



# ERCU 2026 TECHNICAL MANUAL

*(Adopted 1/5/2026)*

## **PROLOGUE**

The goal of Electric Radio Controlled Unlimiteds (ERCU) is to replicate the look and competition of real unlimited hydroplane racing. Boats are 1/10-scale and 1/7-scale replicas of the real boats that have attempted to qualify on the unlimited circuit. The club will emphasize scale appearance accuracy and quality workmanship as well as enjoyable competition on the water. As with the real boats, the races will be run counterclockwise on the course.

## **POLICY AND INTENT**

Guidelines offered in this rulebook are subject to the term “spirit and intent” and apply to the technical aspects of model boat racing as well as to the actions of drivers, crew members, owners, officials, and contest directors. It is expected that all participants will adhere to the spirit and intent of these rules.

These are guidelines for fair and equitable competition. They are not the basis to “read between the lines” to circumvent the intent. The “spirit and intent” clause allows the Referee to make decisions and resolve disputes in a timely manner. If you are contemplating a technical undertaking that is not directly addressed in these rules, please contact the Contest Board to make sure it is legal and will be allowed.

## **DISCLAIMER**

These rules shall govern all Electric Radio Controlled Unlimiteds (ERCU) sanctioned or promoted events and, by participation in these events, all entrants are deemed to have understood and complied with these rules. No express or implied warranty of safety shall result from publication of, or compliance with, these rules and regulations. They are intended as a guide for the conduct of the sport and are in no way a guarantee against injury or death to participants, spectators, or others.

**A. BOAT APPEARANCE & DESIGN (1/10-Scale)**

- I. Boats will be built to 1/10 scale - a scale of 1" (model) equals 10" (actual unlimited) as recorded in the ERCU 1/10-Scale Master Hull Roster.
- II. Dimensional tolerance of plus or minus 10 percent is allowed except overall length shall be plus or minus one inch.
- III. Scale paint and appearance is to be verified by photograph and judged with the model in the water at six feet.
- IV. The underwater hull (bottom, sponsons and the side and sponson non-trips) shall resemble the real boat as closely as possible. Belly pans or blisters, if added, must be no larger than 2.5 inches wide by 4 inches long, exclusive of mounting flanges, effective for all boats registered after January 1, 2008.

**B. BOAT APPEARANCE & DESIGN (1/7-Scale)**

- I. Boats will be built to 1/7 scale - a scale of 1" (model) equals 7" (actual unlimited) as recorded in the ERCU 1/7-scale Master Hull Roster.
- II. Dimensional tolerance of plus or minus 10 percent is allowed except overall length shall be plus or minus one inch.
- III. Scale paint and appearance is to be verified by photograph and judged with the model in the water at six feet.
- V. The underwater hull (bottom, sponsons and the side and sponson non-trips) shall resemble the real boat as closely as possible. Belly pans or blisters, if added, must be no larger than 4 inches wide by 6 inches long, exclusive of mounting flanges.

**C. BOAT APPEARANCE & DESIGN (ALL BOATS)**

- I. Boats are to be built to resemble the original boat in appearance as closely as possible.
- II. Boats are to race in their most recognizable form, including wings, engine or cowling, and graphics.
- III. All boats shall have a scale/technical inspection at the time they are first registered with ERCU.
  - a. Boats shall be subject to a scale/technical inspection after any major reconstruction or repair.
  - b. At the discretion of the Technical Inspector any boat can be subject to a Technical Inspection at any time during an ERCU sanctioned regatta.
  - c. At the discretion of the Inspector a technical inspection, including motor removal, of the first three finishers of any ERCU regatta may be conducted.
- IV. A print or digital photograph of the real boat must be included at the time of the request for inspection.
  - a. The following items are to be included with the boat at the time it is entered into competition:
    - i. Driver, complete from the waist up with proper helmet and life jacket, in open cockpit boats
    - ii. Driver, with a minimum of arms, steering wheel, shoulders and head are recommended but not required in canopy boats
    - iii. Windshield or clear canopy glass
    - iv. Steering wheel and dashboard with instruments
    - v. Air scoops, vents, exhaust pipes and/or manifolds, and flash pans.
    - vi. Bow spoiler; accurate wet sponson detail; open dummy motor or full cowl with the exhaust stacks extending through the cowl (not just glued to outside of cowl).
    - vii. All boats shall have a minimum of two orange stripes on the underside of the hull.

- V. Air dams, if installed, must be below the deck line and not extend beyond the bow.
- VI. Sponsons shall have the same dihedral angle on the primary running surface unless otherwise configured on the real boat.
  - i. Anhedral left sponsons and modern style (Jones, Lucero, etc.) sponsons (inside and/or outside secondary riding surfaces and compound non-trips) are not allowed on boats running in the vintage class.
  - ii. The sponson runners can be modified in both dihedral angle and angle of attack. If ride pads are used, they must be the same dihedral angle as the primary runner.
- VII. The boat must be complete at the start of a race, with all scale and performance items in position and operational.
  - a. Any boat that is not complete in appearance shall apply to the official for a variance before starting any subsequent heats.
  - b. No variance will be granted for the first section or heat of a race.
  - c. The penalty for failure to receive a variance shall be heat disqualifications unless the damage occurred in pre-race testing.
- VIII. Upon completion of a heat, sixth place points will be awarded to a boat which loses any part during the running of a heat.
  - a. Exceptions are granted if loss is caused by collision or roostertail of another boat (cutting off, chopping, etc.).
    - i. If the officials cannot determine which boat is at fault, no penalty will be assessed.
    - ii. Officials must announce to the drivers the status (penalized or not) of a boat that loses a part within one lap after the loss occurs.
  - b. This penalty affects only the points awarded, if any, to the boat(s) in question, but not to their heat placement. Nor does it affect the placement of, and points awarded to, other boats in the heat, except for a consolation and final heat, in which the offending boat would be awarded sixth place points and last place finishing position of all boats left running, with those running moving up in the final finish order.
- IX. Damaged and/or incomplete boats must be repaired and/or completed within four weeks of the date of the damage and/or granting of a variance in accordance with the paragraph above to participate in the next scheduled racing event outside of the four-week window unless otherwise specified by the Competition Committee.

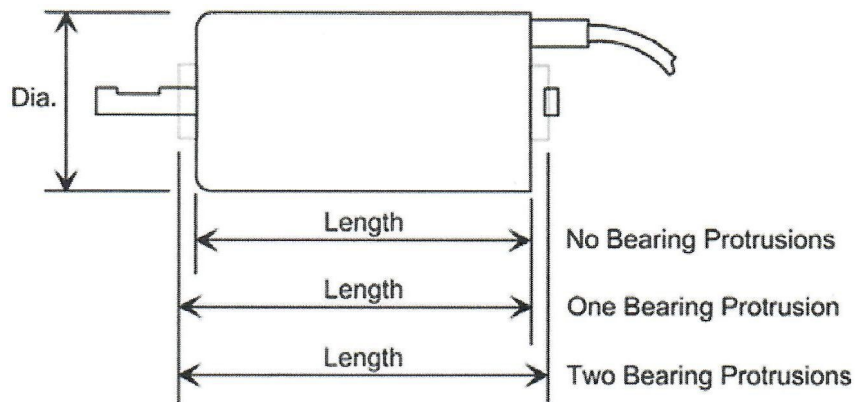
**D. INSPECTION OF MOTORS (ALL BOATS)**

- I. Motors may be tested for KV compliance at any event by the board and/or inspectors. Motors will be tested by club purchased and approved KV meters only.*
- II. Motors may be tested prior to racing, randomly or after heats/final heats at the discretion of the club's inspectors.*
  - a. Motors found to be in violation of the KV rules prior to racing will be disqualified and the boat's replacement motor(s) will also be tested until a legal motor is tested.*
  - b. If a motor fails inspection after a preliminary heat, it will be stripped of points and finishing position for all heats preceding the test. Boat owner/crew will be required to replace it with an inspected legal motor before continuing.*
  - c. If a motor fails inspection after a final heat, the boat will be stripped of all points and finishing positions for the event.*
  - d. Motors that fail inspection will be disqualified from ERCU competition, until they are corrected and test legal.*
- III. Inspectors will label inspected motors with numbered, non-removable stickers and will document all inspection results. Inspectors may also "seal" inspected motors with a small dot of paint.*

**E. POWER AND DRIVE TRAIN (1/10-SCALE)**

<b>1/10 Scale Vintage</b>	<b>1/10 Scale Classic</b>	<b>1/10 Scale Modern</b>
<p><b>Batteries</b></p> <ul style="list-style-type: none"> <li>Up to 12 sub-c battery cells of NiCd or NiMH chemistry, or up to 4S configured Lithium Polymer (LiPo). Total capacity of batteries in allowed chemistries &amp; configurations shall not exceed a total capacity rating of 6,000mAh and a total fully charged voltage of 16.8 volts DC.</li> </ul>	<p><b>Batteries</b></p> <ul style="list-style-type: none"> <li>Up to 12 sub-c battery cells of NiCd or NiMH chemistry, or up to 4S configured Lithium Polymer (LiPo). Total capacity of batteries in allowed chemistries &amp; configurations shall not exceed a total capacity rating of 6,000mAh and a total fully charged voltage of 16.8 volts DC.</li> </ul>	<p><b>Batteries</b></p> <ul style="list-style-type: none"> <li>Up to 12 sub-c battery cells of NiCd or NiMH chemistry, or up to 4S configured Lithium Polymer (LiPo). Total capacity of batteries in allowed chemistries &amp; configurations shall not exceed a total capacity rating of 6,000mAh and a total fully charged voltage of 16.8 volts DC.</li> </ul>
<p><b>Motors</b></p> <ul style="list-style-type: none"> <li>Power to be provided by a single motor meeting the following requirements:</li> <li>Approved motors are of an in-runner design and shall not exceed the following dimensions (see diagram on page 5): <ul style="list-style-type: none"> <li>Length: 60mm (2.362 inches). This includes any bearing protrusion.</li> <li>Diameter: 37mm (1.457 inches).</li> </ul> </li> <li>Motors are limited to a maximum Kv rating of 2000Kv with a top breakout threshold of 2100Kv.</li> <li>Bearings may be replaced at any time.</li> <li>No gearbox of any configuration is allowed.</li> </ul>	<p><b>Motors</b></p> <ul style="list-style-type: none"> <li>Power to be provided by a single motor meeting the following requirements:</li> <li>Approved motors are of an in-runner design and shall not exceed the following dimensions (see diagram on page 5): <ul style="list-style-type: none"> <li>Length: 60mm (2.362 inches). This includes any bearing protrusion.</li> <li>Diameter: 37mm (1.457 inches).</li> </ul> </li> <li>Motors are limited to a maximum Kv rating of 2000Kv with a top breakout threshold of 2100Kv.</li> <li>Bearings may be replaced at any time.</li> <li>No gearbox of any configuration is allowed.</li> </ul>	<p><b>Motors</b></p> <ul style="list-style-type: none"> <li>Power to be provided by a single motor meeting the following requirements:</li> <li>Approved motors are of an in-runner design and shall not exceed the following dimensions (see diagram on page 5): <ul style="list-style-type: none"> <li>Length: 60mm (2.362 inches). This includes any bearing protrusion.</li> <li>Diameter: 37mm (1.457 inches).</li> </ul> </li> <li>Motors are limited to a maximum Kv rating of 2000Kv with a top breakout threshold of 2100Kv.</li> <li>Bearings may be replaced at any time.</li> <li>No gearbox of any configuration is allowed.</li> </ul>
<p><b>Skid Fins</b></p> <ul style="list-style-type: none"> <li>Mounted to the inside of the left sponson and not to extend beyond the back of the sponson.</li> <li>Size is limited to a maximum of 2" wide by 1" deep and must fit in a 1inch x 2- inch box on inspection.</li> <li>No hook-shaped skid fins are allowed.</li> </ul>	<p><b>Skid Fins</b></p> <ul style="list-style-type: none"> <li>Skid/turn fins shall be similar in appearance and location to the full-size boat (mounted to the back of the sponson).</li> <li>The size and precise location shall be determined at the discretion of the owner.</li> <li>To comply with scale appearance rules, skid fins must have a straight leading edge from top to bottom.</li> <li>No part of the skid fin assembly shall extend more than 4" beyond the sponson transom.</li> <li>No hook-shaped skid fins are allowed.</li> </ul>	<p><b>Skid Fins</b></p> <ul style="list-style-type: none"> <li>Skid/turn fins shall be similar in appearance and location to the full-size boat (mounted to the back of the sponson).</li> <li>The size and precise location shall be determined at the discretion of the owner.</li> <li>To comply with scale appearance rules, skid fins must have a straight leading edge from top to bottom.</li> <li>No part of the skid fin assembly shall extend more than 4" beyond the sponson transom.</li> <li>No hook-shaped skid fins are allowed.</li> </ul>

<p><b>Propellers</b></p> <ul style="list-style-type: none"> <li>Any propeller may be used up to a maximum diameter of two inches (50.8mm).</li> <li>A portion of the propeller as noted in the technical review specifications must be under the transom.</li> <li>The drive dog is defined as not a part of the propeller.</li> <li><i>The hub of the propeller counts as part of the propeller</i></li> </ul>	<p><b>Propellers</b></p> <ul style="list-style-type: none"> <li>Any propeller may be used up to a maximum diameter of two inches (50.8mm).</li> <li>A portion of the propeller as noted in the technical review specifications must be under the transom.</li> <li>The drive dog is defined as not a part of the propeller.</li> <li><i>The hub of the propeller counts as part of the propeller</i></li> </ul>	<p><b>Propellers</b></p> <ul style="list-style-type: none"> <li>Any propeller may be used up to a maximum diameter of two inches (50.8mm).</li> <li>The drive dog is defined as not a part of the propeller.</li> <li><i>The hub of the propeller counts as part of the propeller</i></li> </ul>
<p><b>Rudders</b></p> <ul style="list-style-type: none"> <li>Double rudders are not allowed, unless present on the real unlimited (verified by photograph).</li> </ul>	<p><b>Rudders</b></p> <ul style="list-style-type: none"> <li>Double rudders are not allowed, unless present on the real unlimited (verified by photograph).</li> </ul>	<p><b>Rudders</b></p> <ul style="list-style-type: none"> <li>Double rudders are not allowed, unless present on the real unlimited (verified by photograph).</li> </ul>
<p><b>Struts/Shfts</b></p> <ul style="list-style-type: none"> <li>Any <i>legal</i> shaft may be used, <i>and shaft does not need to maintain</i> a straight line from hull exit through the strut.</li> </ul>	<p><b>Struts/Shfts</b></p> <ul style="list-style-type: none"> <li>Any <i>legal</i> shaft may be used, <i>and shaft does not need to maintain</i> a straight line from hull exit through the strut.</li> </ul>	<p><b>Struts/Shfts</b></p> <ul style="list-style-type: none"> <li>Any shaft may be used, and shaft does not need to maintain a straight line from hull exit through the strut.</li> <li>If the strut on the real modern boat extends behind the transom, the forward face of the propeller hub may be positioned up to 0.5 inches behind the transom.</li> </ul>



**F. POWER AND DRIVE TRAIN (1/7-SCALE)**

<b>1/7 Scale Vintage</b>	<b>1/7 Scale Classic</b>	<b>1/7 Scale Modern</b>
<p><b>Batteries</b></p> <ul style="list-style-type: none"> <li>• A maximum capacity of 8S Lithium Polymer (LiPo) batteries are approved. Only LiPo batteries with a cell rating of 4.20 or less volts per cell are approved. Maximum charged voltage is 33.84 volts.</li> <li>• Only LiPo batteries with a manufacturer's discharge rate of 20C or greater shall be allowed.</li> </ul>	<p><b>Batteries</b></p> <ul style="list-style-type: none"> <li>• A maximum capacity of 8S Lithium Polymer (LiPo) batteries are approved. Only LiPo batteries with a cell rating of 4.20 or less volts per cell are approved. Maximum charged voltage is 33.84 volts.</li> <li>• Only LiPo batteries with a manufacturer's discharge rate of 20C or greater shall be allowed.</li> </ul>	<p><b>Batteries</b></p> <ul style="list-style-type: none"> <li>• A maximum capacity of 8S Lithium Polymer (LiPo) batteries are approved. Only LiPo batteries with a cell rating of 4.20 or less volts per cell are approved. Maximum charged voltage is 33.84 volts.</li> <li>• Only LiPo batteries with a manufacturer's discharge rate of 20C or greater shall be allowed.</li> </ul>
<p><b>Motors</b></p> <ul style="list-style-type: none"> <li>• Motors shall not exceed the manufacturer's kV rating of 860kV (950kV breakout threshold).</li> <li>• Motor case may not exceed the following dimensions, including any bearing protrusions: Length: 105mm (4.134 inches; Diameter 42mm (1.654 inches).</li> <li>• Motors without permanently marked factory kV rating will undergo technical inspection to verify rule compliance.</li> <li>• <i>Bearings and connectors may be replaced at any time.</i></li> <li>• No gearbox of any configuration is allowed.</li> </ul>	<p><b>Motors</b></p> <ul style="list-style-type: none"> <li>• Motors shall not exceed the manufacturer's kV rating of 860kV (950kV breakout threshold).</li> <li>• Motor case may not exceed the following dimensions, including any bearing protrusions: Length: 105mm (4.134 inches; Diameter 42mm (1.654 inches).</li> <li>• Motors without permanently marked factory kV rating will undergo technical inspection to verify rule compliance.</li> <li>• <i>Bearings and connectors may be replaced at any time.</i></li> <li>• No gearbox of any configuration is allowed.</li> </ul>	<p><b>Motors</b></p> <ul style="list-style-type: none"> <li>• Motors shall not exceed the manufacturer's kV rating of 860kV (950kV breakout threshold).</li> <li>• Motor case may not exceed the following dimensions, including any bearing protrusions: Length: 105mm (4.134 inches; Diameter 42mm (1.654 inches).</li> <li>• Motors without permanently marked factory kV rating will undergo technical inspection to verify rule compliance.</li> <li>• <i>Bearings and connectors may be replaced at any time.</i></li> <li>• No gearbox of any configuration is allowed.</li> </ul>
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<p><b>Propellers</b></p> <ul style="list-style-type: none"> <li>• Only Graupner K Series 57L two blade propellers or RCBoatbitz (CNC aluminum) 5514r two blade, unmodified, are allowed, and a portion of the</li> </ul>	<p><b>Propellers</b></p> <ul style="list-style-type: none"> <li>• Only Graupner K Series 57L two blade propellers, Graupner K series 63L and CNC 5714R 2 blade or RCBoatbitz (CNC aluminum) 5514r two blade,</li> </ul>	<p><b>Propellers</b></p> <ul style="list-style-type: none"> <li>• Only Graupner K Series 57L two blade propellers, Graupner K series 63L and CNC 5714R 2 blade or RCBoatbitz (CNC aluminum) 5514r two blade,</li> </ul>

<p>propeller must be under the transom.</p> <ul style="list-style-type: none"> <li>• The drive dog is defined as not a part of the propeller.</li> <li>• <i>The hub of the propeller counts as part of the propeller</i></li> </ul>	<p>unmodified, are allowed, and a portion of the propeller must be under the transom.</p> <ul style="list-style-type: none"> <li>• The drive dog is defined as not a part of the propeller.</li> <li>• <i>The hub of the propeller counts as part of the propeller</i></li> </ul>	<p>unmodified, are allowed, and a portion of the propeller must be under the transom.</p> <ul style="list-style-type: none"> <li>• The drive dog is defined as not a part of the propeller.</li> <li>• <i>The hub of the propeller counts as part of the propeller</i></li> </ul>
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<p><b>Struts/Shafts</b></p> <ul style="list-style-type: none"> <li>• Any shaft with a minimum diameter of 3/16" may be used. Any <i>legal</i> shaft may be used <i>and shaft does not need to maintain</i> a straight line from hull exit through the strut.</li> </ul>	<p><b>Struts/Shafts</b></p> <ul style="list-style-type: none"> <li>• Any shaft with a minimum diameter of 3/16" may be used. Any <i>legal</i> shaft may be used <i>and shaft does not need to maintain</i> a straight line from hull exit through the strut.</li> </ul>	<p><b>Struts/Shafts</b></p> <ul style="list-style-type: none"> <li>• Any shaft with a minimum diameter of 3/16" may be used.</li> <li>• Any <i>legal</i> shaft may be used <i>and shaft does not need to maintain</i> a straight line from hull exit through the strut.</li> </ul>