



Mag Sensor Unit Documentation

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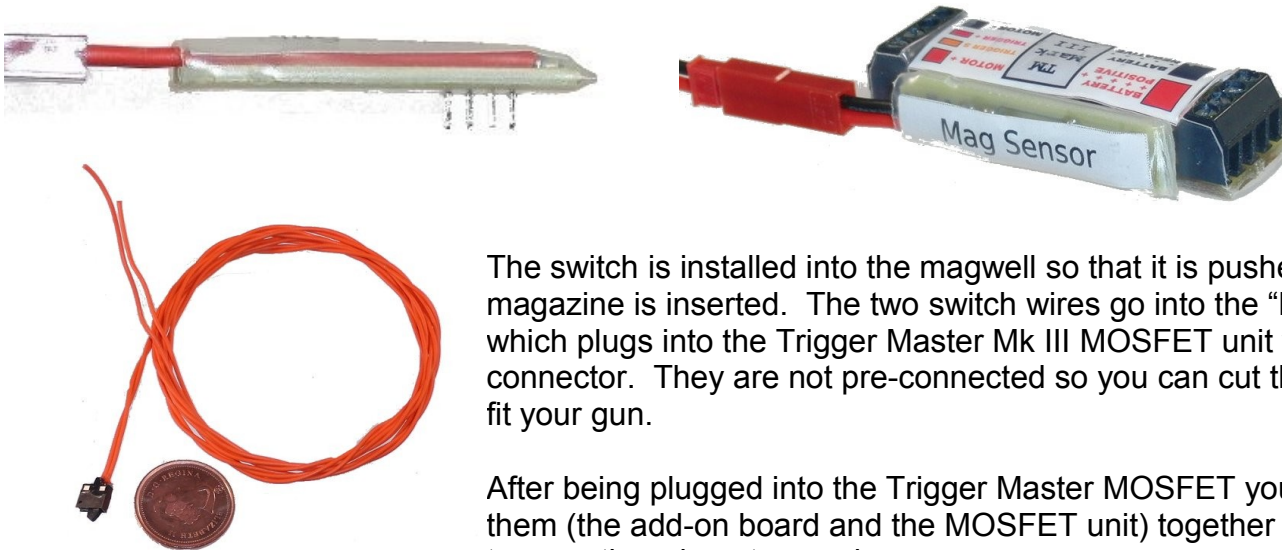
<http://trigger-master.com>

The **Mag Sensor Unit** is compatible with **Trigger Master Mark III MOSFET** units with the number "3.8" *or later* marked on the bottom. Units sold in 2010 and later are compatible.

WHAT THIS IS

The **Mag Sensor Unit** is an add-on board for the Trigger Master Mark III MOSFET unit.

It consists of two parts: the add-on board that plugs into the Trigger Master Mark III MOSFET unit, and a switch that you install into your gun's magwell to sense magazines. (The switch is pressed in when a magazine is inserted.)



The switch is installed into the magwell so that it is pushed when a magazine is inserted. The two switch wires go into the "Mag Sensor Unit" which plugs into the Trigger Master Mk III MOSFET unit with a 4-pin connector. They are not pre-connected so you can cut the wire length to fit your gun.

After being plugged into the Trigger Master MOSFET you should secure them (the add-on board and the MOSFET unit) together with a piece of tape so they do not come loose.

WHAT IT DOES

When plugged in the Mag Sensor Unit will work automatically and enable virtual magazine functionality. It will also prevent the gun from firing when no mag is inserted. When NOT plugged in, it has no effect.

Virtual Magazines is a feature that forces you to reload periodically in order to keep firing. It will also prevent the gun from firing when there is no magazine inserted.

The intent of the Virtual Magazines feature is to allow a small number of hicaps to simulate an "endless" number of lowcaps or realcaps. This is done by forcing you to change magazines when you have fired a certain number of shots (the number is adjustable and may require some configuration. See the **FINE PRINT**.)

So for example: you can carry a small number of hicaps and the gun will make you reload (change mags) *approximately* every 30 rounds (for example) or so. It's like using realcaps and realistically having to reload *without* actually having to carry a large number of realcaps!

Note: This can be especially useful when combined with the "Smart RoF" feature in the Trigger Master Mark III (which drops rate of fire down to a more "realistic" level when firing in fullauto.)

YOU MUST HAVE NO MAGAZINE INSERTED WHEN YOU CONNECT YOUR BATTERY IN ORDER FOR THE MAGAZINE SENSOR TO WORK. (Your gun must always start up with NO MAG INSERTED or the magazine sensor will be disabled and the gun will work "normally".)

HOW TO INSTALL IT

STEP 1 – THE MAG SENSOR SWITCH

First find a good spot inside your magwell for the switch to be mounted.

The switch plunger should be pushed in when a magazine is inserted, and not pushed in when there is no magazine. Pick a spot that will do that. You probably will have to cut a hole in the gun's body.

(Install the switch temporarily if possible – once you confirm it works well you can glue it more solidly. A dab of hot glue works well.)

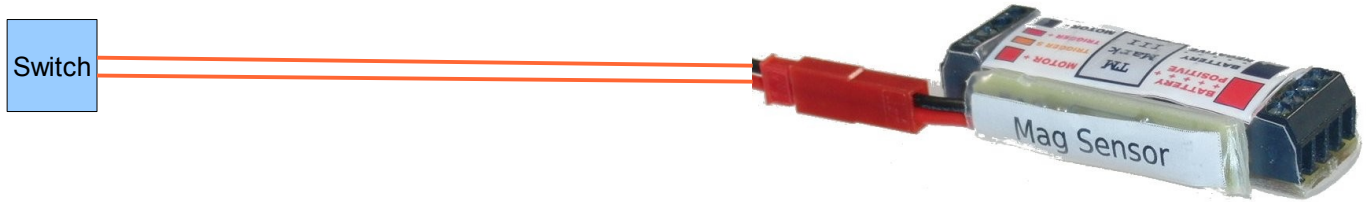
Here is a picture of a switch mounted in an AK magwell. You are going to have to choose a spot on your gun based on your own skills and your particular gun.



Once you have the switch in a good place, route the wires back towards where the Trigger Master MOSFET lives. Twist the wires together where possible – no need to get it all tightly wound, just twist them up so they are together and not loose.

STEP 2 – ATTACH TO AND INSTALL THE MAG SENSOR UNIT

Plug the switch wires into the mag sensor jack. Your connector or wires might differ from the one in the photos but they will all work the same: the two wires from the switch go into the mag sensor. The wires are not polarized, it doesn't matter which one goes to which side.



Then plug the Mag Sensor Unit into the Trigger Master Mark III MOSFET. The four pins will fit into the black four-hole plug on the MOSFET unit. Tape the two units together to keep them from twisting or separating.

STEP 3 – MAKE SURE THE UNIT IS WORKING

With **no magazine installed**, the Mag Sensor Unit plugged into the Trigger Master MOSFET, and the switch plugged into the Mag Sensor Unit, go ahead and connect the battery to your gun.

You will feel the normal startup vibrations from the MOSFET. One short one, then a longer one. **When the Mag Sensor Unit is installed, the long vibration will be extra long** (twice as long as normal, to be exact.) This tells you that the Trigger Master detected the Mag Sensor Board and it is working.

If you start up with a magazine installed, the mag sensor will be disabled and the gun will just work normally with no mag switch functionality.

STEP 4 – TEST IT OUT!

Pull the trigger. Nothing should happen, because the gun will not fire if there is no magazine. This is good!

Now insert a magazine (or push the switch down with your finger) and pull the trigger. The gun should fire!

If that is working, then your switch is A-OK! Go ahead and glue the switch down solidly if you haven't yet. Hot glue works well. Make sure not to get glue on the moving parts of the switch!

OPTIONAL

The Trigger Master Mark III has a "Mag Sensor Test Mode" built in to help you install a mag sensor switch and confirm that it is working as it should. This makes it easy to test several magazines to make sure they all reliably trigger the switch without having to actually test fire the gun.

To enter "Mag Sensor Test Mode" simply enter advanced configuration of the Trigger Master and select option "9". (This mode is marked "Factory use only" in the manual.) Here is a step-by-step.

1. Connect battery.
2. After the first (short) vibration but BEFORE the long vibration pull the trigger once.
3. Gun will give 3 short vibrations.
4. Pull the trigger 9 times.
5. Gun will "answer" with 9 vibrations.
6. Gun will now be in Test Mode.
7. Motor will vibrate when the magazine sensor switch is pushed. No vibration when it is not pushed. If there is an error (no magazine sensor unit detected) then the motor will vibrate off and on 0.5 seconds at a time forever.
8. When you are finished, disconnect the battery.

As mentioned above, while you are in Mag Sensor Test Mode the motor will vibrate whenever the magazine sensor switch is pressed. This makes it easy to test and troubleshoot switch placement and operation.

HOW TO USE AND CONFIGURE IT

First of all, see if it “just works”. Most stock and non-upgraded guns will probably “just work”.

Connect a battery, load up a magazine, and insert it into your gun. Start firing. Your gun should stop firing after a short while. With any luck, the gun stops firing after you have fired about 30 rounds in semi-auto, burst, and/or fullauto.

Perform a magazine change (remove mag, then insert a new mag – a mag change has to take at least 1 second) and you should be able to fire again. Lather, rinse, repeat!

If you're happy with the operation you have just experienced, congratulations – you don't need to do anything else!

Otherwise if you want to fine-tune the amount of time spent firing before a reload is needed, that's where Option 10 comes in. (See below.)

FINE-TUNING THE AMOUNT OF TIME SPENT FIRING BEFORE A MAG CHANGE IS REQUIRED

To change this number, enter option 10. This option is marked “Factory Use Only” in the Trigger Master Mark III documentation. This option is “Virtual Magazine Capacity”. Here is a step-by-step:

1. Connect battery.
2. After the first (short) vibration but BEFORE the long vibration pull the trigger once.
3. Gun will give 3 short vibrations.
4. Pull the trigger 10 times.
5. Gun will “answer” with 10 vibrations.
6. Pull the trigger the desired number of times to set the option. (Motor will vibrate with each pull to confirm)
7. After pulling the trigger the desired number of times, do nothing.
8. The motor will vibrate 3 times. Do nothing.
9. The motor will give one LONG vibration. (This means it is exiting configuration mode)
10. The gun is now ready to use with the new setting.

During step #6 you pull the trigger ONCE for every 5 rounds you want for the magazines to hold. Do not pull the trigger at all (zero pulls) to disable virtual magazines. When disabled, reloads will never be required but the gun will not fire when there is no magazine inserted.

For example:

- 0 pulls = disable virtual magazines
- 1 pull = 5 round virtual magazines
- 2 pulls = 10 round virtual magazines
- 16 pulls = 80 round magazines
- 20 pulls = 100 round magazines
- 40 pulls = 200 round magazines (the maximum)

Any value in between is valid. 5 pulls = 20 rounds, 6 pulls = 30 rounds, etc etc.

Note that this is the ONLY configuration option where zero trigger pulls does something. (Normally zero pulls means “no change”.)

Remember! As per the FINE PRINT the number you choose may not actually have anything to do with the actual number of rounds fired in the real world. You may have to use trial and error to get the right number for your gun. (Setting it to “80” might not actually make fire 80 rounds before requiring a reload!)

THE FINE PRINT

There are some “things” about how this unit works that you should be aware of:

- This doesn't prevent dry-firing and it does not actually sense when a magazine is empty. It only stops the trigger from working after a certain amount of time spent firing, until the magazine is changed.
- The round counting is approximate. It doesn't count actual BBs, it counts time spent firing.
- This count is approximate. If your gun has a high or low RoF you can expect to have to adjust the “virtual magazine size” higher or lower than the actual numbers shown. Expect some trial-and-error to find just the right setting. Upgraded guns shoot faster after all, and fire rate is different whether you're firing in semi or in auto or burst. The computer makes a pretty good best guess but it's still a guess/estimation!
- **YOU MUST HAVE NO MAGAZINE INSERTED WHEN YOU CONNECT YOUR BATTERY IN ORDER FOR THE MAGAZINE SENSOR TO WORK.** (Your gun must always start up with NO MAG INSERTED.) If you power up the gun with a magazine already inserted, the magazine sensor will be disabled and the gun will work “normally” with no magazine sensor functionality.

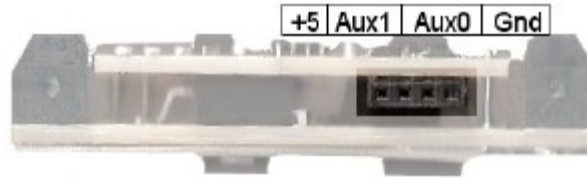
TIPS, TRICKS, and STUFF TO AVOID

- Combine this unit with the “Smart RoF” feature which allows you to change your gun's Fullauto rate of fire. This can give you a wider range of adjustment than just option 10 alone.
- When installing the switch, install it as close as needed to the magazines so that the magazines push the tab of the switch up every time.
- Test several magazines to make sure the switch detects a magazine right every time BEFORE you glue the switch down for good. Use the “Mag sensor test mode” feature to help. (This mode vibrates the motor every time the switch is triggered.)
- If a magazine doesn't quite trigger the switch (but others do) you can put a small piece of foam tape, a piece of band-aid, or any other slightly-squishy material on the top of the magazine to bulk it up a little so it pushes enough on the switch to trigger it.
- The switch included is very small. When gluing it make sure not to get glue into any of the moving parts of the switch!
- There is nothing “special” about the switch that is included – except that it is nice and small. Any switch will work as long as magazines reliably trigger it when inserted. So feel free to replace it with a different switch if you like.
- There is no reason you need to actually put the switch in the magwell. You could install it under the receiver cover of an LMG for example. Instead of changing magazines, you would need to open then close the receiver cover (more accurately replicating the reload process of a machine gun) and the gun would not fire with the cover open.
- **YOU MUST HAVE NO MAGAZINE INSERTED WHEN YOU CONNECT YOUR BATTERY IN ORDER FOR THE MAGAZINE SENSOR TO WORK.** (Your gun must always start up with NO

MAG INSERTED.) If you power up the gun with a magazine already inserted, the magazine sensor will be disabled and the gun will work “normally” with no magazine sensor functionality.

TECHNICAL DETAILS

On the Trigger Master Mark III, the small black 4-pin connector on the side is the AUX port.



When AUX0 is between 2.2V – 2.75V at startup, a compatible Trigger Master Mark III unit will decide a Mag Sensor Unit is plugged in.

When AUX0 is between 2.2V – 2.75V, the mag sensor is idle (no magazine inserted).

When AUX0 is lower than 0.5V a magazine is present.

When AUX0 is higher than 4.5V a magazine is present.

In other words, the mag sensor presents about 2.5V to AUX0 when no mag is inserted. When a magazine is inserted either ~0V or ~5V is presented to AUX0.

YOU MUST HAVE NO MAGAZINE INSERTED WHEN YOU CONNECT YOUR BATTERY IN ORDER FOR THE MAGAZINE SENSOR TO WORK. (Your gun must always start up with NO MAG INSERTED.)

Otherwise the sensor will not be detected at startup and you will need to remove the mag, then disconnect and re-connect power.

store@unconventional-airsoft.com

Unconventional-Airsoft.com, trigger-master.com

AE Innovations

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