8.- Race position	150
Total			500

G.7.2 Prizes

The awards for the MS2 Phase will be published soon.







IV International Competition MotoStudent

SECTION H: ADDITIONAL INFORMATION






ARTICLE 1: DOCUMENTATION REQUIRED

H.1.1 Pre-registration form

H.1.1.1 Pre-registration form for the Category "MotoStudent Petrol"




	IV International Competition MotoStudent 2015 - 2016 PRE-REGISTRATION FORM PETROL CATEGORY	 
<p>We are pleased to announce that the IV Edition of the MotoStudent International Competition 2015/2016 has been launched.</p> <p>NOW, you can reserve your place in the Competition by filling in this form and sending it to the Organization via email to: registry@motostudent.com</p> <p>Notes:</p> <ul style="list-style-type: none"> - All teams must fill out the information below. Use a second form to add more members. - The places are limited, and the selected teams will be announced soon. - The indicated team members can vary from the definitive registration form. - During the following weeks, the Organization will send the info and details about the Competition to the pre-registered teams. - The information and details will be posted too on the official website: www.motostudent.com. - The pre-registration period will end up at January 31th, 2015. - At the end of the pre-registration period, the registration period will be then considered as open. The pre-registration process only reserves your team a place in the Competition, but it does not implicate that the registration is as definitive. The team will be considered as registered once the entry payment fee will be cleared, during the registration period. <p>If you have any problem or general question, please submit them online via email to: info@motostudent.com</p>		
TEAM DATA		
University Name	<input style="width: 100%;" type="text"/>	
Degree or Course	<input style="width: 100%;" type="text"/>	
Faculty Advisor Name	<input style="width: 100%;" type="text"/>	
Team Leader Name	<input style="width: 100%;" type="text"/>	
Contact email	<input style="width: 100%;" type="text"/>	
Contact phone	<input style="width: 100%;" type="text"/>	
TEAM MEMBERS		
N.	NAME & SURNAME	e-mail
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<p>Data Protection Policy</p> <p>The processing of personal data and sending electronic communications by Moto Engineering Foundation are adjusted to the rules established in the article 21 of the Law : Services Information Society and Electronic Commerce 34/2002 dated July the 11th.</p> <p>The data subject may exercise rights of access, rectification, cancellation and opposition, communicating through email to info@fundacionmef.org</p>		
		

H.1.1.2 Pre-registration form for the Category “MotoStudent Electric”

	<p>IV International Competition</p> <p>MotoStudent</p> <p>2015 - 2016</p> <p>PRE-REGISTRATION FORM</p> <p>ELECTRIC CATEGORY</p>	
<p>We are pleased to announce that the IV Edition of the MotoStudent International Competition 2015/2016 has been launched.</p> <p>NOW, you can reserve your place in the Competition by filling in this form and sending it to the Organization via email to: registry@motostudent.com</p> <p>Notes:</p> <ul style="list-style-type: none"> - All teams must fill out the information below. Use a second form to add more members. - The places are limited, and the selected teams will be announced soon. - The indicated team members can vary from the definitive registration form. - During the following weeks, the Organization will send the info and details about the Competition to the pre-registered teams. - The information and details will be posted too on the official website: www.motostudent.com. - The pre-registration period will end up at January 31th, 2015. - At the end of the pre-registration period, the registration period will be then considered as open. The pre-registration process only reserves your team a place in the Competition, but it does not implicate that the registration is as definitive. The team will be considered as registered once the entry payment fee will be cleared, during the registration period. <p>If you have any problem or general question, please submit them online via email to: info@motostudent.com</p>		
<p>TEAM DATA</p>		
University Name	<input style="width: 100%;" type="text"/>	
Degree or Course	<input style="width: 100%;" type="text"/>	
Faculty Advisor Name	<input style="width: 100%;" type="text"/>	
Team Leader Name	<input style="width: 100%;" type="text"/>	
Contact email	<input style="width: 100%;" type="text"/>	
Contact phone	<input style="width: 100%;" type="text"/>	
<p>TEAM MEMBERS</p>		
N.	Name	e-mail
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<p>Data Protection Policy</p> <p>The processing of personal data and sending electronic communications by Moto Engineering Foundation are adjusted to the rules established in the article 21 of the Law : Services Information Society and Electronic Commerce 34/2002 dated July the 11th.</p> <p>The data subject may exercise rights of access, rectification, cancellation and opposition, communicating through email to info@fundacionmef.org</p>		
		

H.1.2 Registration form

H.1.2.1 Registration form for the Category “MotoStudent Petrol”

	IV International Competition MotoStudent 2015 - 2016 REGISTRATION FORM PETROL CATEGORY	 		
<p><i>Please, fill this document in order to be registered in the IV International Competition MotoStudent.</i> Once you have filled all the terms requested, send the file via email to: registry@motostudent.com</p> <p>Notes:</p> <ul style="list-style-type: none"> - All teams must fill out the information below. Use a second form to add more members. - The places are limited. The teams who have already done the pre-registration process have a place reserved until the end of the Registration period, but they will not be considered as registered until they complete the Registration procedure. - The Registration period will end up at May 31st, 2015. - The information and details of the Competition will be posted on the official website: www.motostudent.com. 				
TEAM DATA				
University Name ¹	<input style="width: 100%;" type="text"/>			
Degree or Course ²	<input style="width: 100%;" type="text"/>			
Address	<input style="width: 100%;" type="text"/>			
City	<input style="width: 60%;" type="text"/>	Post Code <input style="width: 30%;" type="text"/>		
County / State	<input style="width: 60%;" type="text"/>	Country <input style="width: 30%;" type="text"/>		
Contact mobile	<input style="width: 40%;" type="text"/>	Other contact phone <input style="width: 40%;" type="text"/>		
VAT ID Number	<input style="width: 100%;" type="text"/>			
TEAM MEMBERS				
Faculty Advisor	<input style="width: 40%;" type="text"/>	F. Ad. Email <input style="width: 40%;" type="text"/>		
Team leader Name	<input style="width: 40%;" type="text"/>	Team email <input style="width: 40%;" type="text"/>		
N.	Name & Surname	e-mail	Date of birth	ID/Passport number
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<p>¹ State the name of the university and the center or campus. Example: University of XXXX - School of Engineering ² State the name of the degree of studies of the majority of the team members. Example: Electronic Engineering, M.Eng, Grado en Ing. Eléctrica</p>				

PAYMENT TERMS

Registration fees:

Team inscription fee (first 7 members included): **2.450 €**+ VAT

Additional members: **250 €**+ VAT per student

Total number of members (please fill in) (minimum of 7)

Total Registration fee: **2.450,00 €** + VAT

The payment of the registration fee includes:

- The rights to participate at the IV Edition of the International Competition MotoStudent as an official team.
- The "full access" passes and corresponding insurance for the Final Event in 2016 for the registered team members.
- The MotoStudent 15/16 Kit that includes common compulsory parts for all teams that must be installed in the bike (see Technical Regulations). The shipping cost of the Kit is also included. There are not included the duties or special taxes of the destination countries, states or other zones.
- The right to access to free CAD design software, discounts in services and parts by the sponsor

Once this Registration Form is filled out and received, the Organization will generate the corresponding invoice with the total amount to pay. The Organization will not consider as registered a team until the payment is conformed.


Data Protection Policy

The processing of personal data and sending electronic communications by Fundación Moto Engineering Foundation and Parque Tecnológico del Motor de Aragón S.A. are adjusted to the rules established in the article 21 of the Law : Services Information Society and Electronic Commerce 34/2002 dated July the 11th.

The data subject may exercise rights of access, rectification, cancellation and opposition, communicating through email to info@fundacionmef.org



H.1.2.2 Registration form for the Category “MotoStudent Electric”




IV International Competition


MotoStudent

2015 - 2016

REGISTRATION FORM

ELECTRIC CATEGORY





Please, fill this document in order to be registered in the IV International Competition MotoStudent.
Once you have filled all the terms requested, send the file via email to: registry@motostudent.com

Notes:

- All teams must fill out the information below. Use a second form to add more members.
- The places are limited. The teams who have already done the pre-registration process have a place reserved until the end of the Registration period, but they will not be considered as registered until they complete the Registration procedure.
- The Registration period will end up at May 31st, 2015.
- The information and details of the Competition will be posted on the official website: www.motostudent.com.

TEAM DATA

University Name ¹	<input style="width: 100%;" type="text"/>		
Degree or Course ²	<input style="width: 100%;" type="text"/>		
Adress	<input style="width: 100%;" type="text"/>		
City	<input style="width: 50%;" type="text"/>	Post Code	<input style="width: 40%;" type="text"/>
County / State	<input style="width: 50%;" type="text"/>	Country	<input style="width: 40%;" type="text"/>
Contact mobile	<input style="width: 30%;" type="text"/>	Other contact phone	<input style="width: 60%;" type="text"/>
VAT ID Number	<input style="width: 100%;" type="text"/>		

TEAM MEMBERS

Faculty Advisor	<input style="width: 60%;" type="text"/>	F. Ad. Email	<input style="width: 60%;" type="text"/>
Team leader Name	<input style="width: 60%;" type="text"/>	Team email	<input style="width: 60%;" type="text"/>

N.	Name & Surname	e-mail	Date of birth	ID/Passport number
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¹ State the name of the university and the center or campus. Example: University of XXXX - School of Engineering
² State the name of the degree of studies of the majority of the team members. Example: Electronic Engineering, M Eng, Grado en Ing. Eléctrica

PAYMENT TERMS

Registration fees:

Team inscription fee (first 7 members included): **2.450 €**+ VAT

Additional members: **250 €**+ VAT per student

Total number of members (please fill in) (minimum of 7)

Total Registration fee: **2.450,00 €** + VAT

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- The rights to participate at the IV Edition of the International Competition MotoStudent as an official team.
- The "full access" passes and corresponding insurance for the Final Event in 2016 for the registered team members.
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- The right to access to free CAD design software, discounts in services and parts by the sponsor

Once this Registration Form is filled out and received, the Organization will generate the corresponding invoice with the total amount to pay. The Organization will not consider as registered a team until the payment is conformed.

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ARTICLE 2: INFORMATION OF INTEREST

H.2.1 Protest model for the Final Event

Mr/Ms _____ with personal ID-number _____ , as
tutor/team leader of the team of the _____ University, known as
_____ hereby wishes to lodge a

PROTESTS with the Organisation of the III MotoStudent Competition:

For what is considered as a breach of article _____ of the Regulations of the
above-mentioned Competition, which says:

The following proofs are attached to be taken into account by the Organisation when
verifying this protest:

And for the record, I sign this document in Alcañiz, on _____.

Mr/Ms _____

Team _____

Soon more additional information of interest to the participant teams will be attached

IV International Competition MotoStudent

SECTION I: MODIFICATIONS GLOSARY

In the Modifications Glossary will be reflected all additions, clarifications or corrections made on the Regulations of the Competition in future reviews.

EVERYTHING NOT PERMITTED AND SPECIFIED IN THESE REGULATIONS IS STRICTLY FORBIDDEN