AIRSOFT SYSTEMS

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ASCU

for gearbox Ver.2

INSTALATION AND USER MANUAL

What is the ASCU?

The ASCU is a two piece electronic module (Control Unit and Sensor Unit), which when installed in an airsoft electric gun, drastically improves the way it works. The original switch group is replaced by the Sensor Unit that monitors the actual position of the sector gear, the fire selector and the trigger. All the information is passed to the Control Unit where the software in the processor analyzes it and controls the AEG's motor by a active brake MOSFET.

The ASCU makes every standard AEG with Marui type of gearbox ver.2 to work exactly as the most expensive and sophisticated airsoft rifles known as Professional Training Weapons.

The ASCU system monitors the operation of the AEG in any time, and no matter how fast you tap the trigger, the AEG will always complete the full cycle, no matter if you shoot in Semi or Full Auto mode. After each shot or burst the piston will stop in its foremost position.

The ASCu has an integrated Low Drain Protection, which is specially designed to keep LiPo batteries from damage.

The ASCU will also stop the AEG firing if any mechanical problem occurs in the AEG, which protects the internals of the gearbox from further damage.

The ASCU is easy to install in all AEGs with Ver.2 gearbox. In most of the models there is no need for any modification of the original parts of the airsoft rifle, nevertheless some models may need some minor and easy to do, modifications of some parts in order make the installation easier.

> **WARNING!** Please read carefully this Instruction manual before you proceed with the instalation of the ASCU.

> **WARNING!** We strongly recommend that the ASCU should be installed by an experienced airsoft service.

> **IMPORTANT:** The ASCU works properly only with motors with strong magnets. With cheap and weak magnet motors the active brake will not be effective.

> **WARNING!** If you are not familiar with the AEG's gearbox internals and you do not have good gearbox repair experience, please do not proceed with the installation and turn to your nearest airsoft service.

The ASCU kit includes:
Control Unit - 1 piece, Sensor Unit - 1 piece, Data Wire - 1 piece, Insulation sticker - 1 piece.
Instruction manual.

ASCU INSTALLATION

Tools that you need: Set of Philips screwdrivers, cardbox cutter, PVC tape
Tools that you may need: Set of small files, 4.5 mm drill.

1. Remove the gearbox from your AEG by following the standard procedures.

2. Open the gearbox and remove the cylinder together with the piston and the spring. Remove the gears and the anti-reversal latch. Unscrew and remove both parts of the trigger safety lever. Unscrew the switch assembly and remove it together with the wiring.

Gearbox Maintenance Tip! If your gearbox has a lot of grease inside and over the gears, clean it and lube the gears, and their axis with thin layer of silicone grease. Apply a thin layer of lubricant only to the contact surfaces. Over lubricating can result in drop of ROF and malfunction of the gearbox..

3. At this point check the gearbox shell for any sharp edges in the way of the wires. If there are any, round them with a small file. Clean the gearbox shell from any dirt and grit. Check also the receiver for any sharp edges in the wires way, and if there are any, round them with a small file.
All sharp edges in the wires way must be rounded because they can cut through the wires insulation and damage the ASCU.

* The red arrows show possible places of sharp edges.

* High quality gearboxes usually will not need this procedure.
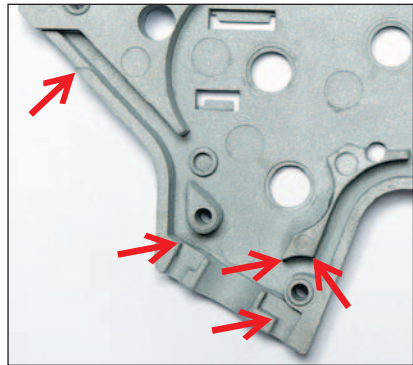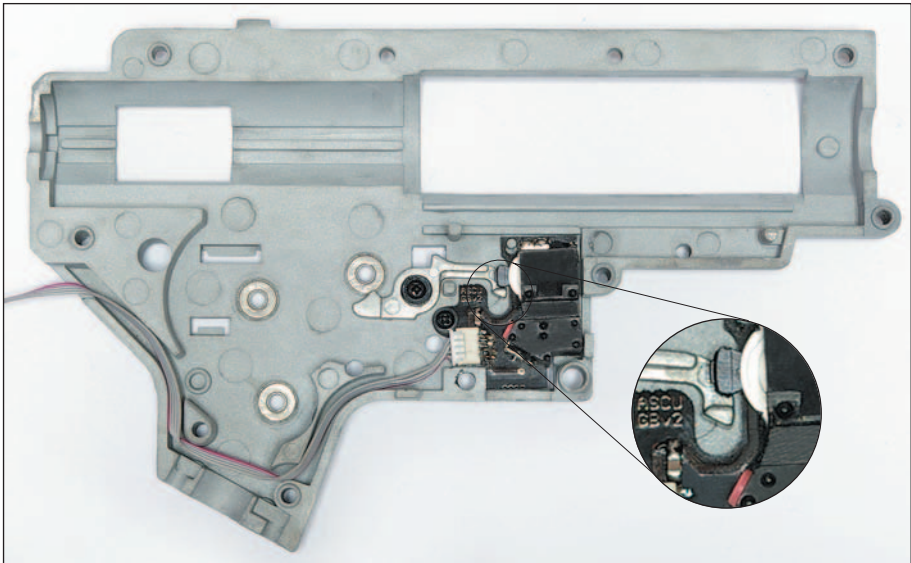
4. In the place of the original switch group install the ASCU Sensor Unit. Be careful to place the cutoff lever under the lever of the cut-of sensor - exactly as shown on the picture above. Fix the Sensor Unit by screwing back the screw that was used for the original switch assembly. Check at the other side of the gearbox shell if the bottom flat pin of the Sensor Unit is making any contact with the gearbohx shell. **There must be no contact with the gearbox shell.**

NOTE: In some models the opening on the sensor plate for the fixing screw must be 4,5 mm, In this case use a 4,5 mm drill by hand to widen the opening.

5. Place the Sensor Unit data wire exactly as shown on the picture. Bend data wire in pinion gear zone as shown on the picture. Make sure the data wire is not covering the opening for the gearbox fixing pin!
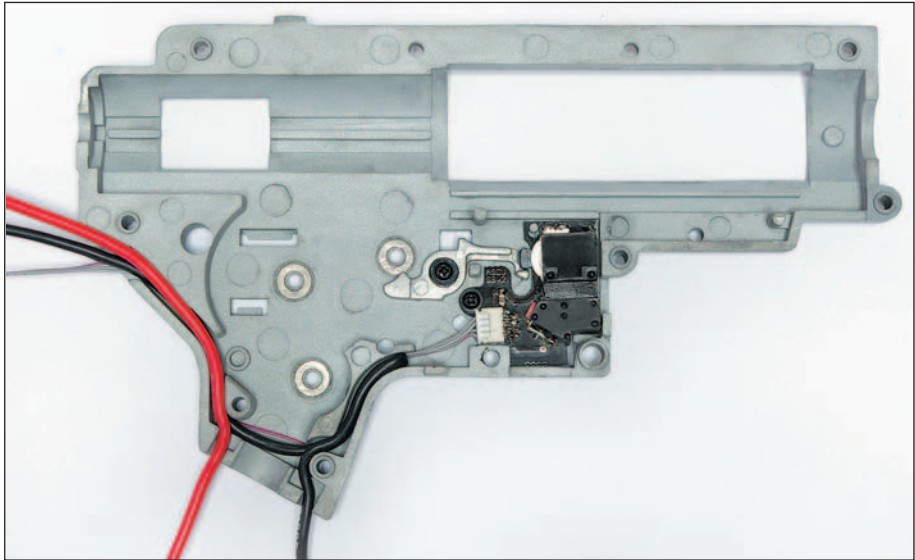
6. Take the ASCU Control Unit with the attached to it wiring and place first the black wire in the wire channel as shown on the picture. Leave 15 cm of the black wire out of the bottom part of the gearbox. Bend the black wire as sholn in the picture and use it to fix the flat data wire with it.

NOTE: Be careful that the data wire and black wire are firmly against the wall of the gearbox shell. Otherwise the pinion gear of the motor may cut the wires during gearbox operation.

7. Place the red wire in the wire channel of the back of the gearbox as shown on the picture by keeping the black and red wires between the gearbox and the Control Unit with equal lengths.
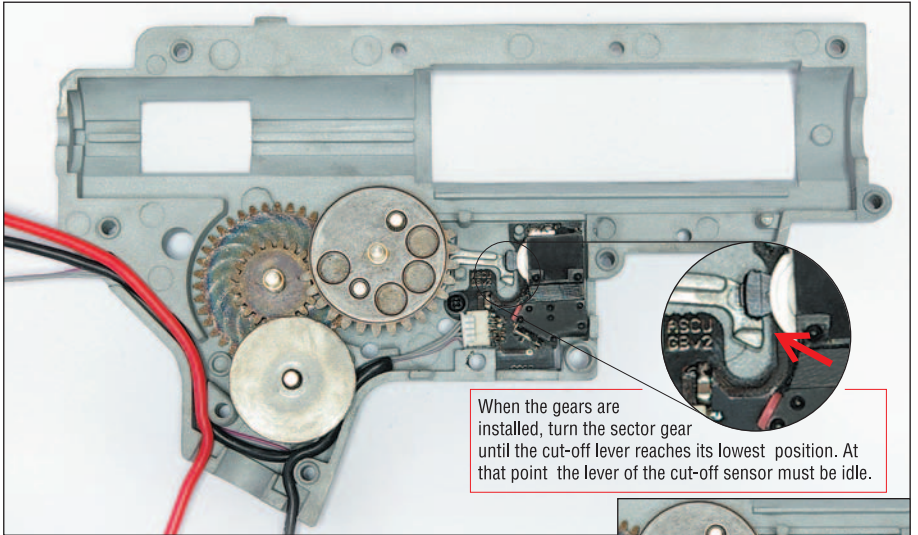
When the gears are installed, turn the sector gear until the cut-off lever reaches its lowest position. At that point the lever of the cut-off sensor must be idle.

8. Replace the gears. Rotate by hand the sector gear and check if the cut-off lever is moving properly and if it activates the cut-off sensor lever as shown on the pictures on the right. If the cut-off lever does not activate the sensor, change the cut-off lever with better one.

WARNING! Do NOT replace the anti-reversal latch and the trigger safety lever! You do not need them anymore. Anti-reversal latch may be relapsed only if you use a low power magnets motor.
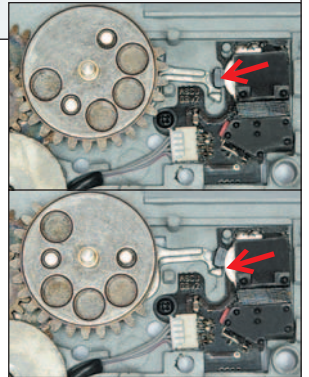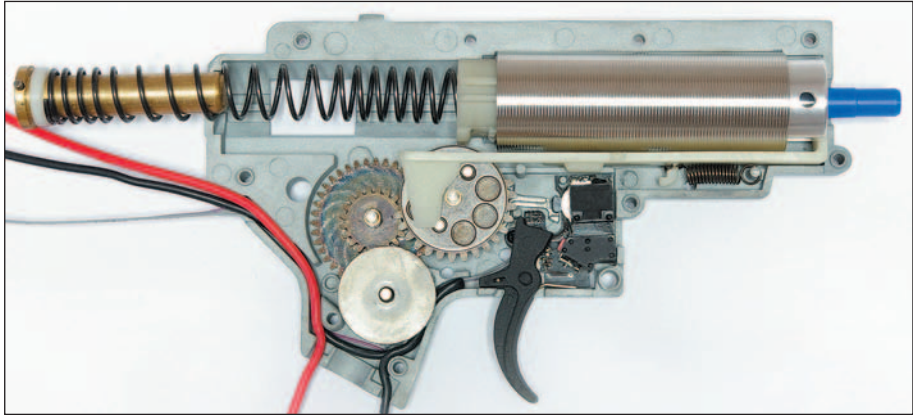
9. Replace the cylinder with the piston and the tappet plate. Reconnect the tappet plate spring. Replace the trigger. Insert the main spring and the spring guide. Check again that the Data Wire is away from the opening for the gearbox fixing pin.
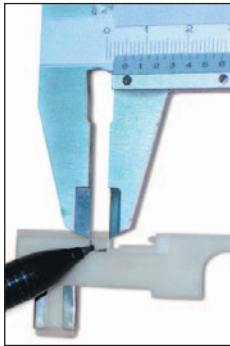

10. Close the gearbox.

11. Remove the selector plate and the selector plate spring. Cut off a 5 x 5 mm piece of the front part of the inner cut, as shown on the picture. Clean edges with a file or sandpaper.

IMPORTANT: Do not use selector plates without metal plate. Do not use all metal selector plates!

12. Replace the selector plate bask to the gearbox. Do not replace the selector plate spring.
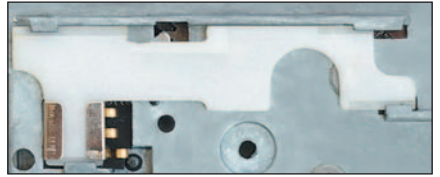
13. Use the PVC sticker form your ASCU kit and stick it on the inner wall of the receiver where the metal part of the selector plate may make contact with the receiver, as shown on the picture. Do not need to use the sticker if the AEG is with polymer receiver.
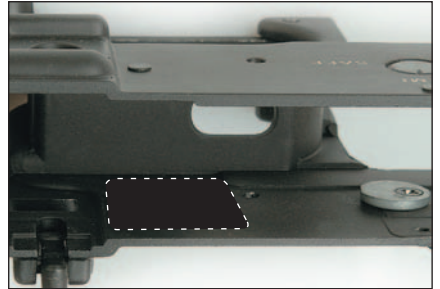
14. Connect the data wire to the Control Unit. You may use PVC tape to join the three wires together.

NOTE: For models with stock tubes: Check if the stock tube is for back wiring, if it is not, you will need one that is. Check for any sharp edges that may damage the wires, and if there are any, round them with a small file. If the wire channel in the stock tube is too narrow for the wires, take with a file as much as needed material from the stock tube as shown in the picture. Clean the receiver from any shreds.

15. Pass the Control Unit and the Data Wire through the opening in the pack of the lower receiver as shown on the picture.

16. Replace the gearbox in the lower receiver. Check the opening for the gearbox pin for any obstructions and if it is properly aligned. Replace the gearbox pin.

17. For models with stock tube: Pass the Control Unit and the Data Wire through the stock tube. Place the wires in the wire channel of the stock tube, keeping the data wire protected under the red and black wires as shown in the picture above. Very carefully slide the stock tube into the receiver while watching that the wires stay in the wire channel. If the stock tube does not slide in easily refer to the last NOTE above.

18. Fix the stock tube to the receiver using the original bolt together with the washer. By keeping the flat cut part of the washer facing the wires, very carefully tighten the screw to fix the stock tube in place. Be very careful not to damage the data wire with the washer.

NOTE: The washer must be originally partially cut from the bottom side.
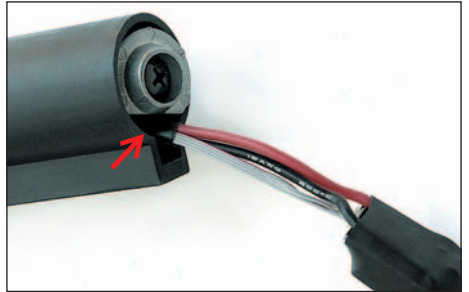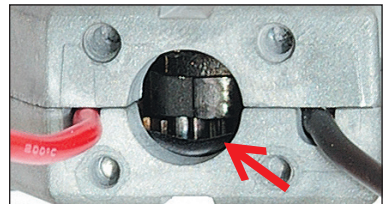
19. Push the Control Unit into the stock tube.

NOTE: It is recommended to use Crane Stock with Battery compartments.

20. Make sure that the data wire and black wire are firmly against the wall of the gearbox shell. Install the grip and the motor. **Make sure to adjust the motor correctly.**

USER MANUAL

WARNING! Always before connecting the battery set the fire selector to "SAFE"

A new feature in this new version of the ASCU are the 4 selectable modes:
Mode-1. Single fire + Combined 3 round Burst and Full Auto. (factory preset)
Mode-2. Single Fire + Full Auto
Mode-3. Single Fire + 3 round Burst
Mode-4. Single Fire only.

CHOOSING BETWEEN MODES:
    Set the fire selector to "Safe", then connect the battery, and within 2 seconds move the fire selector to "Full Auto" and pull the trigger. A long beep will indicate that you are now in "Program mode".
A Beep sequence will start: one beep for mode-1; two beeps for mode-2; three beep for mode-3 and four beeps for mode-4. Once you hear the number of beeps for the desired mode, pull the trigger and the mode will be selected. A single beep will indicate that ,the mode has been selected and the AEG is ready to operate.
The ASCU will remember the last chosen mode and will keep it until another mode is selected. The disconnection of the battery does not affect the selected mode.
    If during Program mode no new mode is selected, the system will exit Program Mode after the four beep sequence and the AEG will be ready to operate with the last selected mode.

The ASCU is ready to work together with the Airsoft Systems Empty Magazine Detecting Hop-Up unit. The second program mode is used when the Hop-Up unit is installed in order to activate it. **If you do not have the ASEMD Hop-Up unit installed do NOT enter in this mode.** The ASCU is factory preset to work without it.
If you have the ASEMD Hop-Up kit installed then you need to enter in the second program mode to activate it.

Set the fire selector to "Safe" , then connect the battery, and within 2 seconds move the fire selector to "Semi" and pull the trigger. A long beep will indicate that you are now in "Program mode".
A Beep sequence will start: one beep for ASEMD deactivation and two beeps for ASEMD activation.
If during Program mode no new mode is selected, the system will exit Program Mode after the two beep sequence and the AEG will be ready to operate with the last selected mode.

CONNECTING THE BATTERY:
Set the fire selector to "SAFE", Connect the battery, wait for 3 seconds until a beeb indicates that the AEG is ready to operate.

WARNING! Always store and transport your AEG with the battery disconnected from the ASCU!

SHOOTING:
When the fire selector lever is on "SAFE" the AEG will not fire when the trigger is puled.

When the fire selector lever is on "SEMI" the AEG will fire a single shot each time the trigger is pulled. The ASCU will manage the gearbox allay through a full cycle and will stop it exactly when the cycle is completed and the piston is in its foremost position.

When the fire selector lever is on "AUTO" the fire function depends from the selected program mode:
For mode-1: when the trigger is puled the AEG will fire fully automatic until the trigger is released. If you tap the trigger once, or the trigger is released before the third shot is completed the AEG will fire a 3-round burst.
For mode-2: when the trigger is puled the AEG will fire fully automatic until the trigger is released.
For mode-3: when the trigger is puled the AEG will fire a 3-round burst.
For mode-4: when the trigger is puled the AEG will fire only a single shot as in "Semi" mode.

When the battery is depleted, the AEG will stop firing with a double beep signal. Change the battery with a charged one.

The ASCU will stop the AEG from firing if there is a mechanical problem in the gears or the motor. The ASCU will stop the AEG from firing if there is any short-circuit in wires. After the problem is fixed the ASCU will return to normal operation.

If you experience any problems refer to the Troubleshooting section

Airsoft Systems LTD is not responsible for any injuries or damages caused by the use or misuse of the ASCU!

TROUBLESHOOTING

MALFUNCTION	POSSIBLE REASON	WHAT TO DO
When battery is connected there is no beep signal and the ASCU does not function.	Bad battery or AEG cable plug Bad or no connection of one of the wires with the motor Short circuit of wires.	Check the plugs. Check the motor connections with the black and red wires Check all wires and motor. After the short-circuit is fixed the ASCU will resume normal function
When the fire selector is on "SEMI" or "AUTO" the AEG wont fire. When the fire selector is on "SEMI" the AEG fires auto.	No connection between the Sensor Unit and the Selector Plate. No connection with data wire.	Check the contact between the flat pins on the back of the Sensor Unit and the selector plate. Check the data wire and its connectors.
When the fire selector is on "SAFE" the AEG fires or when it is on "SEMI" the AEG fires auto.	Misplaced selector plate.	Check the selector plate assembly. Change the selector plate with better one.
When the fire selector is on "SEMI" the AEG works fine, but when it is on "AUTO" it stops with a double beep.	The selector plate is not cut properly.	Cut the selector plate according to the instructions in this manual. Check the cutoff lever. If it is not moving freely ad lubricant or change it.
The AEG makes only few automatic shots and stops, no matter if the selector is on "SEMI" or on "AUTO"	The cutoff lever sensor is not installed under the lever of the cutoff sensor The cutoff lever is not moving.	Install the cutoff lever under the lever of the cutoff sensor. Ad lubricant or change it.

The AEG behaves strange or it fires by itself when the selector is not on "SAFE"	The data wire is damaged and short-circuited.	Change the wire.
The AEG stops firing with a double beep signal when the battery is charged	The motor is overtightened.	Regulate the motor regulating screw
	The gears are overtightened.	Check the shimmings.
	The motor is underpowered.	Change it with more powerful motor.
	The battery is damaged.	Check with another charged battery.
	A broken or worn gear.	Change the gear.
The gears backspin after the shot.	Weak motor magnets.	Change the motor with one with stronger magnets. If there is no option to change the motor, install back the anti-reversal latch.

As there are a lot of AEG producers, and no matter that all of them are producing AEGs with gearboxes that are clones of the Tokyo Marui ver.2, some times there are very small difference in dimensions and shapes of some parts. This is why during the installation of the ASCU may happen that the original cut-off lever or the original selector plate do not work as required with the ASCU, and have to be changed with better ones.

For any other problems send your AEG to the nearest authorized service.

For complete list of authorized services check on *www.airsoftsystems.com*

For updates and other information check on www.airsoftsystems.com and the technical support forum.

WARRANTY

The ASCU has a 12 months warranty for product defects. All ASCU with production defect will be replaced by Airsoft Systems.

EXTENDED WARRANTY
All ASCU kits that are instilled in our distributors service and have their warranty cards stamped by the service are receiving 1 extra year warranty for the Control Unit (total of 2 years warranty). The warranty of the Sensor Unit remains 1 year.

WARRANTY VOID IF the ASCU is modified by the user, or any of its parts is damaged due to bad installation, bad handling, submerging in water, use with batteries with voltage higher that 12V, and damaged wires.

RETURN AND REPLACEMENT.
All defective units must be returned to Airsoft Systems in their original packing and warranty card. Replacement units will be returned within 45 days from the date they are received in our office.
Airsoft Systems does not take any responsibility for delays and losses due to the post or courier services.
Shipping back replacement units by mail / post service without insurance is free of charge.
Shipping back replacement units by courier express service with insurance will be charged.

Owners name

Date of instalation:

Authorized service
signature and stamp:

WORLD WIDE WARRANTY
1 YEAR

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