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Automatic Electric Gun [AEG] Reviews

SYSTEMA PTW M733 MAX

Manufacturer	Systema Engineering
Model	PTW M733 MAX
Capacity	120
Weight	2950 g
Power	450+ fps
Motor	PF-490
Hop-up	Adjustable
Battery	12 V 1200 mAh
Shooting Mode	Semi, Full auto
Construction	Aluminum, Steel and Fiber-reinforced polymer

Pros	Cons	Verdict
-Real dimensions and balance -Realistic operation and working bolt catch -Complete easy to use package -Quick and easy change of power level	-Initial cost	A realistic high performance training tool from Systema, which is also applicable for Airsoft skirmishing. Real dimensions allow to use all real accessories, and the balance and feel is equally realistic all over. The latest generation gets two thumbs up for just about everything we can evaluate!

Introduction: Airsoft guns in actual training

No matter what the activity, training is important. Whether you are driving a car or bicycle, or fighting with a sword or a rifle, it is always advisable to start safely with an instructor and some training aids. Even when you progress to higher levels, the importance of training remains high. Practice alone doesn't make perfect, you need repetition to make the skills consistent.

Some activities are simply too dangerous to perform for real in training, so training tools such as wooden swords and rubber knives have a long history all over the world. While they don't have all the characteristics of the real thing, they are close enough to help practice the coordination and control you would need in a real situation. With firearms, force-on-force training with live ammo is simply out of the question for fairly obvious reasons. Standing armies of the world have trained soldiers to shoot paper and reactive targets as long as they have used firearms, and it still is an important aspect of the training of a soldier. However, to make the targets think and shoot back, soldiers need to go into simulated combat with something else.

KM Adjustable Trigger for Type96

Realistic force-on-force training doesn't have a very long history, and there's still quite some variance in the methods and simulator systems. As the name implies, it's only a training simulation, but there is a need to make it as realistic as possible. There are certain drawbacks with all systems, and as usual, everything has a price tag attached to it. Various Mil/LE organizations have used paintball markers to train their personnel close quarters combat. While it's not totally useless, you could say that these events are more about having fun and bonding the group, than improving tactical CQC skills.

Actual simulator systems, like the MILES (Multiple Integrated Laser Engagement System) and Simunition FX Marking Cartridges, utilize real guns with certain adapters and/or accessories attached. The cost of these devices is surprisingly high, and it accumulates over time, as the cost of suitable ammo in some cases is even higher than actual live cartridges!

Another point of concern is something that can?t be measured in any currency. The possibility of a fatal accident, because of cerebral flatulence at the wrong time, is very real. Even one soldier, police officer or other person six feet under from a training accident, is one too many. For example failure to attach the blank firing adapter to the tip of the muzzle properly could easily result in severe injury. In the end, using an actual firearm in force-on-force training violates the second rule of Col. Jeff Cooper (R.I.P.) without room for interpretation: "Never let the muzzle cover anything you are not willing to destroy."

Quite a lot of training sites and professional instructors have started using Airsoft guns as training tools, because of the high level of safety and realism they offer for an affordable price and good availability. With a proper mindset you can avoid the shortcomings of Airsoft, (being able to do certain things which couldn't be done with the real counterpart and vice versa), and because it's training instead of a competition, trainees can be expected to call their hits, without the need to confirm it with a paint mark or laser reactive gear. The non-marking BBs can be easily cleaned from the training site afterwards.

Airsofts, being relatively new technology, usually require someone who is previously familiar with them, to sort out any possible problems that may arise. LE Agencies most likely have other things to do than searching tips and tricks how to tweak the hop-up chamber or tappet plate of this or that model, because it wasn't working out of the box. The most famous brand for reliable hassle-free operation in the Airsoft fields, Tokyo Marui, is also the one whose plastic receivers are usually switched to metal ones for increased strength, so again it's not a ready complete solution.

It should go without saying that no training system can replace experience with the real counterpart. Tactical force-on-force training in *any* simulated environment is a supplement, not a replacement.

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IPR2023-01461

The M733 from the left ---

and from the front ---

and right side.

Enter the PTW concept

To offer something to fulfill the need for higher realism, strength and general ease of operation compared to regular Airsoft guns, Systema Engineering started developing the Professional Training Weapon. What's in common with the PTW and Airsoft is the 6 mm BBs they shoot, and the fact that they are made by perhaps the most famous upgrade part manufacturer in the Airsoft world. Unlike its close relatives, the PTW is made for actual training, instead of collecting and wargaming. The whole package is thoroughly developed to ensure that the focus remains where it should be: Training.

As mentioned before, the cost of simulation devices can be extraordinarily high. The PTW is certainly not a cheap purchase either, but two very important points are the low running and maintenance costs. The PTW runs off a rechargeable NiCd-battery, and 10 USD will get you several thousand premium quality BBs. This translates to ammo cost of less than 0.4 cents per shot. The PTW can easily reach five figure numbers without any other maintenance than cleaning the barrel, and reaching the 100 000 threshold is not unheard of either! Replacing the wearing parts is not something that can be done easily by the untrained user, but it doesn't need to be done often and the parts are rather affordable.

Compared to other simulation systems, the PTW is safer and simpler to use without any special protective or reactive gear. Tactical goggles with a ballistic rating are mandatory, but they would be worn in a real situation anyways, and similar glasses should be worn also when shooting an actual firearm. A silicone mouthguard is recommended, coming from someone who?s tooth has been shot in two with a BB.

The PTW is available in all sizes. From left: CQB-R, M733, M4, M16A3

The package is not complicated. With one charger you can charge up to four batteries of various kinds.

The M733 PTW upon first look

The Systema M733 PTW we review here is a limited anniversary model, and features an exclusive 11.5" steel outer barrel. It features the usual 14 mm right hand (CW) threads, but you can also attach a suitable suppressor directly over the steel A2 flash hider. The performance is enhanced by the newly produced 6.05 mm inner barrel and PF-490 motor. A MAX cylinder unit produces a velocity of 500 fps with 0.2 gram BBs, which is very impressive for a compact carbine sized weapon.

When you lift it out of the box, you first notice the heft and balance, which are on par with the real one. Next, the typical Airsoft player would notice something odd, while old school airsofters and people who use the real AR-15 type weapons, feel something familiar: The grip has the exact same thickness and other dimensions as the real one! This used to be true with the classic Airsoft guns a couple of decades back, but it has been used to house the motor of an AEG for the past 17 years. Systema has corrected the situation without cutting corners: The PTW grip still holds the motor, and it has even a higher performance than any AEG motor.

The handguard is manufactured by DPMS. Saying it is realistic would be incorrect, because it is in fact *real*. The handguard can be replaced, according to the user preference or requirement, by anything that fits the real M733 or M4A1 carbines. This allows the operator to use the same accessory mounts without having to purchase two sets. The barrel nut is the correct size for free floating options, which attach to the barrel nut (first stripped of the delta ring and the retaining spring). The threaded front of the upper receiver allows attaching a real free floating tube directly to the training weapon, exactly like on a real one. It is also possible to replace the stock and grip with various options you get for the real AR-15 type weapons, but they require some modification. The stock modification is the easier of the two, being as the thread is the same straight away.

All steel parts and a DPMS handguard. The 11.5" barrel allows easy attachment of accessories, while remaining compact.

The stock has a comfortable recessed neoprene pad for comfort.

The trigger, selector lever and other detail parts are made from steel. The selector has a very tactile feel, and it snaps between different positions with the same force you need to apply for a real selector switch. The bolt hold open does not have a similar realistic feel, as it has to move easily enough to be actuated by the magazine. Still, having to press it after inserting a fresh magazine is a big leap towards the mindset that you handle the training weapon precisely as if it was real.

The left side of the lower receiver features Systema markings. While collectors may not be pleased about this, it allows the PTW to be imported into the US without infringing any manufacturer's trademarks. After all, it is primarily a training weapon. Given the functions and performance of the PTW, you could say that it has enough credibility even if it was painted entirely pink. But let's not go there. The markings are neatly laser-etched and feature a stylized bird, which looks to me like a mythical Phoenix. Other markings include "Safe, Semi, Auto" around the selector, and "UP/DN" on the A2 type rear sight.

With AEGs, you can typically fit all airsoft accessories, and most real accessories. In the case of the PTW, you can say that all *real* accessories fit, but most airsoft accessories as well.

A solid carrying handle doesn't stop you from adding the most modern technology on the carbine. The King Arms rail (KA-MB-06) and Madbull HALO (MB-GT-HALOSLR) were direct fits.

The selector and pins are all steel. Markings are laser etched and neat.

Operating and handling

To get the PTW running, you need a battery. The lower three power levels (M90, M110 and M130) use a 9.6 volt NiCd-battery, while the MAX (M150) requires a 12 volt battery. The batteries are made specifically for the PTW series, and slide right in without having to tuck and fold wires or fumble with separate packs hanging from the connecting wires. The batteries for CRANE type stocks have two shafts, which slide conveniently in two holes in the rear, while the solid A2 stock houses a less shaped model. The design is jarhead-proof, as the battery can't be inserted incorrectly or connected the wrong way.
Charging the battery couldn't be simpler, as Systema also make a charger for the batteries. It is designed with the same philosophy as the entire PTW series, which means that special knowledge is not required for operation. The charger is simply plugged in a wall outlet, and you can charge up to four battery packs sequentially. There are no confusing programming features or even a start button! You simply connect the battery(-ies), and they are ready to use when their respective lights are steady green. Battery diletants such as old R/C car racers may opt to use a programmable "intelligent" chargers, but anyone else will appreciate the ease of operation with the Systema charger.
Loading a real magazine takes one second per round - if you're quick. The PTW magazines can be loaded with a loading tube and rod, or with the help of a handy BB-loader. An XL-sized loader is similar in appearance and size to a STANAG-magazine, and holds up to 470 BBs. These are popular with Airsoft players, and highly recommended for any other uses which involve 6 mm BBs. The loader pushes four BBs per each cycle of the plunger into the magazine, which means that seven or eight pushes will have your magazine close enough to the capacity of the real one. 30 pushes fills the magazine to its maximum capacity, 120 BBs.
It may be worth noticing that the PTW mags also feature real dimensions, which allows you to use polymer speed pouches like the Blade-Tech seen in our video. Until now it has seen no use other than live-fire training and dry practice with a real M4 type carbine, as regular AEG magazines were too wide to fit. Also the PTW magazines will not sink too deep into mag pouches, thanks to their proper length.

This picture explains it all. Do note that the battery may also be a simpler shape to fit in the solid A2 stock. The voltage however is the same.

The real size steel magazines feed all BBs (120 or less if preferred), and stop the PTW from shooting when empty. Two roll pins secure the inner assembly in place.

Certain models are available with a working burst option. For example the M4 as opposed to M4A1 has a burst.

Performing a tactical reload inevitably makes the top BB fall free out of the magazine well. It's a clear improvement over the four BBs you lose with AEG models. The magazines also feed every last one of the BBs in the magazine.
A really new and unique feature of the PTW is a working bolt hold open aka. bolt catch. The weapon stops firing when you are out of ammo, and you must press the bolt hold open after inserting a new magazine, before you can continue firing. While the lever is rather light to push, the motion needs to be done and it reinforces the routine.
The PTW has an adjustable hop-up to put a backspin on the BB for improved range and a flat trajectory. Initially it was set quite high, and the light 0.2 gram BBs were actually curving up because of the excess lift! The hop-up is adjusted with a supplied tool, but an allen key can also be used. The grub screw visible deep in the front of the magazine well is turned clockwise to *decrease* hop-up, and counter-clockwise to increase it. The direction is counter-intuitive, but you just need to remember it's reversed. You can also look into the barrel bore from the rear, with the cylinder unit removed, to get a visual of the position of the hop-up nub in the top of the chamber. Two full turns decreased the hop-up to a suitable level for our use.

The bolt hold open (circled in blue) is activated by an emptied magazine. After inserting a fresh one, it must be pressed just like on the real thing!

Hop up adjustment is located inside the magazine well. Turn clockwise to reduce, CCW to increase backspin.

Looking through the bore from behind allows you to make a rough adjustment close to optimal. Adjusting should be started from less hop-up, and increased gradually.

Performance
The out-of-the-box performance of the PTW is something that can only be achieved with expensive upgrade work on a regular AEG - and even then all the features and reliability won't be comparable or available. With the MAX cylinder unit (M150, red color code), even the short M733 variant shoots 500 fps with 0.2 gram BBs. The tested unit shot an average of 504 fps with a neglible variance in muzzle velocity. Rate of fire is very good, and the trigger response time is minimal. The circuitry of the weapon also completes the cycle even if the trigger is tapped really quickly, which prevents having the mechanism in an odd "half-cocked" position. The mechanism also resets in the same default position when you fire bursts of various length.
Accuracy tests were performed from 20 meters without any special rests or optics. The M733 proved capable of putting BBs repeatedly inside a 100 mm (4") circle from this distance, so the accuracy limitations of previous models seem long gone. While it still doesn't quite make the level of an individually tuned precision Airsoft weapon, it is comparable to a high quality factory model, and is completely feasible for any training purposes.
Should the need arise to change the power level, all you need to do is field-strip the weapon like the real one, and replace the cylinder unit with another one. The cylinder unit is removed just like the bolt carrier of the real one, by pulling on the charging handle. You can check the color code of the cylinder unit without disassembly, by looking into the magazine well or ejection port. If you have not played the cello for 10 years, popping the receiver open may seem hard at first. It will become easier as the parts wear in a little. Should you use force to open the weapon, check once more that you pushed the takedown pin all the way to the retainer. Also, do not hit the rear end of the stock, to prevent leverage at the wrong point. It is better to hit the stock near the base, if you absolutely have to.

Takedown pin pokes out but is retained in this place - again like on the real thing.

This grip is recommended for tilting the upper receiver open. As opposed to other first times, you don't need to worry: It will be hard.

The cylinder assembly comes out just like a real bolt carrier assembly. The large lug of metal keeps the receiver closed like a safe.

Cylinder options
The approximate velocity with a 0.2 gram BB are shown in the following list. The MXXX figures represent meters per second. There is always slight variance between an individual training weapons and cylinder units, but the fluctuation is small enough that it actually takes a chrono to spot the difference between two similar setups.
- M90 (black): 300 fps
- M110 (blue): 360 fps

- M130 (gold): 430 fps
- M150 (red): 450+ fps

All new PTW models use the same "M4 type" cylinder unit. If you have an older PTW M16 model and want to check which cylinder type it uses, field-strip the weapon and check whether the retaining bearing is in the rear of the cylinder unit, or the front face of the buffer tube plug. If it is on the buffer tube plug, you may update your PTW to current spec, which has the bearing on the cylinder unit - or continue using M16 type cylinder units. All short variants and M16 MAX versions use the current "M4 type" universal cylinder units.
A change from or to the MAX level will require changing the battery as well, but within the M90-M130 range you can use the same 9.6 volt battery. The lowest M90 level is well within the comfort limit of an average person, but even the M150 MAX level can be used at close ranges, for an increased awareness of the fact that you may be shot at from behind the next corner. It should go without saying that proper eye protection is mandatory at any power level, but at and above M130, some cover on the face may be a good idea.

These are the cylinder units for all current PTW models. The ports relate to the power level, not the model or barrel length.

The PTW in main components. Up to here and a bit further: No tools required.

The accuracy department is taken care of. The diameter of the black area is 100 mm (about 4"), and shooting distance 20 m (60 ft)

A comparison for the Airsoft player. (We know you're reading this.)
Compared to a regular AEG, the cost of a PTW is admittedly high. A lot of airsoft players rightfully ask, is it worth the dough? Being as we live in a world where people pay tens of thousands of US dollars for an autograph or painting by a famous person, we are not in the position to make that decision for others. But we can compare the cost and features, and let you decide for yourself. Here's a basic list of what it would cost to upgrade the Tokyo Marui M733 to very near specs:

- TM-COLT-M733 Tokyo Marui M733 $211.00
- GP176 G&P; Metal Receiver for M16A2 $138.00
- GP224 G&P; Jungle series M733 Handguard Kit $92.00
- CMB-M-SR Systema Complete Mechabox (Gearbox) M170 Magnum Set for SR16 / M4 $296.00
- SYS-BAT-12V2400-A2A3 Systema 12V 2400mAh Battery (Ni-Cd) for MAX
- M150 A2/A3/A4 $118.00
- GP077 G&P; M16A2 / M4A1 Stock $39.00

Total: $894.00
Even with these upgrades, whe AEG is still lacking the real dimension grip, other 100% real dimensions, easily changed power level (another $229.00 for the PGC Gearbox if you want that feature), and ability to shoot all BBs and then stop firing. A burst feature is also something you don't get with regular M16 type AEGs, and let's not forget the fact that someone has to put all this together and make sure everything fits and works.
One thing to mention regarding the airsoft use of the PTW is, that quite a lot of airsoft accessories fit the weapon as well - so you don't absolutely have to get expensive real accessories for these things, unless you want to. For example the Madbull TALON (licenced replica of the Gemtech model) was a direct fit to the PTW barrel nut.
For those skirmishers who are keen on using 5000 round auto-winding box magazines, a PTW may not be the optimal solution. Because of how the electronics work, and the high power combined with a motor tightly enclosed in the grip, sustained firing of hundreds of rounds may result in damage to the circuitry or motor from the heat. This is not an issue with MilSim players, but a "BB hose" is best built on another platform.

Conclusions and further education
It takes a while to get used to completely new ways of doing things, and it's hard to teach an old dog new tricks. The PTW is breaking new ground among Mil/LE-personnel as a training tool, and sets new standards to how 6 mm BB guns are seen in this area. While some of the features and solutions are not that important to an individual user, with the time and enthousiasm to really study the equipment thoroughly, they make a significant difference to training sites and larger organizations, who don't have that possibility. If you need special training to use a training weapon, the benefit is greatly reduced. This is why the "plug and play"-interface and close resemblance of operation to the real M4/M16 is such a great benefit.
For further viewing, here's a well made video about the PTW. Mr. Wes Doss from Khyber Training explains and demonstrates thoroughly what the PTW is all about: Click to play, right click and save to download.
Another video, made by us here at Redwolf. This one is short in length and covers the basics: Clicky!
Further reading:

- Khyber Interactive Associates, LLC
- SYSTEMA Engineering

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