CARF-Models

REBEL MAX + REBEL PRO

Short Manual

This is a short manual to give you the important specs you need to set up your Rebel MAX and Rebel PRO. The high prefabrication renders a lot of “instruction manual” text obsolete, but some items have caused confusion and additional questions, so this manual should get you quickly up to speed with short but important information.

Aileron and flap servos: Install the servos in the servo cutouts of the support ribs. You do not need more than 30 mm (1 1/4”) servo arms(preferrably aluminum arms). Keep the max aileron throw at 30-35 mm when the servo travels 100%. It is recommended to make a simple long philips screw driver by cutting one and extending it with a brass tube, so that you can work from the wing’s root. Various servos have slightly different dimensions, some aluminum arms also. In case your servo arm and the already installed dual control horn isn’t lining up 100%, you can work with a plywood frame or two plywood tabs as spacer between servo and rib.

Note: In the first Rebel PRO we realized too late that the recesses of the servo hatches were not 100% symmetrical and perfectly aligned with the servo ribs. This caused some mis-alignment of servo arm and slotted hatch. This can be easily fixed by spacing the servo away from the rib with a plywood frame or two plywood tabs. Just make sure that the servo screws are long enough to reach the actual servo rib. We are sorry for this mishap, we didn’t catch it in time before the first kits were shipped.

The flap linkage is all internal in the wing, make sure that your flap servo is set so that when flaps are fully deployed (approx 60 degrees) the servo arm and linkage are IN LINE to each other, making the servo load free at fully deployed flaps. Please note that you must set and synchronize the flap down angle with the length of the linkage only, because in that position your servo arm is fully in-line with the linkage. Servo endpoint setting from the transmitter will not be able to change the flap-down angle at all.

The wings mount to the fuselage by 4 M6 studs, which also act as anti rotation pins. Use 4 of our typical M6 knurled plastic nuts. Here, too, we realized after quite some planes delivered that the hardware bags were short of these nuts. In case you need some, please contact us.

Rudder and elevator servos: These are installed through the root ribs of the respective panels. Here, too, keep the servo arms short enough so that you can reach max deflection of the control surface with 100% of the servo travel. Elevator 30-35 mm, rudder 50-60 mm. Especially when using short servo arms, you will have to extend the slots for the linkages to the rear. That is no problem and will not cause any strength problems.

Engine, fuel tank and thrust tube installation: The Rebel MAX is designed for 220-260 N engines, the Rebel PRO will be working well with a 180, and be a rocket ship with a 220. Installing the engine depends on the engine mount of the respective manufacturers, and also the positioning of the front end of thrust tube will depend a little on that position. Some

manufacturers' engine mounts do not center the engine perfectly on the mounting rails. So we have decided NOT to permanently glue the front pipe mount. It is a very self explaining construction and needs to be aligned with the engine's exhaust cone.

Length wise, the pipe should stick out of the tail of the fuselage by 10-15 mm. That will give you the position of the intake lip the engine's exhaust cone. The distance from the rear edge of engine's exhaust cone to the beginning of the stainless thrust tube should b 25-30 mm. Obviously, the thrust tube should be perfectly co-axial with the exhaust cone opening.

Assemble the two foam parts and the little plywood block with 30 min epoxy, and let this cure fully. Then align the little plywood block with the single hole in the thrust tube, which is aligned to the TOP of the airplane. So, you can mount the thrust tube to the mount with a single sheet metal screw and then mount the rear fuselage to the front temporarily.

Note: The 4 M6 bolts are held in place with Loctite. You should not have to adjust them. IF they get lose, re-glue them. The actual fixture of the rear fuselage to the front fuselage are TWO M4 bolts in the top flat surface above the thrust tube, and 1 M4 bolt at the bottom tab.

Lay the engine on the two mounting rails and eye-ball from the rear that the engine is centered to the thrust tube. If not, grind or cut a little off that single top support, or add a few mm of scrap plywood to space it from the top fuselage wall. Once all is centered, take the tail fuselage off the front fuselage and permanently glue the mount in the rear fuselage with 30 min epoxy.

Then screw also the engine in place. For all further installation of engine components, such as ECU, pump, fuel lines, valves, filters, please follow the instructions of your engine's manufacturer. In the Rebel PRO and MAX, the perfect space to install all this is on that horizontal area of that fuselage dome right in front of the engine cutout. CG will work out fine, if batteries are planned to be installed in the nose of the airplane - of course depending on the size/weight of the engine.

The fuel tank is installed in front of the engine. It hooks under the wing tube with a milled plywood construction. To avoid the mount sliding sideways, a balsa block glued to the wing tube or fuselage floor, placed between the two vertical plywood formers, will do the trick.

In the front the milled half round foam piece will be glued to the fuel tank with 30 min epoxy, in the exact position so that it can be screwed to the tank former without gap. Glue this on while tank and foam piece are in its place, and remove after the glue has cured. Then you can reinforce the joint and fill the corners as you deem necessary.

The hopper tank can be either mounted on the dome, where also the other components will find place, or in the bottom of the fuselage. In order to easily take the main tank out, we recommend to mount the hopper tank on the dome.

Landing gear installation: The main gear mounts have holes for M5 T-Nuts. Press the T-Nuts from the underside into the plywood mounts and then mount the retract mechanics with M5 allen bolts.

The nose gear is supposed to be installed from the bottom into the mounting rails. For this we use self tapping wood screws. You can widen the gear cutout in the fuselage skin in that area to access the screws more easily, if you wish.

Make sure you tighten all grab screws well. It is not really necessary to grind flat spots to the connection pins, except you should grind one flat spot where the grab screw of the steering control arm is located. This is only one single grab screw and it will not hold tight without a flat spot in that area. Installing the steering servo is straight forward, but make sure to orient the servo that the servo wire is on the side AWAY from the retract unit, so that it will not catch the gear frame and get pinched.

RC Equipment: All other RC equipment should be installed on the dome under the canopy, where also the hopper tank and engine ECU found their place. This support is 100% level, so it can be used to mount a Gyro in the right attitude. It is advisable that you reinforce the mounting surface with a plywood from the inside to stiffen especially the Gyro mount against vibration or G-load movement during flight.

CG and Control Settings: The Rebel in general is very forgiving in terms of CG and control throws. No bad habits at all. What looks right, most certainly is right.

The CG of all Rebels is the rear edge of the wing tube. This should be easily obtained with all batteries installed in the nose, but it can vary 20mm forward or backward with no problem.

Elevator, aileron travel: 35-40 mm 20-30% expo
Rudder travel: 60-70 mm (20% Expo)
Low rates can be set to 70% of the above.
Flaps: 25-30 mm Take Off position, approx. 60 degree for landing, Down elevator mix proportionally approx. 8-10 mm at full flaps. Use a 2-3 second servo delay function when changing flap modes

A Cortex Pro Gyro would be set at approx. 25% gain when setting procedure is done with the high rates as above.

A few words of caution, though: Avoid entering into a controlled SPIN with your Rebel. That's the only maneuver it doesn't like. A recovery from a full autorotating spin, especially when the CG is at the further back position, will take full throttle and several rotations! So better do not attempt it in the first place, as it has to be forced very hard into a spin, it doesn't want to stall in the first place - leave it at that!