

Advanced V3 Mechbox Assembly & Troubleshooting



2006 Edition

**THE AirSoft
PRESS**

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Preface

Airsoft has been well established in Asia for over 20 years, but only in recent years has there been much interest in the Western world. Most professional literature on Airsoft were written in Japanese, with very few translated works available. Even though we are seeing more and more tech tips (in English) popping up on the internet these days, too many of them were written by newcomers who don't really know what they are talking about. If you upgrade your AEG based on their advices, you may risk running into unexpected troubles.

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Safety precaution

Along the process of disassembling/assembling your mechbox, there are chances for unexpected debris to fly out (e.g. when you try to put a M120 into the mechbox, your spring guide may accidentally fly out with strong impact). Therefore:

- order your children to stay away from the work area.
- don't work in a location too close to the windows (you don't wanna break the window glass).
- wear safety goggles yourself if you are going to deal with very stiff springs.

Good luck!



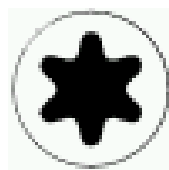
Step 0: Getting the tools you're going to need

The two basic types of screwdrivers are standard (slot / flat head) screwdrivers and Philips screwdrivers. Make sure you have drivers of different size handy – a whole set of drivers from your local store should cost less than USD\$5 each.



Only TM mechboxes use Torx screws. Torx head size is typically described using the capital letter "T" followed by a number, such as T5, T10, T15 and T25. TM mechboxes use T10 screws. You therefore need to have the corresponding driver handy.

Note: It doesn't hurt for you to use the regular Philips screws in place of the Torx screws. The Torx screws have nothing special nor unique other than the special screw head layout.



Is it OK to use flat head screw driver to drive the mechbox torx screws?

Why not? In fact, as long as the size fits, a flat head driver will work just fine on the torx screws. Do make sure you don't use brute force when driving the screws.

Screws with a centre hole that is hexagonal require the use of Allen wrenches or Hex drivers. To the best of our knowledge, however, no mechbox shall require

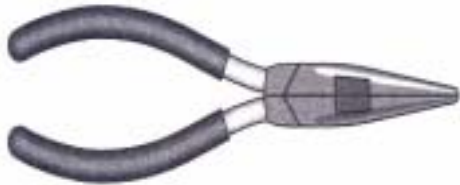


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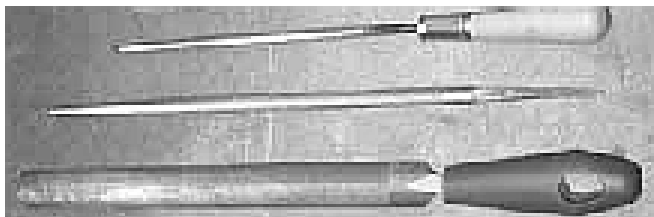


the use of hex screw.

You shall need needle-nosed pliers when handling the smaller mechbox screws and springs.



You may need some assorted files (such as straight edge, rounded and rounded side) for deburring and cleaning the edges of cuts needed for slight modification of certain mechbox parts.



You may need to use a pen shape soldering iron for rewiring the mechbox and the battery connection (especially when you are not happy with the existing wiring or you want to switch to the Deans plugs – the use of Deans plugs as well as proper wiring/soldering techniques are further covered in our **Practical AEG Upgrade** guide). You may also use it to produce small holes on the plastic mechbox parts if an electric drill is not available.



Step 1: Having all the parts ready:

Have you got all the parts ready? You better ensure that you do...

The shell:



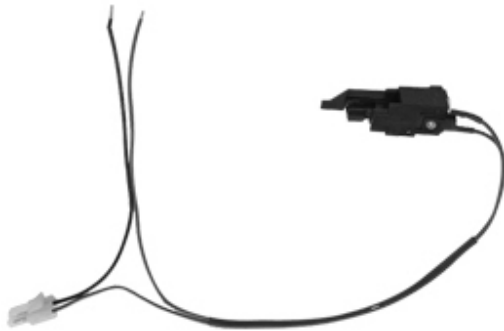
Is this the regular 6mm version or the newer 7mm version? You need to figure this out at the time you buy the shell so that you can also buy the proper bushings. Whether or not the shell has been reinforced does not make a difference in terms of assembly and troubleshooting procedures.



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The electronic switch assembly:



The V3 switch assembly is different from the V2.

I strongly suggest that you first get all the necessary soldering works and wire connections done before putting the switch assembly into the mechbox.

The AUG switch assembly has a different architecture due to a totally different select-fire mechanism.

Depending on the gun model and the planned location of your battery, you'll need to plan the length of the wires for battery connection carefully. You must also plan the length of the motor wires – remember, **for models without the mechbox motor mount frame** the wires need to be properly routed inside the piston grip before reaching the motor (to avoid getting in the way of the motor shaft and pinion), therefore it is always preferable to keep the motor wires a little longer than required.

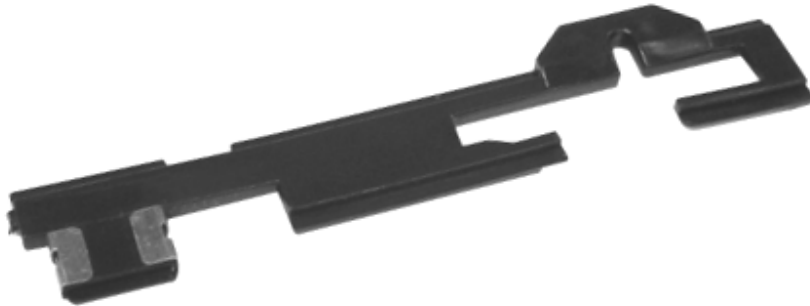
And don't mix up the pos / neg wires. Use red wire for pos(+) connection and black wire for neg (-) connection. Select the proper wires to use based on the guidelines presented in the **Practical AEG Upgrade** guide.



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The switch plate:



Check your switch plate. Different gun models may use switch plate of different shapes. Most importantly, test fit your switch plate with your mechbox shell. If the switch plate cannot slide smoothly even on an empty shell, it is going to get stuck when the mechbox is fully equipped. Therefore, use a piece of sand paper to make the back of the switch plate (the side facing the mechbox shell) a little thinner until it can slide smoothly.



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The tappet plate:



Generally speaking, all V3 mechboxes use the same type of tappet plate. HOWEVER, tappet plates of different makes do have minor difference in dimension which can render your mechbox inoperable. As mentioned in our **Practical AEG Upgrade** guide:

Even though most tappet plates look identical, different makes do have small difference that can introduce big problems. Take for example the tappet plate made by ICS. We tried to use it to replace a broken one found in a Cybergun DPMS AR15. The mechbox got stalled after making the replacement. Upon checking, we found that on the ICS plate there was an alignment stripe which prevented the plate from sliding inside the Cybergun mechbox. Therefore, when replacing the tappet plate, double check and ensure that the replacement plate can really fit into your mechbox. Minor cutting/dremelling/filing may be necessary to permit smooth sliding.

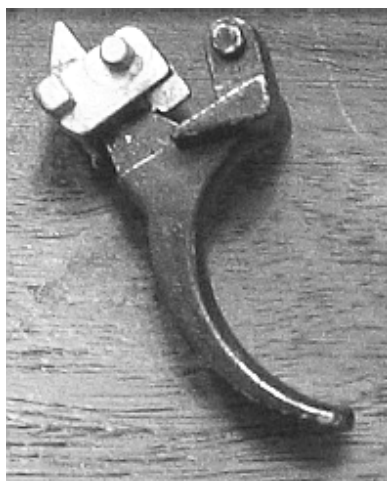


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Trigger:

The trigger assembly found in the V3 mechbox consists of 2 units (below shows the trigger assembly of an AK47):



The AUG trigger assembly has a slightly different architecture due to a totally different select-fire mechanism.



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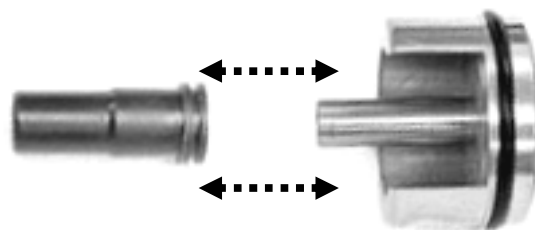


Cylinder, piston, air nozzle, spring guide and spring:



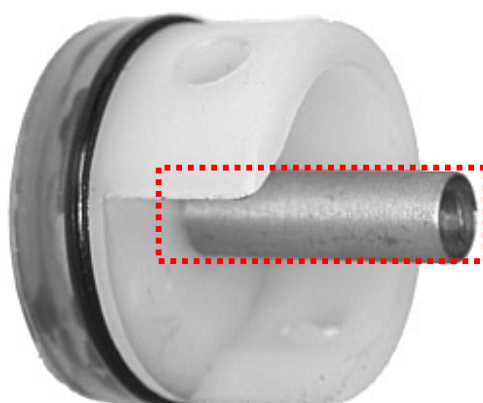
You need to pay particular attention to 5 issues here:

1, Does the air nozzle have an inner dimension that allows a smooth fit with the cylinder head nozzle? A loose fitting will fail to seal air, while a tight fitting may lead to air nozzle breakage or jamming. Also, is the nozzle of a correct length? A nozzle that is too long can lead to misfeed. On the other hand, one that is too short can lead to FPS drop. Check the specification of your gun model to find out the exact length needed, and make sure your nozzle doesn't go 1mm more or less.

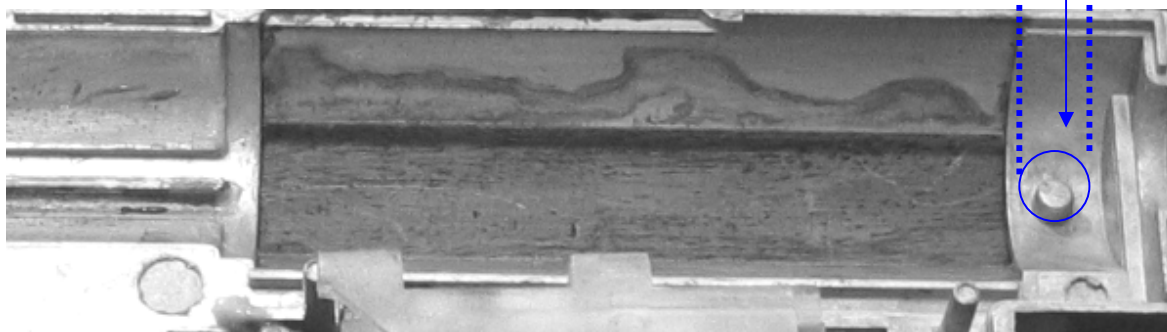
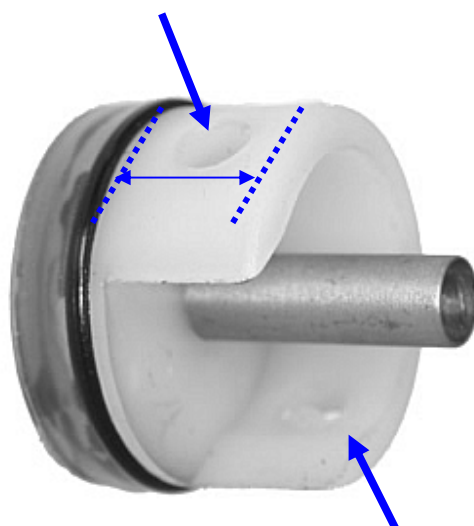


2, If your cylinder head is not of the one-piece type, does the cylinder nozzle wobble? If it does, fix it (instant cement will do) or get a replacement before moving on.





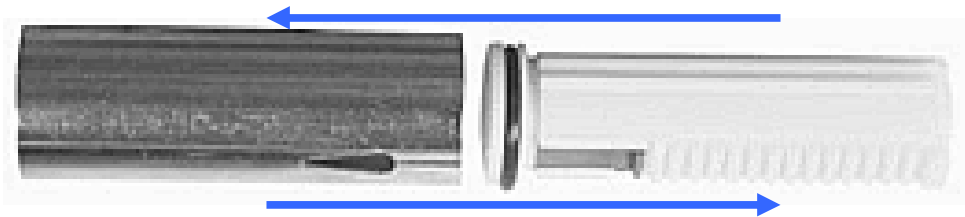
3, Check the side holes of the cylinder head – do they fit with your mechbox shell? If not, you may need to “extend” the holes forward or backward a bit depending on the actual fitting needs:



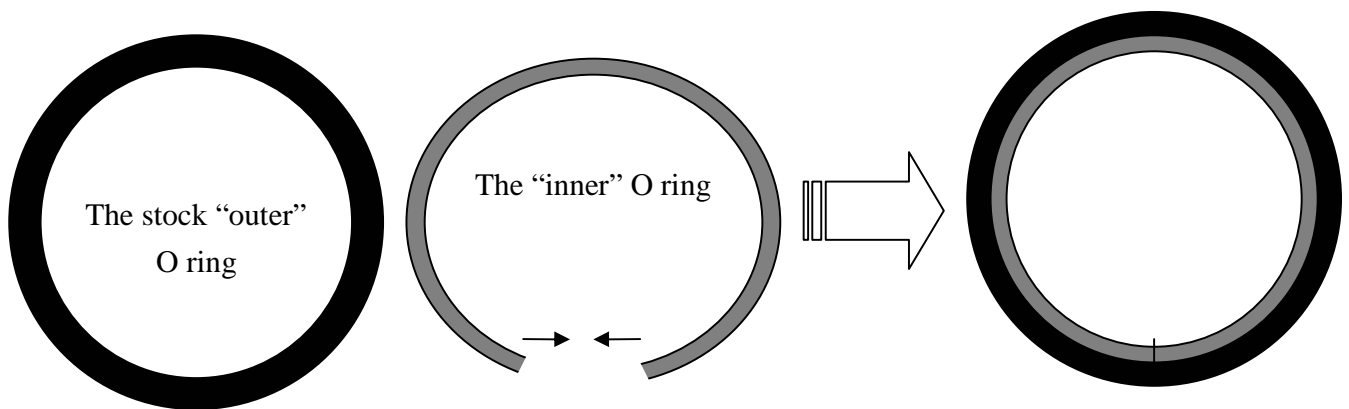
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4, Test fit the piston with the cylinder. When you move the piston inside the cylinder you should feel a certain level of resistance. If there is no resistance at all, the piston or the piston O'ring is no good (it is allowing too much air leakage, which can result in real serious performance drop). On the other hand, if there is too much resistance, the spring will have a hard time pushing the piston and will lead to both FPS drop and ROF drop. Based on our experience, the stock TM piston is one of the best in terms of air sealing.



What if you can't buy a piston head O ring of a suitable size? One little trick is to buy a smaller and thinner O ring, then cut it short a little bit to make it just long enough to wrap around the inside of the piston head.



Put it in first, then put your stock O ring back in (so your stock O ring can wrap around the thinner O ring). This way you can slightly increase the effective dimension of the "outer" O ring (for better compression) and at the same time retain some "flexibilities" without introducing too much friction along piston movement (an oversized O ring can produce too much friction and lead to fast wear and tear on the O ring rubber as well as serious FPS drop).

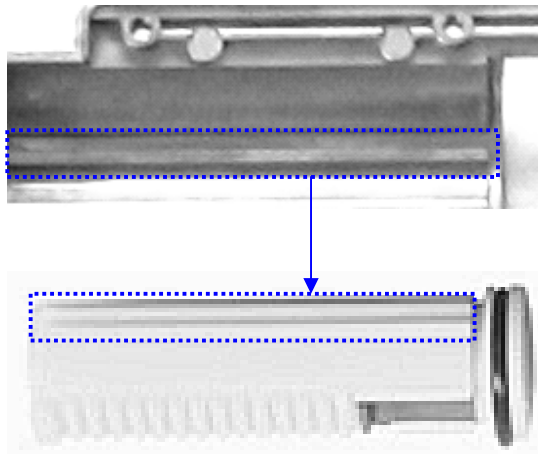
Also pay attention to the side stripes of the piston. We found that certain made-in- China pistons have side stripes that are not deep enough to fit with the



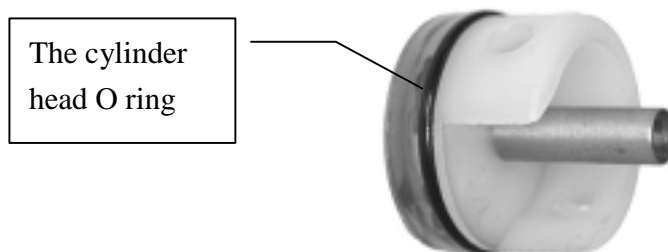
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tracks on the mechbox shells (you will have a hard time closing up the two halves of the shell back together). Again, you can perform test fitting prior to formal assembly. You must be able to get the two halves of the mechbox shell perfectly closed and at the same time allow the piston to slide smoothly.



5, Test fit the cylinder head with the cylinder. A loose cylinder head can allow serious air leakage. Pay particular attention to the cylinder O Ring – if the cylinder head is loose, try to see if you can replace this O ring with a larger one.



When buying a new piston O ring, by all means take your current cylinder / piston set with you to the hardware store and try things out on the spot. You want an O ring large enough for a slightly tighter fit with the cylinder (so you can improve compression), but at the same time you don't want an O ring that is too large. An over-sized O ring will make it very hard for the piston to move inside the cylinder and will increase the load of the motor and the battery quite significantly.

** Remember to also check the inner diameter of your replacement O ring. If it is too large (an inner diameter almost as large as the overall diameter of your piston head is way too large), it may*



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fail to sit inside the “channel” of the piston head during rapid piston movement. If part of it comes off, your mechbox will immediately jam.

Applying grease around the piston head O ring is a measure primarily for ensuring smoother movement – with proper lubing the O ring can have less wear and tear (and can last longer). Most of the time you should not need to replace the O ring unless FPS drop becomes apparent. Do keep in mind, an O ring that fits with the cylinder tightly WILL wear faster due to more friction imposed on it during piston movement.

The cylinder head O ring is made of very thin rubber and is quite difficult to acquire from the local hardware stores (due to its unique sizing). If you don't have one handy, the best thing to do is to apply grease around it for better air sealing. Since the cylinder head does not move, in theory its O ring should not wear out by itself. Still, you may want to regularly check and reapply grease around it if necessary during your regular maintenance effort.

6, If you are using a custom made spring (don't get me wrong, I have nothing against custom made spring), before installation you need to test fit it both sides with the spring guide. Installation-wise the side with the tighter coils always go to the spring guide, but when performing a test fit you must do it both sides because along spring compression most part of the spring will eventually be in touch with the spring guide and if any part of the spring does not fit with the spring guide your mechbox will get locked up eventually. **Remember, a good fit should allow all parts of the spring to freely rotate along the spring guide (even when the spring is fully compressed).**



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