

# (J) Competitors: Vehicles

## General

**1.1.** Vehicles competing in events will conform to the Technical Regulations as appropriate.

**1.2.** Categories of Vehicles. Where the Supplementary Regulations leave any doubt as to the category in which a particular type of vehicle falls for the purposes of the competition, the position shall be governed by the definitions set out in these Regulations.

## Competition Car Log Books (CCLB)/Vehicle Passports (VP)

**2.1.** Competition Car Log Books/Vehicle Passports are required for certain sporting disciplines, as detailed in the Specific Regulations. Vehicle Passports are available from International, and National Scrutineers. Vehicle inspections can be arranged by appointment with an appropriate local scrutineer.

**2.1.1.** By reciprocal arrangement Motorsport UK will recognise log books issued by the MSI (Motor Sport Ireland). Such log books are considered valid for competitions within the UK.

**2.1.2.** To obtain a Vehicle Passport, a registration document (where appropriate) for the vehicle, or vehicle identity number is required. A recent good quality colour photographs showing the car static, unoccupied and in tyre contact with the ground must be shown on the CCLB/VP. Photos for VPs must include a front 3/4 view from right side, rear 3/4 view from left side (both with number plate legible where applicable) and an engine bay view.

CCLB/VP continuation sheets may be obtained from Motorsport UK.

**2.1.3.** CCLBs/Vehicle Passports refer to complete cars and must not be transferred with a bodyshell.

**2.1.4.** Any CCLB/VP issued will remain the property of Motorsport UK, which reserves the right to withdraw or suspend it at any time, stating the reasons why.

**2.1.5.** CCLBs/VPs must be sent to the Motorsport UK Technical Dept for any of the following reasons:

- (a) Issue of new VP.
- (b) Change of engine type or capacity.
- (c) Change of ownership. Change of bodyshell.
- (d) Change of address.
- (e) Vehicle disposal or dismantling.
- (f) Change of vehicle colour (with new photos).

CCLB continuation sheets may be obtained from Motorsport UK.

**2.1.6.** Competition Car Log Books first issued prior to 1st January 2000 will expire on 31st December 2020.

CCLBs first issued between 1st January 2000 and prior to 31st December 2004 will expire on 31st December 2022.

CCLBs first issued between 1st January 2005 and prior to 31st December 2009 will expire on 31st December 2023.

All other CCLBs will expire on 31st December 2025.

Once a CCLB has expired a new Vehicle Passport will need to be applied for. Until the date of expiry a CCLB may continue to be returned to Motorsport UK for amendment per 2.1.5.

## Scrutineering (G.7)

**3.1.** Before taking part in any competition, or practice for any competition, all vehicles must be presented to the event Scrutineers for examination and approval.

**3.1.1.** The fact of obtaining a Scrutineer's approval at pre-event scrutiny does not indicate that the Scrutineer is accepting any responsibility for the safety or the roadworthiness of the vehicle, nor does it indicate that the vehicle complies in all respects with the Regulations. Please note that pre-event scrutineering or logbook inspection by a scrutineer is only a spot check of a limited number of key safety and eligibility features of a vehicle's condition. Alone it will not guarantee that the vehicle meets all applicable regulations or standards.

**3.1.2.** Subsequent to pre-event scrutiny, any vehicle involved in an accident, or having been modified in any way, should be represented to the Scrutineers for further examination.

**3.1.3.** At any time during an event, the Clerk of the Course, or the Scrutineers may order that a vehicle be re-examined, even if this involves stopping a vehicle whilst practising or competing.

**3.1.4.** At the conclusion of a competition, a number of vehicles, as agreed by the Clerk of the Course and the Scrutineers, or as ordered by the Stewards, or as laid down in the Regulations, may be required to be presented for Post-Event Scrutiny. No work is to be done on such vehicles after finishing the competition except by permission or request of the Scrutineers, until after the examination is completed and the vehicle released. It is the responsibility of the competitor to provide appropriate tools and personnel within an agreed time to carry out the work required.

**3.1.5.** The Post-Event Scrutiny will be mainly directed at the vehicle's eligibility and may involve parts of the vehicle being sealed for subsequent stripping and examination (C.5.3). This should normally be within a maximum of 30 days, although it can be extended by mutual agreement to 50 days. At the end of the season, series or championship, it should never exceed 30 days.

**3.1.6.** Vehicles, or components, may be sealed on the instructions of the Clerk of the Course, Stewards of the Meeting, the Technical Commissioners, or following a protest. Sealing may be by wire seals, special reactive paint, or other suitable method. Such seals must not be broken except with the written permission of the person who originally affixed the seal, or of Motorsport UK, or by the person designated to examine the parts in question. The Technical Commissioner or Scrutineer examining the vehicle or component will report his findings to the Clerk of the Course for his action (C.3.1.1).

**Note:** Throughout these sections an asterisk(\*) indicates a requirement for additional information to be printed in the Supplementary Regulations (SRs). Text shown in *italics* indicate a Regulation which may be amended in the SRs. Text shown in red indicates a new or amended regulation for 2022.

**3.1.7.** Approval of a vehicle will only be in relation to those items of the vehicle which have been examined and will only apply to the event which the vehicle has just completed.

## Competition Numbers [Chart 4]

**4.1.** Numbers must be displayed in a durable manner and be black, of a minimum size of 23cm high with stroke width of a minimum of 3.8cm on a white oblong background measuring not less than 48cm x 33cm which must extend at least 5cm beyond the outline of the numbers. Alternatively, the numbers may be displayed on a white circular background provided that the background extends at least 5cm beyond the outline of the numbers.

**4.1.1.** If on a white vehicle a background of the dimensions in 4.1. must be delineated by a continuous black line, except for cars of period A to E.

**4.1.2.** Numbers must be displayed on each side of the vehicle (front doors, alongside the cockpit or on rear wing end plates) and on the foremost part of the nose.

**4.1.3.** Certain types of competition have special requirements which will appear in SRs (Subject to approval by Motorsport UK) (see U.17.25 to 17.28 for Kart Numbers and Q11.5. for Circuit Racing).

**4.1.4.** Note. Consideration should be given at all times to the positive identification of vehicles by the competition organisers, whose decisions will be final.

**4.1.5.** The numbers must be of the 'Classic' type as shown below:

1-2-3-4-5-6-7-8-9-0.

**4.1.6.** In International events on both front wings an illustration of the national flag(s) of the driver(s) as well as the name(s) of the latter shall be displayed. Minimum height of both flag(s) and name(s) shall be 4cm.

**4.1.7.** Any means of identifying individual cars during a competition MUST be removed at the finish of the event.

**4.1.8.** Race organisers may use three figured numbers subject only to:

- (a) the specific approval of the Chief Timekeeper
- (b) that the white background respects the requirement of 4.1. above, which must extend at least 5cm beyond the outline of the numbers.

## Technical

**5.** The following technical regulations are mandatory and apply to vehicles in all forms of competition (other than Karting). In addition vehicles must comply with the appropriate Specific Technical Regulations. Where there are several regulations concerning any particular subject it shall be taken, as a general principle, that one does not override another unless specifically stated.

### General

**5.1.** As a general principle in all Technical Regulations, it is prohibited to carry out any tuning or modification that is not specifically permitted. The fact that some modifications are mentioned as prohibited does not imply that others are allowed.

Vehicles that are not exclusively powered by an internal combustion engine are subject to the following regulations, those set out in (K) or SR's as appropriate. Electrified Vehicles must comply with Appendix 2.

**5.1.1.** Competitors competing under the provisions of H12.1 are permitted to make modifications, additional to those permitted by regulation, solely for the purpose of enabling operation of vehicle control systems.

**5.1.2.** Period Defined Vehicles (Non- Rally) taking advantage of any exemptions for Period Defined Vehicles within the General Regulations must have been issued with either a validated Motorsport UK Period Defined Vehicle Identity Form, an FIA Historic Technical Passport, or an approved Vehicle Identity Form issued by an Motorsport UK Registered Club, which must be presented at Scrutineering. This will be the definitive document defining the vehicle period.

### All vehicles must: Chassis/Body (including aerodynamics)

**5.2.1.** Be fitted with bodywork including a driver (and passenger) compartment isolated from the engine, fluid filled batteries, gearbox, hydraulic reservoirs (with the exception of fire extinguishers) pressurised above atmospheric pressure, pneumatic reservoirs and accumulators, transmission shafts, chains, belts and gears, brakes, road wheels, suspension components including their operating linkages and attachments, petrol/fuel tanks, oil tanks, water header tanks, catch tanks and fuel system components (other than where such components comply with 5.13.1 and 5.13.2) such as to prevent there being a hazard.

With the exception of cars of Periods A-E, front engine vehicles to be fitted with a bonnet covering the engine and all its' major components.

Excepting for cars of Periods A-E exposed transmission shafts, gears and chains to be guarded such as to prevent their being a hazard.

Where a radiator is not isolated from the driver/passenger compartment a suitable deflector to be fitted to prevent fluid directly coming into contact with the vehicle's occupants.

**5.2.2.** With the exception of cars of Periods A to E, which in period specification were not equipped with a bonnet or casing of metal or solid flame resistant material covering and surrounding the main engine structure, have a protective bulkhead of non-flammable material between the engine and the driver/passenger compartment capable of preventing the passage of fluid or flame. Gaps must be sealed with suitable flame proof material that completely closes any gap at all times. Magnesium is prohibited for bulkheads.

**5.2.3.** Have a complete floor of adequate strength rigidly supported within the driver/passenger compartment.

**5.2.4.** Not have the space normally occupied by passengers encroached upon in such a way that may impede extrication of the driver from that side, but may have the passenger seats removed.

**5.2.5.** Deleted.

**5.2.6.** With the exception of racing cars or cars of A to D be equipped on all wheels with mudguards which present no sharp edges and cover the complete wheel (flange+rim+tyre) around an arc of 120 degrees. This minimum coverage must:

- (a) be achieved with a continuous surface of rigid material within which ventilation louvers may be fitted. The tyre must not be visible when viewed from above. When viewed from the rear, the tyre must not be visible above any point 50mm or more above the axle centre line
- (b) extend forward ahead of the axle line
- (c) extend downward behind the wheel.

**5.2.7.** Aerodynamic devices may only be fitted to Racing and Sports Racing Cars (unless prohibited by an Approved Formula), or where specifically permitted, where FIA homologated, or where complying with National type approval. Such devices must not extend beyond the maximum width of the vehicle, above the maximum height of any roof, or for an open car the maximum height of the ROPS. For Saloon and Sports Cars such devices must not extend longitudinally from the bodywork by more than 100mm. For Sports Racing Cars such devices must not extend longitudinally from the rear wheel axis by more than 1100mm. Racing Cars must comply with Q,Appendix2.

**5.2.8.** If originally fitted with driver/passenger doors, hatchback doors, sliding doors, opening boots or tailgates, these must be secured in the closed position during events.

**5.2.9.** Have effective means of ventilating closed cars.

**5.2.10.** Tinted glass in any window which can significantly affect through vision (in or out) or distort the colours of signal flags or lights, is prohibited.

**5.2.11.** With the exception of Cross Country Vehicles, Racing Trucks and Karts, in all vehicles with the driver seated normally, the soles of his/her feet, resting on the pedals in the inoperative position, shall not be situated to the fore of the vertical plane passing through the centre line of the front wheels. Not applicable to vehicles constructed prior to 1.1.99 or for those vehicle designs which have participated in a Motorsport UK Permitted Championship prior to 1.1.99.

### Seating

**5.3.1.** Have a normal adequate seat for the driver.

**5.3.2.** With the occupant seated, the seat must be correctly located and securely anchored within the compartment and must not tilt, hinge or fold unless it is a production seat fitted with a serviceable locking mechanism preventing independent operation.

**5.3.3.** It must support and retain the driver within the vehicle.

**5.3.4.** The seat cushion (i.e. the part on which the occupant sits) when uncompressed, must not be less than 15.25cm below the top edge of the adjacent body side or door.

**5.3.5.** Any other seats fitted must similarly comply and all seats must face forward.

**5.3.6.** Cars of Periods A to D are exempt from this requirement.

**5.3.7.** If a single seater, the maximum time for a driver to get in or out of the vehicle must not exceed 10 seconds.

### Engines

**5.4.1.** If forced induction is used, the coefficient will be 1.7:1. unless stated otherwise in Specific Technical Regulations or SRs.

**5.4.2.** Be equipped with a positive method of throttle closing by means of external spring/springs so that in the event of failure of any part of the throttle linkage the throttle(s) are sprung closed.

**5.4.3.** Vehicles fitted with electronic throttle control as standard original manufacturer's equipment for that vehicle are exempt from this requirement.

### Suspension

**5.5.1.** Be fitted with sprung suspension between the wheels and the chassis.

**5.5.2.** Suspension must be controlled to avoid fouling of wheels on chassis or bodywork.

**5.5.3.** Cars of Periods A and B need not have sprung suspension, if originally built without it.

### Brakes

**5.6.1.** Be fitted with brakes that are operative and capable of stopping the vehicle as required.

**5.6.2.** Non-ferrous disc brakes are prohibited unless a Standard Part for that vehicle, or specifically authorised by Motorsport UK for a class or category of car.

### Steering

**5.7.1.** Have a steering wheel with a continuous rim not incorporating any reflex angles in its basic shape (except for Drag Race vehicles). 'D' shape wheels are permitted.

**5.7.2.** Specifically not permitted are wheels having a non-continuous rim shape similar to that shown in the Drawing 5.7.

**5.7.3.** Cars of Periods A and B may have a tiller or alternative to a steering wheel if it formed part of the original vehicle.

**5.7.4.** Have steering movement controlled to avoid fouling of wheels on chassis or bodywork.

**5.7.5.** Rear wheel or four wheel steering is prohibited unless fitted on a Production vehicle by the manufacturer, or permitted under the Specific Technical Regulations, or SRs.

### Wheels

**5.8.1.** Have not less than four road wheels and tyres (excluding the spare).

**5.8.2.** Not be fitted with any wheel spacer exceeding 2.5cm in thickness or of less than hub diameter. Multiple or Laminated Spacers and extended studs are prohibited.

**5.8.3.** Have all hub nave plates and wheel embellishers removed.

### Tyres

**5.9.1.** Have tyres complying with Specific Technical Regulations and/or Construction and Use Regulations (if Standard Road Tyres), for the duration of the event.

**5.9.2.** Tyres, if treaded, must have not less than 1.6mm of tread remaining at the start of an event. Formula Ford 1600 1mm.

**5.9.3.** Where freedom of choice of tyres is left to the Competitor, the responsibility rests with each Competitor to ensure that the tyres to be used are of adequate rating having regard to the potential speed of their vehicle and the nature of the event.

**5.9.4.** The fitment and/or use of pressure control valves to wheels and/or tyres is not permitted.

**5.9.5.** Unless permitted under sporting regulations the use of chemical tyre softeners is not permitted.

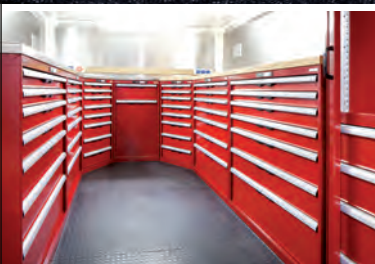
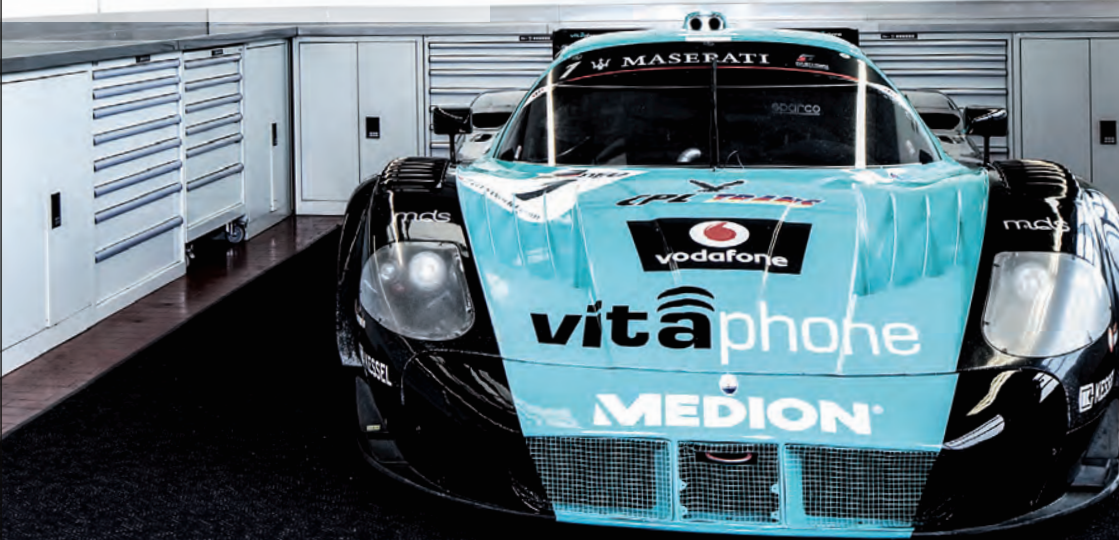
**5.9.6.** The interior of the tyre (space between the rim and the internal part of the tyre) must be filled only with air or nitrogen. This does not preclude the use of inner tubes.

### Cooling

**5.10.1.** Have any fluid carrying lines or tubes carrying coolants through the driver/passenger compartment painted red, except for HV Battery cooling lines. And if non-metallic to be internally or externally metal braided hydraulic pressure hose.

**5.10.2.** Screwed hose clips (e.g. 'Jubilee Clips') may only be used in conjunction with a suitably swaged pipe.

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## Transmission

**5.11.1.** Have the transmission outside the driver/passenger compartment, beneath the floor or secured in casings or coverings of solid material.

**5.11.2.** Be equipped with a reverse gear in normal working order unless otherwise stated in Specific Technical Regulations. Racing Cars of Periods A to E are exempt from this requirement.

## Oil Systems

**5.12.1.** Have any oil lines passing through the driver/passenger compartment protected and, if non-metallic, to be of internally or externally metal braided hydraulic pressure hose.

## Fuel Systems

**5.13.1.** Have any fuel lines passing through the driver/passenger compartment protected and, if non-metallic, to be internally or externally metal braided hydraulic pressure hose or fuel lines complying with FIA specifications.

**5.13.2.** They may only be joined by screwed sealing joints or vehicle manufacturers approved joint.

**5.13.3.** If fitted with fuel fillers in a closed boot, or under closure, have collector/spill trays incorporated to drain outside the vehicle.

**5.13.4.** Use Pump Fuel (see definition Nomenclature and Definitions) except, subject to prior written authority having been given by Motorsport UK, where permitted otherwise under event SRs, and Championship Regulations.

**5.13.5.** If using LPG, the entire system must conform with Construction and Use regulations and LPG Industry Technical Association Code of Practice No. 11.

**5.13.6.** If using non-pump fuel have a 3 inch diameter 'Day-Glo' orange disc affixed immediately adjacent to the Competition Numbers on both sides.

**5.13.6.1.** Any vehicle using methanol must include a Motorsport UK approved additive which provides a distinguishable colour and smell when burning. The maximum permitted volume of additive within the fuel is 0.2%.

**5.13.7.** With the exception of cars competing in Sprint and Hill Climb road going production category, cars competing in British and Motorsport UK Titled Championships for, and all new build cars for, Rallycross, Car Racing, Special Stage Rallying, Sprints and Hill Climbs must be equipped with the facility to enable a fuel sample to be taken. For fuel injected cars the facility must be a dry break fuel sampling coupling, approved by the FIA, Competitors must carry and make available a 300mm minimum length of hose to which, where necessary, the appropriate mating part is to be attached.

**5.13.8.** Have sufficient fuel for a fuel test (D.34) present at any time during the event.

## Electrical Systems

**5.14.1.** If located in the Driver/Passenger compartment, where a Passenger/Co-Driver is present the Auxiliary battery must be situated behind the base of the Driver's or Passenger/Co-Driver's seat.

Any wet Auxiliary batteries in driver/passenger compartment must be enclosed in a securely located leak-proof container.

**5.14.2.** Have Auxiliary batteries duly protected to exclude leakage of acid and to protect terminals from short circuiting and producing sparks.

**5.14.3.** With the exception of racing cars be equipped with Auxiliary battery, generator, self-starter, side, tail, and brake lights. All this equipment to be in normal working order. Exceptionally when taking part in an event held totally off the public highway, need not comply with DFT Statutory Requirements regarding lighting or horn.

**5.14.4.** With the exception of racing cars, or cars of Periods A to C, have headlights in normal working order with glasses of minimum 182.5 sq cm each unless SRs permit their removal.

**5.14.5.** Have the Auxiliary battery earth lead, if not readily distinguishable, identified by a yellow marking. **5.14.6.** If required to have a self-starter, be able to demonstrate during the competition that it is capable of starting the engine.

**5.14.6.** If required to have a self-starter, be able to demonstrate during the competition that it is capable of starting the engine.


**5.14.7.** Engines must be fitted with effective radio interference suppressors.

**5.14.8.** Any vehicle incorporating an electrical system, with the exception of ignition systems, which may run at a voltage exceeding 60V must display the sign detailed in Drawing 5.14 next to all competition numbers.



Drawing 5.14

Minimum size 75mm x 75mm

**5.14.9.** If non lead acid Auxiliary batteries are used as the main vehicle battery, they battery pack(s) must carry the appropriate "EC" and  markings, and be either a Standard Part or manufactured by a Motorsport UK registered manufacturer.

**5.14.10.** With the exception of Electrified Vehicles, the total quantity of recuperated energy stored in the car must not exceed 200 kJ; this energy may be re-used without exceeding 10 kJ by means of 1kW maximum.

## Weight/Ballast

**5.15.1.** If subject to a minimum weight, that must be the weight of the vehicle in the condition in which it crosses the finishing line (excluding driver and passenger), or at any time during the competition and/or practice (except for certain classes or formulae which include the driver in the total weight).

**5.15.2.** Any ballast required must be attached to the shell/chassis via at least 4 mounting points using bolts with a minimum diameter of 8mm each with steel counter plates of at least 400 sq mm surface area and 3mm thickness.

**5.15.3.** Provision must be made for the fixation of seals by scrutineers if deemed necessary.

**5.15.4.** Where ballast is fitted to touring, sports, sports racing or GT cars it shall be fitted in the passenger's location.

**5.15.5.** Single seat racing cars are exempt from the above mounting requirements.

## Exhausts

**5.16.1.** Have the exhaust system isolated from the driver/passenger compartment (e.g. beneath the floor or secured in casings of solid material).

**5.16.2.** Have no part of the exhaust system protruding to the rear of the bodywork more than 15cm.



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**5.16.3.** If Racing Car with rear aerodynamic device, not have any exhaust pipes extending rearwards beyond the aerofoil.

**5.16.4.** If Racing Car without aerodynamic device, not have exhaust pipes extending more than 60cm beyond the rear wheel axis.

**5.16.5.** If Rear Engined Single Seater Racing Car, have the exhaust outlet between 4cm and 60cm from the ground.

**5.16.6.** Have all exhaust outlets terminating behind the mid-point of the wheelbase of the vehicle and within 150mm of the outside of the bodywork periphery in plan view. Side exhausts not to protrude more than 4cm.

For vehicles other than racing cars that are not fitted with enveloping bodywork any side exhaust may not extend beyond the plane through the outside of the front and rear tyres with the front wheels in the straight ahead position. Cars of Periods A to E and Drag race vehicle are exempt from these requirements.

**5.16.7.** Exhaust catalytic converters must be fitted to all petrol engine production based saloon, touring and sports cars, including specialist production and kit cars, manufactured after 31/12/99. They may be specified for certain other formulae. Competitors are reminded of their obligation to maintain such equipment on a vehicle used on the highway where government legislation requires it.

## Silencing

**5.17.1.** The reason for Silencing (SOUND CONTROL) is to reduce environmental impact and to keep Motor Sport running. Environmental Protection legislation has increased the pressure on activities generating noise and Local Authorities have the power to suppress any noise source deemed to be causing a nuisance. Our system of control is acceptable to most Environmental Bodies and must be considered as part of eligibility to Compete in events.

**5.17.2.** All competing vehicles are subject to mandatory silencing, unless a specific waiver for that Class, or Formula is granted. Where specified as mandatory, a silencer must be used, irrespective of the exhaust sound generated without it.

**5.17.3.** Vehicles which comply with the Technical Regulations of FIA Formulae and Championships set out in the current FIA Yearbook and other FIA approved Champion-ships, Series and Cups which are participating in races for such Formulae, Championships, Series and Cups at meetings which have been entered on the FIA International Calendar are exempt from Motorsport UK sound test requirements but must comply with the sound test requirements set out in the appropriate Formulae, Championship, Series or Cup Regulations.

**5.17.4.** Silencing is not mandatory in competitions catering exclusively for the following categories of vehicle but is strongly recommended, and may be made mandatory in the SRs at the request of the Circuit/Venue owners:

- (a) All cars of Periods A to D. (This does not include events any part of which takes place on the Public Highway where national laws will apply)
- (b) Formula 1 and other single seater racing cars of Periods E and F.
- (c) Drag race vehicles.

**5.17.5.** For British Formula Three, British GT and British Touring Car Championships the sound test shall be conducted as set out within these regulations with the engine running at 3/4 maximum speed, the sound level meter at a height of 0.5 metres above the ground ( $\pm 0.1$  metre) located at 45° to and 0.5 metres distant from the exhaust with a maximum permitted sound level of 118dB(a).

**5.17.6.** Special regulations apply to High Speed Oval formulae and are only applicable when racing on high speed oval circuits.

**5.17.7.** Temporary Silencers, by-pass pipes or the inclusion of temporary parts to achieve silencing requirements are prohibited. Officials may refuse to carry out Sound Checks on vehicles utilising temporary parts in exhaust systems. Organisers are empowered to disqualify in such situations.

**5.17.8.** Circuit/venue owners/organisers may impose additional restrictions in SRs.

## Sound Test Requirements (Chart 5.18)

**5.18.1.** Measurements will be made at 0.5m from the end of the exhaust pipe with the microphone at an angle of 45° with the exhaust outlet and at a height of 0.5 to 1.0m above the ground.

**5.18.2.** Where more than one exhaust outlet is present, the test will be repeated for each exhaust and the highest reading will be used. In circumstances where the exhaust outlet is not immediately accessible, the test may be conducted at 2.0m from the centre line of the vehicle at 90° to the centre line of the vehicle, with the microphone 1.2m above the ground.

**5.18.3.** Measurements should be made outdoors with no large reflecting objects (e.g. walls etc.) within 3.0m (in the 0.5m test) or within 10.0m (in the 2.0m test).

**5.18.4.** Background sound levels should be at least 10dB(A) below the measured level.

**5.18.5.** Where possible measurements should be taken as close as possible to the vehicle, at the defined distances, to avoid background noise.

**5.18.6.** Cars of Periods A to D falling within Sections C and D should run engines at two thirds maximum RPM.

**5.18.7.** The 2.0m test can be made from either side of the car.

**5.18.8.** The highest reading registered being the one needing to comply with the maximum noise requirements.

**5.18.9.** Sound testing should be carried out BEFORE taking part in any competition.

**5.18.10.** The time and location of sound testing should be advised to competitors prior to the event.

**5.18.11.** It is stressed that all participants in motor sport, competitors, officials, marshals, etc., should be aware of, and protect themselves from, noise.

## Safety

**5.19.1.** All vehicles must comply with Safety Regulations as itemised under their Specific Technical Regulations and as detailed under the section headed Competitor Safety (Section K).

**5.19.2.** The vehicle occupant(s), seated in their normal position, wearing normal equipment, with seat belts fastened and the steering wheel in place, must be able to evacuate the cockpit in a maximum of 10 seconds.

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## Miscellaneous

**5.20.1.** Be of sound construction and mechanical condition and be well maintained.

**5.20.2.** Have positive fastenings for all doors and all hinged or detachable parts of the bodywork.

**5.20.3.** Have no temporary parts incorporated in their construction.

**5.20.4.** Not necessarily be equipped with seat belts, speedometer, spare wheel or bumpers if the event is held on private property unless specified to the contrary by SRs. Any exposed sharp ends of bumpers etc., must be protected.

**5.20.5.** Deleted.

**5.20.6.** Not be a vehicle of commercial type, such as a van/pick-up which was initially intended solely for commercial or goods carrying, unless permitted by SRs.

**5.20.7.** Have a minimum distance of 185cm between the centre lines of the foremost front and rearmost rear substantial load-carrying wheels, unless complying with an Approved Formula, or being a standard production car.

**5.20.8.** Except for racing cars, be fitted with a windscreen. If plastic windscreen, side screens or rear windows are fitted the thickness must not be less than nominal 4mm (minimum 3.8mm). Except for vehicle models originally in production prior to 1st January 1990, for new build vehicles from 2022 they must be Polycarbonate with a nominal thickness of 6mm (minimum 5.8mm) for the windscreen.

**5.20.9.** Sports cars supplied as standard with plastic side screens may retain them in their original thickness.

**5.20.10.** Not have skirts, bridging devices or any form of aerodynamic device between the chassis and the ground/track. Any specific part of the car influencing its aerodynamic performance must:

- (a) comply with rules relating to coachwork.
- (b) be rigidly secured to the entirely sprung part of the vehicle.
- (c) remain immobile in relation to the vehicle.

**5.20.11.** No part of the bodywork, or of the suspended part of the car, can be below a horizontal plane passing 4cm above the ground (unless stated otherwise in SRs), the car being in normal racing trim with the occupants aboard. A gauge may be used by Scrutineers before or after races or practice to check the ground clearance.

**5.20.12.** Not carry or pass any liquids or gases, other than air at atmospheric pressure, in or through any tubes comprising part of the chassis structure.

**5.20.13.** It is strongly recommended for all competitors participating in single venue competitions to have available at their paddock base, and for multi venue competitions to carry within their vehicle a self contained spill kit capable of effectively absorbing minor spillages of up to 1.25 litres of all vehicle fluids – oils, fuels, coolants, battery acid. Used spill kits are to be disposed of in accordance with local or National guidelines.

**5.20.14.** Any information device (including but not limited to – data loggers, displays, instrumentation, communication systems, trip computers etc.) mounted within the cockpit must use a mechanical means of attachment sufficiently robust to withstand anticipated stresses and vibration and must not present any sharp edges or projections in the vicinity of the driver's body or helmet. Where possible, a secondary means of attachment should also be used. Suction mounts are not acceptable as the primary mounting method.

## 5.21. On-Board Cameras

**5.21.1.** The carrying of on-board cameras/videos for personal use is permitted unless prohibited by Event regulations. The carrying of on-board cameras/videos for commercial use is prohibited unless authorised by the Event Organiser.

**5.21.2.** Where Event or Championship Regulations require the fitting of a camera, the location and method of fitting should be specified.

**5.21.3.** Where forward facing cameras are fitted for judicial purposes, they should be mounted so as to capture an image that provides a 'driver's eye' view that should include, where possible, the steering wheel, 'dashboard' and a view of the circuit ahead with a field of vision of approximately 100 degrees. In open wheel cars and karts both front wheels should be in view where possible. The fitting of rear-facing cameras may also be required for judicial purposes.

**5.21.4.** Where cameras are permitted but not mandated by the Organiser, they may be mounted in any location on the vehicle which is considered safe by the Chief Scrutineer.

**5.21.5.** The mounting of any camera must be specifically approved by the Chief Scrutineer. Any mountings must use a mechanical means of attachment sufficiently robust to withstand anticipated stresses and vibration and must not present any sharp edges or projections in the vicinity of the driver's body or helmet. Where possible, a secondary means of attachment should also be used. Suction mounts are not acceptable as the primary mounting method. Where cameras are fitted by professional TV or film companies, the Chief Scrutineer has discretion to approve non-mechanical mountings.

**5.21.6.** For karting, U12.6.1 and U19 apply.

**5.21.7.** Competitors may be obliged to use mountings and/or cameras specified and/or approved by the Organiser and these too must comply with 5.21.5/U12.6.1/U19.

**5.21.8.** Fitting of cameras to helmets is only permitted in accordance with K10.3.3(d).

**5.21.9.** Fitting of on-board cameras in Road Rallies is forbidden (R7.2.9).

**5.21.10.** Unless specified by the Organisers, the choice of system is free but playback must be possible at the Event by regular means such as a lap top computer.

**5.21.11.** Clerks of the Course and Stewards should not refuse to view relevant on board footage during any judicial process unless they consider there is a good reason why it should not be viewed (in which case, such reason must be stated as part of their written decision). Where the camera has not remained under the control of the Organisers, the Clerk of the Course/ Stewards must be satisfied as to the authenticity of such footage and must consider the weight they will give to such evidence.

**5.21.12.** Where a camera is mandated, in the event that no images are available upon request (other than due to a proven defect with the equipment) sanctions may be applied in accordance with C2.1.1. The burden of proof to establish the cause of such failure shall lie with the competitor.

**5.21.13.** The Clerk of the Course may also refer the matter of lack of recorded images to the Stewards of the Meeting for further sanctions or referral to Motorsport UK.

**5.21.14.** In the event of judicial action being instigated, all relevant on board footage must be retained until the time period for conclusion of all judicial matters has elapsed.

**5.21.15.** Where it is necessary for a Clerk of the Course to review footage after an Event, such footage should normally be reviewed within a period of 7 days of the Event.

**5.21.16.** Competitors should be aware of any rights including copyright in relation to footage captured by on board cameras at an Event. Footage may not be shared or otherwise used for broadcast or commercial purposes or on social networking sites, forums or any other internet media without the permission of any rights holders.

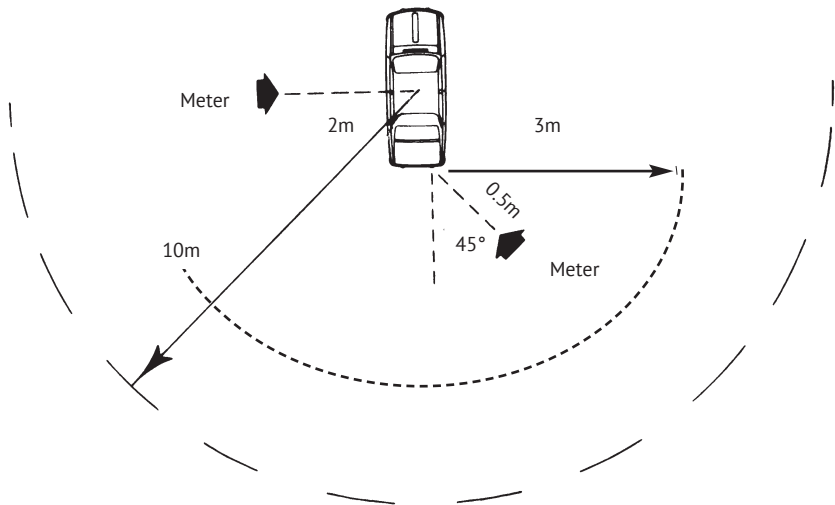
**5.21.17.** Any breach of camera regulations may be subject to the penalties provided for in C2.1.1 with an option to report any matters to the Championship Stewards where appropriate.

Appendix 1: Charts and Diagrams

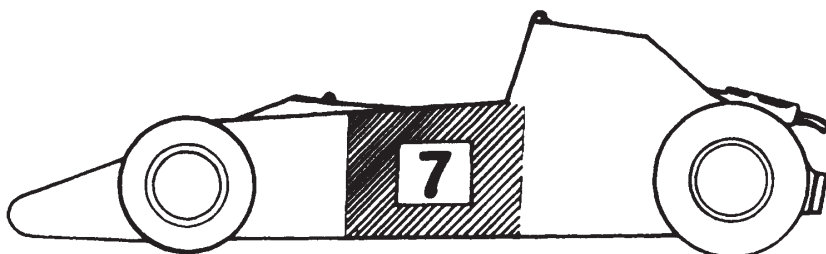
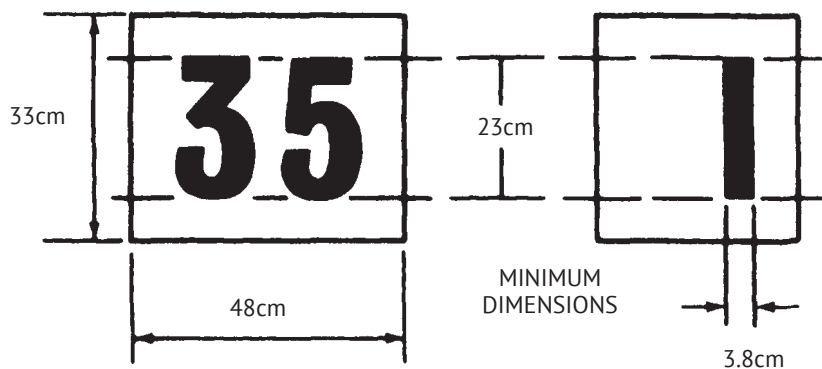
Chart 5.18: Maximum Noise Limits

The following table gives alternative distance readings. (Noise measured in dB(A).)

	0.5m	2.0m	
Section 'A'	105	93	CAR RACE (SALOON AND SPORTS CARS) MAXIMUM AT ¾ MAXIMUM RPM
Section 'B'	108	96	CAR RACE (SINGLE SEATER AND SPORTS RACING CARS) MAXIMUM AT ¾ MAXIMUM RPM
Section 'C'	100	88	STAGE RALLY, AUTOTEST, TRIALS, MAXIMUM AT 4,500 RPM
Section 'D'	98	86	ROAD RALLY MAXIMUM AT ¾ MAXIMUM RPM
Section 'E'	100	88	CCV MAXIMUM AT ¾ MAXIMUM RPM
Section 'F'	108	96	AUTOCROSS AND RALLYCROSS MAXIMUM AT ¾ MAXIMUM RPM
Section 'G'			HILLCLIMB AND SPRINT MAXIMUM AT ¾ MAXIMUM RPM –
	110	98	RACING AND SPORTS LIBRE CARS AND CARS COMPLYING WITH S.13
	108	96	ALL OTHER CATEGORIES



**Drawing 4: Competition Numbers**



**Drawing 5.7: Steering**



## Appendix 2: Regulations for Electrified Vehicles

### Technical: Electrified Vehicles

**5.22.1.** The term Electrified Vehicle (EV) is used in these regulations to cover all forms of Electrified Vehicles (including those defined in FIA Appendix J – Article 251) : mild Hybrid Electric Vehicle (mHEV), Hybrid Electric Vehicle (HEV) / Full Hybrid Electric Vehicle (FHEV), Plug-in Hybrid Electric Vehicle (PHEV) and Electric Road Vehicle(ERV) / Battery Electric Vehicle (BEV).

**5.22.2.** High Voltage (HV) shall be as defined in FIA Appendix J Art 251 3.1.10 (from ISO 6469-1:2009): > 30V AC and ≤ 1000V AC or > 60V DC and ≤ 1500V DC.

**5.22.3.** An EV may contain a High Voltage (HV) or Low Voltage (LV) propulsion system.

**5.22.4.** As a general principle in all Technical Regulations, it is prohibited to carry out any tuning or modification that is not specifically permitted. The fact that some modifications are mentioned as prohibited does not imply that others are allowed.

**5.22.5.** Changes to these Technical Regulations made on grounds of safety may be enforced immediately without notice.

**5.22.6.** These General Technical Regulations are for individual vehicle builds. Championships for specific vehicles not in accordance with these regulations may apply for approval, which will be considered at the discretion of Motorsport UK.

### **5.23. PERMITTED ELECTRIFIED VEHICLE TYPES (Table 2).**

**5.23.1.** These regulations apply to any modified National Type Approved or bespoke/prototype EVs intended for competition use. Standard and unmodified production EVs are subject to the existing requirements of Motorsport UK and the FIA where applicable.

**5.23.2.** A Standard vehicle is defined as built by the manufacturer in accordance with its homologation/type approval with no modifications or alteration of the vehicle structure, powertrain, or electrified propulsion system. E.g., competition seats using the original mounting points and fasteners are permitted. A ROPS requiring fastening to the vehicle structure is prohibited.

**5.23.3.** A Modified vehicle is a Standard vehicle with non-powertrain modifications only (including fitment of safety equipment, including ROPS, which alters the vehicle structure). No modifications to the internal combustion engine (ICE) and/or electrified propulsion system are permitted.

**5.23.4.** A Bespoke vehicle is one designed and constructed from scratch, including prototypes. Only Bespoke BEVs are permitted. Bespoke includes prototype or otherwise unique competition vehicles.

**5.23.5.** A production vehicle with the ICE powertrain replaced by an electric one is classified as Bespoke.

**5.23.6.** Hydrogen powered fuel-cell hybrid and electric vehicles are prohibited.

**5.23.7.** These Technical Regulations cover all EVs, but not all regulations apply to all vehicles. For example, the HV safety related requirements do not apply to an mHEV, as these operate at a nominal DC voltage of 48V which is lower than the 60V DC limit (Table 1).

**5.23.8.** The discipline-specific Sporting Regulations will determine which category of EVs are allowed to compete in which discipline.

**5.23.9.** Except for Standard EVs in non-Speed Events, all EVs must be in possession of a valid Vehicle Passport to compete. Modified and Bespoke EVs must undergo and pass a Vehicle Passport inspection irrespective of discipline or category.

**5.23.10.** Electric Vehicle Passports will be issued by Motorsport UK.

**5.23.11.** See 5.24: EV PASSPORT AND INSPECTION PROCESS for more details.

**5.23.12.** Additional requirements or restrictions from discipline and/or category specific regulations shall apply

### **5.24. EV PASSPORT AND INSPECTION PROCESS.**

**5.24.1.** Anyone considering building a Bespoke EV for competition use must supply a project outline, including details/qualification of those engineering the vehicle for review by Motorsport UK Technical Department prior to starting construction. On-going dialogue between the entrant and Motorsport UK throughout the build process is encouraged to minimize the risk of non-compliance with these regulations when vehicle is inspected

**5.24.2.** Standard EVs may be issued with a Vehicle Passport, without inspection, upon application to Motorsport UK. Modified and Bespoke EVs must undergo and pass a Vehicle Passport inspection and be in possession of a valid Passport to compete irrespective of discipline or category. For a modified production vehicle, the inspection will include a comprehensive visual inspection to ensure that installation of the ROPS and non-powertrain modifications have not compromised the HV system. Note: no repositioning of HV components (incl cables) is permitted. For a bespoke vehicle a detailed technical inspection of the entire vehicle including the EV system, and its safety systems will be required. An EVP will be issued once the vehicle has passed the inspection.

**5.24.3.** See Table 2 for EVP requirements.

**5.24.4.** Where a Bespoke or Modified OEM EV is intended for a single make/one make series and all vehicles are built/modified by the same organisation, then only the first vehicle in a batch will require full inspection. All subsequent vehicles from the batch will be issued with an EVP following written confirmation by the build organization that the follow-on vehicles are identical to the first vehicle.

**5.24.5.** Electric Vehicle Inspections must be arranged by appointment with Motorsport UK and will be carried out by a Motorsport UK HV qualified Technical Official.

**5.24.6.** The entrant must provide all data/evidence to Motorsport UK 3 months prior to the vehicle inspection as summarised below:

- (a) RESS impact protection details (5.28.9) if mounted underfloor. RESS Structural calculations or crash test/simulation results (5.28.11).
- (b) UN 38.3 and MSDS for cells (5.28.20).
- (c) Cell chemistry details (5.28.21).
- (d) BMS including cell temperature monitoring details (5.28.25).
- (e) Isolation Surveillance System details (5.29.20).
- (f) Vehicle specific Emergency Services Guide (5.29.21).
- (g) Detailed EV system schematic (5.29.22).
- (h) Vehicle specific functional switching diagram (5.30.5).
- (i) Crash HV Isolation FMEA (5.30.12).
- (j) Details of throttle fail safe system (5.30.18).
- (k) Off-board charger details (5.26.1).
- (l) On-board charger details (5.31.2).

**5.24.7.** In addition to the vehicle, the entrant must provide the following to enable the inspection to proceed:

- (a) Completed Technical Inspection form.
- (b) Detailed Build log with photos of the HV system components and installation.
- (c) Photos of the EV components/features to be added to the EVP.
- (d) Evidence of team personnel HV qualifications.
- (e) An Emergency Services Guide specific to the vehicle undergoing inspection.
- (f) The team HV qualified person.
- (g) HV tools and safety equipment required to support the inspection.
- (h) Example of the off-board charger to be used.

**5.24.8.** The vehicle will be examined at a location mutually agreed between the entrant and Motorsport UK. If inspection of the EV system requires access to the underside of the vehicle a suitable vehicle hoist or lift will be required. The use of jacks and axle / chassis stands is not permitted. The venue must have a mains power supply suitable for the off-board charger.

**5.24.9.** A second inspector may be present (for training and/or HV safety reasons) at the inspection.

**5.24.10.** The entrant will bear all fees arising from and the costs incurred by the inspection.

**5.24.11.** The entrant is responsible for ensuring that the vehicle satisfies all the Motorsport UK EV requirements and is presented for inspection in a finished and competition-ready condition.

**5.24.12.** All items on the Inspection Checklist must be clearly visible to the inspector without using instruments such as endoscopes or mirrors. Visible access may be provided by removing body panels or via removable access panels. Covers on the traction battery must only be removed by the nominated team HV qualified person if requested by the technical inspector.

**5.24.13.** Demonstration of the correct function of the indication and safety systems and the on/off-board charging systems forms part of the inspection. Correct response to a simulated crash event must also be demonstrated by the HV safety system.

**5.24.14.** The inspection of Bespoke EVs will examine all items included on the EV Inspection Checklist plus any other items the inspector may wish to examine. The exact procedures and instruments employed for inspection and testing are entirely at the discretion of the Technical Inspector.

**5.24.15.** The Inspection of Modified EVs will focus on ensuring that the installation of the safety items (ROPS, seat, fire extinguisher) has not damaged or disturbed any part of the EV system. It is prohibited to reposition any part of the EV system (including cables).

**5.24.16.** If any part of the vehicle EV system does not comply with the requirements or is deemed to be a concern, the entrant must correct the problem and re-present the vehicle for inspection. Minor faults may be rectified immediately, major issues will require a new inspection to be arranged and paid for.

**5.24.17.** The decision of the Motorsport UK inspector concerning compliance with the EV regulations is final and cannot be appealed.

## **5.25. SCRUTINEERING.**

### **Safety**

**5.25.1.** Only Motorsport UK EV qualified Scrutineers will perform safety scrutineering on EVs.

**5.25.2.** A valid VP or EVP must be provided at Safety Scrutineering.

**5.25.3.** HV Vehicle Safety scrutineering procedures will include but not be limited to visual inspection of the EV system and demonstration of the correct function of the safety and indication systems.

**5.25.4.** The Team HV qualified person must be present at Safety scrutineering equipped with their own set of HV safety equipment and tools as required.

**5.25.5.** The vehicle specific Emergency Response Guide must be provided to the circuit/venue/organiser's emergency services team before the vehicle is allowed to compete.

**5.25.6.** Motorsport UK Technical Officials can require the vehicle to be re-inspected at any time during an event.

### **Eligibility**

**5.25.7.** Only Motorsport UK EV qualified Scrutineers will perform eligibility scrutineering on EVs.

**5.25.8.** Motorsport UK Technical Officials reserve the right to request access to any set-up information or data from the vehicle ECU(s) and other electrical devices at any time during an event including data that proves compliance with 5.28.3 and 5.28.5.

**5.25.9.** It is the responsibility of the competitor to prove that the vehicle has not exceeded any control parameter limits during an event (e.g. maximum power, maximum voltage etc.).

**5.25.10.** Motorsport UK Technical Officials reserve the right to request that the vehicle be fitted with a data logger.

**5.25.11.** The Team HV qualified person must be present at Eligibility scrutineering (equipped with their own set of HV safety equipment and tools as required) and be prepared to safely isolate the HV system and remove any HV components for more detailed inspection at the request of the Scrutineer.

**5.25.12.** Sealing requirements for HV system components will be developed and published in due course.



## 5.26. CHARGING.

**5.26.1.** Off-board chargers must be commercially available and meet all UK Electrical safety requirements. Details must be supplied to Motorsport UK 3 months prior to the vehicle inspection.

**5.26.2.** Standard and Modified vehicles must use the unmodified on-board charger, charge port and charging cable(s) supplied with the vehicle.

**5.26.3.** Charging of the RESS must be done with the battery(s) in-situ.

**5.26.4.** Any temporary charging installation must be installed and connected to the mains supply by a trained competent person following the Code of practice for Electric Vehicle Charging Equipment Installation, 3rd edition and meet all the requirements of BS7671: 2018 (the 18th Edition wiring regulations), with particular attention paid to earthing.

**5.26.5.** The charging system must be automatic and must ensure that the battery cannot be overcharged or damaged if left permanently connected to the charger.

**5.26.6.** The use of diesel or petrol generators to provide the energy to charge EVs is strongly discouraged. Motorsport UK are working with circuit/venue owners to investigate provision of sustainable charging facilities.

**IN ADDITION A BESPOKE ELECTRIFIED MUST COMPLY WITH Appendix 2 5.27 – 5.31.**

## 5.27. MOTOR AND INVERTERS.

**5.27.1.** A maximum of two motors, whose output are combined mechanically driving the wheels through a mechanical gearbox and differential are permitted. A maximum of two inverters are permitted. In Drag Racing there is no limit on the number of motors or inverters.

**5.27.2.** Only a single driven axle is permitted i.e. FWD or RWD.

**5.27.3.** Any system that achieves torque vectoring across or between axles is prohibited.

**5.27.4.** Hub/wheel motors are prohibited.

**5.27.5.** Only commercially available production motors and inverters are permitted.

**5.27.6.** Repurposing of OEM motors and inverters is permitted.

**5.27.7.** The inverter may be integrated with or separate from the motor. The motor may be integrated with or separate from the gearbox.

**5.27.8.** Brushed DC motors are permitted and motors with exposed commutators must be fitted with a commutator shield.

**5.27.9.** If the motor or inverter is liquid cooled, >51% water-based coolant must be used. The use of Dielectric fluid is prohibited.

**5.27.10.** If the motor is air cooled, all ventilation holes must be small enough to prevent the passage of a 12mm diameter spherical test object through all holes.

**5.27.11.** When an electrical motor casing is rotating around the stator, a scatter shield must be included to surround the rotating parts of the motor. The shield must be constructed from min 2mm steel or 3mm thickness aluminium alloy. Does not apply to motors fully enclosed in the transmission housing.

**5.27.12.** All motor and inverter connections that use bolted HV terminals must be fitted with moulded insulated terminal covers that are sealed to satisfy a minimum IP65 rating.

## 5.28. RECHARGEABLE ENERGY STORAGE SYSTEM (RESS).

### General

**5.28.1.** The RESS must be comprised of a maximum of 2 separate traction battery enclosures per vehicle.

**5.28.2.** Capacitor and flywheel energy storage systems are prohibited.

**5.28.3.** For Bespoke EVs, the maximum total power going out of the RESS at any time is limited to 250kW, except for Drag Racing where the limit is 1MW.

**5.28.4.** For National Type Approved EVs, the power out of the RESS may not exceed the homologated power.

**5.28.5.** For Bespoke EVs, the maximum voltage on the Power Bus must never exceed 450V, except for Drag Racing where the limit is 1000V.

**5.28.6.** For National Type Approved EVs the maximum voltage must not exceed the homologated maximum voltage.

**5.28.7.** The RESS must include appropriately specified fuses or circuit breakers to prevent over-current in the event of short circuit. The protection devices must be located inside the RESS as close as possible to the main power bus connectors.

**5.28.8.** The RESS must be capable of being isolated from the Power Circuit by at least two independent systems (e.g. contactor or a manually operated Service Switch). There must be at least one manually operated system and one automatic system (under control of the BMS or Electronic Control Unit). The Service Switch may be a High Voltage (HV) or Low Voltage (LV) device. Any HV device should be orange and designed such that no HV potential is exposed when the device is operated/removed. If HV Service switches are used, they must be fitted into each battery pack. If a LV switch is used, only one is required (preferably mounted on one of the battery packs). The location of the Service Switch(es) should be clearly marked.

### Enclosure

**5.28.9.** The RESS must be installed within the survival cell, passenger compartment, engine compartment or boot of the vehicle. Underfloor installation of the RESS is permitted if full impact protection is provided to meet the 60kN FIA impact energy requirements. Full details of the impact protection must be provided to Motorsport UK 3 months prior to the vehicle inspection.

**5.28.10.** The RESS must not be used as a stressed member.

**5.28.11.** Calculations must be provided to Motorsport UK 3 months prior to the vehicle inspection to confirm that mechanical and electrical safety is ensured in a crash. The RESS may be required to pass a crash test defined by Motorsport UK.

**5.28.12.** The RESS enclosure must be to a minimum rating of IP65.

**5.28.13.** Cells/modules must be mechanically secured inside a metallic or composite enclosure. Any covers or access panels must be sealed and secured with fasteners requiring tools to remove.

**5.28.14.** The RESS must be designed to prevent short circuit of the conductive parts. In the event of compartment or component deformation, the design must ensure that no fluids enter the cockpit/passenger compartment.

**5.28.15.** The RESS must prevent the build-up of an ignitable gas/air or dust/air concentration inside the compartment by means of a burst valve or vent tube, positioned away from the driver. Any vent tube if fitted, must discharge direct to atmosphere external to the passenger compartment or survival cell.

**5.28.16.** All HV connections to the RESS must be made using either proprietary HV connectors with High Voltage Interlock Circuitry (HVIL) or the cables must pass through HV rated cable glands of suitable size to match the cable and which preserve the IP rating of the external enclosure.

**5.28.17.** The enclosure containing the cells, must also contain the BMS voltage and temperature sensing elements associated with the cells, service switch, fuses/circuit breakers and contactors.

#### **Cells**

**5.28.18.** Off-the-shelf commercially available cells / modules must be used.

**5.28.19.** It is prohibited to modify individual cells or off-the-shelf/repurposed OEM battery modules except for the modification of cell tab/connections to enable connection together into modules, fitment of an approved BMS to comply with 5.28.22 and addition of temperature sensors to comply with 5.28.26.

**5.28.20.** The competitor must supply documents from the Cell/module producer specifying safety relevant data, including manufacturers' datasheet: UN38.3 report and Material Safety Data Sheet (MSDS). Including battery characteristic diagram showing the battery limits of voltage (U), power (W), temperature (T) and State of Charge (SoC). These documents must be provided to Motorsport UK 3 months prior to the vehicle inspection. Equivalent data from a 3rd party test house may be submitted in place of manufacturers data. Evidence of test house capability must be included as part of the submission.

**5.28.21.** Any type of commercially available cell chemistry is allowed subject to prior agreement from Motorsport UK. Full details of the chemistry and safety handling must be provided to Motorsport UK 3 months prior to the vehicle inspection.

#### **Battery Management System**

**5.28.22.** A Battery Management System (BMS) from an approved supplier is mandatory.

**5.28.23.** For Modified EVs the architecture of and functionality of the BMS must not be changed from standard.

**5.28.24.** The BMS must ensure that all cells do not exceed the manufacturers stated limitations for voltage, current and temperature under any circumstances.

**5.28.25.** The BMS in all cases must monitor every serial cell for voltage and a minimum number of cells (evenly distributed throughout the modules/pack) for temperature in order that the hottest, coldest and average cell temperatures are monitored. Full details of the temperature monitoring must be provided to Motorsport UK 3 months prior to the vehicle inspection.

**5.28.26.** In the event that any cell exceeds the manufacturers stated limitations for voltage and/or temperature, within 2 seconds the BMS must reduce power to less than 5kW in order to leave the course or automatically isolate the battery from the traction circuit if it is not safe to reduce power.

#### **Cooling**

**5.28.27.** If the RESS is liquid cooled, >51% water-based coolant must be used.

**5.28.28.** The cooling liquid must not come into direct contact with any active components within the RESS.

#### **5.29. ELECTRICAL EQUIPMENT AND GENERAL ELECTRICAL SAFETY.**

**5.29.1.** Specifications for general electrical safety are laid down in Appendix J – Article 253-18.1.

**5.29.2.** Specifications for the Power electronics (inverters, DC/DC converters, on-board charger etc.) are laid down in Appendix J – Article 253-18.5.

**5.29.3.** Any vehicle with an electrical system operating at a voltage exceeding 60V DC or 30V AC must display the label detailed in Section J Drawing 5.14 next to all competition numbers. Label minimum size 75mm x 75mm x 75mm.

**5.29.4.** In cases where the voltage of the Power Circuit belongs to voltage class B (2.9), symbols warning of "High Voltage" must be displayed on or near the protective covers of all electrical equipment that may operate at high voltage (Drawing 5). The symbol background must be yellow, and the bordering and the arrow must be black, in accordance with ISO 7010. Each side of the triangle should measure at least 120mm but may be reduced to fit onto small components.

**5.29.5.** No HV potential should be exposed anywhere on the vehicle during normal operation.

**5.29.6.** The design of the system must be such to ensure that a single point of failure cannot cause an electric shock hazardous to life.

**5.29.7.** HV Electrical cables and electrical equipment must be protected against any risk of mechanical damage (stones, corrosion, mechanical failure, etc.) as well as any risk of fire and electrical shock.

**5.29.8.** The voltage class B components and wiring must comply with the applicable sections of IEC 60664 on clearances, creepage distances (3.4.2) and solid insulation; or meet the withstand voltage capability according to the withstand voltage test given in ISO/DIS 6469-3:2010.

**5.29.9.** A plug must physically only be able to mate with the correct socket of any sockets within reach. All HV Power Circuit connectors must not have live contacts on either the plug or the receptacle unless they are correctly mated.

**5.29.10.** All parts of the electrical equipment must be protected using an appropriate IP class with min IP65 protection on all HV components.

**5.29.11.** The HV traction circuit must be isolated from the vehicle chassis.

**5.29.12.** All HV cabling must comply with LV 216-2, ISO 6722 and ISO 14572 Construction of HV wiring systems for hybrid and electric vehicles. All cables must be orange and shielded, either internally or by conduit and must be securely fixed to the vehicle chassis using insulated fixings. Tie wraps are not acceptable. Cable conductor material must be copper. The use of aluminium bus bars and terminals is permitted.

**5.29.13.** All cable terminals must be crimped, or laser welded with a certificate of conformity if not OEM produced. The use of soldered terminals is prohibited.

**5.29.14.** All HV cable runs must be a single contiguous piece of cable between connectors / terminals. Any cable joins or splices must be achieved using bolted terminals securely fixed in a min IP65 rated enclosure with glands/strain relief on the cable entry points. Any covers or access panels must be sealed and secured with fasteners requiring tools to remove.

**5.29.15.** Any HV ancillary equipment (contactors, relays, fuses, current shunts etc.) not located in the battery enclosure(s) must be securely located in a min IP65 rated enclosure with glands/strain relief on the cable entry points. Any covers or access panels must be sealed and secured with fasteners requiring tools to remove.

**5.29.16.** All Class B Power Circuit connectors must not have live contacts on either the plug or the receptacle unless they are correctly mated. An automatic HVIL (High Voltage Interlock) system must be present in every HV connector and detect if a Power Circuit connector is de-mated, for example with shorter alarm contacts within the same connector and inhibit/remove High Voltage from both the plug and the receptacle. If the connector was live when de-mated, the high voltage must be switched off immediately and any residual voltage on the contacts of both the plug and the receptacle discharged to <60V DC within 4 seconds. Re-mating of the connector must not re-energise the circuit.

**5.29.17.** All class B Power Circuit connectors and cabling must provide mechanism for locking, strain relief and sealing to the cable assembly.

**5.29.18.** All major conductive parts of the body must be connected e.g. with wires of appropriate dimension to obtain equipotential bonding.

**5.29.19.** No part of the chassis or bodywork should be used as a current return path.

**5.29.20.** The distribution of high currents in the HV DC network must be made in a star-point configuration and not in a loop, in order to avoid potential shifts resulting from current flows. The star-point of the electrical reference potential is referred to as "Power Circuit Ground".

**5.29.21.** Every part of the electrical equipment must have a minimum insulation resistance between all live components and earth of 500 Ohms per volt. The measurement of the insulation resistance must be carried out using a DC voltage of at least 100 volts.

**5.29.22.** Unless the function is already provided by the BMS, a proprietary isolation surveillance system must be used to continuously monitor the status of the isolation barrier between the voltage class B (2.9) system and the chassis while the HV system is energised.

**5.29.23.** If not part of the BMS, the proprietary isolation surveillance system must be located within the battery enclosure and wired in series with the main battery contactors. If an isolation fault is detected, the system shall open the circuit breaker automatically and trigger the "Danger" state of the RESS Status Indicator. Full details of the isolation surveillance system must be provided to Motorsport UK 3 months prior to the vehicle inspection.

**5.29.24.** The competitor must provide a detailed "Emergency Services Guide" documenting all aspects of the HV system including component locations and details of the standard and emergency HV isolation procedures. This document should be structured in the same way and have similar content to the guides provided by OEMs for production EVs and must be provided to Motorsport UK 3 months prior to the vehicle inspection.

**5.29.25.** See Drawing 1 for an example of the EV System Schematic showing all components and connections. The vehicle specific version must be provided to Motorsport UK 3 months prior to the vehicle inspection.

**5.29.26.** On vehicles without a 12v alternator, a DC/DC converter of suitable power rating must be provided to charge the auxiliary battery and electrical system.

**5.29.27.** The auxiliary battery must never be used to recharge the traction battery.

### **5.30. SAFETY EQUIPMENT.**

#### **Driver master switch**

**5.30.1.** All vehicles must be equipped with a general circuit breaker, of sufficient capacity and which can be operated easily by a switch from the driver's seat when the driver is seated in a normal and upright position, with the safety belts fastened and the steering wheel in place, and from the outside, to cut off all electric transmission devices.

**5.30.2.** This switch MUST act as a General Circuit Breaker that interrupts ALL electrical transmission between the RESS and all other HV circuits by means of a spark-proof circuit breaker providing galvanic switching which MUST NOT be short-circuited by any components such as a pre-charge resistor. Low power batteries provided for low voltage circuits, for example auxiliary circuits, do not have to be isolated by the general circuit breaker provided that they are completely isolated from the main power accumulators.

**5.30.3.** In the event that the circuit breaker is activated, the HV potential, outside the RESS, must drop below 60V DC within 4 seconds.

**5.30.4.** Specifications for the General Circuit Breaker are laid down in Appendix J – Article 253 18.17.

#### **Fire Extinguisher**

**5.30.5.** All cars must be equipped with a plumbed in extinguishing system with nozzles discharging into the Cockpit and onto the Motor(s) and Inverter. Only ABC extinguisher types compatible with the battery chemistry and specified for the voltage level at the power bus are allowed.

#### **Extinguisher switches**

**5.30.6.** There must be two exterior actuators. These actuators must be situated at the base of the main rollover structure on both sides of the vehicle for a single seater or at the lower corners of the windscreen for a closed cockpit vehicle.

**5.30.7.** A means of triggering from the outside must be combined with the general circuit breaker switches.

**5.30.8.** The actuators must be marked with a letter "E" in red at least 80mm high, with a line thickness of at least 8mm, inside a white circle of at least 100mm diameter with a red edge with a line thickness of at least 4mm. See Drawing 3 for an example.

#### **Marshal Neutral Switch**

**5.30.9.** To enable a marshal to isolate the RESS from the power bus in less than 2 seconds, external switch(es) which operate the general circuit breaker must be provided, which:

**5.30.9.1.** For a single seater, a single switch must face upwards and be recessed into the top of the survival cell no more than 150mm from the vehicle centre line and less than 150mm from the front of the cockpit opening and less than 70mm from the extinguisher switches defined in 5.29.6.

**5.30.9.2.** For a saloon, two switches must face upwards and be recessed into the windscreen scuttle on either side, no more than 150mm from the side of the vehicle, 350mm from the door aperture and less than 70mm from the extinguisher switches defined in 5.29.6.

**5.30.9.3.** Each switch must be designed such that the power circuit cannot be accidentally re-energized.

**5.30.9.4.** Each switch must be marked with a red spark in white edged blue triangle with a base of at least 120mm. The angle of the triangle where the spark is pointing to, must point to the button. It must be associated with a letter "N" in blue inside a white circle at least 50mm in diameter and with a blue edge. The height of both symbols must be at least 100mm. See Drawing 4 for an example.

**5.30.10.** It is prohibited to cover the external switches in any way whatsoever.

**5.30.11.** In a crash, all energy sources of the Power Circuit must be switched off automatically and the full RESS must be isolated. The arrangements must be validated by the Failure Mode and Effects Analysis (FMEA) which must be provided to Motorsport UK 3 months prior to the vehicle inspection. An FIA approved Accident Data Recorder may be used to initiate the shutdown.

**5.30.12.** All switches (Driver Master, Neutral and Extinguisher) must operate at a nominal 12V.

**5.30.13.** See Drawing 2 for an example of the functional switching diagram. The vehicle specific version must be provided to Motorsport UK 3 months prior to the vehicle inspection.

**5.30.14.** Safety Indicator requirements are based on the specifications laid down in Appendix J – Article 253 18.22.

**5.30.15.** All indicators must have a viewing angle of at least 120° and a luminous flux of at least 8 lumens.

#### **HV RESS status light**

**5.30.16.** All Bespoke vehicles with a HV RESS must be fitted with a HV RESS Status indicator light, which:

**5.30.16.1.** Is a Red/Green light that indicates the safety status of the RESS.

**5.30.16.2.** Must be in working order throughout the event even if power on the vehicle has failed.

**5.30.16.3.** For a single seater, faces upwards and is recessed into the top of the survival cell no more than 200 mm from the vehicle centre line and the front of the cockpit opening.

**5.30.16.4.** For a saloon vehicle, is fitted centrally at the base of the windscreen with a repeater fitted at the base of the rear screen. Both lights must be clearly visible from a distance of 5 meters.

**5.30.16.5.** Remains powered for at least 15 minutes after the general circuit breaker is activated.

**5.30.16.6.** Is marked with a "HIGH VOLTAGE" symbol (see Drawing 5).

**5.30.16.7.** Has repeater indicator light on the dashboard the replicates the states of the main light. This does not have to comply with 5.28.13.

**5.30.16.8.** See Table 3 for the HV RESS Status indicator states.

#### **Ready-to-Move-Light**

**5.30.17.** All Bespoke EVs that have an EV system that is capable of propelling the vehicle must be fitted with a Ready-to-Move light, which:

**5.30.17.1.** Is a white light that will illuminate to indicate that the vehicle can move if the throttle pedal is pressed.

**5.30.17.2.** For a single seater, faces forward and is fitted to the top of the roll hoop.

**5.30.17.3.** For a saloon vehicle, is fitted to the front roll over structure to be visible through the windscreen.

**5.30.17.4.** Will flash "on" for 0.05 seconds and "off" for 2 seconds whilst the vehicle is charging.

**5.30.17.5.** Will flash "on" for 0.5 seconds and "off" for 0.5 seconds if, when the system has been requested to energize and the bus voltage has not exceeded 50V.

**5.30.17.6.** See Table 4 for the Ready-To-Move indicator states.

#### **Throttle failsafe**

**5.30.18.** All Bespoke vehicles must be equipped with a throttle fail safe system, which in case the throttle and brake pedal are pressed at the same time, overrides the throttle and cuts the power to the propulsion system. The details of the fail safe system must be provided to Motorsport UK 3 months prior to the vehicle inspection.

#### **5.31. BESPOKE VEHICLE CHARGING.**

**5.31.1.** Bespoke vehicles must use a charging system compliant with a recognised charging standard and be able to use public chargers (SAE J1772, IEC 62196, CHAdeMO or Combined Charging System (CCS)) and must follow standard protocols for connecting/disconnecting the charge connector and initiating/stopping the charging process. Only a single external charge port is permitted.

**5.31.2.** Bespoke vehicles must use a commercially available on-board charger (if fitted) and if liquid cooled, >51% water-based coolant must be used. Details must be provided to Motorsport UK 3 months prior to the vehicle inspection.

# Appendix 3: Tables and Diagrams for Electrified Vehicles

**Table 1: Regulation Summary**

Regulation	Description	EV Tech Regs Applicability			
		mHEV	HEV	PHEV	BEV
		LV	HV	HV	HV
Section B: Nomenclature and Definitions		Y	Y	Y	Y
Section J: Competitors Vehicles		Y	Y	Y	Y
Section J: Appendix 2 Electrified Vehicles Technical Regulations					
5.22	Electrified Vehicles	Y	Y	Y	Y
5.23	Permitted Vehicles	Y	Y	Y	Y
5.24	EV Passport and Inspection	Y	Y	Y	Y
5.25	Scrutineering	Y	Y	Y	Y
5.26	Charging	Y	Y	Y	Y
	Bespoke BEVs				
5.27	Motors	n/a	n/a	n/a	Y
5.28	Rechargeable Energy Storage Systems	n/a	n/a	n/a	Y
5.29	Electrical Equipment and General Electrical Safety	n/a	n/a	n/a	Y
5.30	Safety Equipment	n/a	n/a	n/a	Y
5.31	Bespoke Vehicle Charging	n/a	n/a	n/a	Y

**Table 2: Permitted Electrified Vehicle Types**

Vehicle Type	Permitted EV's				EV Inspection				Vehicle Passport Requirement			
	mHEV	HEV	PHEV	BEV	mHEV	HEV	PHEV	BEV	mHEV	HEV	PHEV	BEV
	LV	HV	HV	HV	LV	HV	HV	HV	LV	HV	HV	HV
<b>Standard Electrified Vehicle</b> 5.23.2	Y	Y	Y	Y	N	N	N	N	VP	VP	VP	VP
<b>Modified Electrified Vehicle</b> 5.23.3	Y	Y	Y	Y	Y 2/.	Y 2/.	Y 2/.	Y 2/.	EVP	EVP	EVP	EVP
<b>Bespoke Electrified Vehicle</b> 5.23.4	N	N	N	Y	n/a	n/a	n/a	Y 3/.	n/a	n/a	n/a	EVP

**Key:**

mHEV = Mild hybrid

HEV = Hybrid

PHEV = Plug-in hybrid

BEV = Battery electric vehicle

LV = Low voltage (<30V AC or 60V DC)

HV = High voltage (>30V AC or 60V DC)

VP = Vehicle Passport (existing)

EVP = Electric Vehicle Passport (new)

**Notes:**

- 1/. Category or discipline specific regulations may impose further restriction on permitted vehicles
- 2/. Submission of OEM vehicle specific Emergency Services Guide and visual inspection only
- 3/. Full submission of all data requirements contained in EV Tech Regs plus visual and technical inspection and functional test



**Table 3:**  
**HV RESS Status indicator states**

Light Status	RESS Status
Green	Safe
Red	Danger (Isolation fault)

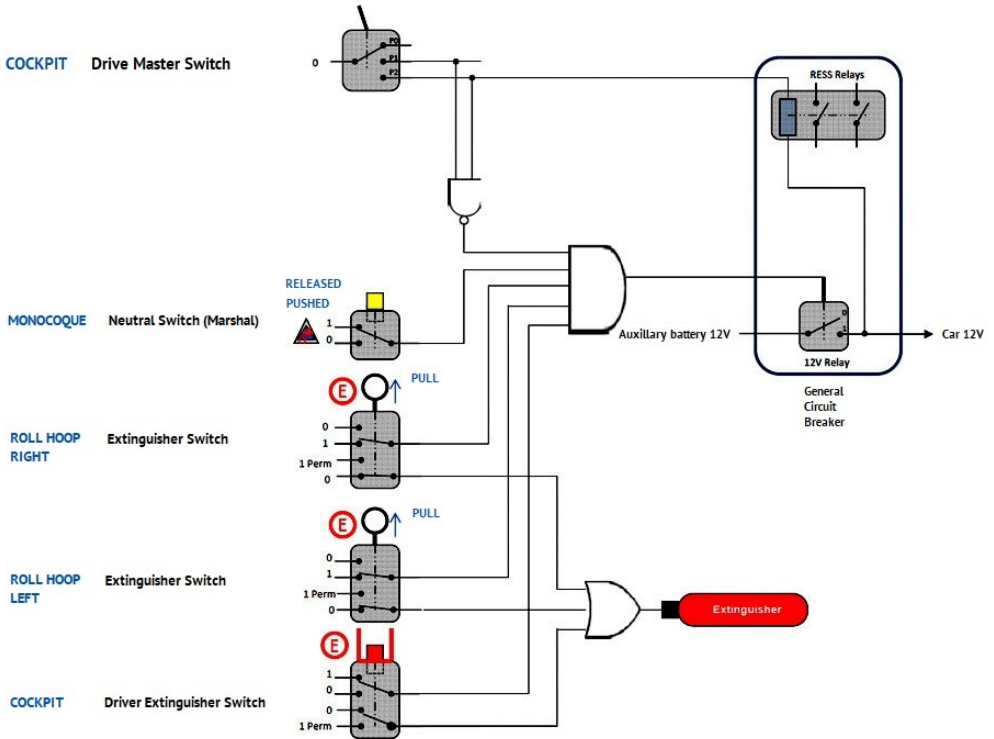
**Table 4:**  
**Ready-to-move indicator states**

Light Status	Vehicle Status
Off	HV system de-energised
White always on	HV system energised – vehicle ready to move
White flashing	Charging

**Table 5: Table of Electrified Vehicle Safety Requirements**

Equipment Who/Where	HV Gloves (Inner & Outer)	Insulated Rescue Pole	Arcflash Helmet	Portable Defibrillator	Voltage Proving, Insulation Measuring & Infra-red Temperature Measuring Device	Insulation Tools	Special Tools (service disconnect)	Vehicle Specific Emergency Service Guide	EV Capable Extinguisher (e.g. F500)
Rescue Crew	x				x				
Rescue Unit	x (spare set)	x	x	x	x	as required – minimum is set of insulated cable cutters for cutting safety loop		x (each unit)	x
EV Scrutineer	x				x (only if trained)				
Scrutineering Bay	x	x	x	recommended					x
Designated Charging Area	x	x	x	recommended					x
Team	x	x	x	recommended				x (for each vehicle)	recommended
Team HV Representative (bespoke vehicles)	x		x		x	as required	as required	x	

## Drawing 2: Functional switching diagram example



### Drawing 3:

#### Fire Extinguisher Warning Symbol



### Drawing 4:

#### Marshal Neutral Switch Warning Symbol



### Drawing 5:

#### High Voltage Warning Symbol

