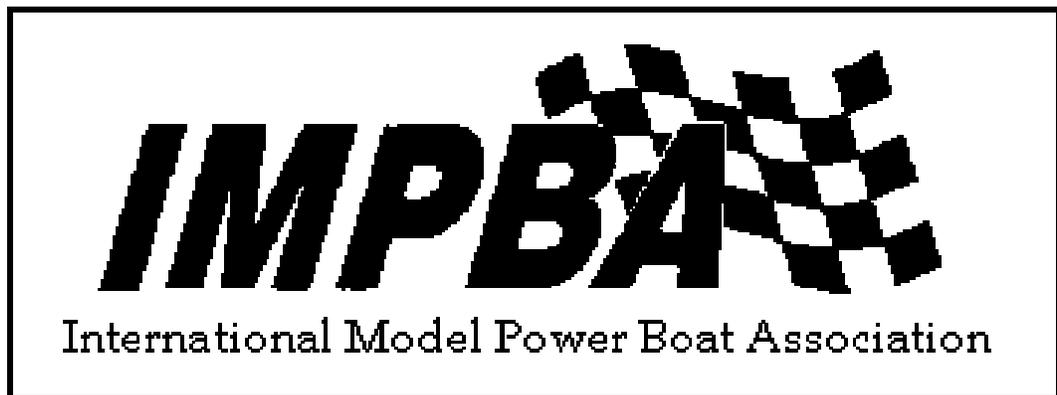


IMPBA OFFICIAL RULE BOOK



**“J”
Fast
Electric**

Fast Electric

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Fast Electric

General

The Fast Electric section of **IMPBA** is to utilize electric motors and batteries to power these model boats.

Motor, Controllers and Classes

1. **Motors:** Any motor that uses battery supplied electrical current to create mechanical motion.
2. **Controllers:** Speed controls may be a mechanically operated switch, electronic speed control or any combination of the above.
3. **Motor classes**

<u>Class</u>	<u>Motors</u>	<u>Bearing</u>	<u>Magnets</u>	<u>Number of Cells</u>
L	1.05	Any	Any	4
N-1	1.05*	Plain	Ferrite Only	6
N-2	Any	Any	Any	6 or 2S
O-1	1.05**	Any	Ferrite Only	7-8
O-2	Any	Any	Any	7-8
P	Any	Any	Any	9-12 or 4S
Q	Any	Any	Any	13-18 or 6S
S	Any	Any	Any	19-24 or 8S
T	Any	Any	Any	25-32 or 10S

* N-1 Motors are Roar Spec. motors (Roar motors cannot be opened at anytime). They must be either Roar Approved with year stamp or the same 'template' as the Trinity 27 turn, Paradox. **Records** may only be broken with a rebuildable 'template' type motor, not with tabbed motors. (*See How to Tech a Paradox*). **IMPBA** sanctioned events may require 'template' rebuildable motors for their approved races and must list it on their flyer.

** O-1 will be using the Trinity Chameleon type Spec motor. It is the same design as the Paradox except it has 19 turns and ball bearings.

Classes O-2, P, Q, S, T shall be open to any number or sizes of motors. Classes N-1 & O-1 shall have 24 degree locked timing motors using the above rules.

4. **Hull Classification**

A boat may be run in more than one class by changing batteries / motors to comply with the class requirements. At any event, a boat may run only as a Mono or a Hydro. Further clarification on hull types may be found under Technical Standards, Hull Classifications.

Battery Specifications

Batteries may be either the Nickel Cadmium (Ni-Cad) or Nickel Metal Hydride (Ni-MH). Batteries must be of the Sub-C size or smaller.

Lithium batteries will include the *Polymer* series (with a nominal voltage of 3.7 volts) and the *Ion* series (with a nominal voltage of 3.6 volts). Physical size of the Lithium battery will be as defined and provided by the manufacture. Lithium packs will be defined as; number of batteries wired in Series with an optional number of series packs wired in parallel.

Example:

A 10S2P would have a total of twenty Lithium batteries wired as two packs of 10 batteries wired in series and then those two packs connected parallel.

A 10S1P would have a total of ten lithium batteries wired in series with no paralleled batteries.

A 10S would be the same as a 10S1P BUT you are allowed to add as many parallel packs as you wish as long as each added parallel pack has the same number of series batteries.

Specialty classes will define allowable battery usage by cell count for Ni-Cad / Ni-MH and pack size (example 10S) for the Lithium series of batteries.

Racing Rules

All **IMPBA**, Procedures, Rules of Competition, Contest & Racing Rules and will run on standard **IMPBA** race courses except where noted below.

Safety Procedures and Precautions

All **IMPBA** safety procedures will be followed. Under no circumstance may any of the Racing Rules be altered that would effect the safety of an event.

Protests

1. Protests will be handled according to Technical Standards, Part C.
2. Roar, tabbed motors will NOT be allowed for records.
3. At a sanctioned race, Roar motors may be inspected but will not be opened. The inspection committee will inspect the motor as best as possible to derive a finding.
4. Template motors will be disassembled by the committee and inspected for conformance to the template design.

Race Starts - Oval

An official **IMPBA** clock, audiotape or stop watch (starting device) may be used to time the start of a race. The time to the start of a race will consist of three consecutive time periods. The total 'clock' time will be 60 seconds and will consist of, Preparation, Launching and No Launch time. When an official **IMPBA** clock is used it may be placed on shore or in the water.

Preparation Time 60 to 30 seconds

This is the 'get ready' time and will last for 30 seconds. The starting device must verbally count down the time in 10-second increments. Example: 60 seconds, 50 seconds, 40 seconds and 30 seconds. Note that when a clock is used it may count down the seconds as well.

Launching Time 30 to 11 seconds

The 'launch window' is when all boats must start running on the water before this time expires. Failure for a boat to start running in this time period will result in a "Did not start". Milling will occur according to the "Figure 9" mill pattern. The starting device must verbally count down the time in one-second increments. Example: 20, 19, 18, 17, 16, 15, 14, 13, 12, and 11.

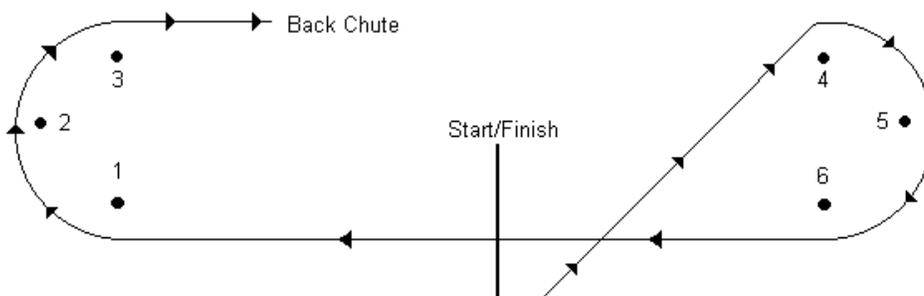
No Launch Time

The last 10 seconds of clock time is a no launch period to the start of the race. All models will be using the "Figure 9" mill pattern and observe all heat racing rules. The starting device must verbally count down the time in one-second increments. Example: 10, 9, 8, 7, 6, 5, 4, 3, 2, and 1.

Once clock time has counted down to zero, the race has officially started. As a boat crosses the Start/Finish line it is now eligible to receive points for the heat. Any boat that jumps over the Start/Finish before clock time has expired must complete one lap and re-cross the Start/Finish line for a legal start. The starting device at zero will either, Flash a strobe, Sound a horn/whistle, switch to the five minutes of racing time, announce Race or any combination of the above.

Milling Procedure

The "Figure 9" race start will be used for all Oval heat races. Refer to the drawing. The boats are launched from the shore and proceed directly to the back chute. Boats must pass to the left of buoy number four. Once on the back chute the boats continue in a clockwise direction around buoys number 4,5 and 6 and then onto the front chute. Once on the front chute a boat must follow a straight line to the Start/Finish line. No fish tailing, 'S' turns or any other tactic (slowing speed is allowed) to delay crossing the start line. Any boat that stops during the milling period (no Launch time) will incur a one-lap penalty. A boat will be considered to have stopped if the bow settles into the water.



Approved Courses and Laps

The 1/5-mile oval and 1/31 straightaway will be the normal racecourse for fast electric racing. The 1/4-mile and 1/3 oval may also be used but must be indicated on the sanction request and race flyer.

The number of laps run will depend on both class and course size. Use the following chart.

Classes	1/5 mile	1/4 mile	1/3 mile
L, N, O, P	4 laps	3 laps	2 laps
Q, S, T	5 laps	4 laps	2 laps

Fast Electric International Regatta

General

The **IMPBA** Fast Electric International Regatta is to be held annually, during July, August or September and awarded on a rotational basis from bids submitted to the National Fast Electric Director, and approved by the **IMPBA** Board of Directors.

Local clubs will provide Survey documents of the race site as prescribed under section K, Technical Standards, "Approved Courses".

The **IMPBA** International Regatta shall primarily consist of the National Championships (US-1). The National Championship will consist of the three events; five rounds of Multi-boat heat racing, 1/31st mile oval and 1/5th mile straight away time trials for all classes.

If the host club desires, it may also run special events. They must be scheduled at a time that is not in conflict with the National Championships. The boats that are entered in these extra events will not count as an entry allowed in the National Championships. Example: A participant may have three boats entered in the National Championships and in addition may enter boats in the Box Stock Mono Race, etc.

At the International Regatta, the winner of any event scheduled by the host club and approved by the Board will be awarded the title of National Champion.

Classes

The International Regatta typically is a weeklong event, for electrics' it is recommended as a minimum of 3 days. If it becomes a 3 day event it is recommended a maximum of 18 classes total where day 1 and 2 are for heat racing and special events, day three for time trials. The selection of classes can be decided by a vote or by paid entries.

The Class options are as follows:

MONO: L, N-1, N-2, O-1, O-2, P, Q, S, and T

HYDRO: L, N-1, N-2, O-1, O-2, P, Q, S, and T

TUNNEL: L, N-1, N-2, O-1, O-2, and P

SPORT: O-2, and P

Competition in the National Championships shall be limited to five boats. If the host club desires, it may also run special events. They must be scheduled at a time that is not in conflict with the National Championships. The boats, which are entered in these extra events, will not count as an entry against the five boats allowed in the National Championships. It is recommended that special event classes only run four rounds of heat racing.

Contest Rules

All **IMPBA** contest and racing rules will be applied except as described below.

1. Point scoring will use the Excellence of performance calculation for heat racing and time trials to determine the US-1 winners for all eligible classes.
2. Time trials will be one day in duration with a starting hour and finishing hour given. Example; trials will commence at 9:00 am and continue until 5:00 pm.
3. All eligible contestants will be listed on a master running order sheet that will be used to call up the contestant in sequential order. The number of times a contestant is called up will depend on the number of entrants and allowable time.
 - a. When a contestant is called up, they may bring as many US-1 class boats as they wish and try as many times as they wish.
 - b. The 2 1/2 minutes of port time will start when their name is called and will switch to the five minutes of record time when expired or when the first boat hits the water.
 - c. The contestant will provide the contest officials with a list of classes they are running.
 - d. Once record time has started, the contestant will 'call' for the type of time trial being attempted. Example, OVAL, Left to Right, Right to Left etc.
 - e. For an Oval time to be awarded it must be a continuous two lap clean run.
 - f. For Straightaway. Once launched, two unaided, opposite direction runs must be made in a continuous manner with the driver calling for each type. The average of the two runs will be used for the straightaway time.
 - g. The contestant may wave a 'call up' if desired at which point the next person on the order sheet will be called.
 - h. Once record time has started a contestant may wave the remainder if desired at which point the next person on the order sheet will be called.
 - i. In the event a retrieve is required the current contestants time is forfeited and the next person on the order sheet is called up with their port time starting the moment the retrieve boat returns to shore.
 - j. Overall first to ninth finishing positions will be awarded on contestants best time for each of the Oval and Straightaway in all classes attempted. No points are awarded if there are no times achieved.

Specialized Fast Electric Classes

1/10 Scale Crackerbox

General

A **Crackerbox** is a Specialized N-1 **MONO** class not offered for records. The Purpose of the 1/10 scale racing Crackerbox class is to race a scale model of the APBA Crackerbox, one design, runabout.

Hull Classification

The basic hull lines of the 1/10 scale Racing Crackerbox must be taken from the drawings of APBA, an approved source. All commercially manufactured hulls that meet these specifications are legal.

To qualify for 1/10 scale Crackerbox competition, hulls must be within + or - 1/8" of approved lines. The deck/hatch must resemble the deck of a full scale racing Crackerbox.

The boat must be painted or finished in the spirit of racing a scale model.

Each boat will have racing numbers preceded by the letter P.

Two drivers of scale-like appearance must be used in the driver/rider compartment. The driver and rider must have orange colored helmets and life jackets.

The dead rise at the transom shall be 3/8" in total (3/16" per side) with a transom width of 6-3/8"

Motor/Battery Specifications

Any single 05 motor with "ROAR" and year stamped on the end of the can from the factory. Roar motors cannot be opened or end bell must not be removed. Paradox template 27 turn motors are also allowed. It is OK to change brushes and springs.

Drive motor batteries must conform to Sub C specifications and be a standard 6-cell pack.

Drive Train.

1. A single motor shall be coupled directly to a straight drive shaft. A flex shaft may be used in a straight tube.
2. The propeller may not extend beyond the back edge of the transom.
3. Steering shall be by a rudder mounted under the hull or affixed to the transom.

Race Specifications

1. A heat-racing format for a specific number of laps shall be used. 4 to 8 laps is typical.
2. The Event Director shall announce the number of laps per heat on the event entry form.
3. The Event Director shall determine the race format; total points of winner-take-all final heat.

IMPBA Racing Rules for Competition will be used to resolve any disputes.

Racecourse size determined by Event Director; a small course is suggested where the skill is the factor, not top speed.

6 Cell Enduro

General

The 6 Cell **Enduro** is a specialized N-1 class not offered for records. The Purpose of the Enduro class is to offer an "entry" level form of racing where a driver may learn driving techniques. Skill, instead of all out speed is a factor.

Motor/Cells

Any single 05 motor with "ROAR" and year stamped on the end of the can from the factory. Roar motors cannot be opened or end bell must not be removed. Paradox template 27 turn motors are also allowed. It is OK to change brushes and springs. Drive motor batteries must conform to Sub C specifications and be a standard 6-cell pack.

Hull/Driveline

Any Hull type or drive system is allowed.

Race Course

Refer to the 'M' course layout. The "ideal" course will be a square 110 feet by 110 feet with one buoy displaced 30 feet. The buoys zero and four may be inset as required to conform to the shoreline but may not be closer than 10 feet to the shoreline.

Refer to the Oval 'M' course combination. This is the ideal layout for both courses.

Race Format and Scoring

This race will run on the 'M' course in a counter clockwise direction and will last for five minutes

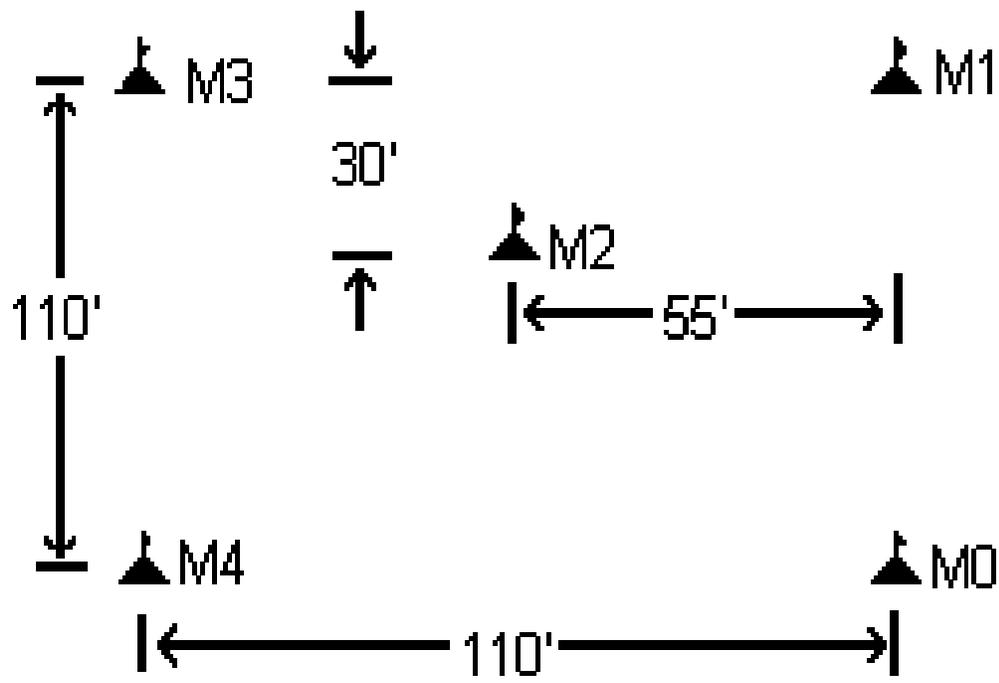
The race will be started with a 5 second countdown. Boats may be launched from a standing start in the water or hand launched into the water. At the start of the race all boats will proceed to buoy number one (M1) and then follow the 'M' pattern. See course layout and starting.

One lap will be counted each time the boat crosses the number zero buoy. Striking a buoy will not be a penalty. Cutting a buoy will require the boat to re-round the buoy on the proper side. Any boat re-rounding a buoy must give right of way to boats on the course. Failure to re-round a buoy will result in a one-lap penalty.

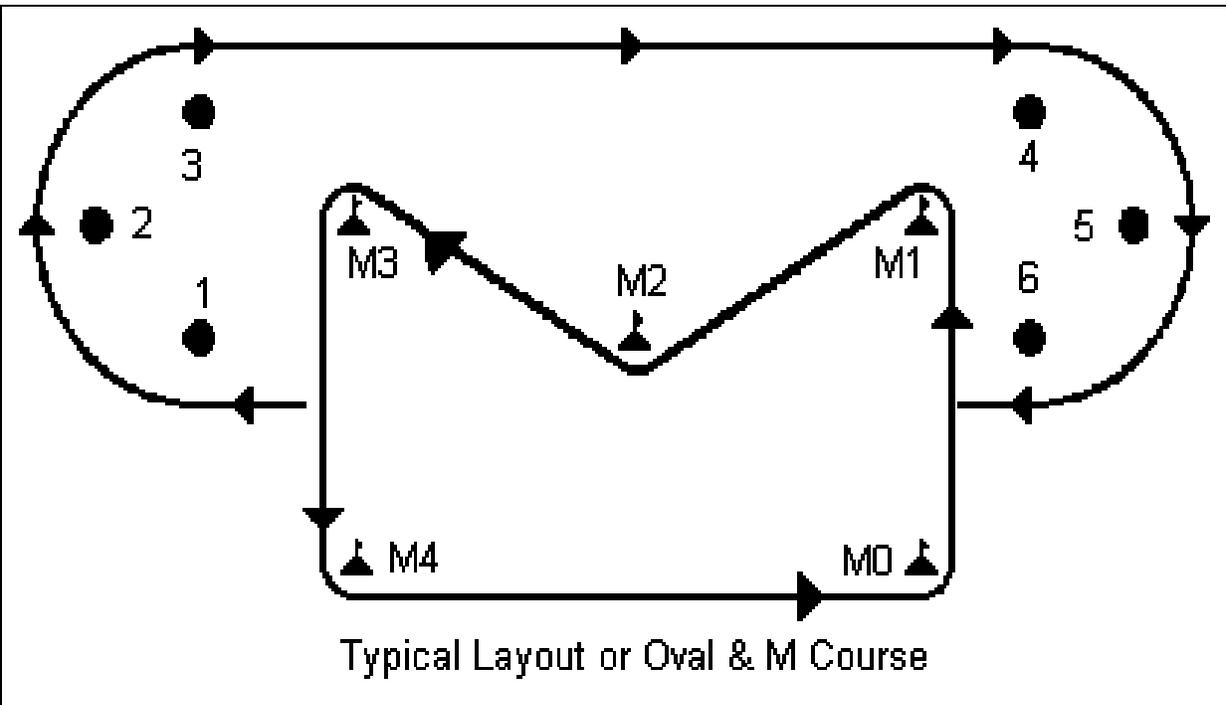
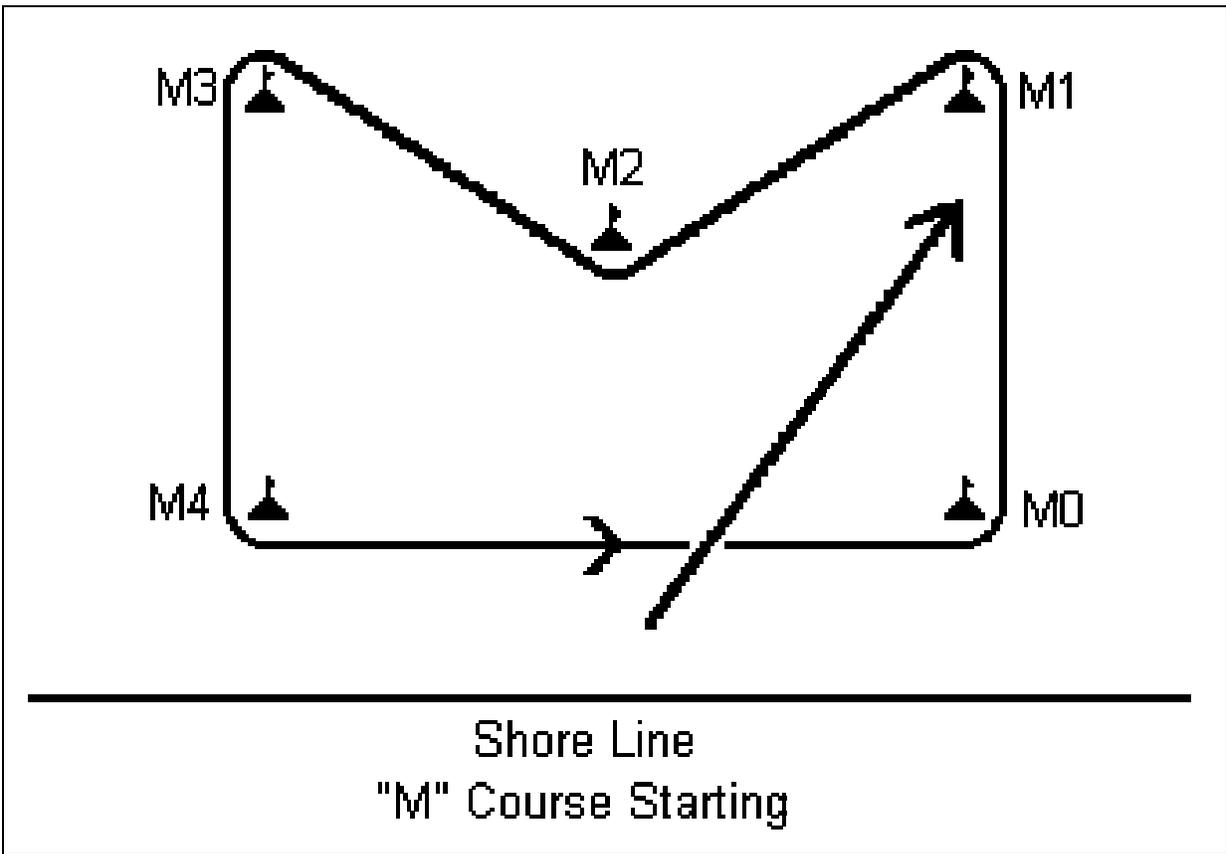
At the end of five minutes all boats will be ordered to stop and a 'point' of a lap will be awarded based on their location on the course.

In order to total the 'point' of a lap at the end of the day. Add up all the whole number of laps then add up all the 'point' of a lap disregarding the decimal. Now convert the 'point' of a lap to a whole number by dividing it by five and add this number to the whole number. Example:

Laps	Current	Total	
Heat 1	8.2	8.2	
Heat 2	8.1	16.3	
Heat 3	4.2	21.0	i.e. 16+4 = 20 then (3+2)/5 = 1.0
Heat 4	8.4	29.4	
Heat 5	0.2	30.1	i.e. 29+0 = 29 then (4+2)/5 = 1.1



Typical "M" course size



12 Cell Spec Class

General

The 12 Cell Spec class is a Specialized P Mono only class not offered for records. The Purpose of the class is to offer a low cost "step up" from the Enduro class. Here a combination of speed and skill is required.

Motor/Batteries

The motor will be the Graupner 700 or 700BB Turbo motor powered by two 6-cell battery packs.

Hull/Drive-line

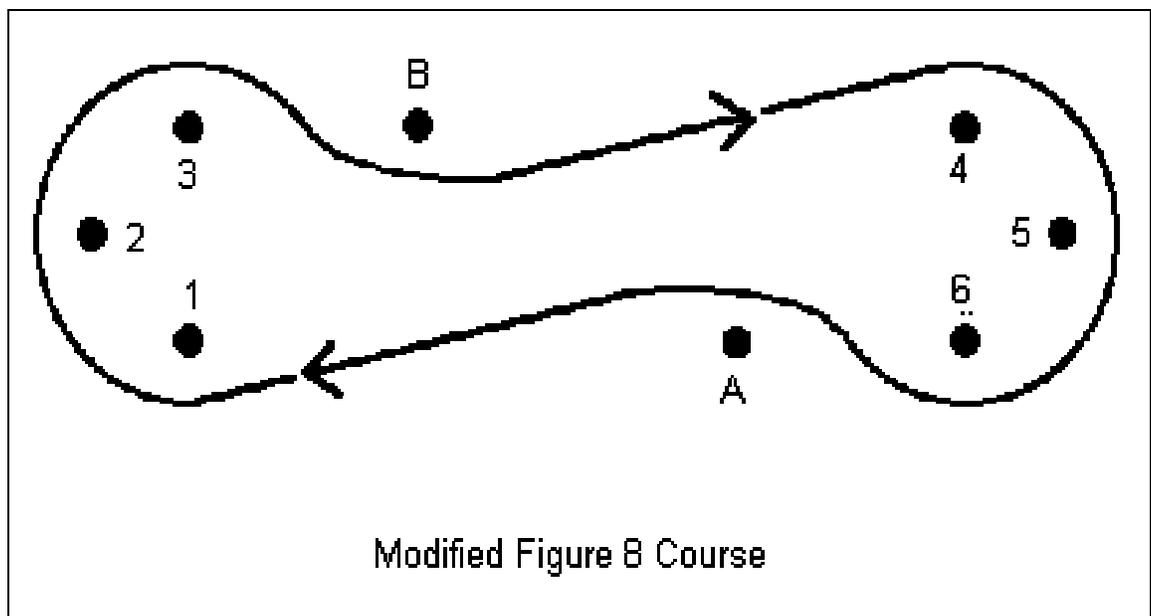
The hull must conform to a legal Mono hull of 24 inches long and may use any type of drive system. Hulls should be colored and numbered in the spirit of offshore type racing. Stepped hulls are allowed in this class.

Race Format

Oval Laps, Oval Endurance, Modified figure 8 Oval or Offshore racing may be used.

Any type of race may be used. Any number of laps or length of time from two to five minutes may be used. Any race direction may be used. Race format must be listed on the race flyer.

The Modified figure 8 Oval will use the standard 'Figure 9' race start and by pass the added buoy 'A'. After the race has started all boats run the course as indicated in the Modified figure 8 courses for the remainder on the race. Buoys 'A' and 'B' should be placed as indicated on the drawing, 30 feet from buoy number 6 and 3.



Sport Hydro

General

All boats to resemble Unlimited Hydroplanes from the past or present. Fictitious teams may be created within the Spirit of the past and present Unlimited Hydroplanes. The word "resemble" shall be loosely interpreted and as long as the boat is configured in the spirit of a real 3-point, full-bodied hydro, it shall be deemed legal.

Motor/Cells

- A. All boats must be inboard motor powered with an effort made to conceal the motor with fake engine or cowling as per prototype boats.

Hull Configurations

- A Hull must conform to the three-point hydroplane configuration and resemble a real limited or unlimited hydroplane from the past or present. Canard hulls are permitted as long as it is modeled after a prototype. Outriggers, modified outriggers or tunnels are not allowed.
- B All boats must have some sort of markings affixed (such as sponsor names, logos, racing numbers) even if these names are fictitious. The hull appearance shall be in the spirit of resembling a real racing hydroplane.
- C The boat must have a driver figure and/or a simulated enclosed cockpit. A blacked-out canopy is allowed.
- D Both round-nose and pickle-fork hull styles are allowed.
- E Air traps/dams are optional.

Driveline

Struts, props and rudders may protrude beyond the transom.

Race Format

Standard Oval heat racing rules will be used with the "figure 9" race start.

Appendix I

How to Tech a Paradox! (With permission from Trinity)

General

The name PARADOX and CHAMELEON are names of motors used by Trinity, Co. This does not necessarily mean that you have to race these motors by this manufacturer. The PARADOX and CHAMELEON are the first of their type of rebuildable stock "template" motors. These names are used as templates in describing this type of motor and does not limit the choices of this "template" motor. For **IMPBA** this is practically the same as "Roar" motors but, easier to tech.

Armature

Shaft

Check the end of the motor shaft. This is the easiest way to spot check if someone is legal or not. The shaft of the Paradox was designed longer than normal and the extra length lets it stick out of the endbell about an 1/8-inch. This along with the special taper on the end makes the armature easy to identify even while it is in the boat. If the guy next to you has a Paradox without this shaft its time for some teching. The shaft length is 2.775 inches, (70.5mm).

ID Tag

Another way to check the armature is to look through the holes in the can. The arm has an ID tag epoxied between two of the poles that says EPIC 27. This tag identifies the armature as the one that belongs in an EPIC can and that it has 27 turns of wire. We also used the Midnight 2 Z Speed armature blank that is shaped like no other RC armature in the world. (Chameleon uses 19 turn ID Tag)

Wire

Rewinding a Paradox stock motor is really not an issue as the armatures are never available in any form other than as they come in the motor. The way the commutator tabs are compression welded will not allow them to be opened without bending them and scratching the commutator. Even if you do get them up and you were to rewind the arm, the tabs do not have enough strength when bent back to make a good electrical contact with the wire. You would have to solder or weld the tabs to get the motor to run at all and this will be visible. The big holes in the endbell will let you sneak a peak at the tabs. The wire diameter is 0.0265 inches or 0.67mm

Motor Can

Bushings

Worried about ball bearings? Well, with the Paradox checking is easy without taking the motor apart. We made the shaft hole in the can and endbell extra big so that the bushings are visible. Not only are the holes big enough to see the bushings you can also see that we use the Midnight 2 Recessed Bushings.

Timing

Because of the flat can design of the Paradox the endbell cannot be rotated in the can. To make sure there is no filing and turning of the endbell we also put a key on it that locks it to the can. Still not sure the timing of the endbell has not been changed? Simply check the 0° mark on the bottom of the can, this lines up with a -24 degree mark on the endbell. When both are aligned, the motor is set at 24 degrees.

Total Disassembly

If you checked all of the above but still think something is not legal, just open up the motor. It only takes a minute, and the beauty of it is that it can just as easily be put back together. Unlike sealed stocks that are illegal after opening, if your Paradox is legal you simply put it back together and run it again.

Opening the Paradox is quick and easy. We designed it with an internal locking ring that holds the endbell secure in the can. The endbell is held to the ring with 2 screws which when removed allow the endbell to be removed from the motor. Capacitor tabs are supplied under these screws so capacitors do not have to be soldered to the can, which would make teching harder.

Once the armature is out of the motor, it can be inspected closer. The simplest way to check it is to simply compare it to another legal Paradox armature. Since they are all machine wound, they all look the same. The commutator is nice and clean around the tabs with no scratches in the silver colored part at the bottom.

The wire gauge is easy to measure if there is any doubt. The wire may be measured with a dial caliper where it goes up to the commutator. It should measure 0.0265 inches or 0.67mm diameter. Of course the motor has 27 turns if you ever need to de-wind one. We feel that this really will never be necessary because of the ID tag and the ability to compare the armature easily with a legal sample. If someone is cheating, it will be very visible to the naked eye.

