## Jarlath's Compact Recoil Kit

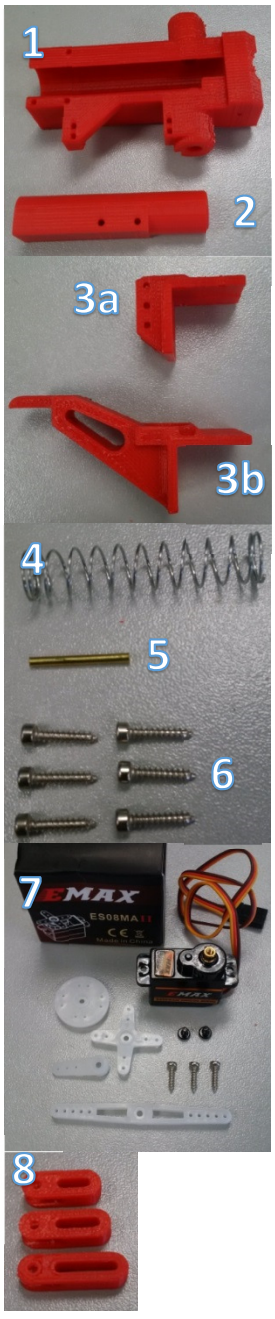
This kit is for many 1/16th scale tanks and has been designed to replace the existing airsoft mechanism with one that gives recoil. The components in this kit are made of ABS plastic through FDM 3D printing, plus other off the shelf items. As designed can give a maximum of 15mm of travel, and incorporates a sprung barrel which allows for some forgiveness when RC Tank drivers to accidentally run into an object. This kit does require some knowledge and skills for preparation and assembly.

Specifications:

Recoil Travel: 15mm Max.
Impact Resistance: Yes
Servo Elevation: Elevation mounting included
High Intensity Flash Capable: Optional

**Kit contents:**

| Part ID | Description | Qty |
|---|---|---|
| 1 | Main Recoil Body | 1 |
| 2 | Recoil Barrel | 1 |
| 3a | Elevation End - Servo | 1 |
| 3b | Elevation End - Tail | 1 |
| 4 | Spring | 1 |
| 5 | Ø1.57mm x 15mm Pin | 6 |
| 6 | M2 x 10mm Screw | 6 |
| 7 | Servo Kit | 1 |
| 8a | Linkage - Short | 1 |
| 8b | Linkage - Medium | 1 |
| 8c | Linkage - Long | 1 |
| 9 | Manual | 1 |




**Tools Required for assembly:**

1.5mm Allen Key/hex wrench
#1 Phillips Screwdriver
Fine grit sandpaper and/or square and round files
Sharp hobby knife

**Tools optional for assembly:**

1.57mm (0.063") drill bit (and appropriate drill/holder)
2.00mm (0.800") drill bit (and appropriate drill/holder)
5.50mm (0.219") drill bit (and appropriate drill/holder)
Glue/Adhesive

Assembly Steps:

i. Remove all ABS parts from the box/bags. These seven (7) pieces are the main body (IT 1), the barrel (IT 2), both elevation ends (IT 3a & 3b) and the trio of linkage arms (IT 8a, 8b, 8C).

ii. Optional: Drill the small holes in the main body (IT 1) using a 1.57mm drill bit. Non-through holes are 10mm deep. These holes are for the M2 screws and pre-drilling will reduce the stress on the material during threading of screws.

iii. Optional: Using the 2.00mm drill bit, clean out all holes to be use on either the servo elevation end (IT 3a), or the tail elevation end (IT 3b), whichever is to be utilized. Or perform on both. These holes are clearance holes for 2mm screws.

iv. Optional: If using a barrel flash system, please drill through the barrel (IT 2) and the selected elevation end (IT 3a, 3b) using the 5.5mm drill. Ensure to drill from the larger opening on the barrel (IT 2) and spring side of the elevation end.

v. There may be small imperfections or excess material which will require removal from the ABS components. Please carefully use a knife and sanding to do so.

vi. With the barrel. Please ensure that the tank barrel that is to recoil, in able to be inserted into the recoil barrel part (IT 2). Some sanding of the internal mounting surface may be required.

vii. Slide the barrel (IT 2) into the main body (IT 1). Note the roughness of the two items sliding in one another. Remove and lightly sand the inner surface of the main body (IT 1) and the outer surface of the barrel (IT 2). Re-assemble and test smoothness for smoothness in operation.

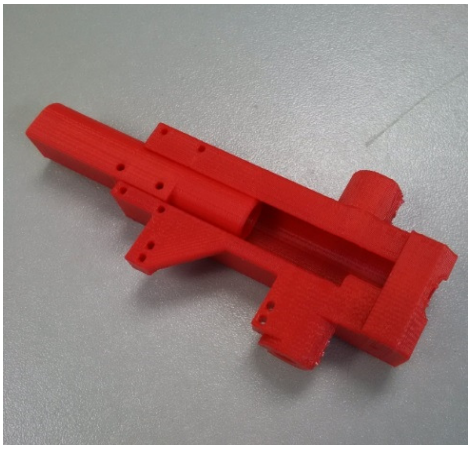
    NOTE: The body and barrel can work without sanding and smooth fit-up. However! Reducing the resistance between these components will increase servo life.

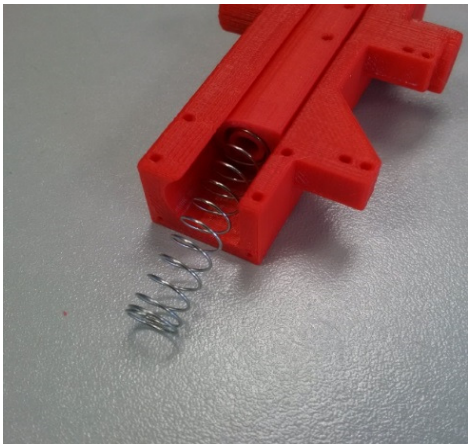
viii. Temporarily install the tank barrel into the recoil barrel part when assembled to ensure smooth operation. Sand components as required to ensure no binding between the main body (IT 1) and the recoil barrel (IT 2).

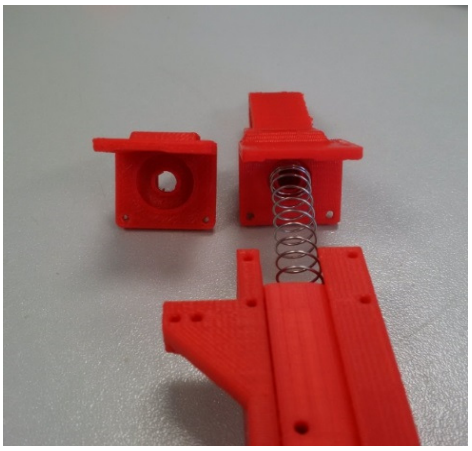
ix. Remove the hardware from the bag. These eight (8) items are the spring (IT 4), the pin (IT 5) and six (6) screws (IT 6).

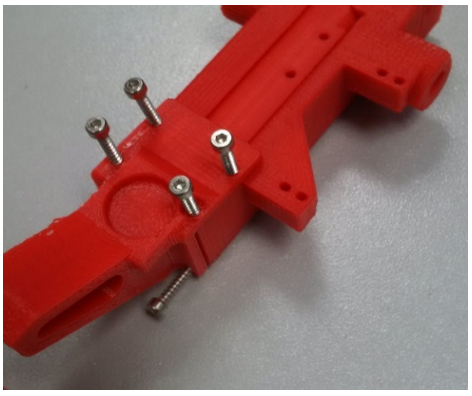
x. With the body (IT 1) and barrel (IT 2) assembled, insert the spring (IT 4) into the groove of the barrel.

xi. Determining which elevation end (IT 3a or 3B) to be used. Place the end near the back side of the body (IT 1) and endure the spring resides in the groove of the selected elevation end. Hereafter it is assumed that the “tail elevation end (IT 3b) is to be used in the assembly. Assembly for the servo elevation end (IT 3a) is identical.





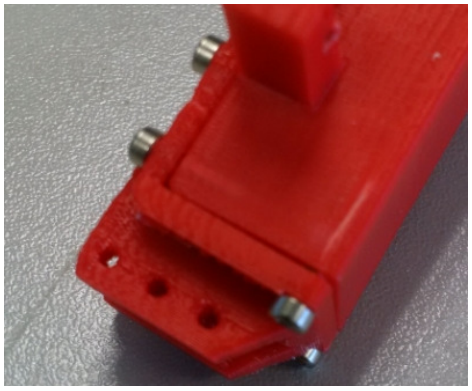




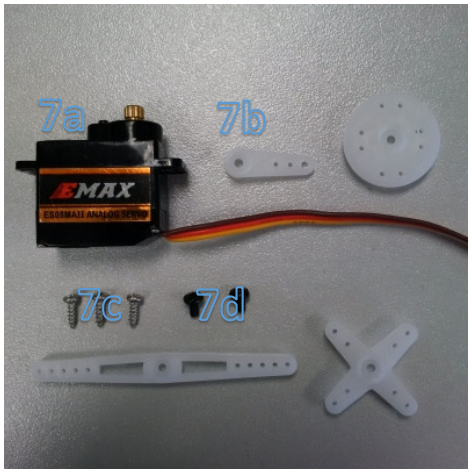
Assembly Steps (continued):

xii. Using your 2mm hex key, install the supplied six (6) M2 x 10mm screws (IT 6), fastening the elevation end to the main body (IT1). Do not over torque. Optional: add in glue along the mating surfaces of the body (IT 1) and the corresponding end to give even more strength.

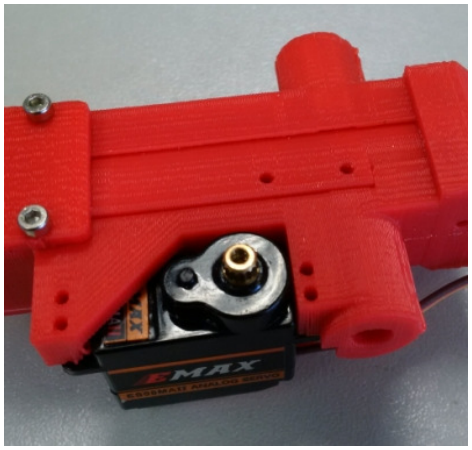
NOTE: The screws are actually threading the ABS plastic material. A white discolouration is normal around the screw pockets as it signifies plastic deformation. Do NOT use #2 screws as these have a diameter of 2.2mm (0.086”), which will damage the unit.



xiii. With the main recoil body assembly complete, it is time to move onto the servo (IT 7). Please remove the servo and all components from the box. The stock setup of this recoil unit will use the following components from the servo box (IT 7). The servo (IT 7a), the single arm servo horn (IT 7b), all three (3) M2 x 6mm screws (IT 7c), and one (1) retaining screw (IT 7d).

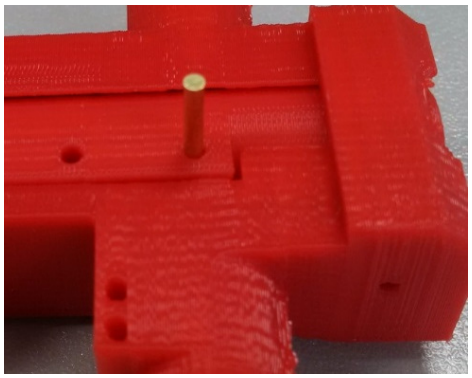



xiv. Place the servo (IT7a) onto the recoil unit assembly as shown. It can only fit one way with the servo gear up and towards the barrel. Using the mounting holes closest to the recoil unit centerline, fasten the servo (IT 7a) into place using two (2) of the M2 x 6mm screws (IT 7c). Do NOT over torque.




xv. Install the pin (IT 5) into the fore most hole on the barrel (IT 2). Optional: add in glue to secure the pin in place.

xvi. This portion of the component will require trial and error and is preferable if able to cycle the servo as per the appropriate electronic controls. Select the appropriate linkage (IT 8a, 8b, 8c) for your operation. Different linkages will give different performance including initial delay, recoil travel, impact resistance (See chart).



| | Short Linkage | Medium Linkage | Long Linkage |
|---|---|---|---|
| Recoil Delay | Short | Med | High |
| Recoil Distance | Max. | Med | Low |
| Impact Resistance | Low | Med | Max. |

Assembly Steps (continued):

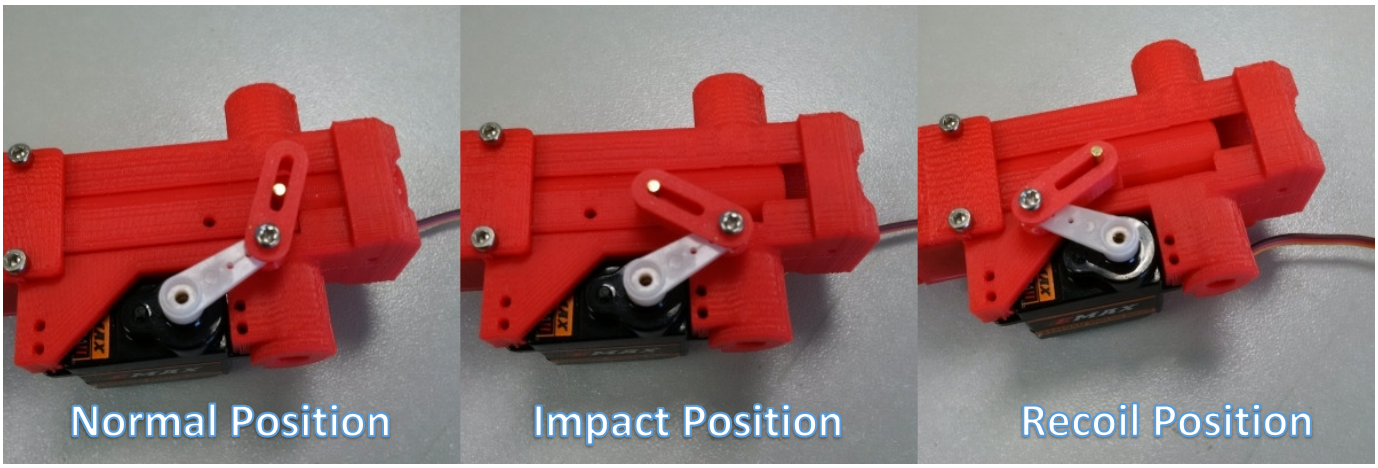
xvii. Using a servo tester, receiver, or your electronic control board, ensure that the servo is positioned to its furthest forward extent which is away from the elevation end.

xviii. Using the 1.57mm drill, and the servo horn (IT 7b), enlarge the hole furthest from the servo mounting point.

xix. Assemble using the final M2 x 6mm screw (IT 7c) to the selected linkage (8a, 8b, 8c) as shown. Do not let the screw tip protrude past the bottom of the linkage.

xx. Place the linkage (8a, 8b, 8c) so that the slot captures the pin (IT 5) that is mounted on the recoil unit assembly.

xxi. Position the servo horn so that the linkage will be in loose state and allow swivelling of the linkage when barrel impact occurs. Trial and error will be required to determine the ideal position for the desired level of recoil/delay/impact.




xxii. Once in position. Secure the servo horn (IT 7b) onto servo (IT 7a) using the retaining screw (IT 7d).

xxiii. Assembly of the compact recoil unit is now complete.

Optional Items for the builder:

- 5mm outer diameter tube for elevation pivots, may require hole clean up on body
- Direct pull linkage from servo arm to barrel (may require modifications)
- Changing recoil style by using additional pins and/or other servo horns (may require modifications)
- Offset servo mounting and larger horn (may require modifications)

NOTE: Modifications to the unit outside of the listed assembly steps are to be performed at the risk of damaging the recoil unit and its component parts.