

The South African Radio Drivers Association
For On Road Electric Model Cars



Car Specifications
for 1/10th and 1/12th
Scale Electric Model Racing Cars

2019 Release

Version 2019.1

This Document supersedes all previous Rules and procedure documents prior to this release.

Contents

1.	General Car Specifications	3
2.	Radio Specifications	8
3.	Classes	8
4.	1/12th Scale Specifications	9
5.	Touring Car Specifications.....	10
6.	FWD Touring Car Specifications	12
7.	Formula 1 Car Specifications	13
8.	Transponders	14
9.	Additive and Tyre Warmers	14
10.	Stock Touring (21.5T Novice) Driver Criteria	14
11.	Pro Stock Touring (Expert and Clubman) Series Rules	14
	Document change history.....	15



1. General Car Specifications

1.1 Appearance

The essence of the sport of radio control car racing is competition between realistic models of racing cars. General car specifications will be applied to all classes unless stipulated differently in the specific class rules.

1.2 Bumpers

When bumpers are used on a car, they must conform to the following specifications:

1.2.1 Bumpers must be between 2 and 6mm thick, with all exposed edges smooth and well rounded

1.2.2 Rigid bumpers made from hard materials such as metal, brittle plastics, hardboard, fibreglass etc. will not be allowed.

1.2.3 Bumpers will not extend forward of the body and may not be wider than the outer edge of the tyres.

1.3 Wheels and tyres

The following shall apply for Wheels and Tyres:

1.3.1 Wheel nuts/axles must not extend more than 2mm beyond the wheels when viewed from above

1.3.2 All tyres shall be black in colour except for any tyre wall detail.

1.4 Chassis

The following shall apply for all chassis:

1.4.1 Scratch built or modified commercial chassis are allowed provided that they comply with the rules within the specified class.

1.4.2 Differentials, ball bearings and thrust bearings are allowed in all classes.

1.4.3 No part of the chassis may protrude beyond the body shell, with the exception of the aerial and body post mountings.

1.5 Bodies

All bodies shall conform to the following:

1.5.1 All bodies must be painted for the event, no unpainted bodies will be allowed.



- 1.5.2 All bodies must be scale replicas of an original full-size car. The body may be painted to the competitor's own design.
- 1.5.3 Windows on all bodies must be clear and unpainted. A light tinting may be used but must remain see-through and the chassis or cockpit must remain visible through the windows. Windows may not be cut out.
- 1.5.4 A 3-dimensional driver figure with at least head (Helmet) shoulders and arms and the top of a steering wheel must be in the appropriate place in all open cockpit cars.
- 1.5.5 All cars must carry 3 numbers during racing. The numbers must be black numerals on a white background. The numbers must be 30mm high and 4mm thick. The numbers must be placed on the front of the car and on each side so as to be visible to spectators and officials. No other numbers may be visible other than the correct number for that race.
- 1.5.6 No cut outs that allow any part of the chassis to be visible when the car is viewed from above are allowed. The only exceptions are those that can be proved to be of scale, e.g., Formula one.
- 1.5.7 All wheel arches must be cut out, unless it can be proved by a photograph of the full size original.
- 1.5.8 No part of the body may be widened to allow for a wider wheelbase.
- 1.5.9 No bodies may be cut above the lower door line or, in the case of touring and saloon bodies, above the rear bumper line.

1.6 Batteries

Batteries shall conform to the following specifications in all classes unless otherwise stipulated in a particular class rule:

- 1.6.1 1/12th scale may use battery pack as per a single cell Lithium Polymer (Li-Po) battery, min 20C, max 3.7 volts and must be in manufacturer's hard case with no limit on maximum Capacity or maximum C rating. The maximum resting voltage will be 4.22 volts before any race.
- 1.6.2 Touring cars & Formula 1 may use a Lithium Polymer (Li-Po) battery, min 20C, max 7.6 volts and must be in manufacturer's hard case with no limit on maximum



Capacity or maximum C rating. The maximum resting voltage will be 8.44 volts before any race.

Max case size

- Length: 139mm
- Width: 47mm
- Height: 25.1mm

1.6.3 All Li-Po batteries must be SARDA approved. ROAR Spec will be used as a base starting point for approval. (See current year equipment list for approved batteries and <http://www.roarracing.com/approvals.php>)

1.6.4 Charging bags must be used to place Li-Po batteries in for the charging process. All members are reminded of the dangers in the misuse of these batteries and are requested to act responsibly. Any member acting irresponsibly will be excluded from the event.

1.7 Motors

1.7.1 **Brushless Can:** Overall maximum diameter is 36.02mm measured at whatever point yields the maximum dimension, excluding solder tabs, screw heads 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. Motor mounting holes must be on 1.00- inch (25.40mm) centres.

1.7.2 **Brushless Stack/Stator:** For any Spec Brushless Motors: The stator construction must be continuous laminations having the same overall shape, one after the other without anything in between. The laminations must be of one homogeneous material without cut-outs, holes or hollow sections other than the three slots for the round copper coil wires and three slots for the screws used to hold the entire can together. The overall stator length parallel to the motor shaft shall be a maximum 21.0 mm. The thickness of the laminations shall be 0.35+/- 0.05mm. A 'go-no-go' gauge 14.500 +0.000/-0.005 mm diameter shall pass into the stator, clearing the stator plus its windings and the electrical collection ring at the end of the stator.

1.7.3 **Winding:** 21.5 & 13.5 Turn motors: Only three slot "Y" wound stators are permitted. No delta wound or slot less stators are allowed. Only circular (round)



pure copper magnet wire permitted. The three slotted stator must be wound with 13.5 turns of 2 strands of a maximum diameter of 21AWG or 0.724mm and two strands of a maximum diameter of 23AWG or 0.574mm per slot.

1.7.4 Modified & 1/12th scale Modified Classes

Touring Modified may use any motor manufactured for radio controlled electric model car racing. Motor can, must be of the 540 size. Only Brushless motors are permitted. Sintered magnets are permitted to be used in the rotor of a brushless motor. Motors may have any configuration of windings and wire gauge. They may be opened for attention. They must however conform to the general rule 0 below.

1.7.5 Stock Touring (21.5 Novice Class)

Only SARDA approved Hobbywing 21.5T G2.1 (item #30408012) brushless motors will be permitted.

1.7.6 Pro Stock Touring (13.5T)

- Only SARDA approved Hobbywing 13.5T G2.1 (item #30408010) brushless motors will be permitted.
- The motors will be sealed and supplied to the drivers by SARDA at every event. Motors are not to be tampered with.
- Motors will be handed out on Saturday before qualifying and must be returned at the end of the day.
- Drivers will receive the same motor on Sunday morning for the mains and must be returned at the end of the day.
- Competitors are liable for the motors in case of damage or loss.

1.7.7 1/12th Stock

Only SARDA approved Hobbywing 13.5T G2.1 (item #30408010) brushless motors will be permitted.

1.7.8 Formula 1

Only SARDA approved Hobbywing 13.5T G2.1 (item #30408010) brushless motors will be permitted.

1.7.9 FWD (Front Wheel Drive) Touring

Only SARDA approved 13.5 Turn brushless motors will be permitted to be used in the FWD Touring class. SARDA will use ROAR Approved as the standard for



approval. Please consult the equipment list for approved motor and
<http://www.roarracing.com/approvals.php>

1.7.10 **General**

No Cobalt, rare earth magnets motors are allowed. Only one drive motor per car is allowed.

1.8 **Electronic Speed Controllers**

1.8.1 **FWD Touring** - Only sensed electronic speed controllers with “blink” mode in the software OR no turbo/timing function may be used and must be approved by SARDA. SARDA will use ROAR Approved as the standard for approval. Please consult the equipment list for approved electronic speed controllers
<http://www.roarracing.com/approvals.php>.

1.8.2 **21.5 Stock Touring (Novice Class)** - The Hobbywing Juststock ESC (Item #30112000) will be used. No tampering of these ESCs are allowed. You are permitted to change the wires. Only the standard capacitor is permitted, no additional capacitors are allowed.

1.8.3 **Formula 1** - The Hobbywing Juststock ESC (Item #30112000) will be used. No tampering of these ESCs are allowed. You are permitted to change the wires. Only the standard capacitor is permitted, no additional capacitors are allowed.

1.8.4 **Pro Stock Touring** - The Hobbywing Juststock ESC (Item #30112000) will be used and available as a rental (R200 per event) for national events. A competitor may purchase such an ESC and use it with the hand out motor at national events. No tampering of these ESCs are allowed. You are permitted to change the wires. Only the standard capacitor is permitted, no additional capacitors are allowed.

1.8.5 **1/12 13.5 Stock** - The Hobbywing V3.1 1S ESC (Item #30112500) will be used. No tampering of these ESCs are allowed. You are permitted to change the wires. Only the standard capacitor is permitted, no additional capacitors are allowed.

1.9 **New equipment**

Any new equipment such as **motors, batteries, electronic speed controls** and **bodies** that come into the market place must first be accepted by SARDA and deemed legal for use.



The SARDA committee is to publish the date from which these new items may be used. Any person may inform / request the SARDA committee to evaluate and accept a new product for use. This must be submitted in writing to the chairman.

The emphasis of this rule is not to prevent equipment from their use but rather to control the timing of their use except in the case when the new products clearly do not comply with the current rules of the class. The new equipment list will only be valid for that race season it came out. Each year a new equipment list will be initiated. SARDA Committee reserves the right to request a sample to be presented of the proposed products for which approval is being requested.

2. Radio Specifications

- 2.1 Standard equipment intended for radio control hobby should be used. If the equipment presents problems to other competitors, then it should be changed.
- 2.2 The control of the vehicle is limited to one channel for steering and one channel for speed and brakes (two channels).
- 2.3 The only frequency band that is currently available for use for surface vehicles is 2.4 GHz.

3. Classes

The following are the classes that will be run at any SARDA sanctioned event providing that there is a minimum entry of four cars within the class:

- Stock Touring (21.5T Novice class)
- Formula 1
- Pro Stock Touring (Expert and Clubman)
- FWD Touring
- 1/12th Scale Stock
- 1/12th Scale Modified
- Touring Modified



When a new class is voted in, it must maintain at least 10 entries for at least 3 of the 5 races in a season to qualify as a permanent class. Existing classes that do not make the above grade should automatically be tabled for possible removal at the annual rules meeting.

4. 1/12th Scale Specifications

4.1 Dimensions

Maximum Length	450mm	(with full body and wing)
Maximum width	172mm	(with full body and wing)
Maximum Height	140mm	(with full body and wing, excluding aerial)
Wheel Base	Maximum	222mm
	Minimum	180mm

4.2 Weight Limit

4.2.1 All 1/12th scale cars shall have a minimum weight limit of 730g (0.73kg) ready to race.

4.3 Wheels and Tyres

Maximum Rim diameter	38mm
Front and rear tyre width	
Maximum	38mm
Minimum	13mm

4.4 Bodies

Only "Group C", GT1, TOJ or IMSA type bodies are allowed, also known as "Sports Prototype"

4.5 Wings

Only one wing is allowed on the car unless extra wings are proven by photograph in scale position. The wing may be no closer than 6.5mm to the body, other than tail fins or side dams. Dimensions are as follows:

Maximum width	172mm
---------------	-------



Maximum side chord

50mm

5. Touring Car Specifications

5.1 Definition

A Touring car is defined as a scale width car with independent suspension to all wheels.

The car must have flexible joints to all drive wheels.

There are 3 classes for Touring cars:

- Stock Touring (21.5T Novice)
- FWD Touring
- Pro Stock Touring (13.5T Expert and Clubman)
- Touring Modified

5.2 Car Manufacture

5.2.1 Any available scale width car is allowed according to the specifications in Pro Stock Touring and Modified.

5.2.2 Any FWD chassis is allowed according to the specifications in FWD Touring however, it must be submitted to SARDA committee for approval. Chassis to qualify for this class must have a front wheel drive layout meaning the motor must be mounted in the front and the drive wheels must be the front wheels.

5.3 Chassis Specifications general.

5.3.1 All chassis must have independent suspension to all four wheels. All drive wheels must be driven by a flexible joint, such as a “Dog Bone” or universal type drive shaft. No solid axles are allowed.

5.3.2 No parts to aid aerodynamics are to be fitted to the underside of the car, such as Diffusers, Splitters, Tunnels, etc.

5.3.3 No multi-speed gearboxes allowed, single speed gearboxes only.

5.3.4 Only a differential or a spool or a one-way differential may be used in the front transmission.

5.3.5 Only a differential or a spool may be used in the rear transmission exempting Front Wheel Drive Class as per class specifications.



5.3.6 No driver aid devices allowed, these include slipper and fluid clutches.

5.3.7 No four-wheel steering is allowed; however Active Rear Suspension is allowed.

5.4 Weight Limits

5.4.1 All Four-Wheel drive cars and Front Wheel Drive cars shall have a minimum weight limit of 1,320g (1.32kg) ready to race.

5.5 Dimensions

All Touring cars shall conform to the dimensions below or otherwise stated:

5.5.1	Minimum Wheel Base:	250mm
5.5.2	Maximum Wheel Base:	270mm
5.5.3	Minimum Width, excluding body	175mm
5.5.4	Maximum Width, excluding body	190mm
5.5.5	Maximum Height, Excluding Aerial	175mm
5.5.6	Maximum bumper cut out line height from chassis	35mm
5.5.7	Minimum wing width including endplates	125mm
5.5.8	Maximum wing width including endplates <i>(Limited to maximum width of the body)</i>	190mm
5.5.9	Minimum height from bottom of chassis to roof	110mm

5.6 Bodies

5.6.1 Unless otherwise stated in the specific class rules, only 190mm 4 door Touring car bodies allowed as per the SARDA equipment list.

5.6.2 This will be the starting point and used as a base. Any new bodies that comply with the basic Roar specifications that have not yet been approved by Roar may be submitted to the committee as "new equipment" for evaluation and addition to this list.

5.7 Wings

Any wing may be used. The wing must be fitted into the standard position intended for the car. No height or extension modifications are allowed.

5.7.1 *All wings shall conform to the following dimensions:*



- 5.7.1.1 Maximum Width: 190mm or max width of Body
- 5.7.1.2 Maximum Wing Chord 40mm
- 5.7.1.3 Maximum Wing side plates 40x20mm

5.7.1.3.1 Chord width is measure from the leading edge of the wing diagonally across to the trailing edge. Wings may only be of one element. Should a wing have two or more elements, this must be proven by a scale picture.

5.8 Tyres

5.8.1 **Rubber Tyres** – All Touring Class competitors will only be permitted to use one set of four pre-mounted Team Powers Rubber Tyres per touring class for the entire National event duration. Touring Modified will be allowed to use one additional set of tyres for the 3 mains. The tyres will be supplied by SARDA to the racers at an approved SARDA cost. Tyres to be handed back to SARDA in a marked zip lock bag at the end of Saturday Qualifying if they are also to be used on the Sunday.

5.8.2 Rubber Tyre dimensions

- | | | |
|---------|------------------------------------|------|
| 5.8.2.1 | Minimum wheel width | 19mm |
| 5.8.2.2 | Maximum Wheel width | 26mm |
| 5.8.2.3 | Minimum Tyre width | 19mm |
| 5.8.2.4 | Maximum tyre width | 28mm |
| 5.8.2.5 | Minimum tyre diameter when mounted | 61mm |
| 5.8.2.6 | Maximum tyre diameter when mounted | 67mm |

5.8.3 Participants are not permitted to use tyres of which the traction surface has worn through.

5.8.4 All tyres will be marked by SARDA before the event commences. An official SARDA marking will be applied to each tyre and may not be removed during the event. In case of the SARDA marking being removed, the competitor will be disqualified from the event.

6. FWD Touring Car Specifications

6.1 **Body Specifications** – Only SARDA Approved Hatch Back bodies will be permitted.



6.2 Chassis Specifications

The following chassis' are permitted

- 6.2.1 Tamiya FF03/FF04 (includes Pro & EVO versions)
- 6.2.2 Top Sabre.
- 6.2.3 Top Sabre FD 2
- 6.2.4 3 Racing Sakura
- 6.2.5 Serpent 411FF
- 6.2.6 VBC FF
- 6.2.7 MTS FF
- 6.2.8 VBC FF TWELVE 17
- 6.2.9 MTS FF version 2
- 6.2.10 Any other chassis – to be submitted to SARDA for approval

7. Formula 1 Car Specifications

7.1 Car Specifications:

- 7.1.1 Only 1/10 scale Formula 1 chassis' will be permitted
- 7.1.2 Maximum width: 190mm
- 7.1.3 Minimum weight: 1050g
- 7.1.4 Front independent king pin, coil spring suspension is allowed.
- 7.1.5 Suspension pick up points must be mounted inside the body.
- 7.1.6 Independent front shocks are not allowed.
- 7.1.7 The main chassis plate must not protrude from the body when viewed from above

7.2 Tires:

- 7.2.1 Only SARDA approved Hudy 803070 & 803080 and Ride XR and Ride GR front and rear rubber tires will be permitted.
- 7.2.2 Only one new set of tyres will be permitted per event.
- 7.2.3 There will be no limit on the number of events a set of tyres may be used for.
- 7.2.4 All tyres will be marked by SARDA before the event commences. An official SARDA marking will be applied to each tyre and may not be removed during the event. In case of the SARDA marking being removed, the competitor will be disqualified from the event.



7.3 Bodies

7.3.1 Only Formula 1 SARDA approved body styles will be permitted.

7.3.2 All cars must have a driver's figure installed in the cockpit.

7.4 Wings:

7.4.1 Any SARDA approved front and rear Formula 1 wing will be permitted

8. Transponders

All cars must be equipped with a personal transponder. SARDA is under no obligation to provide any transponders. In the case that a transponder malfunctions, manual lap scoring will not be done and laps driven without a transponder will be lost.

9. Additive and Tyre Warmers

9.1 Any safe additive can be used for all touring car tyres.

9.2 Tyre warmers will be allowed for tyre preparation

10. Stock Touring (21.5T Novice) Driver Criteria

10.1 The 21.5T Stock Touring Novice class was voted in to provide an entry level class for beginner drivers. If a driver's experience corresponds to any one or more of the following criteria, he/she will not be eligible to participate:

10.1.1 Driver participates in any other class (i.e. F1, FWD, etc.)

10.1.2 Driver has participated in one or more season at national or club level (SARDA and Tamiya Cup)

11. Pro Stock Touring (Expert and Clubman) Series Rules

11.1 The Pro stock class was split to ensure fair series competition between driver skills in the 13.5T class

11.2 There are two different categories in the 13.5T Pro Stock Series: Expert and Clubman.

11.2.1 Expert is for drivers participating in both 13.5T and Touring Modified.

11.2.2 Clubman is for drivers not participating in Touring Modified.

11.3 The driver will select which series he/she will participate during the entry procedure

11.4 Both category drivers will race together – no split between the categories for racing and heats purposes



11.5 The results will be updated after the final main race to indicate the rankings in the two different categories.

Document change history

Rules updated: Nov 2004 (Airborne AGM.) New version 9 Rev 0

Rules updated March 2005 Sarda Committee meeting Version 9 Rev1

Rules update Aril 2005 Committee meeting Version 9 Rev 2

Rules update Nov 2005 Committee meeting Version 10.1

Rules update June 2006 Committee meeting Version 10.2

Rules update December 2006 AGM & Rules Meeting K90 Nats Version 11.00

Rules update December 2007 AGM & Rules Meeting 4 Nov 2007 TRAP Nats Version 12.00

Rules update Committee Meeting 27 November 2007: 2008 Rules Version 12.00 Rev 0.00

Rules update Committee Meeting 7 May 2008: Rules Version 12.01 Rev 1

Rules update AGM & Rules Meeting 1 November 2008: 2009 Rules Version 13.00

Rules update Corrective Editing of Cover Page, 22 January 2009: Rules Version 13.01

Rules update AGM & Rules Meeting 17 October 2009: 2010 Rules Version 14.00

Update class names and insert page numbers Committee Meeting 25 November 2009 Rules update

AGM & Rules Meeting 6th November 2010: Rules Version 15.00

Rules update AGM & Rules Meeting 5th November 2011: Rules Version 16.00

Rules update AGM & Rules Meeting 3rd November 2012: Rules Version 17.00

Rules update adding Serpent 411FF to FWD 13.5 class & adding HobbyWing XERUN-60A-XD (V2.1) to approved ESC's for 21.5 Touring – 5 May 2013: Rules Version 17.02

Rules update – Annexure 1.1 – Change to TOP Racing FD Drivetrain – 6th September 2013: Rules Version 17.03

Rules update AGM & Rules Meeting 16th November 2013: Rules Version 18.00

Rules update AGM & Rules Meeting 15th November 2014: Rules Version 19.00

Rules update AGM & Rules Meeting 14th November 2015: Rules Version 20.00

Rules Version 20.00 divided into two documents.

1. General Rules & Procedures Version 2016
2. Car specifications Version 2016

Rules update – 8 January 2016: Rules Version 2016.2. Updates include:



1. FWD Touring: updated drive ratio for Sabre FD 2 using 40T diff and 16T pulley.
2. Changed class name for 13.5 Touring to Pro Stock Touring
3. Changed class name for FWD 13.5 Touring to FWD Touring

Rules update AGM 29th October 2016:

1. General Rules & Procedures Version 2017.1
2. Car specifications Version 2017.1

Rules update Committee Meeting 19 April 2017 - Rules Version 2017.2

1. General Rules & Procedures Version 2017.2
2. Car specifications Version 2017.2
3. Added Front wheel drive chassis - VBC FF TWELVE 17 & MTS version 2
4. Added Appendix B

Rules update – 26 June 2017: Rules Version 2017.3. Update includes:

1. Rule 7.2.1 Formula 1: Added Ride GR front and rear rubber tyres as Ride XR tyres are no longer being manufactured.

Rules update AGM of 28 October 2017: Rules Version 2018.1. Update includes:

1. Rule 1.7.6 1/12th Stock: Added paragraph regarding the 13.5T brushless motor.
2. Rule 1.8.1 Electronic Speed Controllers: Added 1/12th Stock to the list governed by this rule.
3. Rule 2. Radio Specifications: Removed the 27 MHz, Frequency and crystal specifications
4. Rule 3 Classes: Added 1/12th Stock to the list of classes
5. Rule 9 Additive: Added additive specifications for touring car tires.

Rules update AGM of 03 November 2018: Rules Version 2019.1. Update includes:

1. Rule 3 – Classes: Added 21.5 Stock Touring novice class and split pro stock in 'Clubman and Expert'
2. Rule 1.7.5 - Stock Touring: Added specification to SARDA controlled 21.5T motor
3. Rule 1.7.6 - Pro-Stock Touring Motors: Updated specification to SARDA controlled 13.5T motor
4. Rule 1.7.7 - 1/12 Stock Motors: Updated specification to SARDA controlled 21.5T motor
5. Rule 1.7.8 - F1 Motors: Updated specification to SARDA controlled 21.5T motor
6. Rule 1.8.1 - Electronic Speed Controllers: Changed rule to address FWD class only
7. Rule 1.8.2 – 21.5T Stock Touring Novice Class – Rule added for controlled ESC
8. Rule 1.8.3 – Formula 1 - Rule added for controlled ESC



9. Rule 1.8.4 – 13.5 Pro Stock Touring - Rule added for controlled ESC
10. Rule 1.8.5 – 1/12 13.5 Stock - Rule added for controlled ESC
11. Rule 3 – Stock Touring (21.5T Novice Class added)
12. Rule 5.1 – Stock Touring class added. Pro Stock defined as ‘Expert’ and ‘Clubman’
13. Rule 5.4.1 - Weight limit decreased to 1,320g
14. Rule 9 Additive: - Updated additive specifications for touring car tires.
15. Rule 10 – 21.5T Novice Criteria
16. Rule 11 – 13.5T Pro Stock ‘Clubman’ and ‘Expert’ criteria

