Introduction

Cybergun is a relatively new name in the field of airsoft (comparing to TM, KSC and the like). By working out OEM deals with major Asian manufacturers like Academy, Cybergun is able to roll out lower cost airsoft guns that carry licensed logos of the real steels.

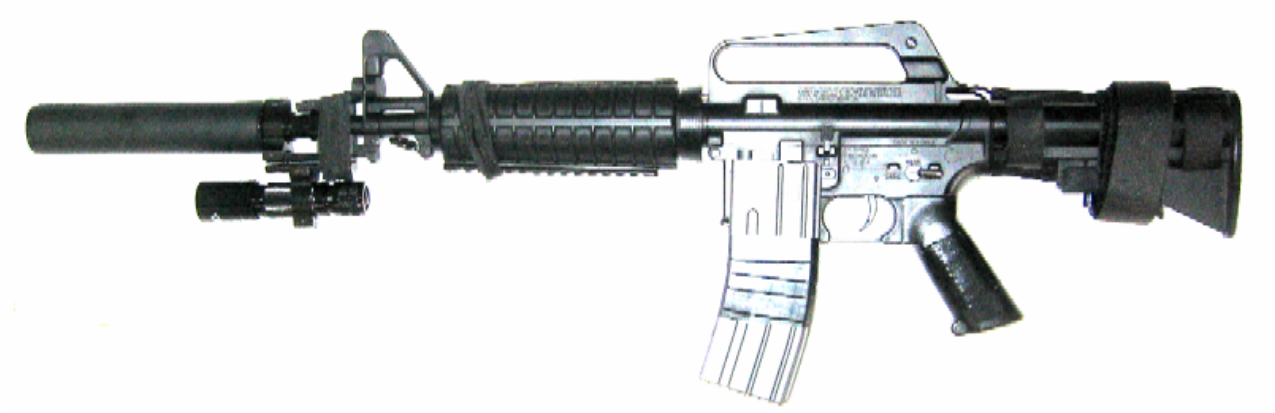
The DPMS A-15 AEG is basically an Academy XM177-E2 with better workmanship and an authenticate DPMS logo. The picture below shows the XM177 package.

Version ONE of the A-15 uses plastic bushings and fixed HopUp, while Version TWO uses metal bushings, much stronger gears and adjustable HopUp. Almost all the mechbox internals are compatible with the TM V2 offerings, meaning you have plenty of choices when purchasing parts for upgrade or maintenance.

There are known (and not-yet well known) problems in both versions of the A-15, and we will tell you how to fix these problems. We do assume that you have the basic ability to disassemble and reassemble your gun and the mechbox. In case you do not, refer to the many step-by-step free tutorial web pages available on

the internet (here are some suggested links:
http://www.airsoftguns.com/articles/skyfire/mechbox/index.htm,
http://www.teamairsoft.com/downloads/v2mech.pdf,
http://www.airsoftplayers.com/mechbox/tutorial.asp).

After trying out the tricks and tips suggested in this e-book, never hesitate to contact us should you believe there are mistakes waiting to be corrected (there are always better ways of doing things…).



Parts compatibility

Note that we use "TM" to represent Tokyo Marui and other after-market parts manufacturers throughout this e-book.

Compatibility of the internals

The shell – not truly compatible with TM.
Piston set – 100% compatible with TM.
Cylinder set – 100% compatible with TM.
Nozzle – 100% compatible with TM.
Version ONE Gears - quite compatible with TM. However, the gear ratio is different. This is why it can achieve a "higher than normal" ROF. You may use the TM standard gears, but gears mix and match is not recommended.
Version TWO Gears – much stronger, with a gear ratio same as the regular TM ratio.
Anti-reversal unit – Can be replaced by the TM anti-reversal lever, but not vice versa*
Electronic unit – quite compatible with TM, but may require minor cutting and

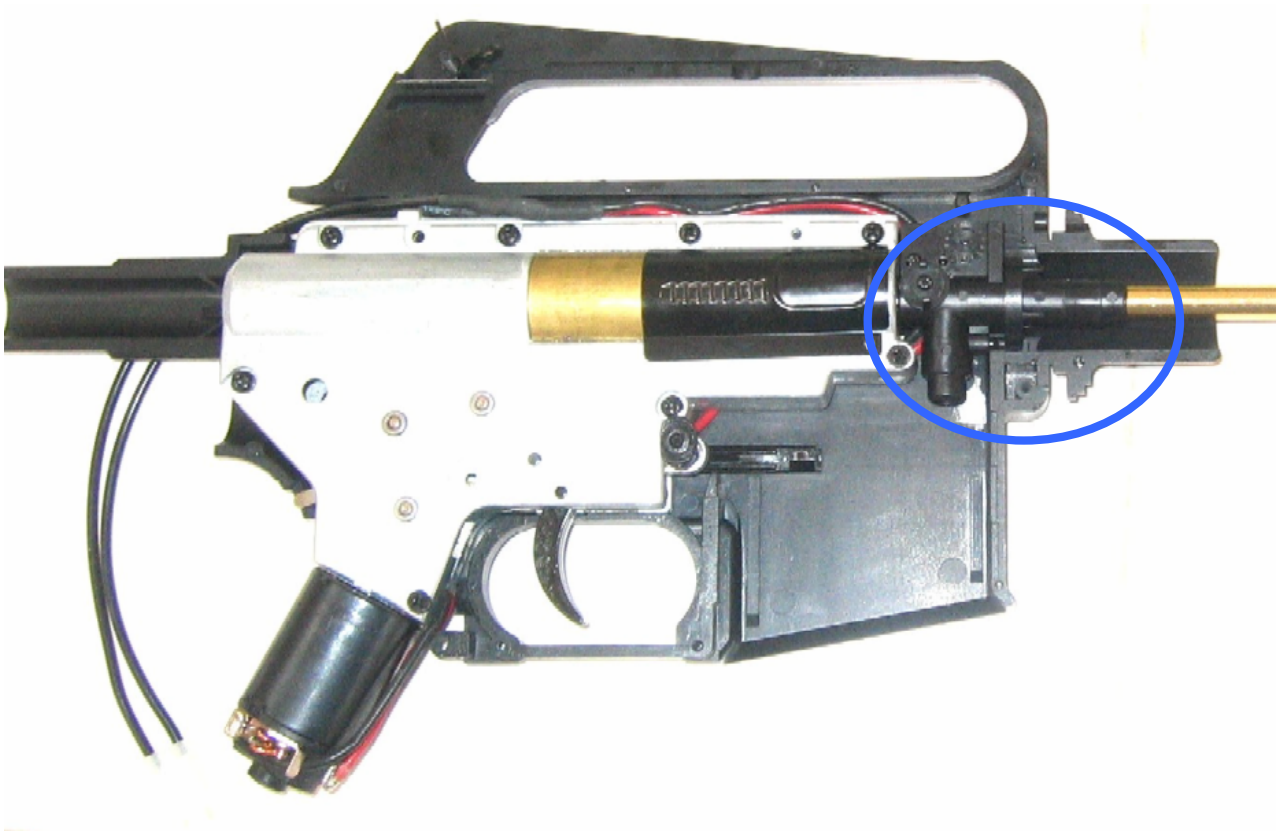
drilling.
Tappet plate – compatible, with caution**.
Trigger – 100% compatible with TM.
Bushings – Version ONE bushings have a slightly smaller dimension than the TM bushings.

Compatibility of the external parts

Most external constructs of the gun are NOT compatible with TM.

Compatibility of the barrel and the HopUp unit

Version ONE – NOT compatible with TM.
Version TWO – highly similar to the TM implementation, but NOT entirely compatible. Smaller parts such as the HopUp bucking and rubber are interchangeable. However, you cannot use a TM hopup unit to replace the stock hopup unit.

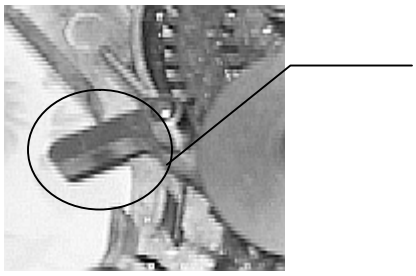


Note: you may replace the Version ONE hopup with the Version TWO hopup provided that you also replace the inner barrel.

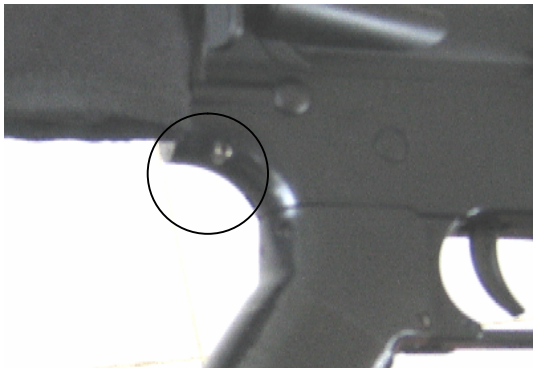
Compatibility of external accessories

External accessories for TM such as scopes and light can be used with the A-15. Most after market silencers and most M203 units cannot be used with it. The Marui BB glow-in-the-dark tracer does support the A-15.

* Anti-reversal compatibility

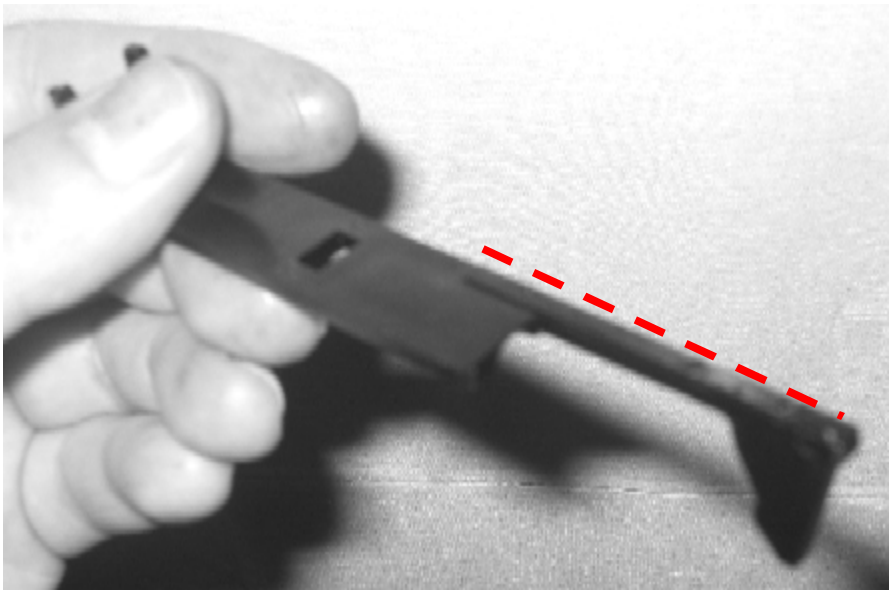


The A-15 anti-reversal lever has a handle extended to the outside of the mechbox (and the receiver). The TM version does not have one. You may replace the A-15 one with the TM one, but not vice versa.



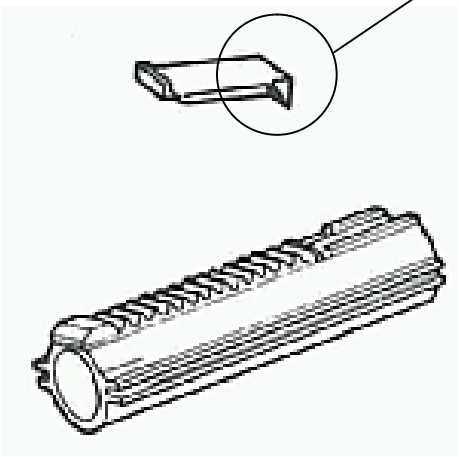
** Tappet Plate compatibility

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 the A-15. 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 may be necessary to permit smooth sliding.



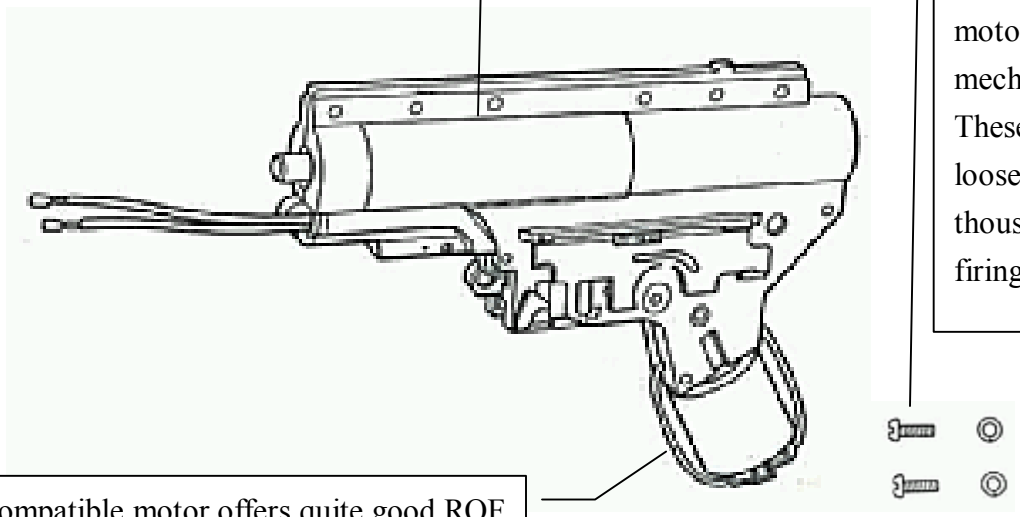
Major problems of the A-15

The piston gear is kinda fragile and can break easily when a harder spring is in use.

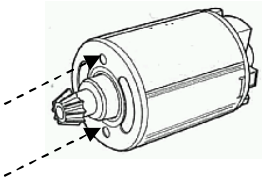


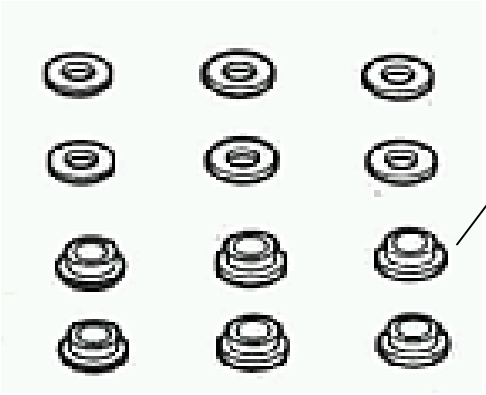
The mechbox is loosely shimmed out of the factory (especially true for Version ONE). That's why it can sustain very high ROF even with just 6V of battery power. The drawback is that sector gear breakage becomes fairly easy when a stronger spring is installed. Version TWO has the problem resolved by using much stronger gears.

The EG-560 compatible motor is attached to the mechbox via 2 screws. These screws will get loose after several thousand rounds of firing.

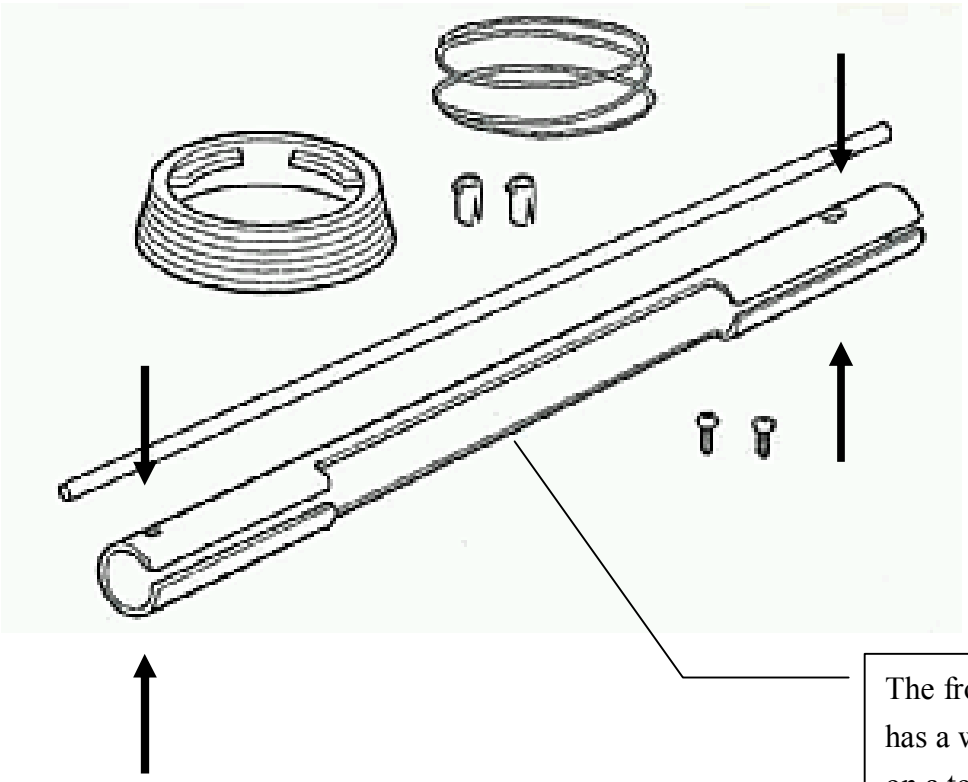


The EG560 compatible motor offers quite good ROF but less torque. It does not last if you put in a stiffer spring (such as a M110 or above).

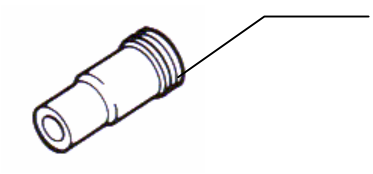




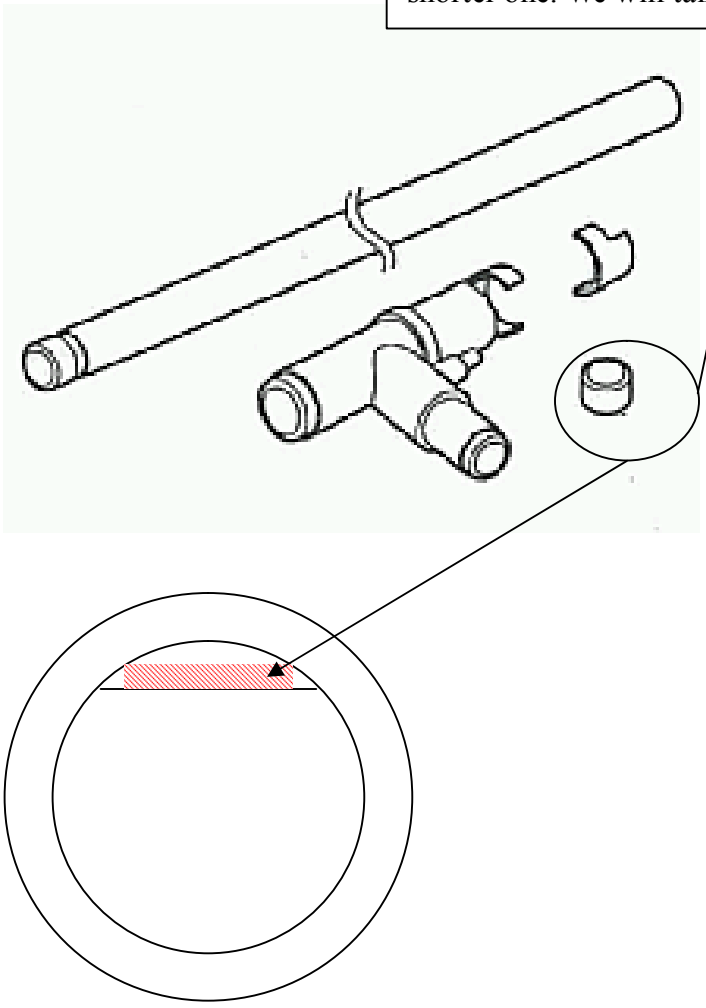
< Version ONE only > The mechbox comes with plastic bushings. These plastic bushings work fine under stock power, but will break if the spring is replaced with a stronger one.



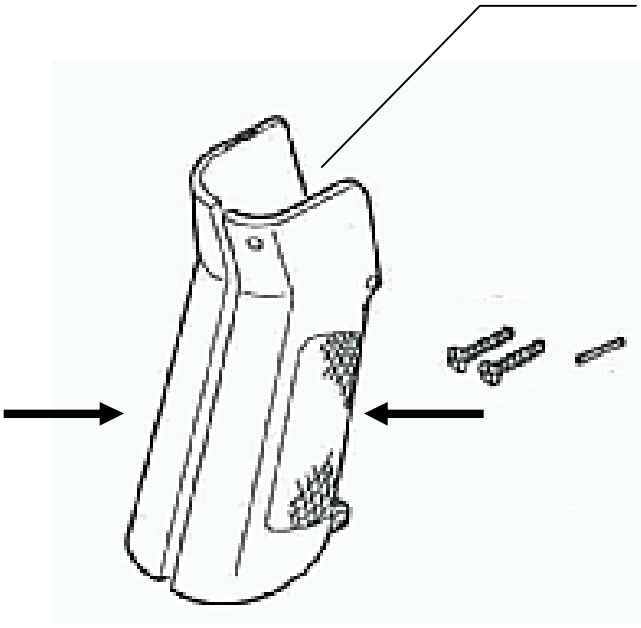
The front barrel assembly has a weak structure. It relies on a total of 4 screws and a rod to hold everything together…



< Version ONE only > It was well known that the A-15 has a very high rate of misfire in full auto mode. Many people believed that this is due to poor magazine quality. We tested the gun with some normal cap magazines (available directly from the manufacturer) and found the same problem. Further investigation revealed that the problem can be solved either by positioning the mechbox slightly backward or by replacing the nozzle with a slightly shorter one. We will talk about this later.



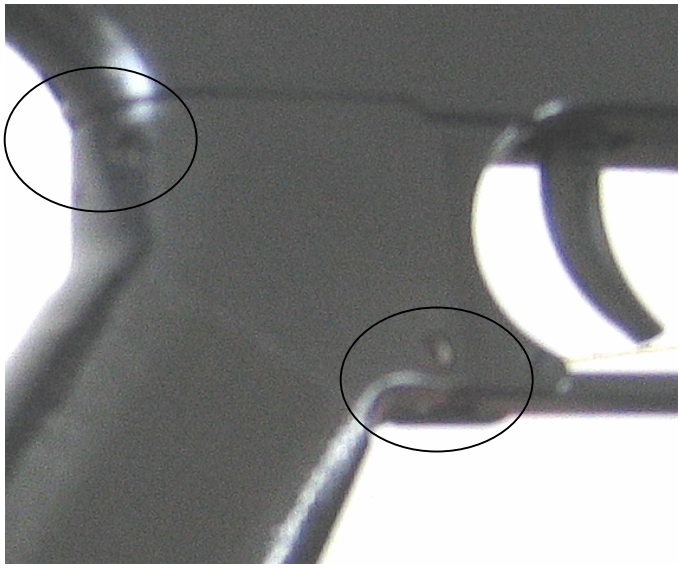
< Version ONE only >
The backspin mechanism relies solely on this piece of hopup rubber. The rubber was preset to produce an effect of 0.2g BB @ roughly 26~28M max. The part of the rubber that produces the backspin effect should last for about 7000 rounds (stock power) or 5000 rounds (upgraded to 350fps) before losing its effectiveness (due to wear and tear). The problem is, you won't be able to find a replacement unit from any of the retailers out there.



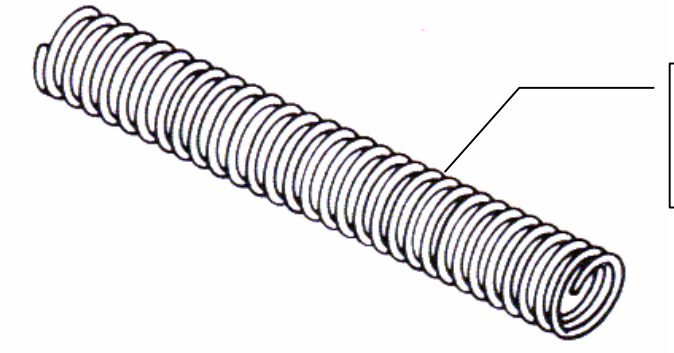
The two halves of the plastic hand grip are affixed together and attached to the receiver through several small screws. Holding the hand grip effectively puts the entire weight load of the gun onto the screws. Not reinforced in any way, this structure is highly fragile.

The inner side of the hand grip is very easy to break too!

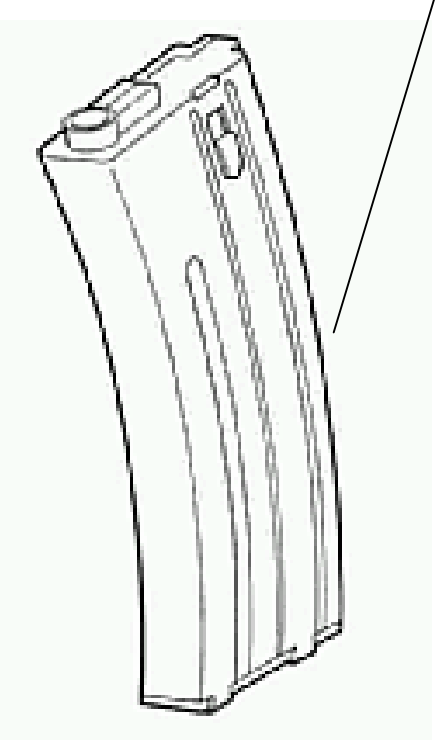
The hand grip has a dimension slightly larger than the TM one as it needs to accommodate the EG560 motor, which is much fatter than the EG700.



The stock sector gear is built with material that is very easy to break. The other two gears are fine though.



If a stock TM spring is rated at 100%, the A-15 stock spring is at the most 85%.



The Hi-Cap magazine is NOT compatible with the TM one (the TM one is too thick to fit into the A-15 receiver). Your A-15 cannot take the TM magazine.

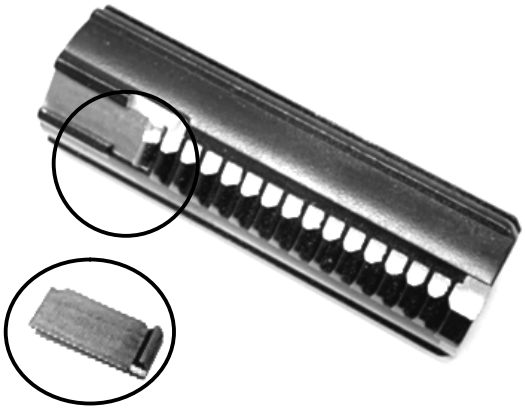
Product quality seems to be quite inconsistent – of the 5 mags we have, 2 performed very badly while the other 3 were perfectly ok.

Although you can replace the spring of the magazine with that of the TM hi-cap, doing so is too costly. If you encountered a bad magazine, just ask your dealer to send you a replacement.

Solutions to the problems

The piston gear problem

When you pull the trigger, the sector gear keeps rotating anti-clockwise and the piston is being driven to (almost) the leftmost position. If the spring is too stiff, the sector gear that keeps rotating will either break itself or the piston gear. Since the piston gear is usually of a weaker construct than the sector gear, it is the one that is ultimately broken.



Our experience shows that the stock piston gear that comes with the A-15 is good only for the stock spring. If you replace the stock spring with, let's say, a PDI 100% or a Systema M90 (which are the equivalences of a stock TM spring), the piston gear will break after around 1000 shots in full auto mode.

If you do not plan to upgrade the spring, stay with the stock piston gear. If you want a mild power upgrade, replace it.

Mechbox shimming

<< Version ONE >> The A-15 can run fine without re-shimming if you stick with the stock spring. If you replace the stock spring with, let's say, a PDI 100% or a Systema M90, the sector gear will break in less than 600 shots due to poor shimming.

<< Version TWO >> The new gearset is MUCH stronger and sector gear breakage is no longer an issue. Default shimming has been nicely done too. Still, to be safe, check and reshim if necessary.

The goal of shimming is to keep the spacing of gears correct. Most shim washers in the market have sizes of 0.2mm, 0.3mm and 0.5mm. There are 0.15mm and 0.1mm available from some Japanese manufacturers too. Use the SMALLEST possible shim washers to make the finest possible adjustment.

Start with the least number of shims. What you may want to do is to test fit the gears one by one incrementally. The test fitting process requires that you insert

the gear in question and put the mechbox back together, then check for 'slop' from BOTH sides. Keep adding shim washers (or changing to a larger one) as long as 'slop' exists (but don't add too many or the gear will have a hard time spinning).

Order of gear installation: first is the spur gear. Next is the sector gear. Finally are the anti-reversal latch and the bevel gear. When inserting the "next gear", always make sure that it aligns correctly with the previous one. Keep in mind that:

- the teeth of the piston must be correctly aligned with the teeth of the sector gear, or the piston teeth will be unevenly stripped.
- there should **almost** be no gap between the sector gear and the spur gear, or the teeth of the sector gear will break within 600 rounds at the time the spring is compressed.
- the anti-reversal latch must be properly positioned relative to the bevel gear, or the latch will worn out prematurely.

Go through several rounds of trial fire until there is **almost** no gap between the gears and at the same time they can spin smoothly without much resistance. * When we say **almost**, we mean the gap should be minimized but NOT completely eliminated. If the two gears are touching each other, you will run into problem too (due to excessive friction).

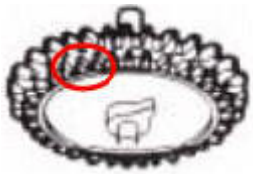
Don't forget to apply grease when installing the gears! Stock lubing was almost absent (gears were dry as hell).

Replacing the sector gear (Version ONE)

Power upgrade

<< Version ONE only >> If you have extra money to spend, replace the stock sector gear with a TM sector gear! The shaft and teeth of the stock sector gear are too weak to handle even a 10% performance increase. The TM sector gear is more solid and durable and can handle a much stiffer spring. * *Although it is technically possible to just replace the sector gear, consider to also replace the other gears. The A-15 stock gears are under a different gear ratio. They may not mesh smoothly in a mix and match setup.*

If two of the inner teeth on the sector gear break in a row, replace it with a TM sector gear and then re-shim in such a way that the gap between the new sector gear and the existing spur gear is minimized to the fullest extent.

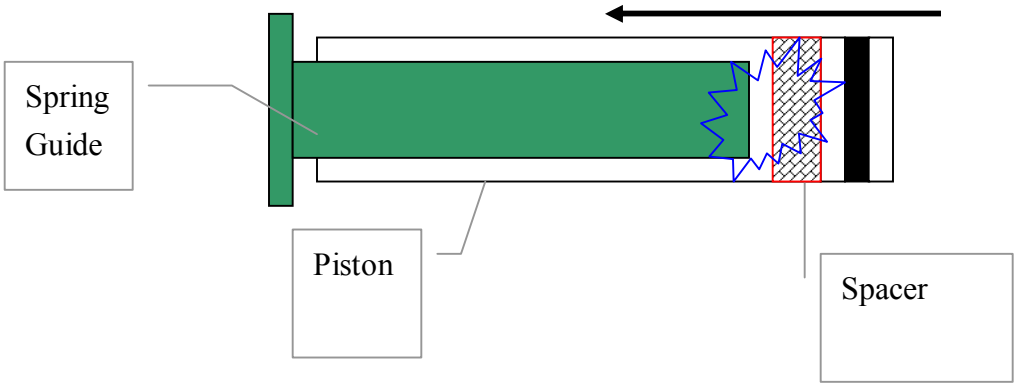


There has been a rumor around saying that the A-15 can hardly be upgraded. We won't go into details on the art of power upgrade here (our title "Practical AEG Upgrade" provides in-depth coverage on power upgrade of different sorts). All we want to say is that the A-15 is in fact quite upgradeable. A nearly fail-safe upgrade can be achieved with a PDI 120% or PDI 130% spring. A tougher upgrade involves the use of a Systema M100. The bottle neck is the motor. The EG560 compatible motor is not exactly an EG560, and it cannot handle stiffer spring like the M110 or M120.

Systema springs are in general longer and harder, while PDI springs are shorter and a little softer. Both of them are from Japan and are of similar prices. People prefer PDI springs because PDI springs are thought to be less stressful for the gears.

When you want to put a spacer on the spring guide (for increasing the compression effect), always ensure that the spacer is of a suitable diameter. If your spacer has an outside diameter exceeding the inside diameter of the piston and that the spacer is too thick, the piston's backward movement will be blocked. Even if your spacer has a piston-safe diameter, use it very carefully. The use of additional spacer is no different from using a spring that is too long. **Do NOT use additional spacers with the PDI spring or the Systema spring.**

If spacer is used inside the piston (rather than with the spring guide), make sure the spring guide won't hit the spacer during full compression:



We found that using spacer for better FPS is effective and safe only for harder and shorter springs. On soft and long springs the small increase in FPS has no real world significance at all.

Battery upgrade

Don't use the hide-in-the-foregrip small battery. It is not enough for powering any upgraded gun. Re-wire the gun and use battery bag to host standard size battery externally (refer to the picture below, the battery pack is attached to the rear stock):

Large Tamiya battery plug. We use it only because most standard size battery packs use this type of plug. You may stick with the stock small plug if you wish as it doesn't really hurt (at the power level of most A15 configurations) anyway.

Bushings replacement (Version ONE)

The plastic bushings should do just fine under the following conditions:

- they are adequately lubed
- your gun runs under the stock configuration
- you do not push the gun with high power battery (a GP 3300 8.4V or a Sanyo 1300 9.6V may be too much)
- you often keep your gun under proper usage

Install metal bushings if you plan to use any spring stronger than a PDI 110% or a Systema M100. Even without upgrade, you should in any case replace the stock plastic bushings after around 10000 shots. The thing is, the A-15 bushings have a dimension slightly smaller than the TM bushings. In order to install the TM compatible metal bushings, you need to enlarge the bushing space holders on the mechbox shell.

Warning: Some metal bushings just do not fit. For best compatibility, we recommend the Area 1000 metal bushings from Systema.

Motor maintenance and replacement

Handgrip replacement

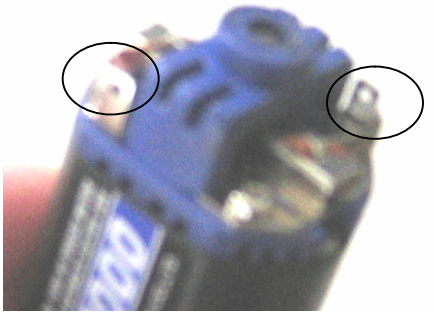
A properly maintained motor can last much longer:

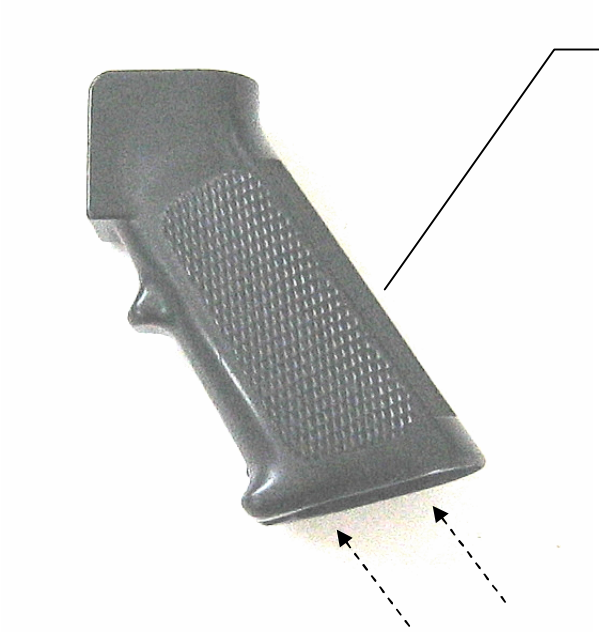
- After about 10000 shots, take the motor to a local electronic shop and find a pair of brushes that work for the EG560. Replace the brushes.
- Properly lube the bushings that reside on both ends of the motor with silicon spray.
- Never remove the fuse of the gun. The fuse prevents the motor from cocking itself when something goes seriously wrong.
- Never use a spring stiffer than a M100 on the A15. The stock motor is not designed to handle much stress. Stay with a softer spring like a PDI 120/130% whenever possible.

If unfortunately the motor fails and that no one can sell you an EG560, you may use an EG700 or EG1000 instead. To do so, however, requires that you replace the mechbox shell as well as the stock hand grip with a TM M4/M16 hand grip. You will also need to use the TM motor plate for aligning the motor (the A-15 stock motor plate is nothing more than a dust cover).

The A-15 mechbox shell is not truly identical to the TM/ICS/CA V2 mechbox. The M4/M16 handgrip won't fit into it. Therefore, you'll need to transfer all the internals to a TM/ICS/CA mechbox shell (expect to do some minor cutting and drilling works to get these parts fit into the new shell). You may also have to change the bushings (for maximum compatibility, go for the Area 1000 metal bushings).

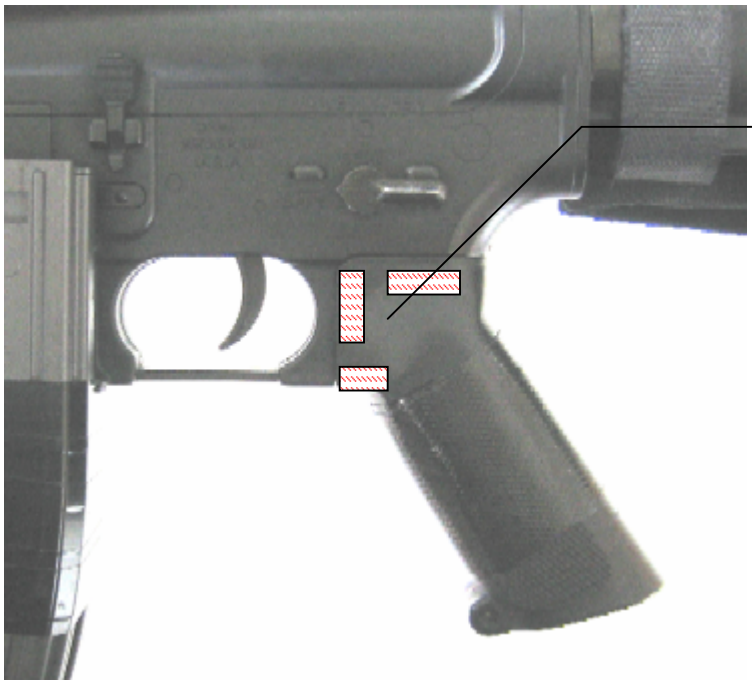
Wiring has to be changed because you no longer solder the wires onto the motor. Instead, you need to purchase motor wire connectors from your local electronic shop. You also need to extend the length of the wires to make sure that they can be connected to the motor.



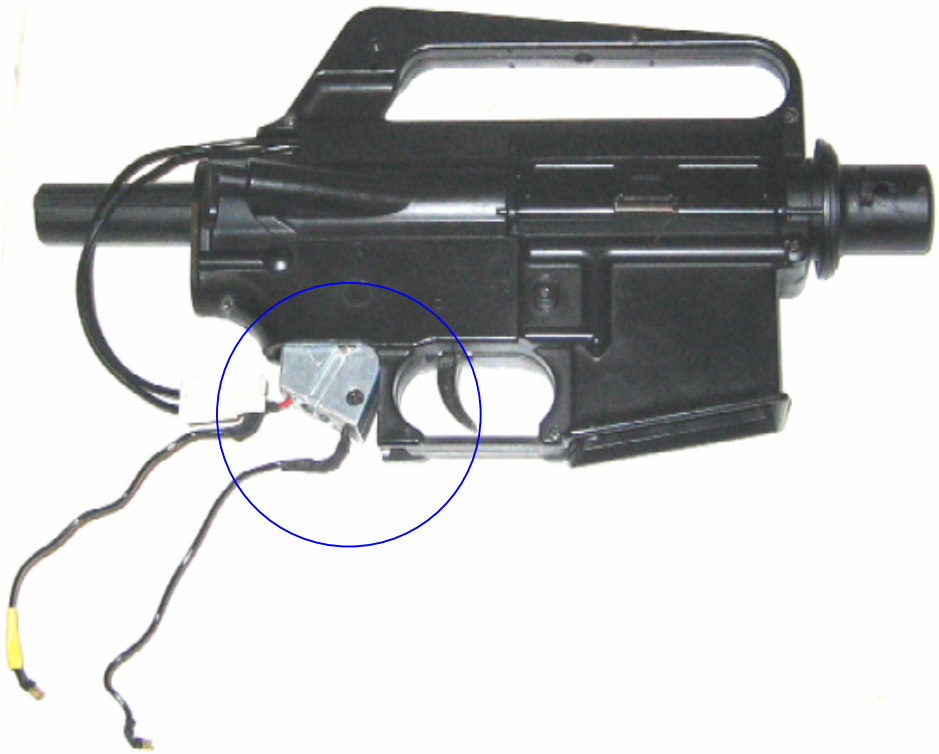


The TM hand grip comes in a rock solid one-piece format. Two screws go inside the hand grip and affix it to the mechbox.

The A-15 mechbox is NOT an exact replica of the TM V2 mechbox, therefore you will have problem attaching any TM compatible handgrip to it. This is why we said you need to also replace the mechbox shell.



To install the TM hand grip you must remove some plastic parts from each halve of the receiver. Since the receiver is completely plastic, parts removal is easy.

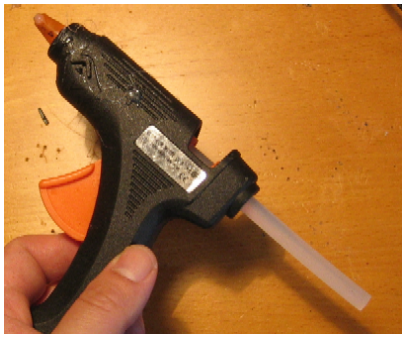


Once the new handgrip is in place, you may insert an EG700 or EG1000 into it.

Front barrel assembly reinforcement

The front barrel assembly has a weak structure as it relies on 4 screws and a rod to hold everything together. There is too much empty space within the structure, thus giving room for wobbling.

To fix this problem, we use a glue gun to reinforce the structure.



The goal is to fill up the empty space so that room for wobbling is minimized:

No worry, the glue can be easily removed with a screw driver.

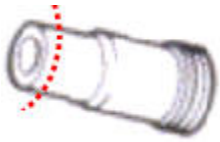
Fixing the full auto misfire problem (version one only)

Version ONE of the A-15 has serious problem going full auto. Reducing the ROF through the use of smaller voltage battery doesn't help. And it is not a magazine problem either.

Upon investigation, we found that it is a problem caused by inappropriate distance between the mechbox and the hopup unit. They are staying too close together!

To work around, you either look for a nozzle replacement, or have the stock one shortened by about 1mm. A shorter nozzle can render enough room for the bullets to move into the chamber smoothly.

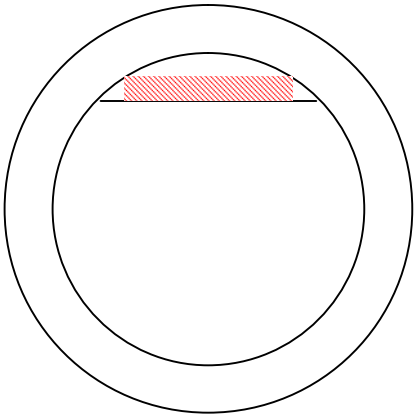
The Cybergun official way of fixing the problem is to remove (by way of filing down) 1 to 2mm of tapered plastic from the Air Nozzle.



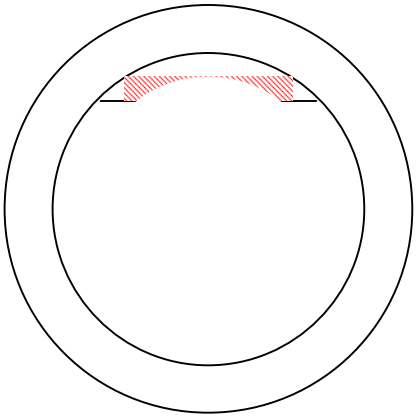
Fixing the HopUp wear-and-tear problem (version one only)

The primary problem with a fixed hopup unit is the ease of wear and tear. If the range of your A-15 drops significantly, check the hopup rubber.

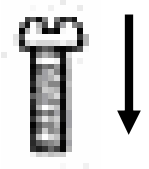
A perfectly OK hopup rubber.

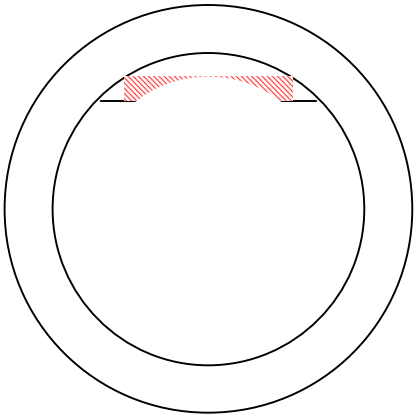


A worn away hopup rubber.



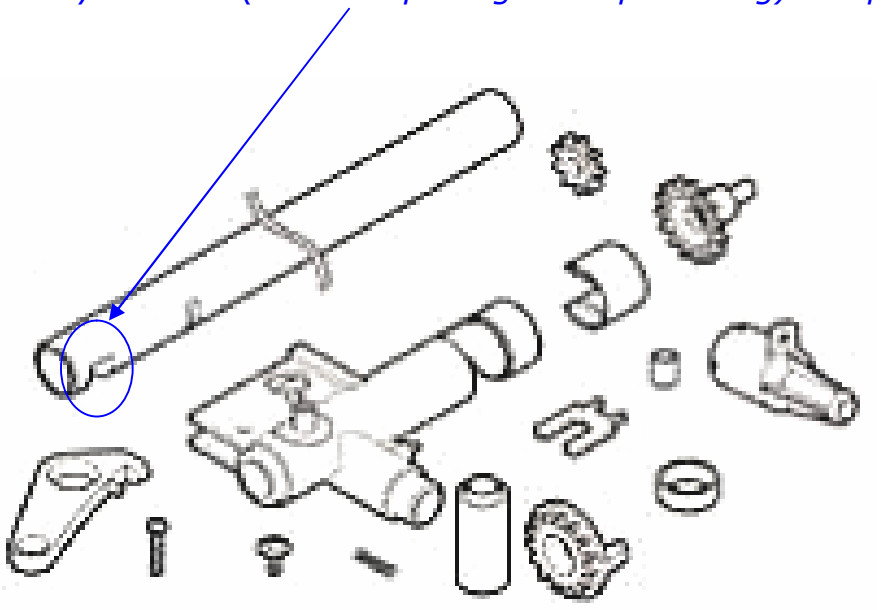
To fix the problem, drill a small hole and insert a screw from the top of the hopup unit. The goal is to slightly press down the rubber.





This is a trial and error process. If the rubber is pressed down too much, your bullets will fly to the 3rd floor. Adjust the screw little by little until the desired range is achieved.

For comparison purpose, below shows the Version Two adjustable hopup unit. Note that a TM style barrel (with an opening for hop bucking) is equipped with this unit:

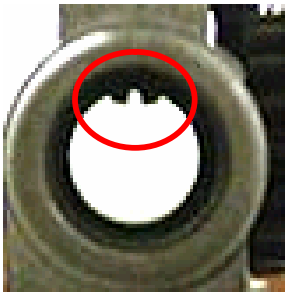


This is how it looks like from the side, with the dust cover opened.

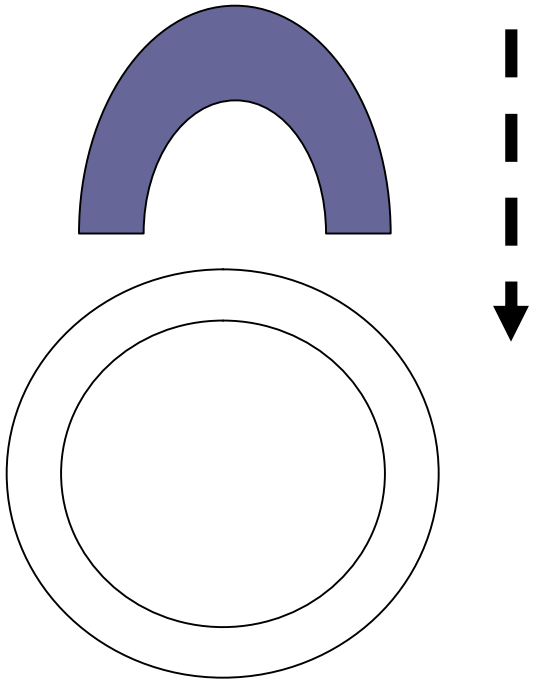
This new adjustable hopup unit has been performing OK so far. In fact, this is a V-HopUp unit (refer to the next section).

The Version TWO V-HopUp unit

The Cybergun A15 R2 use a solid hop up arm with two points of contact with the bucking and BB. Such a structure produces a cut in the middle to facilitate V-hop up, which is believed to produce less power loss through the hop up process and can allow for more stable BB flight.



However, sometimes a damaged V-Hop Up unit can produce unexpected left spinning or right spinning effect. Refer to the illustration below:



The "cut" in the middle is produced by pressing down the arc shaped spacer onto the hop up rubber. If for some reasons the two ends of the spacer are not evenly worn out (or if one end breaks while the other one remains intact), unexpected spinning effect will be produced. Regularly perform visual check (by looking through the barrel) to ensure that the spacer is in good shape.

If your hopup does not produce the desired effectiveness, chance is that the hopup spacer is too soft.

You can buy replacement made by Systema or Guarder, but a lot of the time you can save time and $ by using simple quick fixes. For example, to "harden" the

spacer a little bit, you may insert a small piece of electric wire into it so the space inside is effectively filled up. Or, you can use the ink tube inside a pen as a cheap replacement. You just have to look for one with identical dimension.

Regardless of what you do with the hop spacer, always perform a visual check by looking through the inside of the barrel. If the hop bucking sticks too far into the barrel, your gun will shoot the sky. You don't want this to happen.