

INSTALLATION MANUAL FOR GEARBOX V3

Leviathan - V3 parameters

- It is processor controlled electronic trigger unit with wireless communication.
- Device paramethers are changed with smartphone via application (Android and iOS).
- Device is fully integrated inside the gearbox V3 instead of the original trigger contacts.
- The gearbox has to be compatible with Tokyo Marui standard or Tokyo Marui NGRS V3.
- Completely made wires with mini fuse and T-plug connector to front or above gearbox.

 - It adds new shooting modes, controls RoF, pre-cocking, active braking, virtual magazine, input port, electronic fuse, low battery indication, statistics, profiles, ...

- Usable for battery with max. 17 volts (max. lipol 4S 14,8V).

Safety warning

- Installation of this device into the gearbox requires advanced technician skills!
- Please read these informations before installing your device to prevent any damage.
- Short circuit or incorrectly connected battery will cause immediate damage to the de-
- vice which is not covered by the warranty. It can lead to fire or even battery explosion.
- Disconnect battery, when you aren't using the gun! Otherwise you will fully discharge the battery. Because the device drains small amount of current from it all the time.
- Don't connect battery when gun pointing towards you, another person or an animal.
- Don't modify, repair, put into any kind of liquids or thermal shock the Leviathan.

Package contents

- Leviathan-V3 drop-in module with complete wiring to front or above gearbox

- 2x screw and pad to secure it in the gearbox
- 2x different foams for hair trigger mode
- Real feel trigger system (RFTS) spring
- Sheet with selector plate stiskers
- Leviathan black 40mm round sticker
- 1 Installation manual



Device overview



- Optical sensor for trigger pull detection is in the **red circle**.

- Cycle optical sensor for the sector gear detects gear cam movement(green circle)
- Yellow reset button hold for 2s, password is reset to 1234 after vibration from motor (settings are reset too).



Optical sensor is for detection SAFE, SEMI and AUTO position. It is shown in the red circle. For its function is neccessary to place sticker on the selector plate.



Keep in place transparent foil, it prevents from short circuit through RFTS spring.



Overal look on the wiring to front or top. Black motor wire lead to the right.

External ports

Input terminal

- Leviathan has 3 pads for connecting external button, virtual reload or sensor.

- **3,1V** is in the **red area** (for sensor only), it s covered by foil - partly remove it from right side and put it back after wire solder.

- Signal is in the yellow area.

- Negative pole is in the green area.

- External button connects on SIG and GND pad (doesn't matter on polarity).

- In the app use interface "External input" to activate desired function.

For **AUG weapon** connect external AUTO trigger contact to **SIG** and **GND** pad.



Output pads

- Leviathan has 2 pads on the board for powering hop-up LED illumination, flashlight, laser, magazine motor etc.

- **Positive** pad is battery voltage (red area).

- Negative motor pad is in the green area.

- These pads cannot be controlled from the smartphone app. The power supply will work only when the motor is running.



WARNING: Installation requires advanced soldering skills! Wires can't touch other pads and components on the board. Damage to the Leviathan will void the warranty!

Insertion procedure of Leviathan - V3 into the gearbox

- 1. Remove and open the gearbox according to the normal gun disassembly procedure.
- 2. Take out all the internals from the gearbox and clean the vaseline, oils after them.
- 3. Check the gearbox for edges. Grind for smooth surface to prevent Leviathan damage.



4. Take out these parts out of the gearbox (not used with the Leviathan).



5. Remove other internals from gearbox. Prepaired gearbox for installation.

Gearbox shell modification

On the **picture 6** sharp edge on the gearbox can damage sticker for selector position. Modification on the **picture 7** is necessary **only if you want to use RFTS spring. RFTS spring is NOT fully compatible with Retroarms gearbox, because of short pin.**



6. Grind edges on the gearbox to not catch sticker while the selector plate is moving.



7. To place **RFTS** spring you have to grind edge on the left on the pin where is normally spring for trigger shuttle.

WARNING: Clean the gearbox from filings after the grinding!



8. If you want functions on SAFE pos., remove G36 /grind AK part in red area. Mechanical locking will be disabled.



10. Keep in place transparent foil, it prevents from short circuit through gearbox.



12. Leviathan board shouldn't be bend 5

in the gearbox.



9. Remove metal part on the selector plate. It could make short circuit.



 Insert Leviathan board first through the window in the gearbox.



13. place the blue wire to the black wire where is window in the gearbox.



- 14. Insert the Leviathan V3 instead of the original contacts:
- Check if the Leviathan V3 is laid flat on the gearbox shell.
- Adjust the Leviathan position to the same distance from sector gear bearing (red line).

 Use large screw with washer (blue arrow) from the package for tightening the board near the sector gear. If screw doesnt fit into the hole, use stock screw from cut off lever.

- If the gearbox has hole in this place put smaller screw above reset button (green circles).



15. Make sure the screws doesn't stick outside of the gearbox. If yes grind it.



16. Check if aren't any parts in contact with the gearbox around red area. **6**

Selector plate sticker installation



Choose sticker according your gun.
 Take out one of 4 stickers by pliers.
 Do not touch the sticker by hand!



3. Placed sticker on AK selector plate.



5. Check smooth selector plate movement on the gearbox. Sticker can't Z catch on the gearbox edges.



2. Clean selector plate by degreaser and place sticker on its right edge and to the center of the selector plate.



4. Placed sticker on G36 selector plate.



RFTS spring installation

- Real feel trigger system (RFTS) is **optional feature**, added spring simulates trigger resistance like in the real gun. It adds secondary resistance with reset after the fire.



1. Grind tapped plated on selected area



3. Lube the top part of the trigger by small amount of vaseline (for RFTS).



5. Insert the remaining parts into the gearbox, put it together. Check if top of RFTS spring stays on the pin.



 Insert RFTS spring on the grinded pin in gearbox - see pic. 7 on page 4.
 Sector gear can't interfere with it.



4. Trigger has to be after RFTS spring.



6. AK only: Grab spring with pliers and push it through hole in the gearbox. **8**



7. AK only: hold spring from the bottom and bend it with pliers.



8. G36 only: push spring to the bottom edge of the gearbox.

Foam Installation for hair trigger (optional feature)

In the package are 2 types of foams (2pcs each), black has width 2mm, white width 1mm.
 Foam is placed on the trigger, which interrupts the optical sensor beam with shorter pull.

WARNING: Very short trigger pull can cause random shots or constantly pulled trigger!





2. Clean back part of the trigger by degreaser.

3. Place one or two foams on it by the photo.

4. Assemble the gearbox with trigger and test trigger response in the app "sensor check"





Sensors configuration and testing

1. Install **"Leviathan by JeffTron**" app from App store (iOS) or Google play (Android) into your smartphone.

Or use link https://www.jefftron.net/application (QR code).

| | P | Leviathan-V3 04:91:62:A9:6D:0F | | Connect | |
|--|----------|-----------------------------------|--|---------|--|
|--|----------|-----------------------------------|--|---------|--|

2. Connect the battery to the Leviathan and pair it with your smartphone.

| Gun password | |
|-------------------|-----|
| password 1234 | 0 |
| Remember password | 4/4 |
| Cancel | ок |

3. Use default password **"1234**". You can save it by checking the box "Remember password.



4. Change password to your own 4 digit.



| Change device password | |
|------------------------|------|
| Old password | 8 |
| | 0/4 |
| New password | Ø |
| | 0/4 |
| Confirm new password | Ø |
| | 0/4 |
| Cancel | Save |

5. Set 2x new password and push SAVE. Don't tell the password to anybody! If you forgot your password, restore it by holding RESET button for 2s - see page 2. Battery has to be connected. 10

Optical selector calibration

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| Leviathar | ı | | | | Disc | onnect |
| Sensor | check | | | 🛛 Ern | or log | |
| | Trigger | 0 | 0 | Cycle | | |
| | Semi | i 🔘 | \bigcirc | AUTO | | |
| | Empty mag | 0 | \bigcirc | Externa | l input | |
| Device of | calibration | | | | | |
| 🧷 Opti | ical select | or ca | ibrati | on | | |
| 🍄 🗘 Opti | ical cycle (| calibr | ation | | | |

6. Tap on "Optical selector calibration".

| Move selector to Auto and press finish. | | | | |
|---|--|--|--|--|
| 21% | | | | |
| 61% | | | | |
| 91% | | | | |
| | | | | |

8. At the end every selector position has to end in the green color. If not, go to <u>11</u> the page 13 to solve the problem.



7. Choose AK or G36 family and follow instructions in the calibration.

Move the selector plate to **Safe**, its value should be in range **6% - 30%** and press **continue**.

Move the selector to **Semi**(range **40%-70%**) and press **continue**.

Move selector to **Auto** (range **80%-99%**) and press **finish**.

Try the right Semi and Auto responses in the **"Sensor check**" function. **Blue** is **ON**. **SAFE** is when Semi and Auto are **inactive**.

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|---------------------------------|-------------|------------|----------|-------------|------------|--|
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| Leviatha | ı | | | ſ | Disconnect | |
| Sensor | check | | | Error | log | |
| | Trigger | 0 | 0 | Cycle | | |
| | Semi | \bigcirc | 0, | AUTO | | |
| | Empty mag | 0 | 0 | External in | put | |
| Device | calibration | | | | | |
| ↗ Optical selector calibration | | | | | | |
| Contract cycle calibration | | | | | | |

Optical cycle calibration

9. Tap on "Optical cycle calibration".

Optical calibration process is for setting your gun cycle detection. For that you have to make shot to spin cycle gear.

Unload and check your gun and point it to the safe area.

Pull the trigger to make shot to continue calibration process.

10. Follow instructions in the calibration. Make sure no BBs are in the gun!



11. After the shot, this page appears. Cycle detection point determines when cycle is detected. Higher value = sooner. Cycle range shows sensor reading when sector gear is spinning. Ideal range is 10% - 90%. It works perfectly even with a range difference of only 20%.

Automatic cycle calibration sets cycle detection point when error 103 appears. Cycle detection blinks when a sensor de-

tects sector gear complete cycle.

Light intensity lowers the cycle range if it is too high. For update shoot again. <u>12</u>

Sensor troubleshooting



12. If the cycle range values are **too high**, move the sensor slightly **left** to be closer to the sector gear.

If cycle range values are **too low**, move the sensor slightly **right** to be further from the sector gear or clean the sensor. To do that, use the screw in **red circle**.

| Move selector to Auto and press fin | | | | |
|-------------------------------------|-----|--|--|--|
| Selector on SAFE: | 6% | | | |
| Selector on SEMI: | 58% | | | |
| Selector on AUTO: | 60% | | | |

13. If any selector position ends in **red**, its value is **too close** to another one, so the position will not be set right. This could be caused by wrong sticker position or dirt on selector plate or sensor. It is also possible you didn't change selector position during calibration process.

First time shooting

1. Connect battery, after 1s you will feel a short vibration - power-up self-test is complete.

2. Put the gun into SAFE-nothing happen on trigger pull (if was done selector plate mode).

3. Put the gun into SEMI and it will fire once.

4. Put the gun into AUTO and pull the trigger shortly. Gun should fire a burst of 3 rounds. If you held down the trigger longer the gun will go to auto fire.

If everything works as described, congratulations for the correct installation the Leviathan. If not, check what is written in the error log and the 20-22 pages in this manual
 Pair phone with Leviathan and update firmware to the newest version.

Keep your app and firmware always up to date!

WARNING: Disconnect the battery, when the gun is not in use! Leviathan drains small **13** amount of current from the battery all the time so it will overdischarge the battery.

Change parameters page 1/3 Orange stripe = not paired, green stripe = paired Paired = loads parameters from Leviathan. Change parameter -> shows "writting..." in the green stripe. Text dissapear -> parameter is saved

Fire modes with Selector on safe/semi/auto:

- SAFE: No responding to the trigger pull.
- Semi: It fires a single shot per trigger pull.
- **Semi/BurstX**: A short trigger pull fires a single shot, a long trigger pull fires a burst.
- **Binary trigger**: Fire semi when a trigger is pulled and semi again when it is released in less than 3s.
- BurstX: Gun shoot a burst per trigger pull.
- **BurstX+BurstY**: A short trigger pull fire burstX, a long trigger pull fire burstX plus burstY bullets.
- **BurstX/Full**: A short trigger pull fires burstX, a long trigger pull makes an auto fire.
- Full: Gun makes auto fire until trigger is released.
- Virtual reload: Pull trigger to reload virtual mag.

Burst functions:

It enables you to shoot a set number of BBs on one trigger pull. It will always complete the burst. Every selector has its own burst settings.

Rate of fire:

It is useful for solving problems when RoF is too high. This function makes breaks between shots to reduce the RoF. It gives you fast trigger response even with a very low RoF, just like a real gun.



Change parameters page 2/3

Active Brake:

It uses the excess energy from the motor to stop it. Spring is fully released, parts in gearbox aren't under strain. Higher braking is for weapons with high RoF. Braking effect is more powerful with torque motor. **Note:** Lower braking intensity spares the motor coils.

Pre-cocking:

The piston is partly compressed after SEMI fire. There isn't almost any delay between trigger pull and shot. Recommended compression is about 65%. Holding the trigger for 3 seconds, gun shots again with decocked piston - use it for storing the gun after game. WARNING: it increases wear and tear on the gearbox.

Delay between shots:

It is for simulation the delay from gun reload or recoil. During delay gun can't shoot. After dealy gun vibrates shortly to notify the gun is ready for shooting.

Electronic fuse:

Set sensitivity for high current detection to avoid any damage if something goes wrong. We recommend

to set 10A above average auto current reading from the statistics.

Low Battery Indication:

It is used for only Li-xx batteries. Choose right battery type or it will not work properly. When is the low battery voltage detected, gun vibrates after each shot. Now it is good time to replace the battery at the nearest opportunity.

When the battery is discharged the gun vibrates instead of firing for battery protection.

15 WARNING: Leviathan drains small amount of current from the battery all the time!



Change parameters page 3/3

External input:

Works with Input terminal - see manual at page 3.

- OFF: Every signal to Input terminal is ignored.

- External trigger: gun trigger is disabled and replaced by micro switch connected to Input (SIG and GND)

- Burst-3 trigger: micro switch connected to Input (SIG and GND) make 3 burst fire when it is pressed. Gun trigger is still functional.

- AUG trigger: selector plate detection is disabled. Gun trigger is set to selector on semi. Micro switch connected to Input (SIG, GND) is set to selector on auto.

- Empty mag (NO): Micro switch activates empty magazine detection, when is connected SIG with GND.

- Empty mag (NC): Micro switch activates empty magazine detection, when is disconnected SIG with GND.

- Virtual reload: Micro switch activates virtual magazine reload, when is connected SIG with GND.

Virtual magazine:

Value sets number of shots (70bb here). Gun will stop shooting when virtual mag. reach 0. **Near empty magazine** - makes 2 short beeps after each shot before virtual mag. is empty. **Reload delay** - is time when gun can't shoot after empty mag. or it is triggered by "Virtual reload" (through *input port* - set as fire mode or *change selector position* - there and back)

Save or Save as: You can save these parameters under custom name into your app. FACTORY RESET: It restores parameters to factory state (password is unchanged). <u>16</u>

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|--|-------------|----------------|---------|--|--|--|
| Leviathan | | Dis | connect | | | |
| Using profile 'No Profile'. | Automatical | ly sent to the | gun. | | | |
| External input | OFF | | • | | | |
| Virtual magazine | | Θ | 70 | | | |
| Near empty magazine | | Θ | 5 | | | |
| Reload delay | e |) Virtual relo | ad ⊕ | | | |
| Save Save as Factory reset | | | | | | |



Sensor check:

Shows how the sensors respond. Grey colour is OFF, blue is ON. Sensors are displayed on page 2. With selector on Safe are Semi and Auto detected as OFF

Shot counter: records full gear spin. Total - counts every shot during a lifetime User - can be reset by user anytime 17 Power-up - battery connection reset it



short

Profiles: At this page are saved profiles. "Select" will upload settings to device.

Statistics

Rate of fire (sec): Gun rate of fire per second.

Rate of fire (min): Gun rate of fire per minute.

Last trigger pull shots: The number of BBs fired at the last trigger pull.

Pre-cocking time: Time to move piston to compresed position (it will reduce a Semi cycle time).

Semi cycle time: Time between motor start and a piston release.

Auto cycle time: Time between shots in a burst where the RoF has already reached its max. value.

Motor start current: Peak current when the motor starts spinning.

Average semi current: Current during the first shot Average auto current: Current during burst fire.

Mosfet temperature: Actual mosfet temperature, the cut-off temperature is 75 °C.

Processor temperature: Actual processor temperature, the cut-off temperature is 75 °C.

Signal strength: Shows the signal strength, the smaller the dBm drop, the stronger the signal.

Battery voltage: It shows actual voltage value. Red color line indicates when gun won't shoot. In yellow it will shoot with warning vibration. In green is everything OK and grey is discharge from 100% charge.

Power up time: how long is the battery connected.



Settings

Language: Text translation in the app to different language. Tacticool language is made up for your fun. Dark theme: Choose white or black app interface.

Temperature: Change mosfet and processor temperature unit from °C to °F.

Remember password: Set automatic login to Leviathan. Turn off connection by fire selector: If it is ON, then wireless connection will be turned OFF/ON by fast change selector from Semi to Auto and back. It is good for gun security. It always turns ON when the battery is plug-in. When this function is disabled you can always connect. Overspin detection (Error 100): It will turn off the beep at error 100 (over spinning = double shot).

Sound signalization: Allow/deny sounds when magazine is empty, delay between shots and virtual reload. Full auto limit: It is safety feature. It cut off power after 100 bb continuous burst on the FULL auto fire. Information: Info about app and firmware version. Bootloader and Hardware version is constant.

Device name: Is visible on the list with devices (max. 12 characters). It disconnects from phone after saved name. Device password: Write to the first row old password and to other two new password (4 digits) and push SAVE. Device update: Fixes bugs and adds new features. It takes cca 30s to finish = successful message + vibration. Installation manual: Link to the latest manual in .pdf. Support: If you have any questions or problems, please 19 contact us via email: support@jefftron.cz.



Startup codes

After connecting the battery the Leviathan does a power up self check, which lasts a 1s. It results in the motor vibration or error beeps with the error log record:

1 Short vibration - All systems are OK. This vibration is about half a second long.

1 Short beep - A trigger is pressed during battery connection (102)

2 Short beeps - High current flow in the mosfet (106)

3 Short beeps - High temperature of the mosfet (104)

1 Long beep - Battery voltage is less than 5.5 volts (107)

2 Long beeps - Battery voltage is more than 17.0 volts (105)

3 Long beeps - High processor temperature (108)

Short-long-short beep - Motor is disconnected (109)

Long-short-long beep - Nonfunctional application (200)

Post firing codes

If any problem occur during firing, it will be signaled by beeps with the error log record:

1 Short beep - Sector gear sensor is pressed after motor stop -> piston over traveling(100)

Short-long beep - Sector gear sensor isn't pressed after a trigger pull (103)

2 Short and long beep - Selector plate has moved during shooting (101)

2 Short beeps - High current flow in the mosfet (106)

3 Short beeps - High temperature of the mosfet (104)

1 Long beep - Battery voltage is less than 5.5 volts (107)

3 Long beeps - High processor temperature (108)

1 Vibration after shot - Battery voltage is low. If the battery drops much further, the gun will vibrate instead firing. Now it is a good time to change your battery for new one.

1 Vibration instead of fire - Battery is discharged. The gun vibrates on every trigger pull. change your battery for new one. WARNING: the battery is still slowly discharging.

1 Vibration after some time - When is "delay between shot" activated, it vibrates after the time ends. It is a notification the gun is ready for shooting (sound signalization disables it) Decreasing melody = Wireless conn. OFF, Increasing melody = Wireless conn. ON 20

Troubleshooting

ISSUE: Weapon doesn't react at all after battery connection.

SOLUTION: Check if the battery is properly connected and charged. Also check motor contacts and motor functionality. Check if the safety fuse hasn't been blown.

ISSUE: Weapon doesn't make shots after trigger pull (start-up vibration was made). SOLUTION: Damaged or misplaced sensor for trigger, check it's proper function.

ISSUE: Selector is set to semi but act like on SAFE or AUTO (or any other combination). SOLUTION: Check the right sticker position on the selector plate or clear dirt on this sen-

sor, check its proper function through "Sensor check" in the app and use "Optical selector calibration" to set it again.

ISSUE: Sector gear sensor is pressed after motor stop -> piston over traveling (Error 100).
SOLUTION: Gun have too high rate of fire and piston make over spinning. Solve it by increasing active brake or reducing pre-cocking (if used) or reducing rate of fire or use battery with lower voltage or change gear ratio or use low speed high torgue motor.

ISSUE: Selector plate has moved during shooting (Error 101).

SOLUTION: You have changed by mistake fire selector during shooting or it was changed by vibrations from shooting. Check and change if necessary the right sticker position on the selector plate, and use "Optical selector calibration" to set it again.

ISSUE: Trigger is pressed during battery connection (Error 102).

SOLUTION: Release the trigger and try again. Check for the right trigger sensor function.

ISSUE: The gun always shoots BURST with short-long beep after fire (Error 103).

SOLUTION: Cycle sensor doesn't detect sector gear motion. Clean the sensor from dirt. check its right position in the gearbox to detect the gear cam and use "Optical cycle calibration" to set it again.

ISSUE: High temperature on the mosfet (Error 104).

SOLUTION: Wait until temperature will be dropped down. If it repeats, mosfet is overloa-

<u>21</u> ded by too high Amps. Change gearbox internals to drain less amperage.

Troubleshooting

ISSUE: Battery voltage is too high (Error 105).

SOLUTION: Change battery with less voltage than 17.0 volts.

ISSUE: High current flow the mosfet (Error 106).

SOLUTION: Check if motor or gears is damaged or jammed. Check wires to motor for short circuits or exposed connections. Could be problem of unballanced gun upgrade.

ISSUE: Battery voltage is too low (Error 107).

SOLUTION: Change or charge battery to have more voltage than 5.5 volts.

ISSUE: High temperature on the processor (Error 108).

SOLUTION: check for short circuits on leviathan through the gearbox or damaged parts.

ISSUE: Motor is disconnected (Error 109).

SOLUTION: Check motor and contacts for it, if they aren't damaged or disconnected.

ISSUE: Nonfunctional application (Error 200).

SOLUTION: Program error in the Leviathan. Make update firmware to the newest version.

ISSUE: Gun suddenly stopped firing.

SOLUTION: Protection could be activated - check error log. Check battery charge. Check motor contacts and motor functionality. Check if the safety fuse hasn't been blown.

ISSUE: The Leviathan is not visible in the device list in the application.

SOLUTION: Click to refresh button in the app. Check if battery is charged and connected into the Leviathan. Enable wireless and location in your phone. Restart mobile app.

ISSUE: You programmed the Leviathan, now it doesn't do what you wanted. SOLUTION: Best way is to do FACTORY RESET and start again.

ISSUE: The gun does something strange or nothing.

SOLUTION: STOP! Release trigger, disconnect battery and search for the problem beforesomething will be irreversibly damaged! Contact us at email support@jefftron.cz. 22

MANUFACTURER

Ing. Filip Němec Zahradní 599, 538 03 Heřmanův Městec ID: 87936062, TAX ID: CZ8503013475 Made in Czech Republic



www.JeffTron.net



Warranty does not cover: water immersion, defects or damage from accident, misuse, opposite battery polarity, abuse, damaged wires, wrong installation, bad handling, any modification by user, unusual physical, electrical or electromechanical stress.

Exclusion of liability: Manufacturer Ing. Filip Němec is not liable for any damages, injuries or accidents of any kind resulting from the use of this product in the airsoft gun.





For technical support or reclamation use email: support@jefftron.cz

