INTERNATIONAL FEDERATION OF MODEL AUTO RACING

IFMAR ELECTRIC OFF ROAD RACING AND TECHNICAL RULES

INDEX

2 RACE FORMAT

2.1 RACE PACKAGE

2.1.1 Upon arrival and registration each driver will be given a race package which contains:

1. A set of numbers for his radio controlled car PLUS three additional sets.
2. Two sets of participant identification numbers for wing or spoiler.
3. One identification badge for driver and one for mechanic.
4. A complete time schedule for all practice, heats and finals for the whole event.

2.2 IDENTIFICATION NUMBERS

2.2.1 Each competitor will display on his wing or spoiler his identification number. This number will remain the same through the entire event.

2.2.2 The numbers must be displayed on the right side of the wing or spoiler.

2.3 BADGES

2.3.1 Two badges will be given to each competitor, one blue for driver and one yellow for mechanic.

2.3.2 Access to the pits and track will be restricted and badges must be worn at all times. Badges will be issued as follows:-

Blue	Drivers	Drivers stand, pits, staging area, track.
Yellow	Mechanics	Pits, staging area, track.
Green	Press	Pits, staging area, viewing area.
White	Team Manager	Pits, staging area, viewing area.
Red	Race Official	All areas.
Grey	IFMAR Official	All areas

2.4 OFFICIAL ANNOUNCEMENTS

2.4.1 All official announcements must be made in English.

2.4.2 Referees must be provided with a monitor to show race progress and a microphone linked direct to a speaker mounted on the driver's stand. This is to enable drivers to hear any warnings issued.

2.5 RACING FORMAT

2.5.1 The track will be closed for a minimum of two (2) and a maximum of three (3) days prior to the day one (1) schedule as follows. This closure is to allow the Organizer to put into effect the rule 2.5.4 regarding a minimum of 60% change of layout. Before closure, the track should be available for competitors to practice on. If it is a commercial venue, the usual Organizer's conditions shall apply.

The Organizer must state the availability of practice for all competitors as per Rule I.6.l i (Schedules for Organization).

DAY 1	10.00 to 16.00	Class Registration
	14.00	Opening Ceremony
DAY 2	07.00	Doors open
	08.00 to 18.00	Practice – a maximum of ten (10) rounds of ten (10) pre-arranged practice heats of fifteen (15) cars each
DAY 3	07.00	Doors open

	08.00	One round of controlled practice by qualifying heats
	10.00	Four (4) rounds of qualifying
DAY 4	07.00	Doors open
	08.00	One (1) hour of unofficial practice in heat order. (4 min turn-round per. Heat)
	09.30	One (1) round of qualifying
	11.30	Break
	12.30	"A" Mains practice
	13.30	Mains Finals
	16.30	Rostrum Presentation of top three (3) trophies
DAY 5		TRACK CLOSED
	10.00 to 16.00	Class Registration
DAY 6	07.00	Doors open
	08.00 to 18.00	Practice – a maximum of ten (10) rounds of ten (10) pre-arranged practice heats of fifteen (15) cars each
DAY 7	07.00	Doors open
	08.00	One (1) round of controlled practice by qualifying heats
	10.00	Four (4) rounds of qualifying
DAY 8	07.00	Doors open
	08.00	One (1) hour of unofficial practice in heat order. (4 min turn-round per. Heat)
	09.30	One (1) round of qualifying
	11.30	Break
	12.30	"A" Mains practice
	13.30	Mains Finals
	16.30	Rostrum Presentation of top three (3) trophies

Evening Banquet Awards of all trophies.

2.5.2 There will be a scheduled day off between classes. This day can be used for track repairs.

2.5.3 The track layout/design will not be available for running on prior to the first day of practice.

2.5.4 If the track is used prior to the commencement date then a minimum of 60% of the layout must be changed prior to the start of practice.

2.5.5 Practice will be organized using pre-arranged practice heats. Maximum track time per heat will be six (6) minutes. Practice heats may contain a maximum of fifteen (15) drivers. Practice will be run on standard numerical heat order from heat one (1) to heat ten (10).

2.5.6 All the IFMAR Technical Rules apply during Controlled Practice, including the use of batteries and motors from the IFMAR Approved List which have been checked (and marked where necessary) by Technical Inspection.

2.6 HEATS

2.6.1 There will be fifteen heats of ten drivers each. They may be divided into two groups.

Group A = Heats 1 to 7 Group B = Heats 8 to 15.

2.6.2 There will be five (5) rounds of qualifying heats unless weather or unforeseen circumstances dictate otherwise. Any reduction in the number of rounds will be decided by the International Jury. The sequence of the heats in each round of qualifying will be as follows:

Round	1	2	3	4	5
Heat Number to start with	1	4	7	10	13

Heats run in numerical order, after Heat 15 go to Heat 1

Heat Number to finish the round	15	3	6	9	12

If there are less than fifteen Heats, the start/finish Heats for each round will be adjusted

accordingly.

2.6.3 During the first round of qualifying, heat starting order will be determined by the times achieved overall during the controlled practice rounds. During further rounds, heat starting order will be by the overall fastest time of drivers in their heat.

2.7 QUALIFYING SYSTEM

A driver's point score will place the driver in a final according to the following system. In each round, drivers will score points based on the laps and times achieved in relation to all other drivers.

Fastest driver in each round will score:	**0** points
2nd fastest will score:	**2** points
3rd fastest will score:	**3** points
4th fastest will score:	**4** points

and so on, scoring one point less for each driver down to last qualifying position.

If a driver does not start a heat, he receives no points. No change to the scoring method will be made if less than 150 drivers enter the World Championship. In each round, in case of a tie, the points will be equally awarded to each driver with the same lap and time score. The first driver not in the tie will score points according to their position in the qualifying list. For example:

Fastest driver	8 laps 5:10.00	will score	0 points
2nd fastest driver	8 laps 5:12.00	will score	2 points
3rd fastest driver	8 laps 5:14.00	will score	3 points
4th fastest driver	8 laps 5:15.00	will score	4 points
5th fastest driver	7 laps 5:01.00	will score	5 points - TIED
6th driver	7 laps 5:01.00	will score	5 points - TIED
7th driver	7 laps 5:01.00	will score	5 points - TIED
8th fastest driver	7 laps 5:04.00	will score	8 points

A driver will discard his worst scores based on the qualifying rounds completed to the following rules:

The normal qualifying will be best three (3) rounds out of five (5) rounds. If only four (4) rounds are completed, the two (2) fastest rounds will count. If three (3) rounds are completed, the fastest two (2) rounds will count. If two (2) rounds are completed, the fastest single result will count. If only one (1) is completed, that round will count.

In the case of a tie in the final qualifying positions when the driver's best scores are added together, only the scores (and the laps and times used to determine those scores) will be used to break the tie. The discarded scores, laps and times will not be used to separate a tie. The driver with the lowest single points score from the scores added will be awarded the tied position. In the case of a continuing tie, the next best scores will be considered. All best scores will be considered until the tie is broken.

If a comparison of points fails to break the tie, the laps and times from the lowest points will be compared. The driver with the fastest time from their lowest score will be awarded the tied position. Example, with three (3) from five (5) counting: -

Driver	Points Score	Total	Fastest Lap Time
A	l50,146,130,148	574	8 laps 5:10.00 (Rnd. 1)
B	148, 147,136,143	574	8 laps 5:14.00 (Rnd. 1)
C	149,145,131,147	572	8 laps 5:12.00 (Rnd. 4)
D	145,131,147,149	572	8 laps 5:16.00 (Rnd. 3)

Note: Driver A qualifies ahead of Driver B due to a lower single point score Driver C qualifies ahead of Driver D due to a better fastest lap time.

2.8 FINALS

2.8.1 The World Championship final will be composed of three separate five minute races

composed of the top ten qualifiers after completion of qualifying.

2.8.2 All finals will be of ten drivers.

2.8.3 Final positions will be decided by a point system based on one (1) point for the winner of each final on down to ten (10) points for the tenth placed finisher in each separate final. The best two (2) of three (3) finishes will count. In the event of a tied position, the driver with the single best finishing position in either of the best two (2) finals that counted, will be awarded the tie, in the event of a continuing tie, then the laps and times from the best finishing position will be compared and the one with the fastest laps and time total will be awarded the tie. If still continuing, then times from the second best position will be compared.

2.8.4 A-Main Finals

If three (3) finals are completed, the best two (2) will count as per Rule 2.8.3.
If two (2) finals are completed, the best one (1) final will count.
If one (1) final is completed, that one (1) final counts.
If no A-Main Finals are completed, the finishing order of qualifying will be used to determine the final results of the event.

A-Main Finals will have priority and may be moved in an attempt to have them completed if rain is imminent.

Time must be allowed to charge batteries.

2.9 RACE DURATION

2.9.1. All heats and finals will be five (5) minutes, plus time to finish last lap.

2.10 STARTS

2.10.1 All starting announcements and warnings will be in English.

2.10.2 A two minute warning will be given before the start.

2.10.3 At the thirty second warning all cars must be placed on the track and the mechanics must leave the racing surface. After the thirty second warning no other cars will be allowed entrance to the racing surface until after the start of the race, at which time the mechanic may place the car on the starting grid after all the cars have left.

2.10.4 A ten second warning will be issued followed by the start which will be by an audible signal.

2.10.5 There will be no restarts due to jump starts.

2.10.6. A video record will be made of all starts for review by the referees as necessary.

2.10.7 There will be a one meter penalty line for jump starts. Any car crossing that line before actual start will receive a one lap penalty. Any car jump starting but not crossing the one meter line will receive a ten second penalty.

2.10.8 During qualifications the “staggered start” system will be used. Each car will start separately within one second of its number being called. Starting before its number is called will be classified as a jump start.

2.10.9 If for any reason a car did not start prior to the completion of the first lap by any car, the time for that car will automatically begin the moment the first car has completed a lap.

2.10.10 All main finals will use a staggered grid start of ten (10) rows with one and a half (1.5) meter minimum spacing without being directly in line with the car in front. Two (2) meter maximum spacing is recommended, if possible.

EXAMPLE

Meter	0	1,5	3	4,5	6	7,5	9	10,5	12	13,5
Meter	0	2	4	6	8	10	12	14	16	18
Car #	1		3		5		7		9	
Car #		2		4		6		8		10

2.10.11 Any race stopped due to race equipment malfunction or official's error will be re-run after a suitable delay.

2.11 MARSHALLING

2.11.1 Marshalling shall be provided by the racers. The Race Organizer will provide two (2) designated fill-in marshals to cover unforeseen eventualities. After each heat the participants in that heat will place their cars into impound and assume assigned marshalling positions for the following heat. No other person is allowed on the track (except officials) while the race is in progress.

2.11.2 When there is a break, staggering of heats or a change in the running order of heats, any driver that is responsible for marshalling will be properly notified either in person or through his country's Team Manager.

2.11.3 Marshals will be called one minute prior to the start of each race.

2.11.4 First failure to marshal will result in a referee's warning.

2.11.5 Second failure to marshal will result in a penalty of 3 seconds being added to that driver's fastest qualifying time.

2.12 FINAL RESULTS

2.12.1 Results of each sub-final will be posted upon completion of the final and review by the officials.

2.12.2 Results of the World Championship finals will be posted following completion of each final and review by IFMAR officials.

2.12.3 As soon as the IFMAR officials have reviewed the results of the three World Championship finals and verified such results the official finishing positions and points will be announced and the World Champion will be presented on the podium.

2.12.4 Awards and complete introduction of competitors and their final placing will be at the Awards' Banquet following the finals.

2.13 TRANSMITTER IMPOUND

2.13.1 All transmitters must be placed in impound on each competition and practice day and on the main Finals day from 7 a.m. to 7.45 a.m. Transmitters will be furnished to each competitor after completion of technical inspection and prior to their heat.

2.13.2 All transmitters must be returned to impound following their heat.

2.13.3 Transmitters in the pit areas or areas other than the drivers stand and impound, during official competition hours will cause disqualification.

2.14 TRANSMITTER INSPECTION

2.14.1 All transmitters must be tested and inspected prior to their use. A spectrum analyzer will be used for radio tuning inspection.

2.14.2 All transmitters passing inspection will be identified and only those transmitters thus identified may be used in the event.

2.15 LAP COUNTING AND TIMING

2.15.1 Automatic lap counting, with cumulative and split lap times, will be in place for each car. Competitors are required to install a small transponder into their cars according to the organizer's instructions. An audio/video tape recording will be made.

Every competitor is allowed to use his own IFMAR approved personal transponder if the lap counting officials are informed and agree.

If an organizer is using a personal transponder system, he has to provide to all participants not having their own transponder, a transponder for every heat or final free of charge. It is strictly forbidden to ask for a rental fee. A deposit of the replacement value for the personal transponder may be demanded. If a competitor by any reason destroys or does not return a personal or normal transponder, he loses his deposit.

The driver has to ensure that his personal private transponder belongs to the marked chassis.

Significant stops (tyre changes, crashes, etc.) will be noted with times of stop and restart. This record might not include every incident, however, its intent is to verify incidents, whenever possible. AMB lap counting system or IFMAR approved equivalent must be used in duplicate.

A suitable working computer with proper race proven programmes must be provided to sort lap times, print results from heats and sort final positions from each round of heats within 15 minutes of the completion of the round of heats.

Chronometers must give time to 1/100th of a second, in all cases, the hundreds will be utilized.

In the case of equal results, the following best heat will separate the competitors.

If both the primary and support lap counting systems fail during a qualifying heat or final, the heat or final will be re-run as soon as is practicable. Under no circumstances will any lap score or time, other than those from the official time keeping equipment, be accepted for any purpose to do with the running of an IFMAR race.

2. PROTESTS

2.16.1 Lap count checking:

This need not be written and does not need a deposit. The Team Manager will, within fifteen (15) minutes of the display of the results, show to the race direction officials the time lap sheet involved (the one displayed by the officials) and will indicate where he thinks an error has been made. This must be shown to the Race Director or scoring official. If the request is justified, correction will be made immediately. The race official will advise in writing the result of his finding and the time will be noted. After the checking, if the team manager persists, he may then submit a written protest along with a US$50 protest fee. The request will then be processed as a formal protest.

2.16.2 Formal protest:

Must be done within fifteen (15) minutes after the display of the results or the occasion it concerns, in writing and with a US$50 protest fee. Protest must be in English. The time of the display will be written on the result sheets and protests must be made within fifteen (15) minutes of that time. The protest fee is forfeited if the protest is not upheld, and returned if justified. The protest may be given to the Race Director or to an IFMAR official. Protests are processed by the Race Director and if necessary the IFMAR International Jury. Appeals against the Race Director's decision may be made to IFMAR. IFMAR is obliged to handle such an appeal.

2.17 DISPLAY OF RESULTS

2.17.1 At the end of each heat and final, and after official review, the results will be displayed for the

competitors for checking and information.

2.17.2 The result sheet will include lap times and finishing positions. The display sheet will also display the official time of posting.

2.18 CAR NUMBERS AND LAP COUNTING TRANSMITTERS

2.18.1 Only the numbers supplied by the organizer will be used on the car.

2.18.2 Each competitor is responsible for attaching the lap counting transponder to his car.

2.18.3 During qualifying any car starting without a transponder will not be counted. If, during a heat, the transponder fails or falls off the car, the car will be counted and timed manually, if possible. In this case the Race Director will verify the results and his decision will be final.

2.18.4 During the final(s) all cars must have transponder firmly attached at the start of the race. In the event of the loss and/or failure of transponder the car will be manually counted.

2.18.5 Under no circumstances will a heat or final be re-run due to a car not having a transponder or failure of such. This also applies to a car having an incorrect number.

2.19 FREQUENCIES

2.19.1 Use of fixed frequencies and 2.4GHz DSM/DSS systems.

These systems may only be used if permitted in the organizing country. However, due to the way they operate, a driver using such a system cannot ask for any delay in case of radio problems.

2.19.2 In the case of two or more drivers qualifying for the same final with the same frequency, the higher placed driver will keep his frequency and the lower placed driver(s) must change.

2.19.3 For the World Championship Final all frequencies of the finalists will be known only to the Race Director and Technical Inspector.

2.19.4 The lower placed driver who will not or can not change will not take part in their final for which they qualified.

2.19.5 If a driver must change his frequency before the start of a final due to an error by the organization, he will be allowed ten minutes. If the driver has found his radio defective or has made an error in the selection of his frequency at the start of a heat or final the race will not be delayed. The Race Director may delay the start, due to radio frequency, for a frequency inspection.

2.19.6 Anyone on other than assigned frequency will not be allowed to start the final or heat.

2.20 PENALTIES AND SANCTIONS

2.20.1 Black flag (removal of car from track) may be issued for the following reasons:

a. Drivers who impede the progress of other drivers.

b. Un-sportsmanlike driving.

c. Participants driving in a manner deemed to be dangerous.

d. Vehicles judged to be in an undriveable or dangerous condition by the Race Director. These vehicles, after being repaired, may be allowed to re-enter the track after permission by Race officials.

e. Vehicles losing their body must immediately leave the track and carry out necessary repairs before re-entering track.

f. Any illegal modifications or changes made to the vehicle which are found during technical inspection at the end of a heat or final will automatically cause disqualification.

g. Any vehicle which, by the fault of another driver, is damaged or obstructed during a heat or final will not, under any circumstances, be allowed to re-run in another heat.

h. All participants must strictly observe the instructions and warnings by the Race Director and Referees.

i. The bad behavior and/or deportment of any competitor, even outside an official race meeting, which could injure the promotion of the sport, may become the object of an official national or international sanction.

2.21 PIT ALLOCATION

2.21.1 Pit spaces are allocated by the organizer for the duration of the World Championship.

2.21.2 Every competitor will have a minimum of 12.5 Sq Ft of table space with a minimum depth of 2ft.

2.22 OPENING CEREMONY

An Opening Ceremony will be held on Day 1 (see Rule 2.5.1). Competitors will participate in a welcoming procession. Each national team is asked to wear similar shirts. A sign bearing the name of each country will be provided by the organizer for each team.

3 OFFICIALS

3.1 RACE DIRECTOR

3.1.1 The Race Director is under the direct authority of IFMAR and must be approved by IFMAR and the appropriate host Bloc.

3.1.2 The Race Director within the schedule of the event is responsible for ensuring that the various tasks under his responsibility are correctly done. These include the following:-

a. Time keeping
b. Starts
c. Marshalling
d. Display of results
e. Announcements
f. Technical inspection
g. Frequency control.

3.1.3 Receive any protests and call the International Jury, if necessary.

3.1.4 Make urgent decisions for safety or unforeseen situations.

3.2 TIME KEEPING SUPERVISOR

3.2.1 The Time Keeping Supervisor is responsible for recording all laps, times, and results of all drivers in all heats and finals. He is responsible for classifying the results and setting up the mains. The Race Director must verify this classification and selection.

3.2.2 After the end of all heats and sub-finals the supervisor will review the results before displaying.

3.2.3 In the case of a request for checking results, the Time Keeping Supervisor, along with the Race Director, will check the questioned result and make a decision.

3.3 REFEREES

3.3.1 One (1) IFMAR referee will be appointed by IFMAR. Travel and accommodation expenses will be paid for by IFMAR, EFRA, ROAR, FEMCA and FAMAR equally. The IFMAR Referee will be supported by two (2) appointed deputy referees, one nominated and paid for by the host bloc and one nominated and paid for by the host country's association (see General Rule 1.12). They must be unbiased and experienced persons with a good knowledge of the English language and the current IFMAR rules. They must have driving experience in electric off-road racing.

3.3.2 A back-up referee must be nominated by each organization in case of temporary absence of

official Referee.

3.3.3 The main task of the Referees is to observe the racing and in particular the good sportsmanship during the racing. They will ensure that the correct rules are observed by everybody.

3.3.4. The Referees may be called for information by the International Jury when a meeting is called by the Race Director.

3.3.5 Referees may not be participants in the event or serve in any other official capacity.

3.4 REFEREES' DUTIES

3.4.1 At all times during the qualifying heats and sub-finals, 2 of the 3 Referees present will be watching and observing the racing from start to finish. During the World Championship finals 3 Referees will observe the race from start to finish.

3.4.2 A Referee may issue warnings and instructions. A Referee may take action after an initial warning but in all cases a maximum of three warnings means automatic disqualification from the event. The IFMAR Referee has the right to use his discretion to issue a penalty instead of a warning (refer to General Rules for IFMAR World Championships Rule 1.12). Any appeal against the referee's decision must be made to the International Jury accompanied by protest fee.

3.4.3 A Referee will be responsible to ensure that no race is allowed to start without all marshals in position.

REFEREE GUIDELINES REGARDING OFFENCES WARNINGS:

1. Bad sportsmanship during the racing, i.e.: impeding the progress of other participants, deliberate slowing down or waiting for another car with the intent of impeding or hitting another car, deliberate crashing with another car, deliberate corner cutting, and reckless driving.
2. Unsportsmanlike conduct and behavior of drivers and mechanics involved in the racing.
3. Mechanics going on to the track during the race.
4. Any combination of three warnings will cause disqualification.

INSTRUCTIONS:

1. Cars that do not conform to the regulations before the start or during the race (example: loss of body).
2. Cars that are undriveable or in dangerous condition due to damage or malfunction of the car.
3. Starting procedure, writing down early starts and reporting them to the Time Keeper (Time Keeper and Starter are responsible for starting penalties).
4. It is not the responsibility or duty of the Referees to check if the cars conform to the technical specifications. This is the responsibility of the Technical Inspectors.
5. All warnings and instructions will be announced in English by the Referee using a microphone linked direct to a speaker mounted on the drivers stand.
6. A television/monitor linked to the official lap scoring computer must be provided for the referees to show race progress.
7. Each participant must be able to understand and recognize the words WARNING and INSTRUCTION.

3.5 REFEREES' AUTHORITY

3.5.1 The Referee issues warnings and ultimately may issue a black flag (disqualification) if deemed necessary or when his warnings are not effective. The IFMAR Referee has the right to use his discretion to issue a penalty instead of a warning (see General Rules for IFMAR World Championship Rule 1.12).

3.5.2 Warnings and instructions are announced by the Referee and he keeps a record of the warnings and instructions issued. Repeated warnings, three (3), will lead to disqualification from the competition. Instructions must be observed and obeyed immediately. All announcements will be made in English.

3.5.3 Reason for warning will be announced at time of issue. Further explanation, if required, will be given to the driver or Team Manager at the end of the race.

3.5.4 Under no circumstances may a warning or instruction by the Referees lead to an interruption of the race.

3.5.5 During the main event only, if two out of the three Referees agree, they will have the authority to black flag an entire team if one member of that team is positively interfering with the racing of another car in that event.

3.5.6 Appeals to the decision of the Referees must be made in writing and presented to IFMAR. IFMAR is not obligated to act on such a protest.

3.5.7 Referees have the right to time penalize a driver for offences under normal rules during the controlled practice rounds. However penalties accrued during controlled practice will not be carried through to the event proper.

3.6 INTERNATIONAL JURY

3.6.1 The International Jury consists of official representatives from ROAR, EFRA, FEMCA and FAMAR. Each Bloc will have a total of one (1) vote.

3.6.2 The relevant IFMAR Section Chairman shall always act as Chairman during International Jury Meetings and exercise a casting vote, if necessary. In the absence of the relevant IFMAR Section Chairman, the highest ranking IFMAR Official shall take the chair at any International Jury Meetings. The Race Director and Chairman are members of the International Jury but do not have a vote in the decisions. The Referees may be called by the Jury for opinions and explanations as deemed necessary. All decisions are by a simple majority vote. The Jury can request evidence and/or drivers presence pertaining to matters involved. Prior to the commencement of an International Jury Meeting, any mobile telephones in the meeting room must be turned off and placed on the meeting table until after the completion of the Meeting.

3.6.3 Jury members must be approved by their organizations.

3.7 RESPONSIBILITY OF THE INTERNATIONAL JURY

3.7.1 To decide in unforeseen situations.

3.7.2 To handle protests not covered by the Race Director's responsibility.

3.7.3 To change the race procedures or cancel the race whenever this is required due to safety aspects.

3.7.4 To see that the race is run according to the official IFMAR rules.

3.7.5 To make the decision on interrupting or canceling a race due to rain or other weather conditions.

3.7.6 The Chairman of the International Jury will make official the results of the World Championship through the ranking IFMAR official available.

3.7.7 International Jury members may not have dual duties of being a race official (other than Race Director) or Referee. Jury members may be participants in the event but must allow an auxiliary representative to serve in any protests that concerns the jury member as a participant.

4 TECHNICAL RULES

4.0 For the purpose of the IFMAR 1/10th scale Off-road World Championships, two (2) classes

will be utilized with a separate Championship for each. The classes will be for two (2) wheel drive modified and four (4) wheel drive modified cars. The official measurements in these Technical Rules are the metric measurements.

4.1 TECHNICAL INSPECTION

4.1.1 All cars must be presented for technical inspection at the start of the prior heat. No car will be allowed on the track surface without undergoing technical inspection first, including Lithium Voltage checks at random for some or all cars. Penalties for overcharging are indicated at rule 4.4 (race procedures for batteries).

4.1.2 All cars must be presented for technical inspection at the end of each final.

4.1.3 All motors and batteries to be inspected as necessary during qualifying with mandatory inspection after the finals.

4.2 GENERAL SPECIFICATIONS

4.2.1 Technical inspection will be prior to the start of racing and each heat/final. Cars may be inspected at anytime during the racing program.

4.2.2 All cars in the World Championship finals will be impounded at the end of the finals for further technical inspection, such as motors, etc.

4.2.3 Only one (1) car per driver per class is allowed. All cars must be presented to Technical Inspection for an Initial Inspection before the start of Controlled Practice. The purpose of this Initial Inspection is to determine that the car meets the IFMAR Technical Rules for this event.

When the car passes this Initial Inspection, the chassis of the car will be marked by the Technical Inspector. Marks which are made by engraving, and/or removal of chassis material, are to be avoided. A driver may refuse to have their chassis marked by methods which include removing chassis material.

Once the chassis is marked, the chassis may not be changed without the approval of the Race Director. The chassis may only be changed in the case of damage which cannot reasonably be repaired. Any replacement must be of the same: design, specifications and material as the original chassis registered.

Drivers must race the car he or she passed technical inspection with during qualifying and finals in accordance with the rules above.

4.2.4 Dimensional requirements (both classes);

Maximum overall length	18.00 inches	(457.2mm)
Maximum overall width	9.84 inches	(250.0mm), at any point of suspension travel.
Maximum height	8.00 inches	(203.2mm)

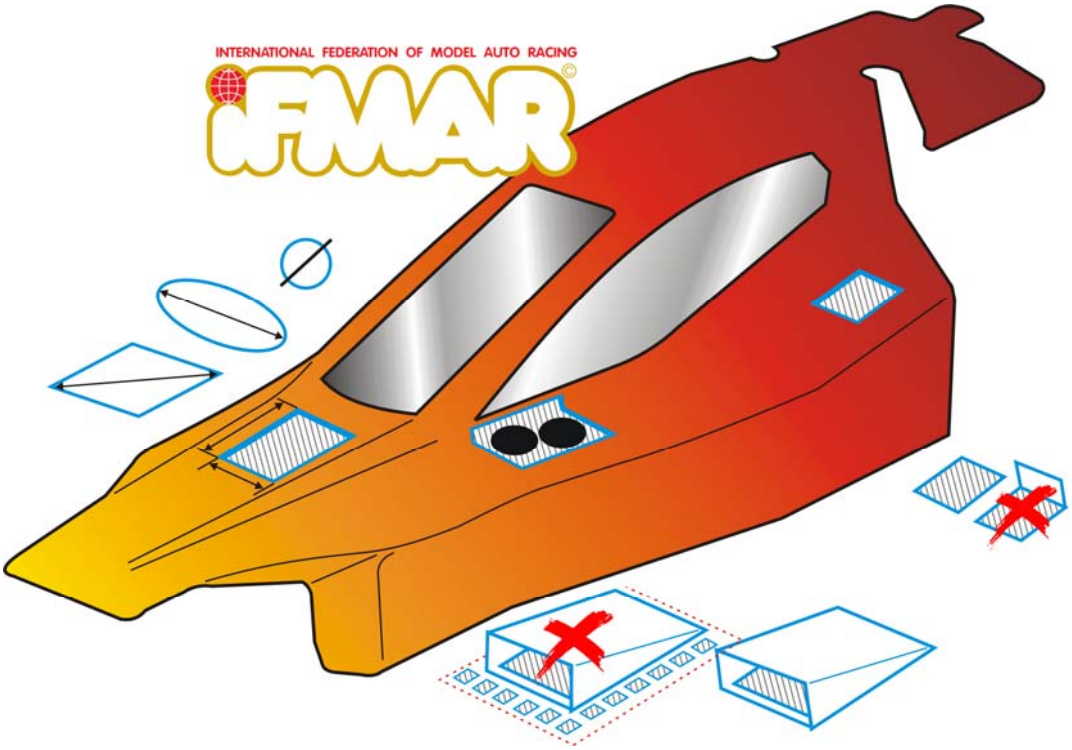
4.2.5 Bodies: All cars must use a 1:10th size body and have the appearance of full size off road racing cars. Pipe type bodies may be utilized on cars originally supplied in that configuration. A driver figure (minimum: head, shoulders, arms) must be firmly secured in proper position on cars using pipe type bodies. A driver figure is not required on enclosed body cars.

4.2.6 Side dams and spoilers: No add on side dams or spoilers allowed. Those molded in body as on original car are allowed.

4.2.7 The body must be securely attached to car at all times while racing. If the body becomes loose and a track hazard or falls off during race, car must pull off the track until the body is re-attached.

4.2.8 Openings in the body shell shall be kept to a minimum. Openings for wing mounts, antennas, and battery on-off switch shall provide no more than 6,35mm in clearance. Specifically, electronic speedo's, servos, receivers, batteries, and servo savers are not allowed to protrude through original shell.

Body shell holes/vents: The front and rear ends of the shell must retain some of the original profile of the two ends of the shell. Front and rear facing areas within the body shell surface which are ´marked´ with the intention of removal to form ”air scoops/ vents“ are allowed to be removed, within a maximum dimension of 10mm in any direction regardless of the manufacturers marking.



If no ”marked“ air scoops/vents are designed in the original mould to assist airflow to the motor or ESC, then material may be removed to a maximum of 10 mm in any given direction within a maximum square area of size 30 mm x 30 mm, in two places only. Windows are not allowed to be removed or include holes, other than for the purpose of the antenna.

4.2.9 Wings: A maximum of two (2) wings may be used. One for the front and one for the rear. Maximum size of wings:

Front 5 inches wide by 2.5 inch cord (127.00 mm x 63.5mm)
Rear 7 inches wide by 3.0 inch cord (177.00 mm x 76.2mm)
Max wing side dam sizes: Height 50mm/1.969in. Length 100mm/3.937 in.
Rear bi-level wings are permitted

4.2.10 Rollover antennas are not allowed. Antennas must be of a flexible non-metallic material.

4.2.11 Controlled tires and inserts must be used for both classes. The type of tires, combinations and inserts for both classes is decided by the IFMAR Electric Executive together with the race organizer (race organizer recommends three types of tires and inserts for the 2wd rear axle and three combinations of front and rear tire together with their respective inserts for 4wd). On 2wd front axle tire and insert is not controlled. In 4wd different types maybe selected for the front and for the rear axle. The race organizer has to forward the recommendations to the IFMAR Electric Section Chairman eight (8) months before the events. The final decision will be made six (6) months before the events by a majority vote of the IFMAR Electric Executive.

The three (3) recommended types of tires and three (3) recommended types of inserts for both classes must be commercially available in the four (4) Blocs at the time of the organizer’s recommendations, (eight (8) months prior to the events) and remain available up until the final decision six (6) months prior to the events. The selected controlled tire and controlled insert for both classes must continue to be commercially available in the four (4)

Blocs from six (6) months prior to the event up until the commencement of the events.

The manufacturer/s who was/were selected to supply the tire/s and/or insert/s for the previous IFMAR 1/10th Off-Road World Championship events is/are not eligible to supply tire/s and/or insert/s for the next IFMAR 1/10th Off-road World Championship events.

All tires must be black. Foam tires are not allowed. Foam/cap tires are not allowed but internal foam inserts are permitted.

Tire sizes: Max width - 1.75 inches
No minimum width.
Max tire diameter - 3.544 inches (90mm)

Wheel sizes: Min bead mounting diameter - 1.625 inches
Max bead mounting diameter - 2.2 inches
Bead mounting dimensions are measured at the point where the internal tire bead meets the wheel.
Max wheel diameter - 2.42 inches

Internal locking ring may be used for the purpose of retaining the tire only. Ring can not be used to increase the wheel's original size and/or the stiffness of the sidewall.

Max wheel width - 1.500 inches

4.2.12 Radio equipment: All transmitters must be inspected and approved prior to use in the event. A maximum of two control devices may be used: i.e. two (2) servos or a servo and a speed control.

4.3. BATTERIES APPROVAL

4.3.1 Lithium based (LiPo/LiFe) cells and batteries must be submitted for IFMAR Approval. Original manufacturer or their agents may request approval.

The deadline date for submitting batteries (cells) to be approved for that year's World Championship is eight (8) months prior to the date of the Opening Ceremony of the World Championship. The applications for approval must be submitted to IFMAR together with:

- The appropriate approval form (available on request as from 10 months before a WC race)
- Four plus one samples of the product closely representing the weight and size range stated
- A written technical specification including dimensions and weights with associated tolerances from the original cell or battery manufacturer for verification. For Lithium based batteries, the specification must also include: maximum charging parameters (amps & voltage), case material, case thickness and case sealing process.
- Lithium based batteries must be covered by their safety test certification in accordance with UN Manual of Test and Criteria ST/SG/AC.10/11/Rev.5, Part 3, Sub-Section 38.3, Tests T1 to T8**.** Copy to be supplied with approval documentation.
- Proof that a minimum of 1000 individual cells/batteries have been sold (by the original manufacturer or their agents) to commercial outlets in the retail or distribution sector of the hobby industry.
- A list of telephone numbers, email-addresses and postal addresses of retail suppliers, shops in each continent from whom the cells can be purchased must be provided.

4.4. BATTERIES TECHNICAL SPECIFICATION

Lithium Based (LiPo/LiFe) Batteries:

1. Lithium Based (Li-Poly/LiPo/LiFe) battery packs must have a hard, protective case that completely envelopes the cell(s). The case should be made from ABS or a similar

material. The two halves of the case must be factory sealed in a way that any attempt to open the case will destroy the case. The only opening in the case that is allowed is for the exit of wires or pin type connectors.

2S Battery: - Maximum external case sizes:

- Length: 139.0 mm
- Width: 47.0 mm. (The max. width includes any side exit. wires).
- Height: 25.1 mm. (Chassis location features additional to this dimension are allowed)

Saddle-Pack cells are allowed, but must comply with the above width and height. Furthermore they must not exceed a combined length of 139.0mm max. when placed end to end.

2. Individual cells used in the construction of the battery pack shall be rated at: LiPo 3,7 volts nominal, LiFe 3,3 volts nominal. Individual cells may be wired in parallel.

   For 2S packs: the maximum "In Series" is two to give a pack voltage of maximum 7,4v nominal for Lipo packs, LiFe packs to be maximum 6,6v nominal.

3. The battery pack shall have leads extending from the case for the positive and negative electrical connections using wire of adequate size to handle discharge rates acceptable to racing applications. Alternatively, 'Female connection tubes' to connect the power wires are allowed but the metal tubes must be well enough below the surface of the moulded case so to avoid short circuit if the pack is placed on a conductive surface. The connection points shall be clearly marked positive and negative.

4. The case must have the original suppliers label intact, clearly stating the name of the manufacturer/importer, the part number of the pack, the rated voltage, the chemistry (LiPo/LiFe), the pack capacity and the C- rating of the pack. The Brand name/logo label shall be easily readable.

5. Weight of any battery is limited to +/- 4% on manufacturers' specified weight. Batteries to comply with the weights specified on the IFMAR approval list.

4.5. BATTERIES RACE PROCEDURE

4.5.1 IFMAR shall produce an Approved Product List which lists all the cells eligible for that year's IFMAR W.C. events. This Approved Product List shall be distributed to all competitors in the race acknowledgement package no later than two (2) months prior to the WC event.

4.5.2 All cells/batteries must comply with the published data contained in the current IFMAR Approved Battery List.

4.5.3 All cells must be submitted to Technical Inspection for checking and marking prior to being used during Controlled Practice, Qualifying and Finals. This may be completed at any time. Cells which do not bear the Organizers mark may not be used for Controlled Practice, Qualifying and Finals.

4.5.4 The Organizer and IFMAR Officials may check the legality of a competitor's cells/batteries at any time during the WC event.

4.5.5 A weight scale will be available at all times during the event for competitors to carry out weight checks on cells.

4.5.6 Cells may not be charged or changed during the race.

4.5.7 1/10th. Off-Road cars will be driven by only 2S LiPo/LiFe batteries with a maximum nominal voltage of 7.4v/6,6v.

4.5.8 All LiPo/LiFe packs must be charged with a LiPo/LiFe-capable charger using the industry standard CC/CV. (Constant Current/Constant Voltage) charge profile. LiPo/LiFe drive batteries must be charged in a 'liPo sack' at all times. LiPo sack is defined as a receptacle designed for the purpose of charging LiPo/LiFe batteries and of a suitable construction as to contain a LiPo/LiFe fire.

4.5.9 Any competitor found to be charging Lithium based cells using a charger that is not specifically designed for LiPo/LiFe cells or using a charge profile other than the industry standard CC/CV, will be disqualified from the event.

4.5.10 2S LiPo/LiFe batteries may be charged to a maximum of 8.40v (LiPo) resp. 7.40v (LiFe). Overcharging is a safety hazard and will not be tolerated.

4.5.11 Any competitor found to have charged LiPo/LiFe cells to above the voltages detailed in rule 4.4.10 will be disqualified from the event.

4.5.12 The use of any additional heating of any type to heat a LiPo/LiFe Battery is not allowed. The use of any cooling devices or "freeze" sprays of any type to cool a LiPo/LiFe battery is not allowed.

4.5.13 A receiver battery pack to power the receiver and Servo are allowed in any configuration. Under no circumstances may power from the receiver pack contribute to the power to the motor.

4.6 MOTORS

Only IFMAR approved motors may be used. Approved motors must meet the following specifications and be commercially available four (4) months prior to the World Championship. Availability requirements must be met at the time of submittal. Submittal deadline to be four (4) months prior to that year's event to be placed on that year's list.

4.6.1 Manufacturers must submit motors direct to a testing laboratory, the name and address of which will be supplied, on request, by the IFMAR Electric Section Chairman. Manufacturers will be responsible to pay all laboratory fees for testing. Upon receipt of laboratory confirmation from the manufacturer to the IFMAR Electric Section Chairman that the product meets all specifications and the Chairman is satisfied that all IFMAR availability requirements have been met the product will be included on the approved products list for use at W.C. events.

4.6.2 An approved products list of motors approved for use in the World Championships must be posted on the IFMAR website and Organizer's website (if available) four (4) months prior to the event and the list shall be included in the race acknowledgement package sent to each competitor no later than two (2) months prior to the event.

BRUSHED MOTORS

Specifications: '05' sized displacements.

Can diameter to be a maximum of 36.02mm

Can length to be Maximum of 53mm measured from the mounting face of the motor to the furthest point not including solder, tabs or lead wires.

Shaft diameter is .125 inch.

Production Tolerances allowed.

Ceramic magnets only (cobalt and rare earth magnets specifically not allowed).

Current is supplied to the armature by 2 brushes.

Armature - The rotor is to have three poles with windings.

Stack length without epoxy - minimum 21mm and maximum is 22.8mm.

Only Copper wire is to be used for the winding.

No Split rotor is allowed.

The laminations have to be one after the other without anything between.

The thickness of the stack plates is 0.35mm + 0.05mm.

The armature has to be permanently marked by the manufacturer, detailing the number of 'winds' and the name of the manufacturer

A minimum of 5,000 units must be available at the time of approval. A minimum of three hundred (300) motors must have been sold to at least three (3) distributors or hobby shops or OEM's at the time of submittal. The manufacturer has to provide an address of a hobby shop or the like, that any driver who wishes to obtain these motors at the time of approval can do so.

Approved motors may be modified by re-winding, balancing, truing of commutators, epoxying, ball bearings, brushes and custom brush systems only.

No hybrid (mixing of parts from approved motors) allowed.

BRUSHLESS MOTORS:

General definition of a Brushless Motor:

a) Sensored or sensorless motors are allowed.

b) The motor has to be rebuildable. Ball bearings are allowed.

c) If the motor is sensored:

- It must use a six position JST ZH connector model number ZHR-6 or equivalent connector with 6 JST part number SZH-002T-P0.5 26-28 awg contacts or equivalent.

Wire sequence must be as follows:

Pin #1 - Black wire ground potential
Pin #2 - orange wire phase C
Pin #3 - white wire phase B
Pin #4 - green wire phase A
Pin #5 - blue wire temp control, 10 k Thermistor referenced to ground potential
Pin #6 - red wire + 5.0 volts d.c. +/- 10%.

Compatible speed control must use the 6 position JST header part number X-6B-ZR-SMX-TF (where the X denotes the style of the header), or equivalent.

- The power connector has to be clearly marked A, B, C.

A for phase A
B for phase B
C for phase C

d) `05` size specifications

Can:

Overall maximum diameter is
36.02mm measured at whatever point yields the maximum dimension, excluding solder tabs or lead wires.

Overall minimum diameter is
34.00mm measured at whatever point yields the minimum dimension, excluding solder tabs or lead wires.

Maximum length is
53.00mm measured from the mounting face of the motor to the furthest most point of the end bell, not including solder tabs, lead wires or original manufacturer's logo or name.

Minimum length is
50.00mm measured from the mounting face of the motor to the furthest most point of the end bell, not including solder tabs, lead wires or original manufacturer's logo or name.
Motor mounting holes must be on 1.00 inch (25,00 - 25.40mm) centers.

Stack/Stator:

The Stack or Back iron must be continuous. The laminations have to be one after the other without anything in between. Stack/Back iron minimum length 19.30mm, maximum 21.00mm. The thickness of the Stack/Back iron laminations is 0.35+/-0.05 mm. All laminations must be of the same material. Inside diameter of Stack or Windings equals the central space between the laminations or assembly of windings and must accept 'plug' gauges of 12.5 mm minimum, 16.0 mm maximum. These dimensions to be measured with the centre of the 'plug' gauge in-line with the centre of the motor Can. (ie. Concentric to can).

Winding:

Delta and Y wound stators are permitted. Only circular (round) pure copper wire permitted. No turn limit.

Rotor:

Output shaft diameter must be 0.125 inches (3.175mm). Only one piece, two pole Neodymium or Ferrite magnetic rotors are permitted. Magnet minimum length 23.00mm, maximum 27.00mm. Magnet minimum diameter 12.00mm, maximum 15.50mm.

e) All motors must have the original manufacturer's logo or name moulded into the end bell.

f) A minimum of two thousand (2000) brushless motors must be available at the time of approval. A minimum of three hundred (300) brushless motors must have been sold to at least three (3) distributors or hobby shops or OEM's at the time of submittal. The manufacturer has to provide an address of a hobby shop or the like, that any driver who wishes to obtain these motors at the time of the approval can do so. No hybrid (mixing of parts from approved brushless motors) allowed.

4.6.3 Reverse is not allowed - forward control only.

4.6.4 Only fixed single ratio transmissions allowed.

4.7 TWO WHEEL DRIVE CLASS

4.7.0 Front wheel drive cars must run in 4wd class.

4.7.1 Two wheel drive/rear wheel drive cars only will be allowed.

4.7.2 Cars must conform to the general technical specifications.

4.7.3 Minimum weight limit: 3.25 Pounds 52 ozs. 1.474 Kilos

4.8 FOUR WHEEL DRIVE CLASS

4.8.1 Four wheel drive and 2 wheel/front wheel drive cars will be allowed.

4.8.2 Cars must conform to the general specifications.

4.8.3 Minimum weight limit: 3.5 Pounds 56 ozs. 1.588 Kilos

4.9 DRIVER AIDS

4.9.1 It is the objective of this rule to ensure that the IFMAR 1/10th Off-Road Electric World Championship be a test of driver skill. IFMAR seeks to limit the type of driver aids to a minimum to achieve this objective. Traction control, active suspension and steering control by gyroscopes are not allowed. Sensors fitted to the car for the purpose of measuring suspension movement, wheel speed or tire slip whilst the car is in motion are not allowed.

4.9.2 Unless an electronic or mechanical driver aid is listed below in rule 4.7.3 it is not allowed for use in IFMAR 1/10th Off-Road World Championships.

4.9.3 The fixed single ratio transmission may include a mechanical device/s between the drive motor output and the gearbox input for the purpose of controlling torque. (e.g. 'slipper' clutch/fluid clutch) This device/s must only be capable of setting or adjustment manually

whilst the car is stationary.

A differential may include a mechanism for apportioning torque over the axle/s (eg limited slip differential). This mechanism must only be capable of adjustment manually whilst the car is stationary

A mechanical or electronic speed controller may include a mechanical or electronic device to limit the current/voltage passed from the batteries to the drive motor (e.g. timed delay, current limiter, keyboard programs). Setting or programming of such a device must only be possible whilst the car is stationary. Changes to the setting or program during a race are not allowed.

4.9.4 Radio control receivers carried in the car may only have two devices (normally the steering servo and speed controller) connected, plus an optional separate battery supply for the powering of the radio control equipment/devices. The use of any further channels to receive electrical signals from sensors carried in the car is prohibited.

It is not allowed to use any form of active telemetry.

Clarification:
It is not allowed for any radio/wireless signals to be transmitted from the car to an external source during a race, that is judged to give the driver a competitive advantage during that particular race.

4.9.5 Any competitor found in contravention of the spirit or fact of rule 4.7 will be disqualified from the World Championship meeting.

5 TRACK STANDARDS

5.1 SURFACE

Pack able rock free dirt - preferably sifted top soil/clay compound with minimum amounts of sand. Surface should be able to be easily broken and repaired to ensure a consistent and wide racing line. Such conditions have shown to yield excellent racing due to width and consistency of the racing line. Additionally qualifying is fairer as the ability to maintain a consistent surface gives all competitors an equal track that can be enjoyed by those in heats before as well as after his own.

5.2 LAYOUT

The track design should employ the following basic components that are found on real off-road circuits from which 1:10 scale racing has been modeled after.

a: Main straight should be between 80ft to 100ft.

b: Jumps should be liberally used throughout the circuit. These jumps should include single, double as well as triple jump sections.

c: Bumps, either a series of “stutter bumps” or moguls should be employed to enhance the overall personality and challenge of the circuit.

d: Additional aspects such as drop-offs, elevation changes, berms etc. may also be utilized to further enhance the personality of the circuit.

e: Lane width to be minimum of 3 meters.

f: In determining the physical location of the track layout it is recommended you consider the following:

1. Location of the drivers stand and rising/setting of the sun should be utmost importance. Additionally shadows cast upon the racing surface is also of great concern as not all the drivers may have to endure such conditions throughout a single round of qualifying.

2. Track location should also offer exceptional drainage should inclement weather be

even a remote possibility.

3. Proximity to power, water and other such necessities is also essential to insure adequate maintenance, lighting (as necessary) and similar elements needed for a World Championship event.

4. The drivers stand should be located at least 10 feet back from the racing surface.

5.3 MAINTENANCE PROCEDURES

5.3.1 To ensure that a consistent and fair track is made available to all entrants regardless of heat number or round run, regular maintenance is absolutely essential. Perhaps the most important aspect of this maintenance is the use of a single crew that will be responsible for the track throughout the complete event. This should ensure consistent track conditions for practice, qualifying and main events.

5.3.2 Watering of the track surface should be done on a pre-determined schedule based on the needs of the track and the atmospheric conditions. Any schedule should be conceived in such a way that no one heat or only a few heats race on a just-watered track. This way any advantage/disadvantage will be shared by all entrants equally.

5.3.3 Track repairs should be made between heats as needed. This should prevent “extreme” deterioration of the racing surface throughout the event. Once again, if a schedule is set up for regular maintenance it should be staggered so that all drivers enjoy any advantage or disadvantage such maintenance may offer. Attention to jumps as well as turns and straight sections is equally important.

5.4 CONCLUSION

A track layout utilizing the suggested components and construction should very closely emulate a real off-road circuit that the full scale counterparts race on. Additionally track conditions should prove to be consistent and offer equal and fair opportunity for all competitors. The restriction of straight length, use of jumps, moguls etc. will also reduce the impact of exceptional batteries, motors etc. which once again yields an extremely fair and equitable yet competitive atmosphere.

FINISH

AMENDED JANUARY, 2005

AMENDED SEPTEMBER, 2005

AMENDED JUNE 2007

AMENDED NOVEMBER 2008

AMENDED FEBRUARY 2011