<Beta Regulations>

MX ACADEMIC CUP

1. Administrative Regulations

1.1. Introduction MX Academic Cup

The MX Academic Cup is the new student design competition launched in aachen for teams all over the world. In teams, students build a motocross competition bike and compete against other universities. The best compromise between useability and sustainability wins. Student teams participate for free in all MX Academic Cup events and get exclusive opportunities. For this very new Student Competition the organisers start with three contact events to focus the interest community for participating Student Teams and supporting Companies.

1.2. Registration

Participating Student Team have to fulfil the following requirements.
The Student Team must have

i. five registered student members or more.
ii. an official supervisor from the University, where the student members are registered.

1.3. Participating Scope

The registered Student Teams commit to participate the following fixed Events.

First contact event	24.-25.07.2019 (fixed)
Second contact event	XX-XX+1.01.2020 (not fixed)
Third contact Event	XX-XX+1.07.2020 (not fixed)
Race Camp	XX-XY.04.2021 (not fixed)
Score Event	XX-XY.07.2021 (not fixed)

the Content and conditions of the contact Events will be published at www.mx-academic-cup.com .

1.4. General Reports and Deadlines

Safe Reports
- Structure Report
- HV Report

Sustainability Reports
- Production
- Drive Mode
- Recycling

1.5. Rules of Conduct

1.5.1 General Officials Authority

1.5.1.1 The officials reserve the right to revise the schedule of the competition and/or interpret or modify the competition rules at any time and in any manner that is, in their sole judgment, required for safe and efficient operation.

1.5.1.2 All team members are required to cooperate with and follow all instructions from the officials.

1.5.1.3 Official announcements shall be considered part of these rules.

1.5.1.4 All guidelines and clarifications posted in the "Rules and Important Documents" sections on the competition website for the current season including the competition handbook are considered part of these rules.

1.5.1.5. Questions concerning the meaning or intent of the rules will be resolved by the officials.

1.5.2. Official Instructions

1.5.2.1 Failure of a team member to follow an instruction or command directed specifically to that team or team member will result in a 10 point penalty.

1.5.3 Arguments with Officials

1.5.3.1 Argument with, or disobedience to, any official will result in the team being eliminated from the competition.

1.5.4 Unsportsmanlike Conduct

1.5.4.1 In the event of unsportsmanlike conduct, the team will receive a 10 point penalty. A second violation will result in expulsion of the team from the competition.

1.5.5 Violations of Intent

1.5.4.3 Violation of the intent of a rule will be considered a violation of the rule itself.

1.5.4.4 Any parts, devices or software fragments designed with the intent to violate a rule, will be considered as a violation.

1.5.6 Questions about the Rules

1.5.6.1 Questions about the rules may be asked to the officials.
The frequently asked questions (FAQ) section on the competition website must be checked before submitting a question.

1.5.6.2 The officials will only answer questions that are not already answered in the rules or FAQs or that require new or novel interpretation.

1.5.6.3 Refer to the competition website for specific directions how to submit a rules question.

1.5.7 Protests

1.5.7.1 If a team has a question about scoring, judging, policies or any official action it must be brought to the officials' attention within the announced protest period for an informal preliminary review before a protest can be filed.

1.5.7.2 A team may protest any rule interpretation, score or official action which they feel has caused some actual, non-trivial, harm to their team, or has had a substantive effect on their score.

1.5.7.3 All protests must be filed in writing and presented to the officials by the team captain. In order to have a protest considered, a team must post a 10 point protest bond which will be forfeited if their protest is rejected.

1.5.7.4 The decision of the officials regarding any protest will be in a written form and is final.

2 General Technical Regulations

2.1. Technical requirements of the motorcycle and restrictions

- Motorcycles presented to compete in MX Academic Cup must present satisfactory level of self-made technical solutions in order to be considered prototypes. The development progress has to be recognizable in reports and at the Motorcycle.
- In order to participate in scoring Phases of Competition, the design and manufacture of presented projects must comply with the Rules imposed by these Regulations.
- Specifications required in the Technical Regulations must be maintained for all test of the Race Camps and Score Event
- Any failure to fulfil the technical requirements and restrictions have to be corrected and re-inspected before the bike can participate in any test during the Race Camps and Score Event.
- The rules reflected in General Technical Rules Section affects equally every possible type of power source of motorcycle, except for the articles where are indicated special requirements for a specific power source.

2.1.1Changes and repairs

Once the static and dynamic scrutineering of the Event have been passed and the motorcycle has been validated for the MX Academic Cup 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:

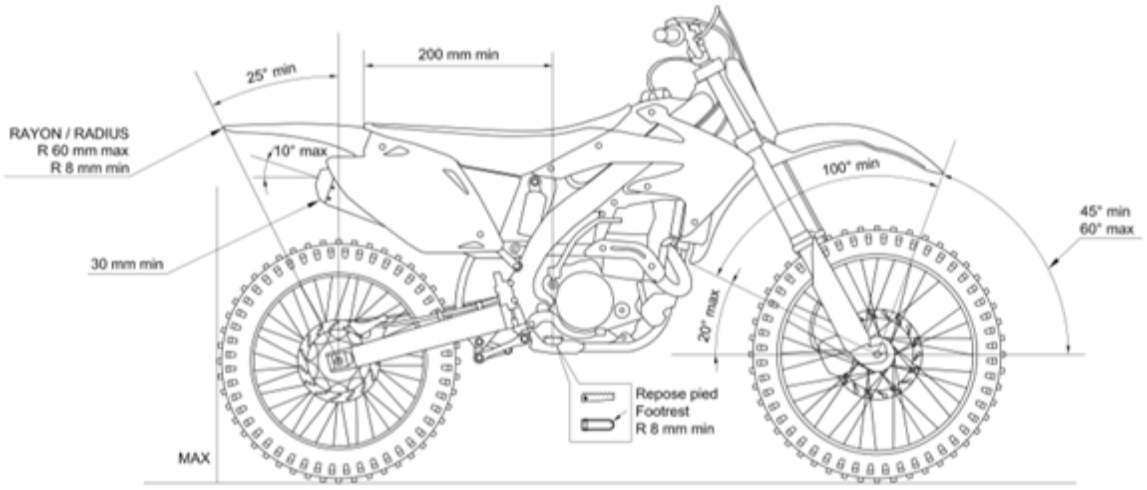
a) Chain adjustment
b) Brake adjustment
c) Changes in the data recording
d) Tyre pressure adjustment
e) Refilling fluids
f) Set-up adjustments
g) Engine set-up adjustments.

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.

2.2 General design requirements

2.2.1 Dimensions

Dimensions of the motorcycle are free, except for the following requirements, introduced on the scheme



2.2.2 Weight

- The total minimum weight of the motorcycle without the rider shall be 95kg for every category, including all fluids that may be necessary for the correct operation of the bike. For bikes using petrol, gasoline or other type of fuel, at least one liter of fuel must be included within this weight.
- The use of ballast to stay over the minimum weight is forbidden. The term "ballast" refers to as any component, device or part, the primary function of which is to add weight to the machine. All components, devices and parts must be firmly fixed to the motorcycle.
- The total allowed maximum weight of the motorcycle is 135 kg. For bikes exceeding allowed weight point penalties will be granted.

2.2.3 Frame

2.2.3.1 General

- The use of commercial frame is allowed, as well as modyfying an existing unit.
- However, the frame must be produced in 2016 or later and be included in the list of allowed motorcycles, given below. The modifications must be documented at the structure report.

OEM	Yamaha	KTM	Suzuki	Kawasaki	Honda	TM	Husqvarna	Alta Motors

Models	YZ 125	SX 125	RM 125	KXF 250	CRF 250	MX 125	TC 125	Redshift MX
	YZ 250	SX 150	RMZ 250	KXF 450	CRF 450	MX 144	TC 150	
	YZF 250	SX 250	RMZ 450			MX 250	TC 250	
	YZF 450	SXF 250				MX 300	FC 250	
		SXF 350				MX 250 Fi	FC 350	
		SXF 450				MX 300 Fi	FC 450	
						MX 450 Fi		
						MX 530 Fi		

Table 1. List of allowed motorcycle

If participating teams want to use motorcycles or chassis parts from motorcycles, that is not mention in the table. They have to send a written request to organisators.

- In case of designing any part of the frame by themselves, 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
- In case of doubt about the safety of the frame design submitted, the Organization may request a safety justification report that includes analysis using the finite element method, simulations or other demonstration tests.

2.2.3.2 Materials

2.2.3.2.1 Titanium and light alloys.

The use of titanium in the construction of the frame, the front forks, the handlebars, the swinging arms, the wheel- and swinging arm-spindles is forbidden. The use of light alloys for wheel spindles is also forbidden. The use of titanium alloy nuts and bolts is allowed.

2.2.3.2.2 Carbon fiber

The use of carbon fibre reinforced materials is authorised (with the exception of handlebars and wheel rims).

2.2.3.2.1 Ceramic materials

The use of ceramic parts is forbidden.

2.2.4. Handlebars, control levers and throttle

2.2.4.1 Handlebars

- The width of handlebars must be not less than 600 mm and not more than 850 mm.
- The handlebars must be equipped with a protection pad on the cross bar. Handlebars without a cross member must be equipped with a protection pad located in the middle of the handlebars, covering widely the handlebars clamps.
- Handlebar clamps must be very carefully radiused and engineered so as to avoid any fracture points in the handlebar.
- Exposed handlebar ends must be plugged with a solid material or rubber covered.
- When hand protectors are used, these must be made of a shatter-resistant material and have a permanent opening for the hand.
- Handlebars made of composite materials are not authorised.
- Repair by welding of light alloy handlebars is prohibited.
- Solid stops (when on full-lock, other than steering dampers) must be fitted. These must ensure a minimum clearance of 30 mm between the handlebar with levers and the tank to prevent trapping the rider's fingers.

2.2.4.2 Control levels

- All handlebar levers (clutch, brake, etc.) must be in principle ball ended (diameter of this ball to be at least 16 mm). This ball can also be flattened, but in any case the edges must be rounded (minimum thickness of this flattened part 14 mm). These ends must be permanently fixed and form an integral part of the lever. If the gear lever consists of a tube, then its edge must be rounded.
- Each control lever (hand and foot levers) must be mounted on an independent pivot.
- The brake lever if pivoted on the footrest axis must work under all circumstances, such as the footrest being bent or deformed.
- Hand- and foot-controls may be modified for mobility challenged riders.

2.2.4.3 Throttle controls

- Throttle controls must be self-closing when not held by the hand. The throttle operation (opening and closing) shall only be activated by mechanical cable from the twist grip directly attached to the throttle valve. Electronically controlled throttle valves are forbidden. All air intakes into the cylinder must pass through the throttle body. No other means allowing ambient air into the inlet track of the cylinder head are allowed.

2.2.5 Footrests

- Footrests must be solidly fixed or of a folding type but in this case must be fitted with a device which automatically returns them to the normal position, and an integral protection is to be provided at the end of the footrest which must have at least 8 mm radius (see Diagrams). The footrest teeth shall not be sharp. The height of the footrest teeth must be 10 mm maximum.

2.2.6 Brakes

- All motorcycles must have at least two efficient brakes (one on each wheel) operated independently and operating concentrically with the wheel.
- The braking system for the front wheel should be commanded by a hand lever installed next to the throttle grip on the right handlebar.
- The braking system for the rear wheel must be commanded by foot by a cam system installed in the area of the right footrest.

2.2.7 Suspension system

- Use of suspension systems available on the market is permitted, with following exceptions.
- Use of electronically controlled and/or active or semi-active suspension systems is forbidden
- The Organization shall not accept the participation of a motorcycle which suspension system is determined to be dangerous for the participation in track tests.

2.2.8 Wheels, rims, tyres.

- All tyres will be measured mounted on the rim at a pressure of 1 kg/sq.cm (14 lb./sq.in); measurements are taken at a tyre section plane with a 90° angle with the ground plane.
- Any modification to the rim or spokes of an integral wheel (cast, moulded, riveted) as
- supplied by the manufacturer, or of a traditional detachable rim other than for spokes, valve or security bolts, is prohibited. The only exception made is for tyre retention screws, sometimes used to prevent tyre movement relative to the rim. If the rim is modified for these purposes, bolts, screws, etc., must be fitted.
- Maximum size for front and rear wheel are respectively 21 and 19 inch.
- Scoop or paddle (continuous radial rib) tyres and/or tyres with lugs having a height of over 19.5 mm are forbidden.
- The tyre surface shall not be fitted with subsequently mounted elements such as anti-skid spikes, special chains, etc.

2.2.9 Fairings, mudguards

2.2.9.1 General requirements

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

2.2.9.2 Mudguards

- Motorcycles must be fitted with rounded mudguards.
- Mudguards must project laterally beyond the tyre on each side.

- The front mudguard must cover the circumference of the wheel at an angle sufficient enough to protect the rider from mud.
- The rear mudguard measure described in the Diagrams ("L" distance) must not exceed 130 mm at the most extended positions of the front and the rear suspension, at full extension.
- The ends of the mudguards must be rounded. The radius must be at least 3 mm.
- Mudguards must be made of flexible materials only (e.g. plastics).
- If cast or welded wheels are used, a protection must be provided by enclosing the spokes with solid discs. Any open area between the outer edge of the solid disc and the wheel rim shall be maximum 10 mm (tyre inflation valve excepted).

2.2.10 Rider equipment

- It is compulsory to wear homologated helmet, gloves, off-road boots, appropriate body protection (chest and back), heavy long pants and glasses.
- It is compulsory that footwear is in a good condition made from leather or another material with similar properties and with minimum heigth of 30 cm
- It is compulsory that gloves are made of leather or another material with similar properties.
- It is compulsory to wear eye protection. Use of goggles, glasses, helmet visors and "roll offs" are permitted and "tear offs" is forbidden. The material used for glasses, goggles and visors must be made of shatter-proof material. Helmet visors must not be an integral part of the helmet. Eye protectors which cause visual disturbance (e.g. scratched) must not be used.
- Wearing helmets
- It is compulsory for all participants taking part in practice and races to wear a protective helmet. The helmet must be properly fastened, be of a good fit, and be in good condition. The helmet must have a chin strap type 'retention system'.
- A protective lower face cover must be present and must be not detachable, and not moveable and made of the same material of the shell.
- Helmets constructed with an outer shell made of more than one piece are not permitted (e.g. they must not contain any seam).
- A retention system with a strap and the double D ring closing system is recommended.
- A helmet is made to provide protection. A helmet is not a platform to attach foreign objects.
- Failure to observe the above rules will entail exclusion.

2.2.11 Powertrain

- There is no limitation to the number and type of used transmission, however a driver must be protected from any risks from the transmission.

2.2.12 Cooling system

- The design of cooling system for any component is permitted.
- Use of other liquids than distilled water is permitted as long as the system is completely sealed in any operating condition.

3. Specific Technical requirements for using -

3.1. electric powertrain components (EV)

3.1.1 Definitions

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

- Any circuit with a potential difference above 48 VDC, will be part of the High Voltage (HV) system of the vehicle. Below this voltage, it will be considered as a part of the Low Voltage (LV) system.
- The maximum permitted voltage of the HV system shall be 600 VDC (fully charged batteries).

3.1.1.2. High Voltage System - HVS

- Any circuit with a potential difference above 48 VDC, will be part of the High Voltage (HV) system of the vehicle. Below this voltage, it will be considered as a part of the Low Voltage (LV) system.
- 1.1.2 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 given in the Regulations
- The HVS must be electrically separated from the vehicle chassis or ground.
- 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.
- The HVS must have a controller device fitted in between the motor and the accumulator, so that there cannot be a direct connection between the motor and the accumulator.
- 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” and a black flash of lightning inside a yellow triangle with a black border. Minimum size of a triangle side is 8 cm.
- 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 by the Organization in order to check whether or not the value
  shown on the display corresponds to the real voltage value of the HVS.

3.1.1.3. 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.
- The GLVS must be a LV system, i.e. with a voltage below 48 VDC.

3.1.1.4. Insulation between HVS and GLVS

- The HVS and the GLVS shall be galvanically separated.
- Should a DC/DC converter be used, it will have to comply with this specification.

3.1.2. Electric motor

- It is allowed to use electric motors available on the market, to modify it or to design own construction.
- The motor must be connected to the battery through a controller.
- It is allowed to use recuperative energy systems.

3.1.3. Energy storage

3.1.3.1 Permitted storage systems

- Any type of battery may be used as energy storage system, except for molten salt batteries (thermal batteries)
- The use of supercapacitors is allowed. The voltage supplied by the batteries shall be a maximum of 600 VDC with fully charged accumulator.
- The use of supercapacitors is allowed
- The connection diagram used shall be submitted to the Organisation (cells in series and in parallel).

3.1.3.2 Battery container

- All battery cells and supercapacitors that form part of the accumulator must be installed inside a battery container or case.
- The use of several battery containers is allowed. Each one of them must comply with the same prescriptions established for a single battery container.
- If the battery container is not easily accessible, the Organisation may request pictures of the layout and the assembly at any time.
- A detailed description of the accumulation system shall be submitted before proceeding with its assembly. Also, it will be obligatory the submission of pictures of the different phases of the assembly of the accumulator, showing all the parts installed. Failure to comply with either of these two requirements may result in the exclusion of the prototype for the Final Phase of the Competition.

3.1.3.3 Electrical configuration of the accumulator

- 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.
- If the container is made of an electrically conductive material (metals, carbon fiber, etc.), the body of the cells cannot be directly in contact with the inner wall of the crankcase and an insulation material must be placed. Prismatic cells with a rigid insulating housing are excluded from this requirement.
- Each container must include at least one fuse inside, the rated intensity of which must be below the cutting power of the contactor.
- Each container must include, at least, a NO-type line contactor, installed in the positive terminal of the accumulator.
- The closing of the line contactor, and consequently the presence of High Voltage (HV) at the exit of the accumulator, must be signalled by means of a red light signal located on the dashboard, according to the standards given in Art. (later on!)
- It is not allowed the direct connection between cell terminals by means of welding or soldering. Indirect welding or soldering is permitted through a conductive material (plates, plates, cables, fusible wire). The welding or soldering of the BMS conductors to the terminals is allowed.

3.1.3.4 Mechanical configuration of the accumulator

- The battery containers must be built with a mechanically resistant material and be installed correctly anchored to the chassis.

- The battery container may be part of the frame of the motorbike, provided that it complies with the appropriate stiffness and resistance conditions.
- The battery containers that are not part of the frame must be protected against side impacts by the motorbike frame.
- The cells must be duly protected and fixed to avoid any relative movement (horizontally and vertically) inside the container.
- 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.
- Ventilation openings cannot cover a complete side of the container.
- Ventilation openings must include some type of filtering element in order to avoid the entry of dust, particles and liquids into the container.
- Should a container be completely and tightly sealed, it must include an escape valve to prevent the gas concentration from reaching critical pressure.
- The use or adaptation of commercially available containers or cases is allowed, provided that they comply with the characteristics established in this article.

3.1.3.5 Battery Management System – BMS

- The installation of a battery management system (BMS) is compulsory
- The BMS must read the voltage of each cell in order to keep the cells within the voltage limits established by the manufacturer.
- The BMS must read the temperature of the cells in their hottest point by means of a compatible temperature sensor. It will be compulsory to read the temperature of at least 4 installed cells, with at least two of them being those corresponding to areas where higher temperatures are expected to be reached.
- Should a cell balancing pasive system be used (non-compulsory), resistances must be used capable of dissipating the energy corresponding to the balancing, in such a way that during the balancing period, the temperature indicated by the manufacturer of the resistor (or the BMS) is not overpassed, and does not affect the battery cells or printed circuits nearby.
- To improve the balancing speed, it is allowed to activate the artificial cooling of the battery container during the balancing process.
- 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 contactor of the battery accumulator open.
- In addition to the conditions set-out in previous point, 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.
- 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 and/or prompt.

3.1.4. Controller

3.1.4.1 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.

- It is allowed to use any type of commercially available controller.
- It is allowed to develop the controller or to adapt any commercially available device.
- The hardware components shall be compatible with the working voltage and intensity values
- The controller must comply with all the prescriptions that may apply to it in these Technical Regulations.

3.1.4.2. 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.
- It is allowed to use any type of commercially available controller.
- The management map for the propulsion system is freely configurable.
- The implementation of different management maps is allowed.

3.1.5 General aspects of the High Voltage System (HVS)

3.1.5.1 Separation of the HVS and the GLVS

- The HVS and the GLVS must be physically separated.
- There cannot be any contact between the HVS and the frame of the vehicle or any metallic part that is exposed to the outside.
- 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, except in the exceptional cases described in next articles:

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

- Distances indicated in previous article shall not apply if the components of the HVS and the GLVS are separated by a humidity insulating barrier with a temperature resistance degree of 150 ºC or higher.

- If some parts or pieces of the HVS and the GLVS should be installed 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).

3.1.5.2. Positioning of the HVS

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

5.2.2 The frame of the motorbike 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, provided that the requirements indicated in Art. 3.4 is met.

3.1.5.3. 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

3.1.5.4. Insulation and cabling

- All components of the HVS must be duly insulated and protected against direct contact.
- 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.
- The HVS connections must be encapsulated in insulating components.
- The cables or conductors pertaining to the HVS must be non-flammable, grade UL-94V0, FAR25 or equivalent.

3.1.5.5. Precharge circuit

- It is mandatory to install a precharge circuit before closing the contact of an accumulator
- The minimum precharge level must reach 90% of the real voltage of the accumulator, and / or 10 V of maximum voltage difference between terminals.
- When the disconnection circuit described in Art.D.6.1 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.

3.1.5.6. HVS activation warning

- A red warning light shall be installed that will remain on while the HVS is active, i.e. while the contactor of the accumulator is closed.

3.1.6. DISCONNECTION SYSTEMS AND CIRCUITS

3.1.6.1. HVS disconnection circuit

- The disconnection circuit manages the opening and closing of the line contactor.
- The disconnection circuit will consist of at least:
    a. A Tractive System Master Switch (TSMS).
    b. A Shut-down button.
    c. An Insulation monitoring device (IMD).
    d. The disconnection system managed by the BMS.
- The disconnection system must follow one of the systems described below:

a. Disconnection system with contactor directly controlled by the disconnection circuit: (diagrams there!)
b. Disconnection system with contactor directly controlled by the controller:

- Should the coil of the contactor 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 in 6.1.3
- Once the disconnection circuit is open (contactor 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.

3.1.6.2. 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.

3.1.6.3. Type of switches

- The Emergency/Shut-down button(s) must be red mushroom-type push-rotary buttons.
- The Tractive System Master Switch (TSMS) must be rotary-type.

3.1.6.4. Deactivation of the DC/DC converter

- Should a DC/DC converter be used as LV energy source, the complete disconnection of the inverter must be ensured to avoid self-consumption

3.1.6.5. Insulation Monitoring Device (IMD)

- The Organization will provide an insulation monitoring device (IMD) BENDER to ensure a proper electrical isolation between the HVS and the chassis of the prototype.
- The installation of this insulation monitoring device is mandatory.
- The proper working of the insulation monitoring device will be checked during the static safety check, as indicated in these Regulations.

3.1.7. Disconnection Systems and Circuits

3.1.7.1. HV Fuses

- The circuit on the HV side must be protected by at least one fuse, according to the conditions stated in Art. 3.3.3
- The rated current of the fuse shall be lower than the calculated shortcut current, and higher than the maximum service current.
- If several cell strings are mounted in parallel, each of these strings must be protected with an own independent fuse.
- The fuse or fuses must be installed inside the battery container or case.

3.1.7.2. 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.

3.1.8. Accumulator Recharging

3.1.8.1. Chargers

- All types of chargers with a rated power minor or equal to 22 kW are permitted (Maximum 32 rated amps in three-phase network side configuration).
- Serial or parallel configurations of different chargers are permitted provided that the total sum of the unit powers of the chargers does not exceed the power indicated in Art. D.8.1.1.
- The charger must be fitted with a respective ground conductor which must be duly connected to the case of the charger.

3.1.8.2. Mains connection

- The mains connection can be single-phase (230 VAC, 50 Hz) or three-phase (400 VAC, 50 Hz).
- The connection of the ground conductor to the socket base is compulsory.

3.1.8.3. Connection to the motorcycle

- The connection between charger and motorcycle must comply with specific minimum safety conditions.
- The charging connector located on the motorcycle must be fitted with an automatic or manual shut-down system.
- The conductors of the recharging connector present on the motorcycle must be inaccessible when the connector is closed.
- The charging connector of the motorcycle must have a tightness degree of IP- 65 when closed.
- The charging connector must be located in a protected area of the motorcycle to prevent damages due to possible crashes, contacts or impacts.

3.1.8.4. Recharging process

- The recharging process of the accumulators must be carried out in a safe way.
- 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.
- 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.
- 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.
- The BMS must be fitted with a recharge control device, as described in Art. D.3.5.

3.1.9. General Installation and cabling

3.1.9.1. General insulation

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

3.1.9.2. Dimensioning

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

3.1.9.3. Protection against humidity

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

3.1.9.4. Wiring

- The cable length must be exact, and therefore it is not allowed to roll excessive cable lengths.
- The passage of the electric installation through possible hot points must be avoided as far as possible.
- 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.
- 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.).

3.1.10. Control and Control Elements

3.1.10.1. Dashboard

- The dashboard shall be perfectly visible for the rider when in riding position.
- The dashboard must include a red warning light that must be lit when the HVS is activated, as indicated in Art. D.5.6.
- The dashboard must have a display showing the voltage between HVS terminals at all times, as established in Art. D.1.2.5.

3.1.10.2. Control elements

- The rider 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.

3.1.10.3. Shut-down button

- This article affects the shut-down button(s) described in Art. D.6.1 of these Regulations.
- 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.
- 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.
- 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.
- The installed shut-down button or buttons must have red colour.

3.2. Combustion engine use. (CV)

3.2.1. Engine Powertrain

3.2.1.1. Engine Limitations

- It is allowed for teams to use the available engine unit for motocross motorcycles, modify it or develop entirely new one. However, few restrictions are given in following points.
- It is allowed to modify engine freely, however participating team must create a comprehensive report. The report must include full description of applied technical modifications and safety analysis.

3.2.1.2. Starter

- Each vehicle must be equipped with an on-board starter, which must be used to start the vehicle. CE 1.2.2 [DV ONLY] The vehicle must be equipped with an additional engine start button next to the LVMS, see T 11 .3, that can be easily actuated from outside the vehicle. Using the external engine start button, the engine may only start if
    - the ASMS (see DV 2.2) is switched on and
    - the gearbox is in neutral. CV 1.2.3 [DV ONLY] There must be a green light next to the engine start button, that indicates that the gearbox is in neutral. It must be marked with the letter “N”. This letter must have a minimum height of 25 mm.
- In case of using standard components participanting teams have to report that the loads must be the same as in the system actually used or less.

3.2.1.3. Air Intake System

- All parts of the engine air and fuel control systems (including the throttle and the complete air intake system, including the air filter and any air boxes) must lie within the surface defined by the top of the roll bar and the outside edge of the four tires. (See Figure 2).
- Any portion of the air intake system that is less than 350 mm above the ground must be shielded from side or rear impact collisions by structure built to T 3.15.
- The intake manifold must be securely attached to the engine block or cylinder head with brackets and mechanical fasteners. The threaded fasteners used to secure the intake manifold are considered critical fasteners and must comply with T 10.
- Intake systems with significant mass or cantilever from the cylinder head must be supported to prevent stress to the intake system. Supports to the engine must be rigid. Supports to the chassis must incorporate isolation to allow for engine movement and chassis torsion.

3.2.1.3. Throttle

- The vehicle must be equipped with a throttle body. The throttle body may be of any size or design.
- The throttle must be actuated mechanically by a hand mechanic at the handlebar.

- Throttle position is defined as percentage of travel from fully closed to fully open where 0 % is fully closed and 100 % is fully open. The idle position is the average position of the throttle body while the engine is idling.
- The throttle system mechanism must be protected from debris ingress to prevent jamming.

3.2.1.4. Mechanical Throttle Actuation

- CE 1.5 only applies if no ETC system is used.
- The throttle actuation system must use at least two return springs located at the throttle body, so that the failure of any one of the two springs will not prevent the throttle returning to the idle position.
- Each return spring must be capable of returning the throttle to the idle position with the other disconnected.
- Springs in the Throttle Position Sensor (TPS) are not acceptable as return springs.
- Throttle cables must be located at least 50 mm from any exhaust system component and out of the exhaust stream.
- Throttle cables or rods must have smooth operation and must not have the possibility of binding or sticking. They must be protected from being bent or kinked by the driver's foot during operation or when entering the vehicle.
- A positive pedal stop must be incorporated on the accelerator pedal to prevent over-stressing the throttle cable or actuation system.

3.2.1.4. Turbochargers and Superchargers

- The intake air may be cooled with an intercooler. Only ambient air may be used to remove heat from the intercooler system. Air-to-air and water-to air intercoolers are permitted. The coolant of a water-to-air intercooler system must be plain water without any additives.
- If pop-off valves, recirculation valves, or heat exchangers (intercoolers) are used, they may only be positioned in the intake system as shown in Figure 17.
- Plenums anywhere upstream of the throttle body are prohibited. A "plenum" is any tank or volume that is a significant enlargement of the normal intake runner system.

3.2.1.5. Crankcase / Engine Lubrication Venting

- Crankcase breathers that pass through the oil catch tank(s) to exhaust systems, or vacuum devices that connect directly to the exhaust system, are prohibited.

3.2.2. Fuel and Fuel System

3.2.2.1 Fuel

- The available fuel types will be unleaded gasoline 98RON and E 85. when the participating team want to use other fuels they have to send an application to the official. The application have to includes
    a. a safety report of the fuel system

b. a safety report of the fuel transport during the race camps and score events.
c. a safety report for impact accidents up to 40g.
d. a safety report for flammability under fire.
e. a safety report about change regulation for the fuel system
f. a report about sustainability and pollution of the fuel use.

- The vehicles must be operated with the fuel provided at the competition.
- No agents other than fuel and air may be induced into the combustion chamber.
- The temperature of fuel introduced into the fuel system may not be changed with the intent to improve calculated efficiency.

3.2.2.2. Fuel System Location Requirements

- The fuel tank must be located within the main frame or the rear additional frame envelope.
- All parts of the fuel storage and supply system must be adequately protected against any heat sources and located at least 50 mm from any exhaust system component.

2.2.2.3. Fuel Tank

- The fuel tank is defined as the part of the fuel containment device that is in contact with the fuel. It may be made of a rigid material or a flexible material.
- The fuel tank cannot be used to carry structural loads and must be securely attached to the vehicle structure with mountings that allow some flexibility such that chassis flex cannot unintentionally load the fuel tank.
- Any fuel tank that is made from a flexible material, for example a bladder fuel cell or a bag tank, must be enclosed within a rigid fuel tank container which is securely attached to the vehicle structure. Fuel tank containers (containing a bladder fuel cell or bag tank) may be load carrying.
- The fuel system must have a provision for emptying the fuel tank if required.
- The fuel tank, by design, must not have a variable capacity.

2.2.2.4. Fuel Lines for Low Pressure Systems

- Fuel lines between fuel tank and fuel rail and return lines must have:
    a. Reinforced rubber fuel lines with an abrasion protection with a fuel hose clamp which has a full 360° wrap, a nut and bolt system for tightening and rolled edges to prevent the clamp cutting into the hose, or
    b. Metal braided hoses with crimped-on or reusable, threaded fittings.
- Fuel lines must be securely attached to the vehicle and/or engine.
- All fuel lines must be shielded from possible rotating equipment failure or collision damage.

2.2.2.5. Fuel Injection System Requirements

Low Pressure Injection (LPI) fuel systems are those functioning at a pressure below 10 bar and High Pressure Injection (HPI) fuel systems are those functioning at 10 bar pressure or above. Direct Injection (DI) fuel systems are those where the injection occurs directly into the combustion chamber.

- The following requirements apply to LPI fuel systems:

a. The fuel lines must comply with CE 2.4.
b. The fuel rail must be securely attached to the engine cylinder block, cylinder head, or intake manifold with mechanical fasteners. The threaded fasteners used to secure the fuel rail are considered critical fasteners and must comply with T 10.
c. The use of fuel rails made from plastic, carbon fiber or rapid prototyping flamma-ble materials is prohibited. However, the use of unmodified Original Equipment Manufacturer (OEM) Fuel Rails manufactured from these materials is acceptable.

- The following requirements apply to HPI and DI fuel systems:
  a. All high pressure fuel lines must be stainless steel rigid line or Aeroquip FC807 smooth bore PTFE hose with stainless steel reinforcement and visible Nomex tracer yarn. Use of elastomeric seals is prohibited. Lines must be rigidly connected every 100 mm by mechanical fasteners to structural engine components.
  b. The fuel rail must be securely attached to the engine cylinder head with mechanical fasteners. The fastening method must be sufficient to hold the fuel rail in place with the maximum regulated pressure acting on the injector internals and neglecting any assistance from in-cylinder pressure acting on the injector tip. The threaded fasteners used to secure the fuel rail are considered critical fasteners and must comply with T 10
  c. The fuel pump must be rigidly mounted to structural engine components.
  d. A fuel pressure regulator must be fitted between the high and low pressure sides of the fuel system in parallel with the DI boost pump. The external regulator must be used even if the DI boost pump comes equipped with an internal regulator.
  e. Prior to the tilt test specified in IN 7, engines fitted with mechanically actuated fuel pumps must be run to fill and pressure the system downstream of the high pressure pump.

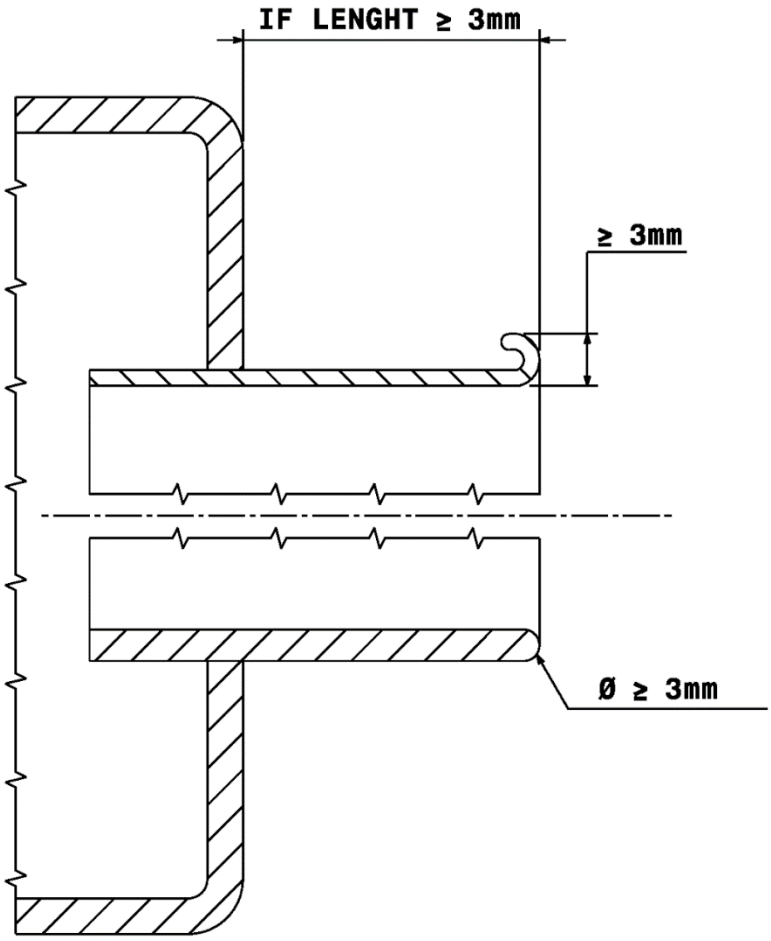
2.2.2.6 Venting Systems

- The fuel tank venting systems must be designed such that fuel cannot spill during hard cornering or acceleration.
- All fuel vent lines must be equipped with a check valve to prevent fuel leakage when the tank is inverted.

3.2.3. Exhaust System General

Exhaust pipes and silencers must fulfil all the requirements concerning sound control.

- The axis of the silencer end must be parallel (tolerance 10°15°) to the two principal longitudinal planes central axis of the vehicle. The extremity of the silencer must not pass the vertical tangent of the rear tyre.
- The edge of the silencer shall not be dangerous in case of accidental contact with the riders or helpers. If the final tube protrudes more than 3 mm, the edge must be rolled to an angle of 180° or radiused (see pictures below). In both cases, the edge thickness shall be 3 mm minimum.

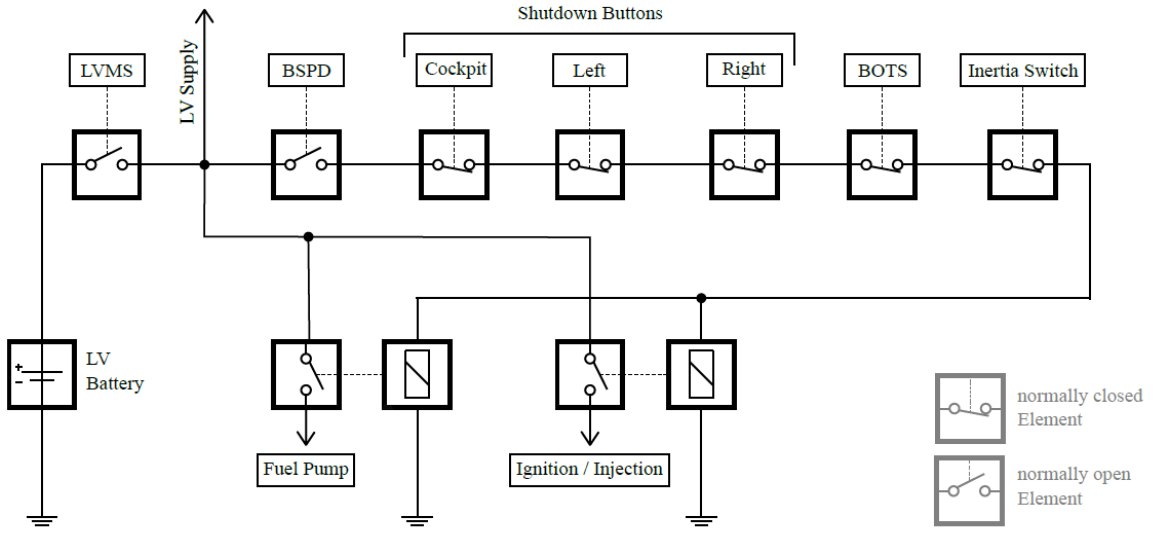


- Exhaust fumes must be discharged towards the rear but not in such a manner as to raise dust, foul the tyres or brakes, or inconvenience the passenger (in the case of sidecars), or any other rider.

3.2.4. Shutdown System

3.2.4.1. Shutdown Circuit

- The shutdown circuit directly controls all electrical power to the ignition, fuel injectors and all fuel pumps. It must act through a minimum of two mechanical relays. One relay for the fuel pump and at least one relay for injection and ignition. An explanatory schematic of the required shutdown circuit, is shown in Figure 19.
- The shutdown circuit is defined as a series connection of at least the LVMS, see T 11 .3, the BSPD, see T 11 .6, three shutdown buttons, see T 11 .4, the BOTS, see T 6 .2 and the inertia switch, see T 11.5.
- All circuits that are part of the shutdown circuit must be designed in a way, that in the de-energized/disconnected state they open the shutdown circuit.



4. Technical Inspection

4.1. Technical inspection process

The technical inspections is divided into following parts:

a. Pre-inspection
b. [EV ONLY] Accumulator Inspection
c. [EV ONLY] Electrical Inspection
d. Mechanical Inspection
e. Vehicle Weighing
f. [CV ONLY] Noise Test
g. [EV ONLY] Rain Test
h. Brake Test

4.2. General rules

- Each vehicle must pass all parts of technical inspection before it may participate in any dynamic event.
- Passing the technical inspections is not a certification of complete rules compliance of the vehicle.
- The technical inspection sheet includes several inspection points and will be provided on the competition website prior to the competition. It must always stay with the vehicle.
- The officials may inspect other points not mentioned on the technical inspection sheet to ensure compliance with the rules.
- Teams are responsible for confirming that their vehicle and the required equipment satisfies the requirements and restrictions of the rules before presenting it for technical inspection.
- Vehicles must be presented for technical inspection in ready-to-race condition.
- Safety uncritical rule violations without a benefit to the team that cannot be changed at the event may result in at least 20 penalty points for the teams, depending on officials decision. The penalty points will be deducted from the team's overall score.
- All items on the inspection sheet must be clearly visible for the officials without using instruments such as endoscopes or mirrors. Visible access may be provided by removing body panels or by providing removable access panels.
- The vehicle must maintain all required specifications throughout the competition.

- Officials will mark or seal various different approved parts. Removal of or damage to the seals will void the inspection approval.
- Once the vehicle is approved for competition, any damage to the vehicle that requires repair(s) will void the inspection approval. After completion of the repair(s), the vehicle must be re-submitted to technical inspection for re-approval.

4.2.1. Technical Inspection Sticker

- The competition technical inspection stickers will be placed on the nose of the vehicle.
- If a vehicle is no longer in compliance with the rules, the officials will set the vehicle's technical inspection status to fail, remove the respective inspection sticker(s) from the vehicle and note the reason for revoking the technical inspection approval in the technical inspection sheet.

4.2.2. Inspection Responsible Person

- To accelerate the technical inspection process, the team must appoint one team member as inspection responsible person. [EV ONLY] For electrical inspection and accumulator inspection this has to be an ESO.
- This inspection responsible person must be:
    a. Familiar with the vehicle.
    b. Able to show compliance of the vehicle with all points mentioned on the technical inspection sheet.
    c. Able to perform the technical inspection autonomously observed by the officials, when asked.
    d. Should the inspection responsible person be unable to perform one of these requirements, or the vehicle and all necessary items are not ready, the technical inspection will be aborted and the team will be asked to leave the technical inspection area.

4.3. Pre-inspection

- The following items must be presented for pre-inspection:
    a. All helmets
    b. All driver's equipment and other safety gear
    c. Two unused and in date fire extinguishers

4.3.1. [EV only] Accumulator Insprection

4.3.1.1. Accumulator Inspection General Definitions

- Cell modules or stacks do not need to be disassembled when AIRs, fuses, pre- and discharge circuit and positive locking mechanism of the maintenance plugs are reachable and visible for the officials.
- An official temperature logging device must be installed if used by the competition, see EV5.8.5.
- The accumulator charger will be inspected and sealed.
- The set of basic tools will be checked.

4.3.1.1. Accumulator Inspection Required Items

- The following items must be presented at accumulator inspection:
    - All TS accumulators
    - Accumulator hand cart
    - Accumulator charger
    - Basic Tools, see IN3.2.2
    - Tools needed for the (dis)assembly of parts

    - Samples of self designed PCBs that are part of the tractive system and inside the accumulator container, see EV4.3.6
    - Data sheets for all parts used in the accumulator
    - Original delivery notes for material without serial number printed on according to T1.2.1
    - Print-outs of rule questions (if applicable)
- The following basic tools in good condition must be presented:
    - Insulated cable shears
    - Insulated screw drivers
    - Multimeter with protected probe tips and two 4mm banana plug test leads rated for 1000V CAT III or better
    - Insulated tools, if screwed connections are used in the tractive system
    - Face shield
    - at least two pairs of HV insulating gloves (not expired)Two HV insulating blankets of at least 1.0m 2 each
    - Safety glasses with side shields for all team members that might work on the tractive system or accumulator

  All electrical safety items must be rated for at least the maximum tractive system voltage.

4.3.1. [EV only] Electric Inspection

4.3.1.1. Electrical Inspection General Definitions

- The insulation resistance between the TS and LVS ground will be measured. Vehicles with a maximum TS voltage less than or equal to 250V will be probed with 250V and vehicles with a maximum TS voltage greater than 250V with 500V.
  To pass this test, the measured insulation resistance must be at least 500 Ω/V related to the maximum TS voltage of the vehicle.
- The IMD will be tested by connecting a resistor between the TSMP, see EV4 .7 and LVS ground connector, see EV4.7.8. The test is passed if the IMD shuts down the TS within 30s at a fault resistance of 50% below the response value which corresponds to 250 Ω / V
-

4.3.1.2. Electrical Inspection Required Items

The following items must be presented at electrical inspection:

- One ESO
- Vehicle with mounted TS accumulator
- Quick jack and push bar
- Samples of self designed PCBs that are part of the tractive system and are outside of the accumulator container, see EV4.3.6
- Tools needed for the BSPD check, see T11.6.9
- Data sheets for all parts used in the tractive system
- Original delivery notes for material without serial number printed on according to T1.2.1
- Tools needed for the (dis)assembly of parts for electrical inspection
- Print-outs of rule questions (if applicable)

4.3.2. Mechanical Inspection

Mechanical Inspection Required Items

The following items must be presented at mechanical inspection:

- The vehicle in ready-to-race condition
- Quick jack and push bar

- The tallest driver of the team
- Copies of any safety structure equivalency forms
- Copies of any impact attenuator data requirement
- Print-outs of rule questions (if applicable)
- Impact attenuator test piece (except for teams with “standard” IA)
- Teams with a monocoque: laminate test specimen(s)
- Teams using alloyed steel: test specimen(s)
- Only tools needed for the (dis)assembly of parts for mechanical inspection

4.3.3. Vehicle weighting

Vehicle Weighing Procedure

- All vehicles must be weighed in ready-to-race condition.
- All fluids must be at their maximum fill level for weighing.

4.3.4. [EV only] Rain test

Rain Test General Definitions

- Vehicles must have passed electrical inspection, see IN4, to attempt the rain test.

Rain Test Procedure

- The vehicle must be in ready-to-race condition. All components and constructions used to protect the vehicle from water during the rain test must be used during the entire competition.
- The tractive system must be active during the rain test.
- The vehicle must be jacked up using the quick jack, see T13 .2, and all driven wheels must be removed.
- The vehicle must not be in ready-to-drive mode, see EV4.11.
- The test will be conducted without a driver.
- Water will be sprayed at the vehicle from any possible direction. The water spray is similar to a vehicle driving in rain and not a direct high-pressure stream of water.
- The test is passed if the IMD is not triggered while water is sprayed at the vehicle for 120s and 120s after the water spray has stopped.

4.3.5. [CV only] Noise only

Noise Test Procedure

- The sound level will be measured during a static test.
- The vehicle must be compliant at all engine speeds up to the maximum test speed, see CV3.2.1.
- Teams must bring a laptop to indicate the engine speed measured by the Electronic Control Unit (ECU).
- Measurements will be made with a free-field microphone placed free from obstructions at the exhaust outlet level, 0.5m from the end of the exhaust outlet, at an angle of 45° with the outlet in the horizontal plane.
- Where more than one exhaust outlet is present, the test will be repeated for each exhaust and the highest reading will be used.
- The test will be run with the gearbox in neutral. During this test the vehicle must be jacked up using the quick jack (see T13.2).
- After passing the noise test the function of the master switch, the cockpit-mounted shutdown button and the inertia switch will be tested.

• After passing IN10 .1.8 the air tightness of the intake system will be tested by closing off the inlet after which the engine must stall.

4.3.6. Brake test

Brake Test Procedure

• Lock all four wheels and stop the vehicle in a straight line at the end of an acceleration run specified by the officials without stalling the engine
• [EV ONLY] After accelerating, the tractive system must be switched off by the driver and the driver must brake using only the mechanical brakes. It is acceptable for the TSAL to switch to green shortly after the vehicle has come to a complete stop as the reduction of the system voltage may take up to 5s.
• The brake light and TSAL illumination will be checked and the officials will verify if the illumination is satisfactory for external observation.
• [EV ONLY] The ready-to-drive sound will be checked and the officials will verify if the sound level is satisfactory.

4.3.7. Post event Inspection

Post Event Inspection Procedure

• The officials reserve the right to impound any vehicle at any time during or after any of the dynamic events to check for compliance with the rules. If necessary the vehicle will remain with the officials until the violation of the rule was discussed with the team.
•After the endurance and trackdrive event, the vehicle must be placed in parc fermé where no team member may access the vehicle.
•After any dynamic event, the vehicle must be in compliance with the rules.
•For each violation of the rules, the team receives a separate penalty as follows:
  • Group A: Violation of the rules without advantage for the team
  • Group B: Violation of the rules with advantage for the team (e.g. aerodynamic device)

	Acceleration	Skidpad	Autocross	Endurance	Trackdrive
Group A	0.3 s	0.3 s	1s	30s	30s
Group B	1s	1s	5s	2 min	2 min

The penalty applies to all runs since the team entered the dynamic area the last time.

•Violation of the rules concerning safety or the environment (e.g. BOTS, safety harness issues, ground clearance, fluid leaks, noise) results in Disqualified (DQ) for that particular run.
•Changes in vehicle weight of more than ±5kg compared to the official technical inspection weight (see IN8) results in a 20 point penalty for each kg the tolerance is exceeded by. E.g. a weight difference of ±6.2kg results in in a 40 point penalty.
•[EV ONLY] The vehicle must be able to enter ready-to-drive mode, see EV4 .11, during post inspection process for all tests requiring this mode. Violation will result in DQ.
•[EV ONLY] Directly after endurance and leaving parc fermé, every team must come back to the charging area to disassemble the temperature logging device (if used by the competition) from the TS accumulator, see EV5.8.5.
•[EV ONLY] Directly after trackdrive or endurance and leaving parc fermé, the data logger, see EV4.6 or DV1.3, will be disassembled from the vehicle.

ICE – how to ensure that projects are innovative:
- different types of fuels /laboratory test
- solutions regarding sustainable production
- hybrid / modifications of the engine
- less pollution to environment

5. Score Regulations/ Score Event

5.1. General Information's.

- The participating Teams can score points only at the Score Event.
- The participating Teams can reach 25 Points at each score category.
-

5.2. Score Categories Definitions

The score categories are separate in the topics useability and sustainability report.

Category Content	Sustainability Report			Useablity		
Points each score category	Production	Drive-Mode	Recycling	Race 1	Race 2	Acceleration
25	Place 1					
23	Place 2					
22	Place 3					
21	Place 4					
20	Place 5					
19	Place 6					
18	Place 7					

- Race 1
  option A: It will be a Motocross Race with 25 min + 2 Rounds in
  option B: Each Team ride alone on the Track 25 min + 2 Rounds.

- Race 2
  option A: It will be a Motocross Race with 25 min + 2 Rounds in
  option B: Each Team ride alone on the Track 25 min + 2 Rounds.

- Acceleration
  option A. Holeshot, winner of the starts
  option B. shortest time from 0-100 Km/h

- Sustainability Report
  The participating teams produce a scientific report that sets sustainability in terms of production, driving and recycling versus usability, under competitive conditions.

The objective of the sustainability report is to work out the greatest potential for a sustainable motorcycle.
Definition Sustainability: Sustainability is a principle of action for the of resources, in which the preservation of natural regeneration capacity of systems involved is to be ensure.
The Sustainability Report will be rated in production, drive mode and recycling.