



# 2018 KARCS Reno Class Racing Rules



## Kitsap Aircraft Radio Control Society 2018 Reno Class Racing Rules

Version 1.8

### Purpose

The purpose of the KARCS Reno Class of racing is to expand the scope of the racing environment provided by KARCS to include airframe choices not available in the current, single airframe style "Park Flier Racing" class. The ultimate hope is to include more fliers by not dictating the airframe they may use.

### Personal Safety Requirements

1. Recent changes in AMA safety rules now require all participants in racing events to wear safety helmets. This includes pilots, lap counters, helpers, judges, and CD during racing heats.

### Schedule

1. The 2018 racing season begins on the first Saturday in April 2018, and runs through the first Saturday in October 2018.
2. Races occur on the 1st Saturday of each included month starting immediately following the completion of the Park Flier class of racing for the day.
3. On the Last Saturday of March there will be a clinic held at 10:00 at the field. The rules, aircraft specifications and other aspects of the racing season will be discussed.

### Race Officials

4. Duane Barrett shall serve as Kitsap ARCS Reno Class Racing Contest Coordinator in 2018.
5. If the 2018 Reno Class Racing Contest Coordinator is unavailable on race day, one club member will be selected as Substitute Contest Coordinator for that day.

If the Contest Coordinator or Substitute Contest Coordinator is a participant in any race heat (section), a nonparticipant shall be selected to perform those duties for that heat (section) only.

6. In the event of a possible rule infraction or a pilots' dispute, the decision of the Contest Coordinator shall be final.
7. If the Contest Coordinator is a party to a dispute, a vote of the pilots present shall determine the dispute's resolution.
8. Pilots who have previously held the position of Substitute Contest Coordinator may elect not to repeat in the role.
9. There will be a pylon judge for each pylon, stationed safely on the south/east side of the runway.



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## Equipment Requirements

10. Although WWII/Korea prop driven war-birds are the target airframe for this class, any aircraft conforming to the following specifications qualifies to race.
11. Wingspan is limited to 50 inches (1,270mm.)
12. Flying weight shall be limited to 50 oz (1,418 gr.) The purpose of the weight limit is to help hold down the size of the aircraft to something we can safely fly on our (confined) race course.
13. Use of landing gear is not required.
14. Alteration of colors is permissible but not required.

## Aircraft Speed Limit

15. Maximum aircraft speed ( $V_H$ ) shall be limited to 110 fps (75 mph, or 120.7 kph.)

### Testing Aircraft Maximum Speed.

16. The initial method for determining the  $V_H$  of each plane will be mathematical. This theoretical speed limit for the aircraft can be determined using the battery specifications (total volts out), the motor kV, and the propeller pitch. These three factors can be combined to calculate the theoretical maximum level speed of the airplane.

#### Method A: Prop Speed Calculation

- i. The formula to be used is:

$$V_H = kV * V_o * PP * (5/5280) * Eff$$

Where  $kV$  = motor kV,

$V_o$  = Total battery output voltage (4.1 volts/cell in a LiPo)

$PP$  = Propellor Pitch

$(5/5280)$  is the conversion factor from Inches/Min to MPH

$Eff$  = Efficiency factor

- ii. The initial efficiency factor ( $Eff$ ) used will be 80%.
  - iii. If the calculation indicates that the potential  $V_H$  is greater than 5% above the 75 mph speed limit (78.75 mph) the power train must be modified to fall within the allowable range.
17. If the practical top speed of an airplane is in question, the speed will be tested by performing a timed run over the length of the field, 2 level-flight runs in each direction (4 runs total), with the average determining the top speed. The runway is 350'.

#### Method B: Radar Gun

- iv. If available, a speed gun may be used to determine the aircraft speed, provide it can be demonstrated that it can provide reliable speed values for the airplane.
- v. If a speed gun is used, the four recorded speeds will be averaged to determine the maximum speed of the aircraft. (Must be less than 75 mph or 120.7 kph.)

#### Method C: Time Trial (B)

- vi. In lieu of a speed measuring device, time keepers (TKs) will be stationed at each end of the runway. As the airplane passes the 1st TK, s/he will signal the second TK, who will start a stopwatch. As the airplane passes the 2nd TK, the stopwatch will be stopped.



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- vii. The Contest Coordinator shall record the time.
  - viii. The average time will be determined by averaging the four individual recorded times. The average time to transit the runway must **exceed** 3.18 seconds.
18. During speed testing, a judge shall stand with the pilot to insure maximum throttle is being used. All runs must be completed within 3 minutes of takeoff. In between runs, the judge shall confirm that the throttle is reduced to avoid excessive drain on the batteries (which could reduce top speed for the test.)
19. **Use of Transmitter-Set Throttle Governors.** Pilots may choose to reduce their  $V_H$  by setting a speed governor within the radio. To do this the following conditions must be met:
- a. The demonstrated RPM at maximum throttle must be reduced to generate a  $V_H$  within the rules stated above.
  - b. If the governor is assigned to a switch,
    1. The ability to reduce the top RPM by flipping the switch must be demonstrated.
    2. The switch must be taped in the low RPM setting during the race.

## Pilot Qualification

20. All pilots who intend to participate in the Reno Class of racing must **successfully qualify with the aircraft intended to be used** before they can compete.
21. Qualification will consist of flying a sample race of a full ten laps at a minimum 90% throttle, using the regular racing start and operations rules.
22. Up to two (2) pilots may qualify simultaneously.
23. Once qualified, the pilot need not re-qualify, unless performance during actual races indicates to the CD that the pilot is unsafe while in the race environment.
24. The CD may pull a pilot's qualification at any time should it appear that the pilot is a danger to himself or others.
25. Disqualification from a single race for erratic flying is NOT equivalent to having your qualification pulled.

## Race Operations

26. Two pylons will be spaced parallel to and in alignment with the ends of the 350' fabric runway, near the middle of the race course (the grassy area to the north/west.) The pylons are to be placed in a location between the runway and the tree line and at least 60' from the runway centerline.
27. Each race day there will be three (3) Heats
28. Each Heat will consist of ten (10) laps around the course.

## Number of Aircraft per Heat/Section.

29. No more than four (4) aircraft may participate in any given race. If more than four aircraft are participating, the heats will be subdivided into Sections.
30. If more than one Section per Heat is required (see above), the number of Sections per Heat will be



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established to maintain the most equal number of planes possible per Section, while complying with rule (a). For instance:

7 aircraft: one (1) Section of four (4), and another of three (3) aircraft.

8 aircraft: two (2) Sections of four (4) aircraft each.

9 aircraft: three (3) Sections of three (3) aircraft.

etc.

31. If the Sections require an uneven number of contestants, the first Section shall consist of the larger number.
32. Each aircraft will participate in only one Section per Heat.

## Aircraft Identification

33. Aircraft are not required to alter their paint or markings to participate in Reno Class racing. However, if two similarly marked aircraft of the same airframe type are in the same section, all aircraft in that section will be required to carry a (minimum) three foot (3') streamer on a (minimum) two foot (2') string.
34. { Deleted }
35. Each streamer must be of a unique color.
36. Streamers will be supplied by the Contest Coordinator.

## Race Start and Execution

37. Reno Class races will begin with an air start, rather than a ground start. This is due to the hazards imposed by attempting to quickly launch multiple tail-draggers simultaneously.
38. Upon given the instruction to launch, all aircraft will take off in their own time, using caution so as not to interfere with the other participants.
39. All participating aircraft must be in the air within 90 seconds of the call to launch.
40. All participating aircraft will begin to orbit the track counterclockwise at approximately 3/4 throttle.
41. The Contest Coordinator will coach the pilots into a loose formation so that the trailing aircraft is no more than 85' to 90' (1/4 the distance between the pylons) behind the lead aircraft.
42. When the contest Coordinator is satisfied with the positioning of the contestants, s/he will call the start of the race when the middle aircraft in the group is approximately midway between the pylons on the south bound leg (flying right to left.)
43. Each pilot shall LOUDLY and CLEARLY call off the completed lap number as they pass the start/finish line, where the CD will be located.
44. Upon the start of the race, the first time each aircraft passes the start/finish line will count as Lap 0 (zero) for that participant. I.A.W the previous rule, the lap number (0) shall be called **LOUDLY** and **CLEARLY**.
45. Planes cutting a pylon must perform a penalty orbit of one pylon before completion of the race. Failure to comply will result in forfeiture of any points for that Heat.

## Race Completion

46. Race timing stops when the first pilot crosses the start/finish line after completing their 10th lap, e.g., when the first pilot calls lap 10.



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47. The race is complete when the final aircraft crosses the finish line, or when the CD calls the race. The race can be called if
  - a. An injury has occurred
  - b. All aircraft are on the ground.

## Disqualifications

48. Any pilot who flies over the runway will be given a verbal warning. A second offense in that heat/section will result in disqualification.
49. Any pilot who flies south/east of the runway during the race will be immediately disqualified.
50. Any aircraft that has been determined to exceed the 75mph airspeed limitation will be disqualified.
51. Any aircraft that flies outside of the course boundaries will be disqualified.
52. Any aircraft that appears to be out of control, or is not positively IN control will be disqualified.
53. The CD may at his or her discretion disqualify any aircraft that exhibits any apparent safety problem, until such time that it has been deemed satisfactory by the CD.
54. Planes cutting the LAST pylon must:
  - a. Return to and orbit that pylon BEFORE crossing the finish line, or
  - b. Lose one final position in the heat. (1st becomes 2nd, 2nd becomes 3rd, etc.)
55. Disqualifications are not subject to dispute.

## Collisions

56. Any aircraft involved in a collision with another aircraft, the ground, or any other object are subject to disqualification at the discretion of the CD. The CD will query the pilot(s) involved as to the controllability of their aircraft, and will observe the aircraft for indications of distress. If, in the opinion of the CD the aircraft's controllability has been compromised, the flier will be DQ'd and will be required to land.
57. All aircraft involved in a collision, whether disqualified or not, will be subject to a safety check, and may require a test flight at the discretion of the CD.

## Test/Certification Flights

58. Any aircraft suffering damage requiring repair to wings, fuselage or flight controls will be required to make a test flight under the observation of the Contest Coordinator before they will be allowed to participate in any further races.
59. The Contest Coordinator may waive the test flight requirement if in his/her opinion the repair does not pose risk to flight worthiness.

## Points System

60. Points are awarded on a per Heat basis. The following values shall be used:
  - a. 1<sup>st</sup> Place . 25 points
  - b. 2<sup>nd</sup> Place . 18 points
  - c. 3<sup>rd</sup> Place . 15 points



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d. 4<sup>th</sup> Place - 12 points

61. Points will not be awarded under the following conditions:

- a. Any racer that fails to land within 15' of the runway. Crashing within 15' of the runway does not count.
- b. Any racer who flies outside the approved course flight area. The offending racer must remain clear the race area until the race finishes.

62. Any racer who damages the runway will receive 50 penalty points.

63. Any racer who damages either of the pylons will receive 10 penalty points.

64. The racer/team with the most accumulated points for the season will be declared champion and will receive an award at the annual Club Banquet.

## Rules Changes

65. Any rule **other than**

- a.) The points rule, or
- b.) The number of aircraft participating in a single heat

can be changed by a 2/3 majority of participating pilots.

66. Rules changes arrived at I.A.W. the previous rule are only in force for that race day.

67. Conversion of a race day rule change to a permanent change to this rules document requires approval by the KARCS Executive Board, and a vote of at least 50% of Reno Class racing participants.



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## List of Changes

Date	Version	Section	Change
10/08/2014	0.10	All	Initial document draft.
10/15/2014	0.11	Rule Changes	Change to which rules can be altered by a vote of the contestants.
10/27/2014	0.13	"Aircraft Speed Limit"	Mathematical speed calculation added as primary mechanism for determining max speed.
		"Aircraft Speed Limit"	Use of transmitter based throttle governors added.
01/21/2015	0.14	Disqualifications	Added rule outlines pilots' responsibility when cutting the last pylon.
04/02/2015	1.0	Equipment Requirements	Removed reference to electric only
01/12/2016	1.1	Document	Changed Contest Coordinator's name for 2016
01/15/2017	1.2	Document	Changed for 2017, Changed Contest Director to Contest Coordinator and minor clerical.
02/16/2018	1.3	Document	Changed year to reflect 2018, changed number of race heats to three, and added new AMA Safety requirements for all participants..