SIMGRADE°

R7 PEDALS

Spec C

Manual v.2.5

Table of contents

1. General

Please read the manual carefully as it contains important information regarding the pedals and safe usage of them.

The latest version of the manual and software can always be found at: https://simgrade.fi/support/

Contact the manufacturer: info@simgrade.fi

Pictures on the manual might not represent your actual pedal configuration exactly.

Thank you for choosing the R7’s, we hope you will enjoy your new pedals.

Best regards,

Team SIMGRADE°

1.1 Varoitukset ja ohjeet turvalliselle käytölle

- **VAROITUS: TUKEHTUMISVAARA - sisältää pieniä osia, käyttö vain aikuisen valvonnassa! Älä anna lasten käyttää polkimia, tai mitään toimitettua osaa tai työkalua ilman aikuisen valvontaa.**
- Älä koskaan käytä vahingoittunutta tai millään tavalla viallista tuotetta, lopeta käyttö ja ota yhteys jälleenmyyjään tai valmistajaan.
- Sisältää teräviä reunoja ja kulmia sekä sulkeutuvia välejä, **älä koske polkimiin käytön aikana.**
- Älä käytä maaöljypohjaisia voiteluaineita polkimien kanssa, ne vahingoittavat osia polkimista. Mikäli voitelua tarvitaan, suosittelemme PTFE-kuivavoitelusuihketta.
- Varmista, että kaikki jotka polkimia käyttävät, ovat lukeneet ja ymmärtäneet käyttöohjeen sisällön (ajantasaisen käyttöohjeen löydät: https://simgrade.fi).
- Varmista aina, että kaikki liitokset ovat kireällä ennen kuin käytät polkimia. Kiristä liitos aina mutterin puolelta kun sellainen on käytössä.
- ÄLÄ avaa ohjausboxia.
- Polkimia tai niiden osia ei saa käyttää kuin siihen tarkoitukseen, johon ne on suunniteltu. SIMGRADE° R7 PEDALS on tarkoitettu käytettäväksi USB-peliohjaimena tietokoneella. Valmistaja ei vastaa vahingoista, jotka voivat syntyä tuotteen ohjeiden vastaisesta käytöstä.
- Kiinnitä aina polkimet M6-pulteilla (4kpl / poljin) tukevaan alustaan. Käyttäjä vastaa siitä, että alusta kestää polkimien käytön.
- Maksimi kiristysmomentti muovia sisältäviin liitoksiin / muoviosien kiinnittämiseen: 6 Nm.

1.1.1. Käyttöympäristö ja turvalliset säilytysolosuhteet

- 15°C – 35°C lämpötila, tiivistymätön kosteus.
- Älä altista polkimia tai muita sen osia suoralle auringonvalolle tai kosteudelle.
- Vain sisäkäyttöön ja varastointiin.

1.1.2. Takuu

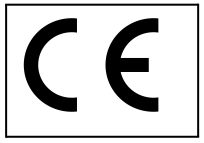
Tuotteella on 2 vuoden takuu, poislukien tilanteet ja tapahtumat joissa:

- Käyttö- tai hoito-ohjeita on laiminlyöty.
- Tuotetta on käytetty väärin tai huolimattomasti.
- Tuotteen luovutuksen jälkeen on sattunut onnettomuus tai muu tapahtuma, jossa tuote on vahingoittunut ulkoisten tekijöiden toimesta.
- Normaali kuluminen käytössä.

1.1.3. CE-Merkintä

Tuote täyttää EU:n terveys-, turvallisuus- ja ympäristönsuojelustandardit.

- Valmistaja: SimGrade Oy
- Valmistajan osoite: Piispanpelto 8, 02200 Espoo
- Tuotteen nimi / tunnus: SIMGRADE° R7 PEDALS



1.1. Warnings & instructions for safe usage

- **WARNING: CHOKING HAZARD - Small parts, adult supervision required! Never let children use the pedals, or any of the provided parts or tools without supervision by an adult.**
- Never use damaged or in any way defective product, stop using it and contact the reseller or the manufacturer.
- There are sharp edges and corners and closing gaps, **keep away from the pedals while they are being used.**
- Do not use petroleum based lubricants with the pedals, these will damage some of the parts in the pedals when in contact. If you need to use some lubricant, we recommend dry PTFE-spray.
- Always make sure everyone using the pedals have read and understood the content of the manual (up-to-date manual can be found: simgrade.fi).
- Always check that all connections are tightened before using the pedals. Always tighten from the nut side when one is used.
- DO NOT open the controller box.
- Pedals or any of their parts may not be used on any other purpose than what they were designed for. SIMGRADE° R7 PEDALS is meant to be used as an USB-input device on a computer. The manufacturer is not liable for any damage that may result from using the product in violation of the instructions.
- Always fasten the pedals to the support base with M6 bolts (4 pcs / pedal). It is the user's responsibility to ensure that the platform can withstand the use of the pedals.
- Maximum tightening torque for joints / attachment of plastic parts; 6Nm.

1.1.1. Operating environment and safe storage conditions

- 15°C – 35°C temperature, non-condensing humidity.
- Do not expose the pedals or any provided part to direct sunlight or moisture.
- Indoor use and storing only.

1.1.2. Warranty

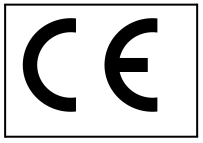
The product has a 2-year warranty, excluding situations and events where:

- Instructions for use or care have been disregarded.
- The product has been used incorrectly or carelessly.
- An accident or other event has occurred after the product has been handed over, in which the product has been damaged by external factors.
- Normal wear and tear in use.

1.1.3. CE-Marking

Product meets EU standards for health, safety, and environmental protection.

- Manufacturer: SimGrade Oy
- Manufacturer address: Piispanpelto 8, 02200 Espoo
- Product Model name / identification: SIMGRADE° R7 PEDALS



1.4. Mounting the pedals

- **A proper racing rig with a sturdy mounting platform is required**. Aluminium extrusion profile base for the pedals is recommended.
- Some possible configurations require empty space to be left behind the pedals - check this during installation.
- Always use all 4 mounting bolts (M6) with washers on each pedal. Mounting pattern for one pedal is 80 mm (longitudinal) x 87 mm (lateral).

1.5. Connecting the pedals to the controller box and to the PC

Connect the brake pedal to the middle port, and throttle on the side of the USB-out port. The 3rd port is for the clutch. Slots are marked with letters: C=Clutch | B=Brake | T=Throttle

It is recommended to connect the pedals directly to the motherboard of the PC (back of the computer), into a USB 2.0 slot (black coloured port). We do not recommend using USB-hubs with the pedals.

1.6. Maintenance

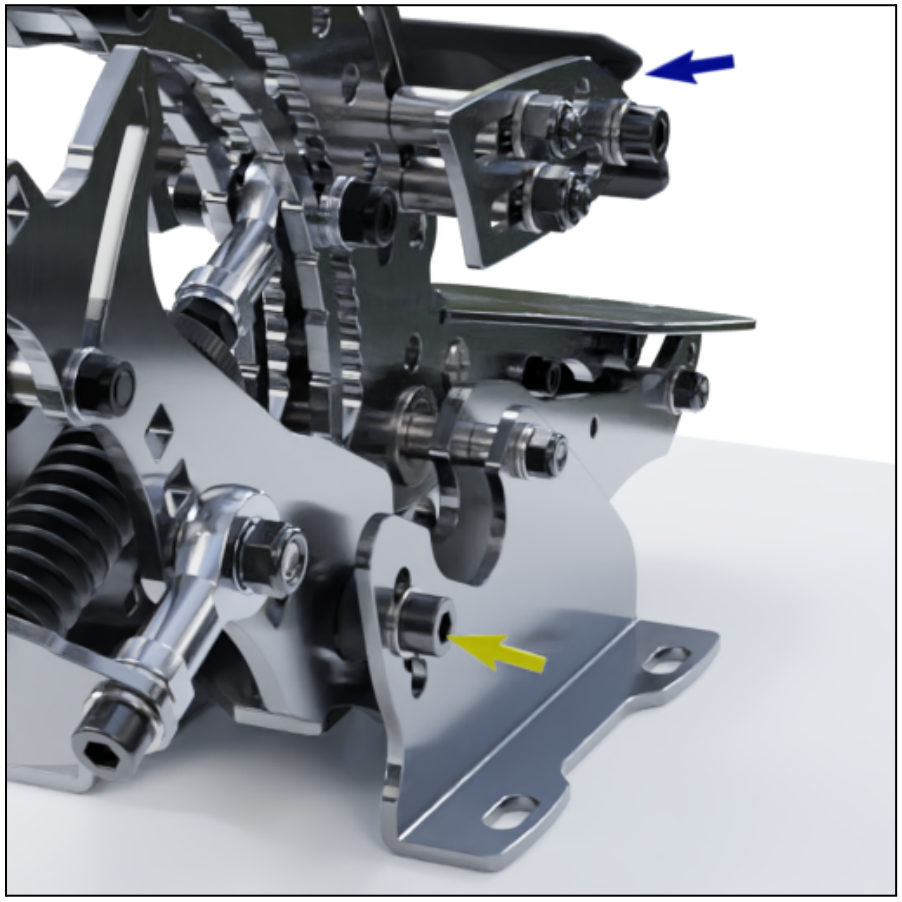
Pedals do not need any added lubrication in normal conditions. If you add some regardless, only use dry PTFE-spray. Clean the pedals only with a dry cloth. The provided felt pads for the travel stoppers should last a considerably long time. Replacements are available from us (contact: info@simgrade.fi) but they can also be replaced with any local product, if needed (cut size: ~ 25mm x 12mm).

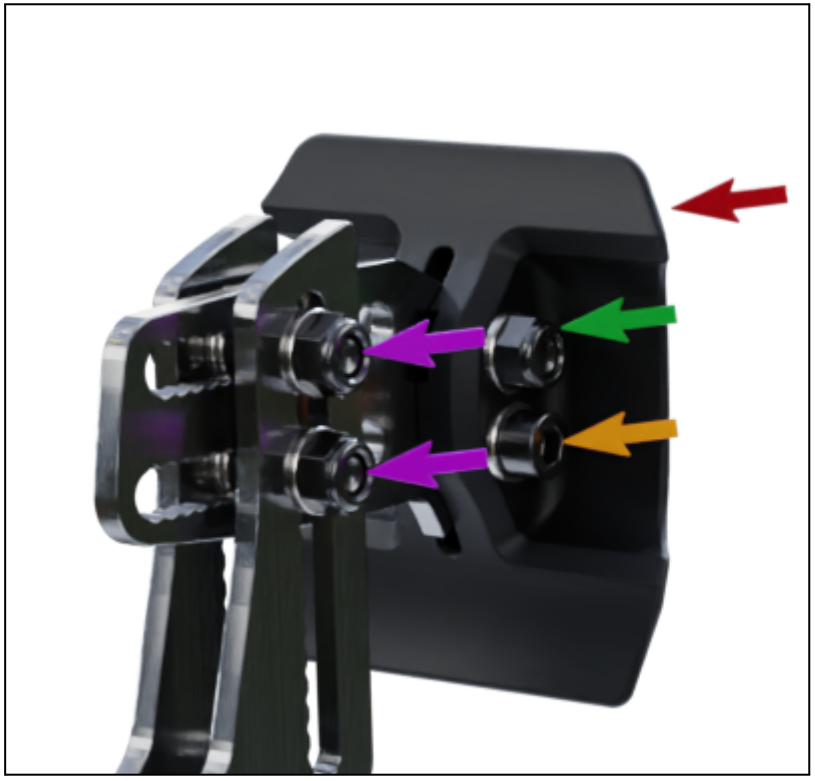
2. Mechanical Adjustments

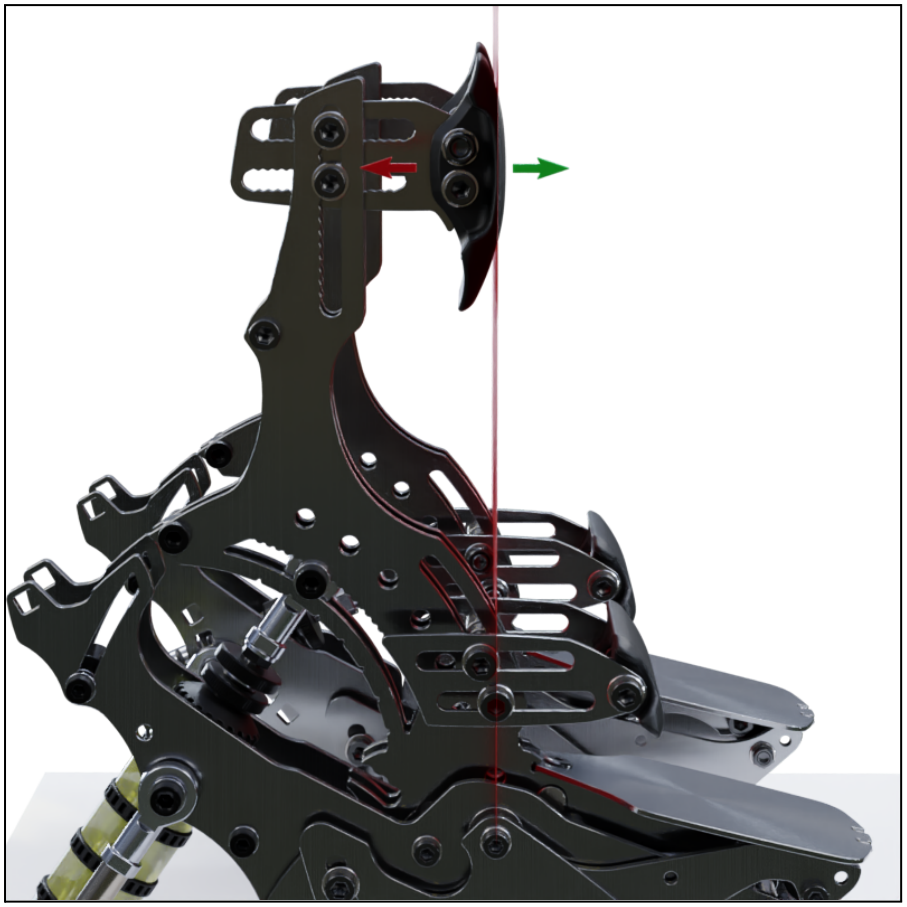
2.1. General

- We recommend aligning the (both) pedals so that your leg is in a straight line with the pedal. Especially on the brake it is important to minimise the strain especially on your knee, but also on the pedal. Using maximum wide spacing between the throttle and the brake is something that we also recommend for ergonomic reasons.
- To achieve a more traditional feel to the pedals, adjust the heel support (blue) closer to the pedal arm. This will reduce the movement of your heel, which might feel more comfortable at first. It is recommended that you gradually learn to use the heel supports further away from the pedal arms, as this will increase the control you have on the pedals, as you can basically push the pedals both ways.
- It is good practice to first adjust the angle of the whole pedal using the bolts on the back (yellow) and then fine tune by adjusting the pedal face (red) position and orientation with the slotted holes (purple).
- Note the position of the pedal face in relation to the main pivot point: If you draw a vertical line straight up from the ball bearings, having the pedal face either ahead or behind the line changes how the pedal feels (see page 11). Usually it is beneficial to keep the pedal face in front of the line (closer to the driver) on the brake, and behind or close to the line on the throttle. For example, this helps if you feel that your foot is trying to ‘slide over’ the brake pedal face. Keeping the PF behind the line on the throttle might give you a more comfortable and natural feel. For the brake, it is often a good idea to first adjust the angle of the whole pedal (yellow) one step higher, and then slide the pedal face back, closer to the pedal arm. This way there is less strain on the pedal and you should have a better feel for the brake, as your foot can not start to slide over the pedal face so easily.

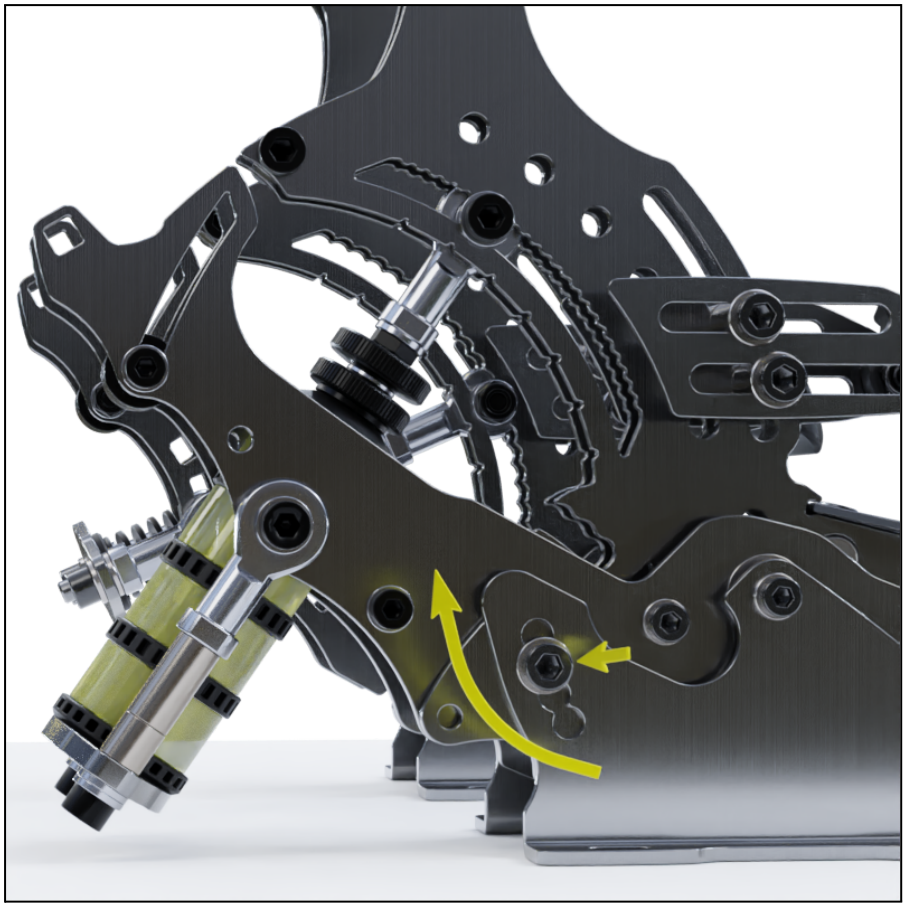
- If you notice that the plastic part of the pedal face is loose, follow these steps: 1) Loosen the nyloc nuts on both sides (green) 2) Tighten the M6-bolt (orange), as there is another nut inside the PF 3) tighten the nyloc nut while keeping the bolt secured. Don’t overtighten (plastic starts to deform = too much torque). **Check the pics on the next page.**







(Vertical line from the pivot point bearing



(Pedal angle adjustment

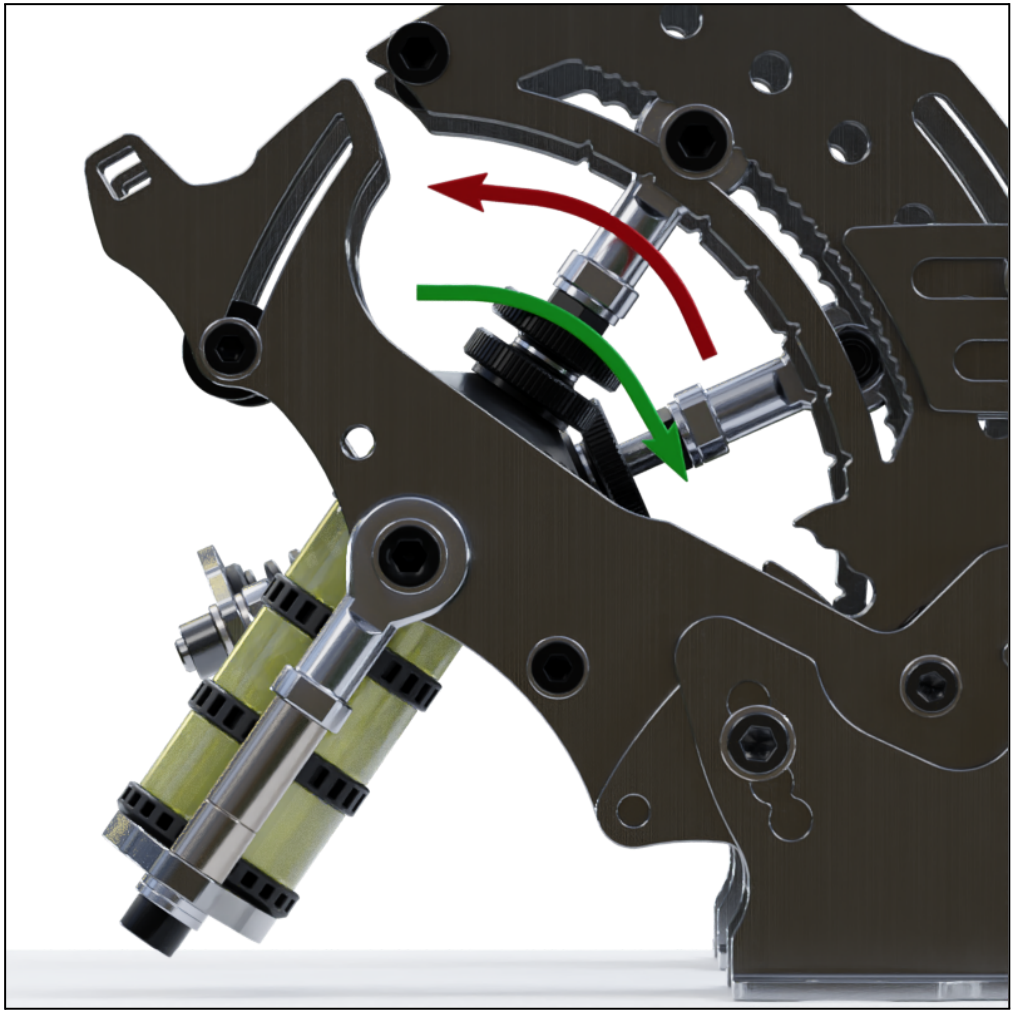
2.2. Brake

When adjusting the brake, the first thing to change is the leverage angle of the push-rod / elastomer pack. With this adjustment, you have 25 different stiffness options available. So using the equal amount of pedal pressure, you can directly change the amount of travel by small increments. You should be able to change the position without tools, just rotate the assembly by hand.

More angle (red) = stiffer pedal

Less angle (green) = softer pedal

Preload is adjusted and locked with the double finger nut:



It is possible to use M6 DIN 125 washers inside the elastomers [for different thicknesses, you can also use DIN 988 (not included)]. This will protect the elastomer from overcompression, and make the lifetime longer. By using different amounts of washers inside the elastomers you can also affect the overall progressivity of the pedal feel.

Recommended amounts of washers inside the elastomers (these amounts are enough to guarantee the longest lifetime for the elastomers):

Elastomers with length = 15 mm: **3x**

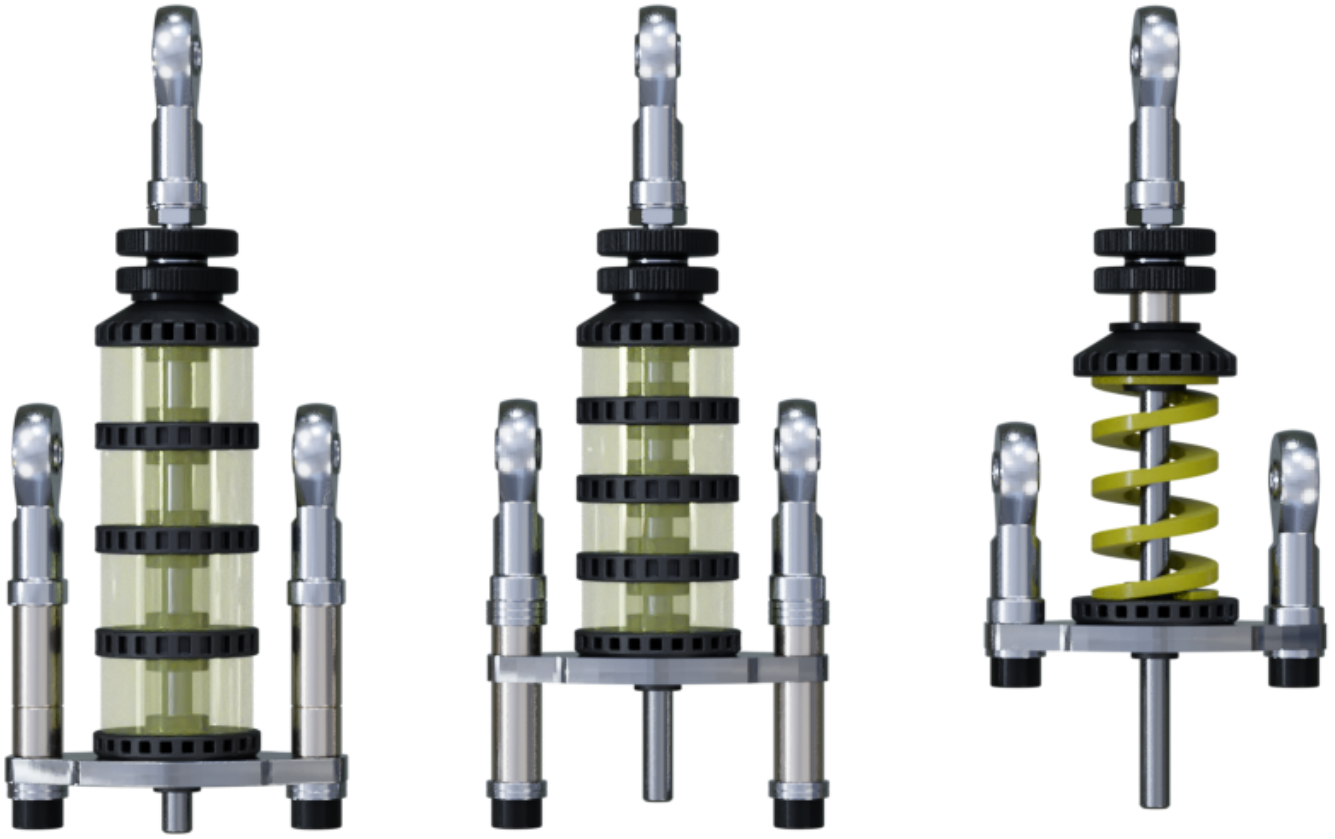
Elastomers with length = 10 mm: **1x**

Using a smaller amount of elastomers than what is demonstrated on the default configurations (on the next page) will give you less travel with the same level of pedal pressure. Just be aware that the less elastomers used, the easier they are overloaded (less travel available before getting to the limit).

You can also freely mix the different length elastomers.

Always use an elastomer between the plastic bushings.

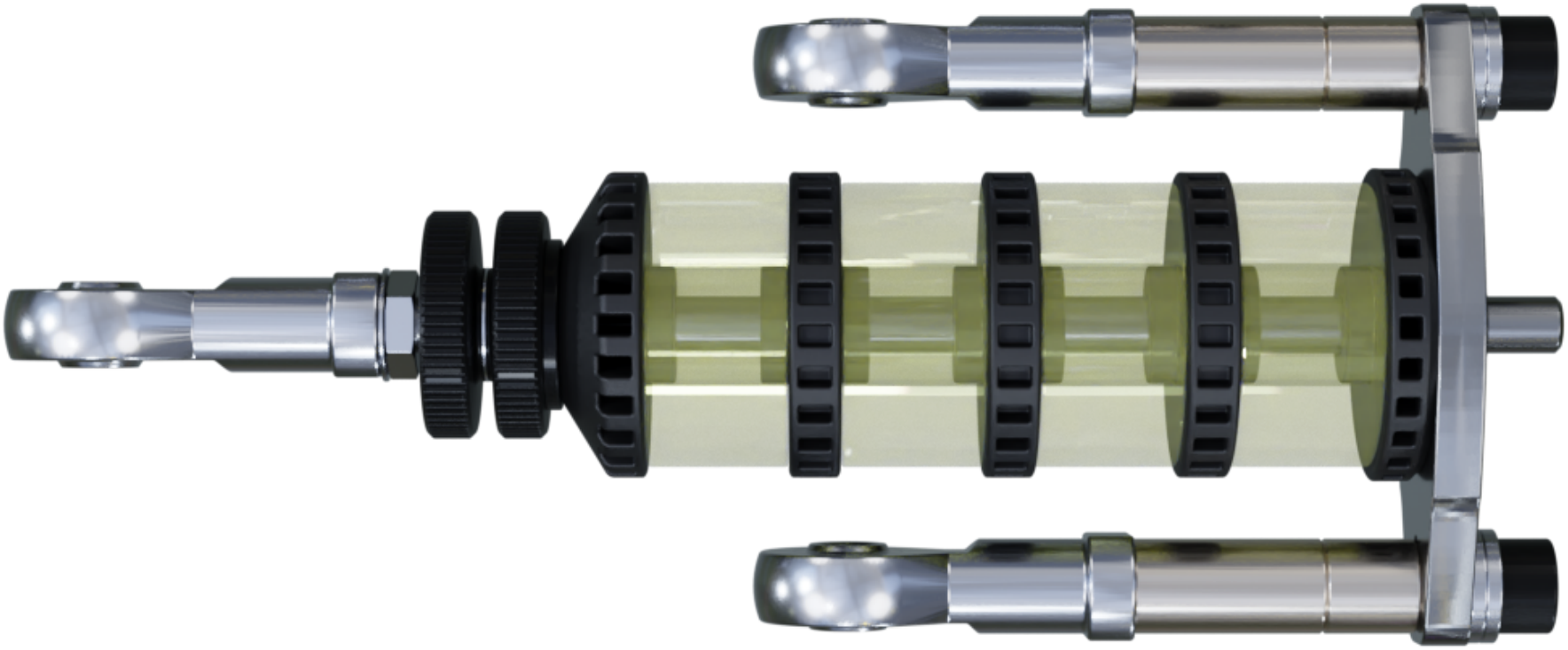
The pedals come with two sets of polyurethane springs (elastomers) and with a steel diecast spring option. If you like a really sharp return phase for the pedal, we recommend you to try the spring, as this characteristic is even more pronounced with it. With the adjustable leverage ratio, you have 25 different pedal softness settings for each installed combination of elastomers / spring.



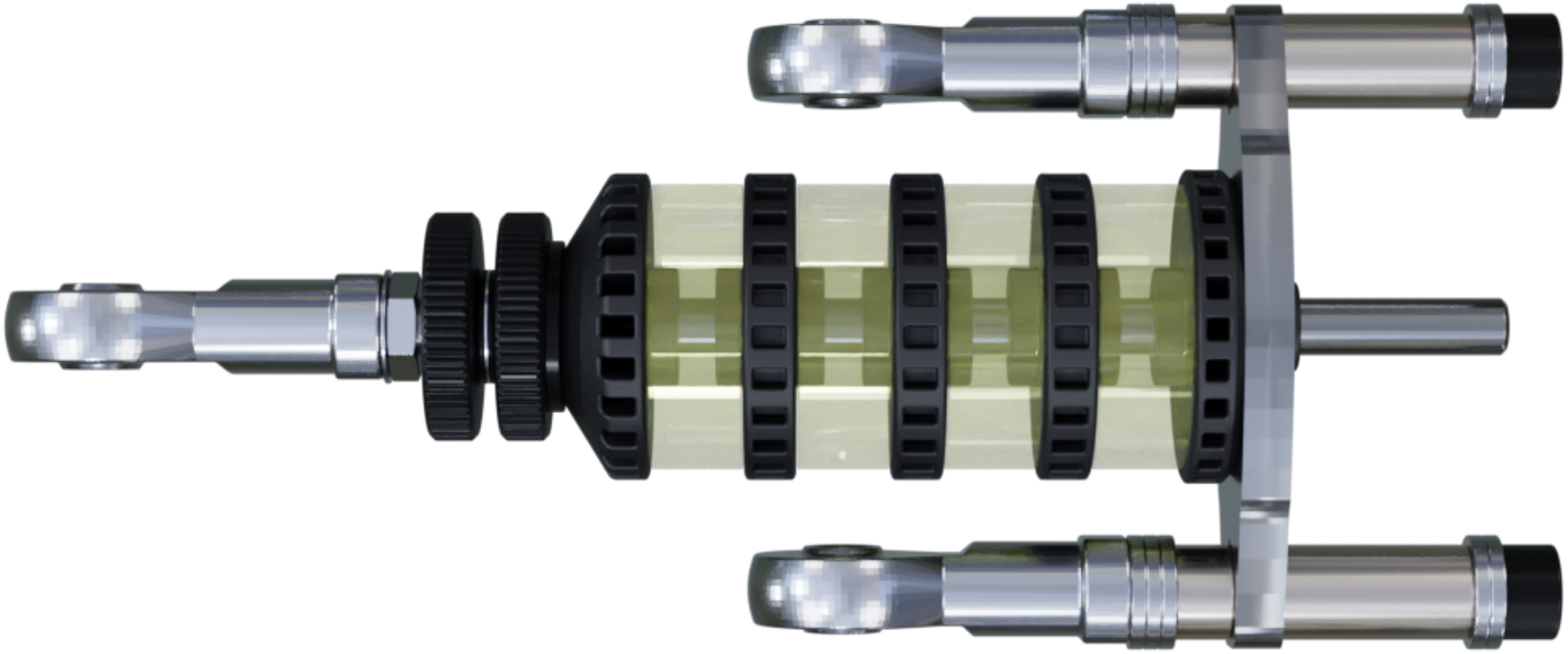
Preview of the included elastomer / spring combinations. On the next pages they are displayed in more detail.

2.2.1. Included Elastomer / Spring configurations

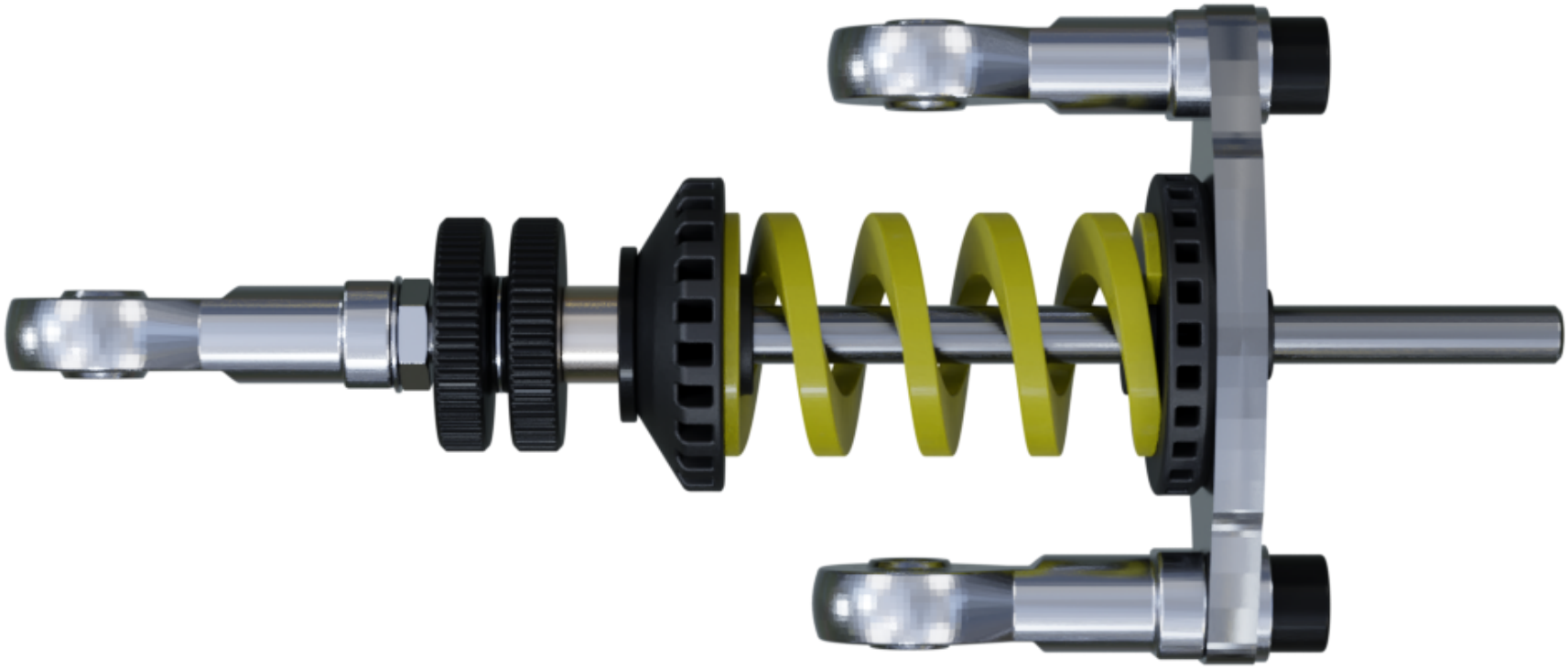
Medium: 4pcs, L=15mm:



Soft: 4pcs, L=10mm:



Hard: Steel Spring:

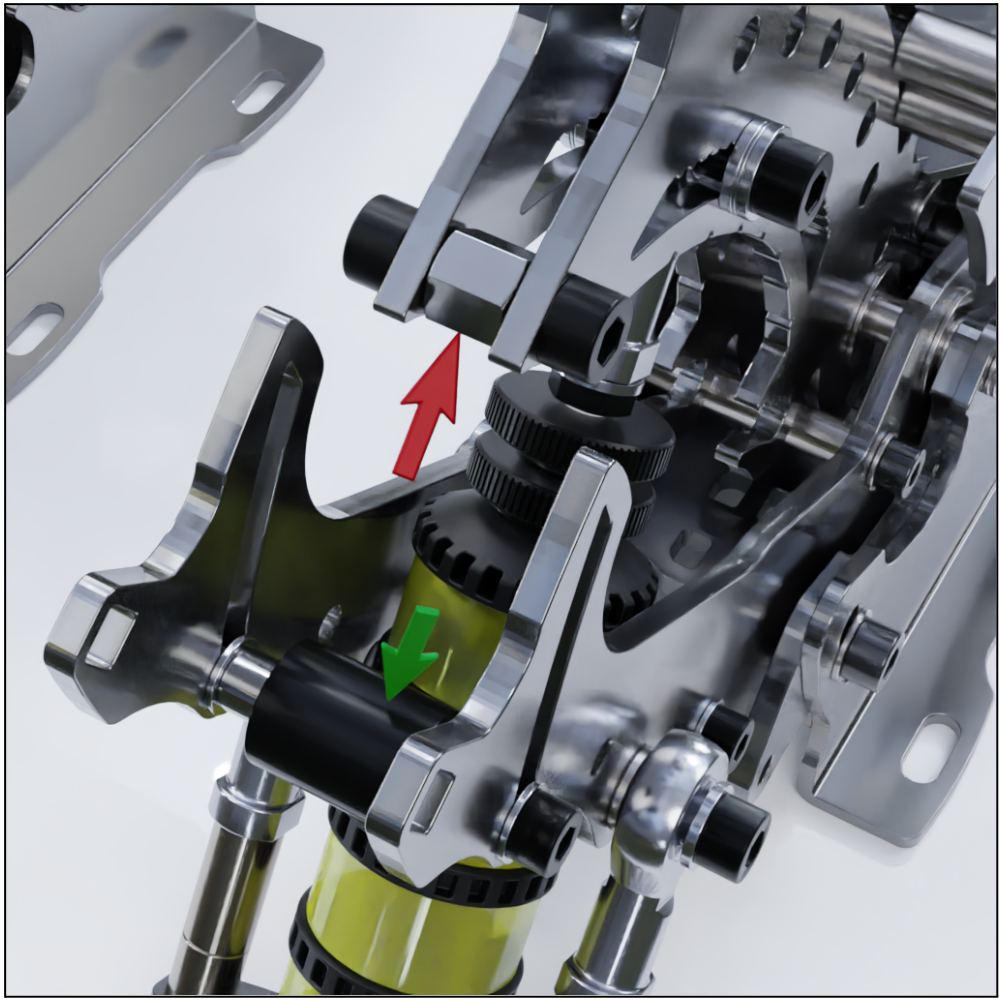


2.2.2. Brake travel limiter

The travel stopper (green) is adjusted just the same as in throttle.

The stopper is mounted on the loading frame, so it only the travel of the pedal - not the loading of the load cell, meaning that the brake will read more inputs even after in contact with the limiter.

So it can be used as a haptic point at the end of the wanted travel. Normal use case is to adjust it for the hardest or the hardest braking point, and you can feel the moment each you reach it - always ending up with the same amount of force with high consistency.



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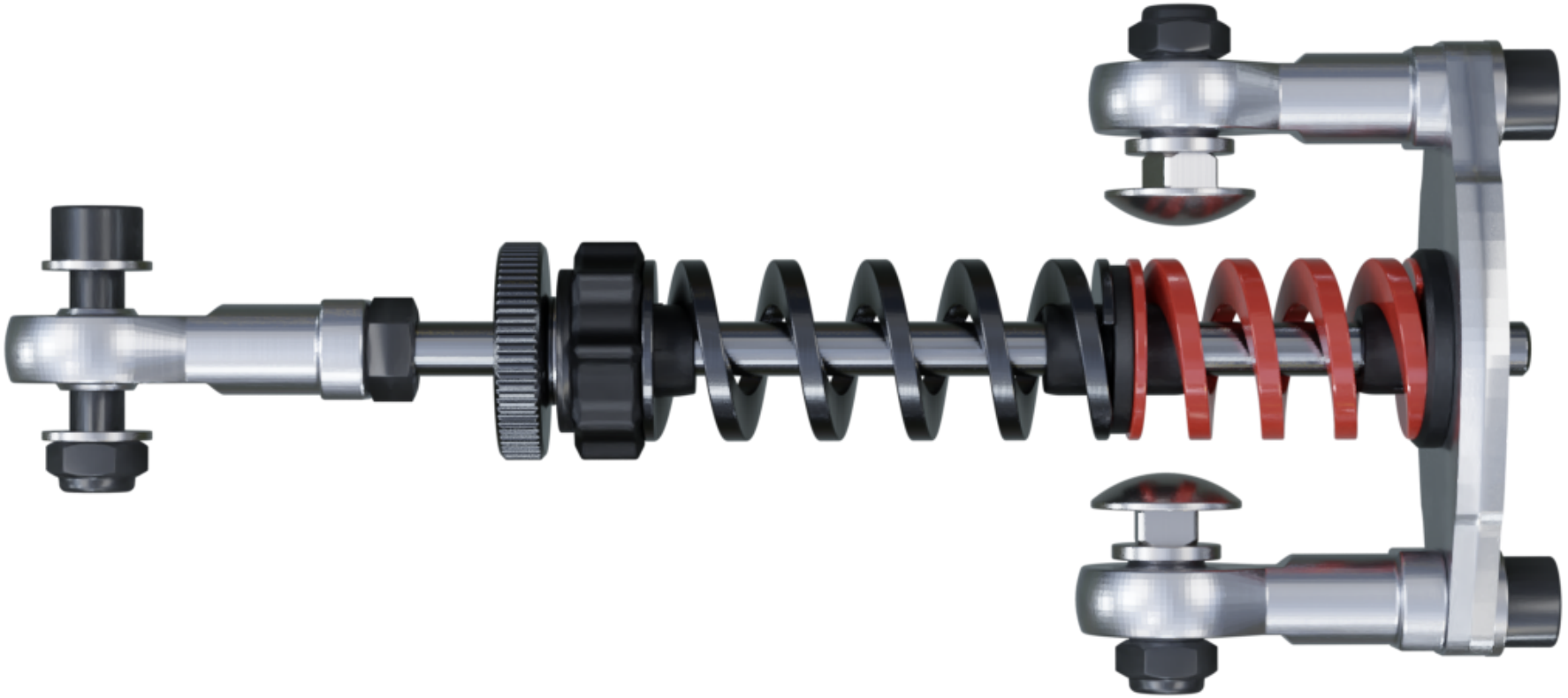
2.2.3. Advanced Brake Kit

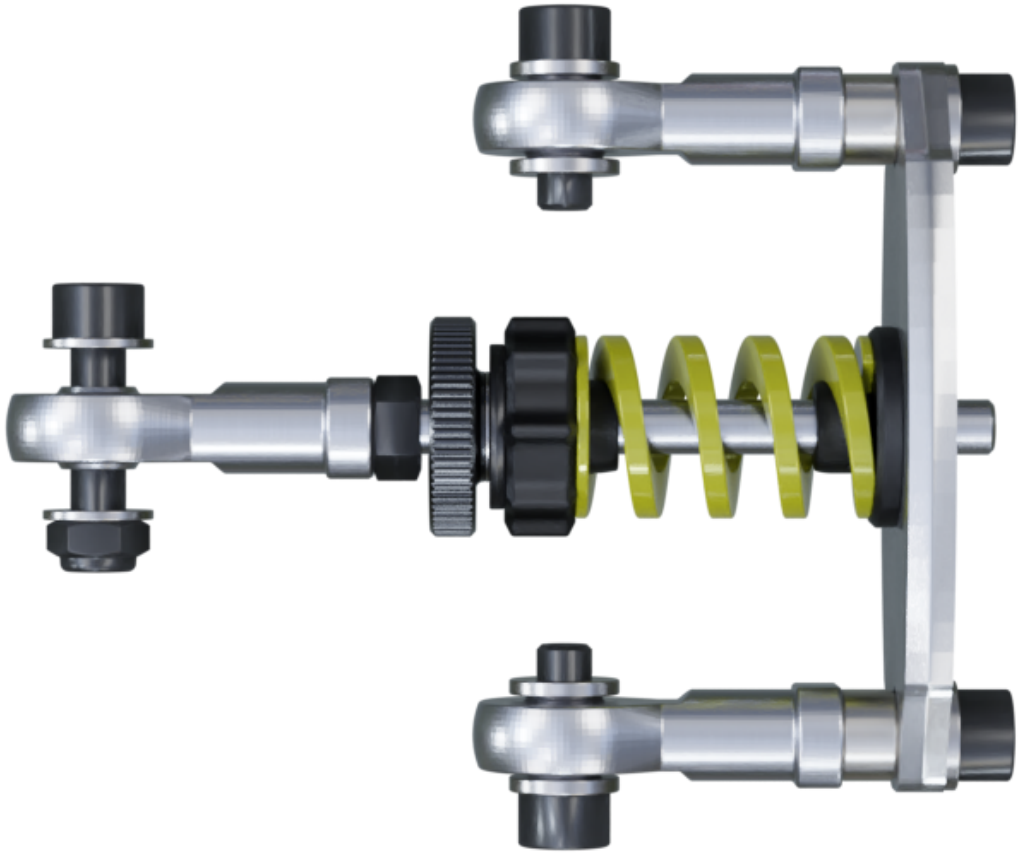
Additional preload spring:

Allows for individual preload adjustment and makes the return phase of the brake more pronounced.



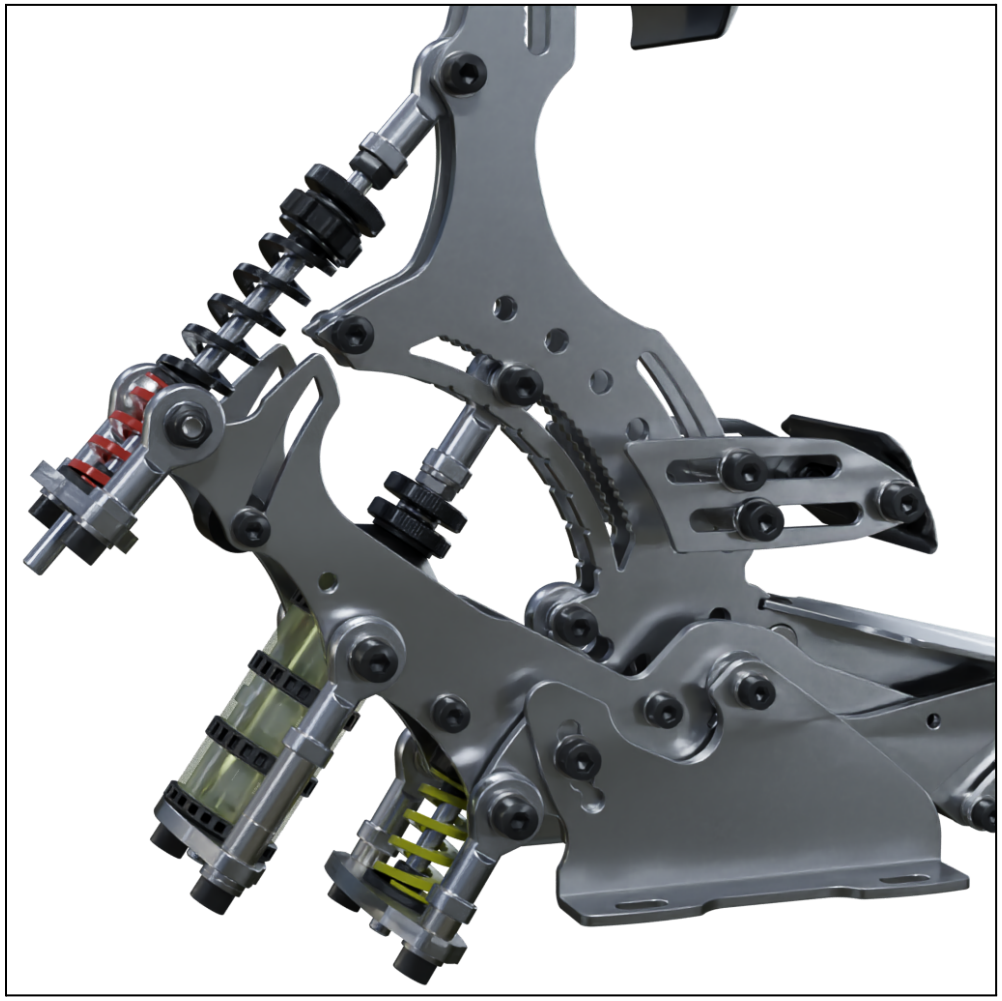
Load limiter:

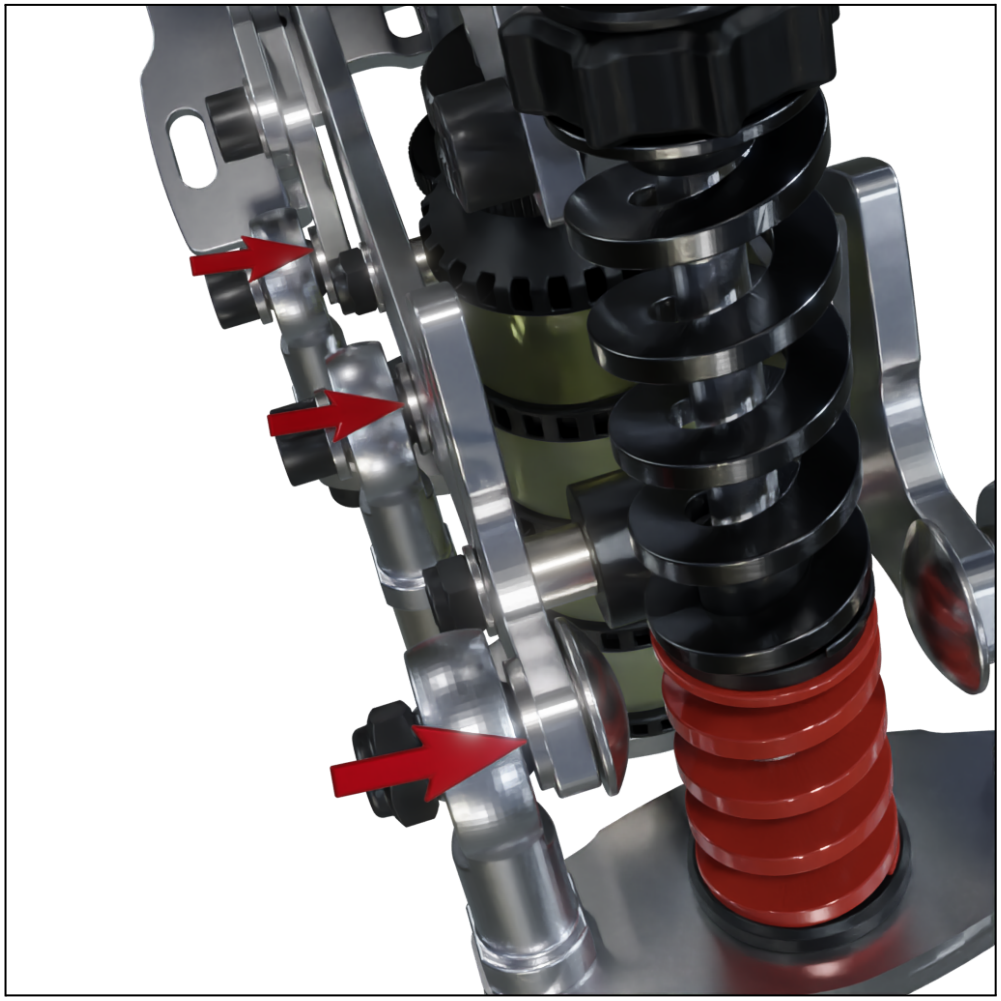
Takes load off from the brake load cell and thus increases the maximum usable pedal pressure. Optionally you can use the red spring from the preload assembly here (red spring = softer).

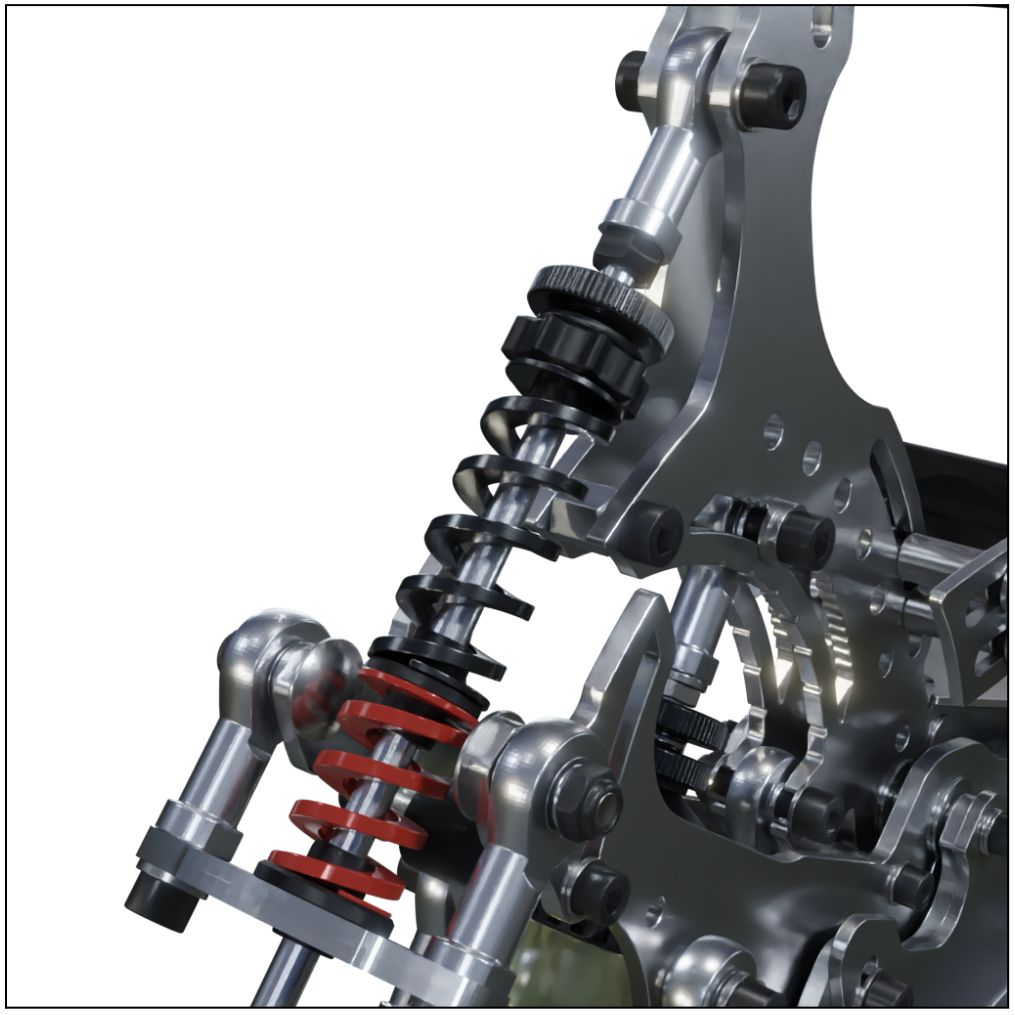


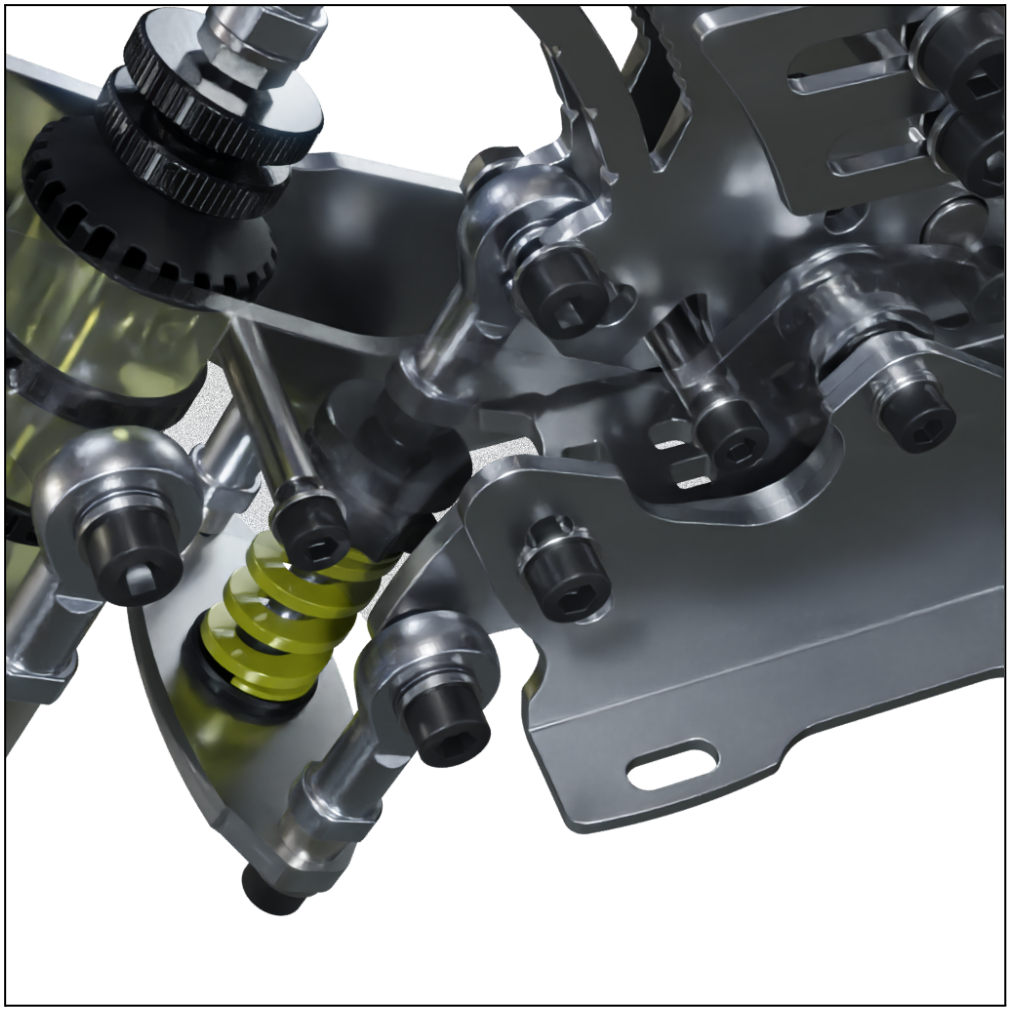
Installation of the Advanced Brake Kit

See the pics below to install the set. Note the washers (red arrows) that need to be between the rod ends and the frame plates.



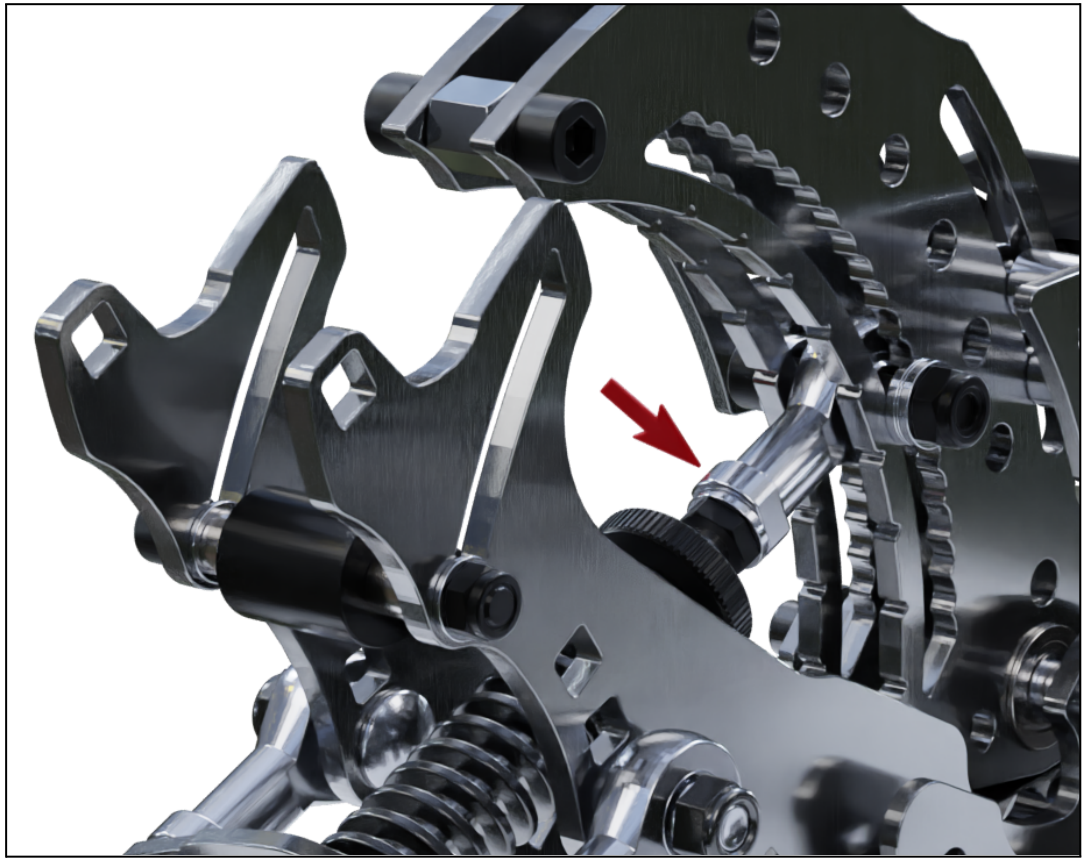






2.3. Throttle

- Preload is adjusted with the plastic finger nut and secured with the steel nut on the top.
- Resistance progressivity is adjusted by changing the rod-end (red) position on the pedal arm. The spring should not be fully compressed with the pedal pressed down, if this happens, lower the rod-end and increase the preload.
- Throttle travel is adjusted by changing the location of the end stopper (green). Remember to calibrate after a change.
- Throttle is factory calibrated for full travel.



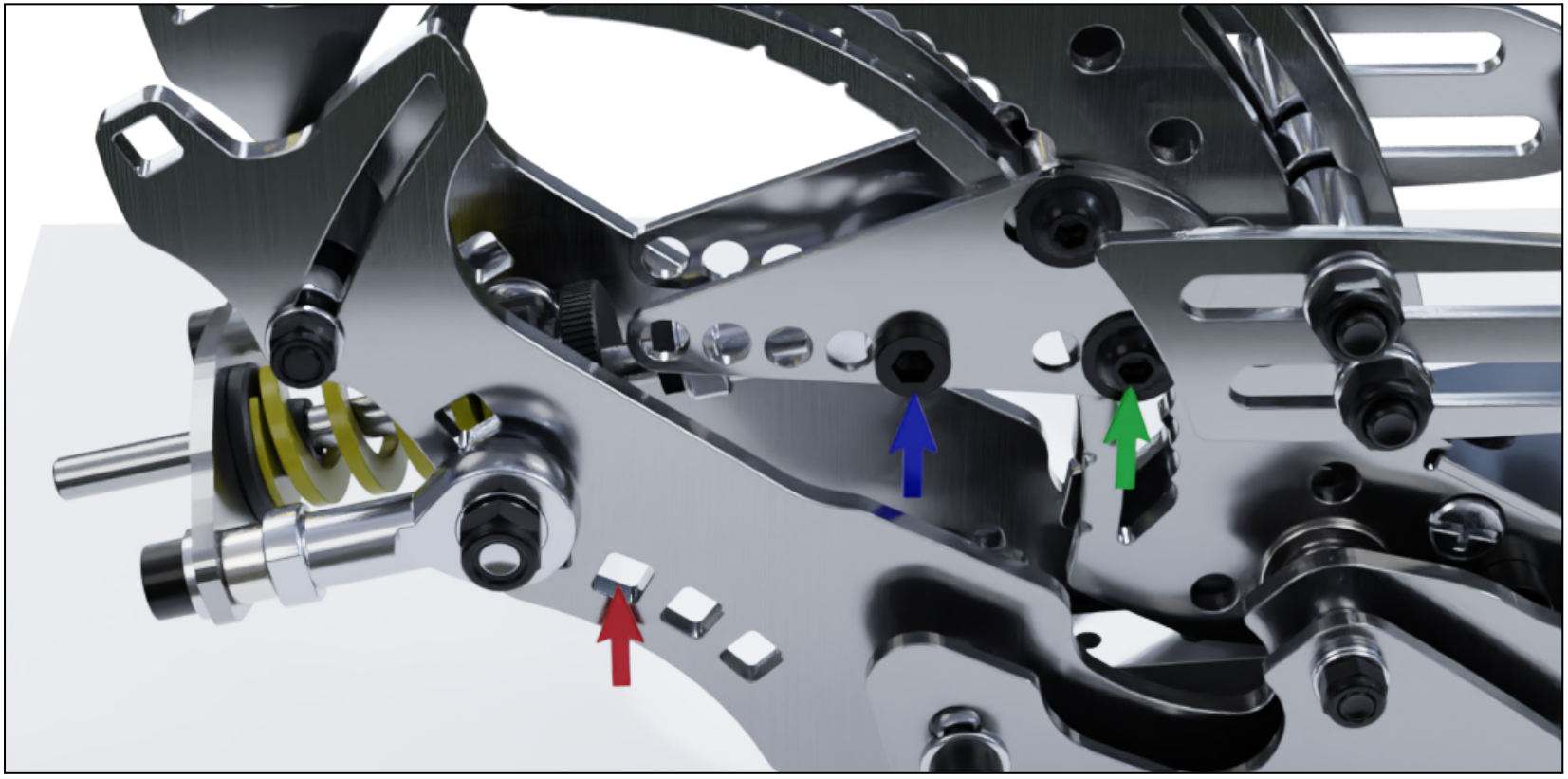
2.4. Clutch

The advised adjustment options for the clutch are

A) spring change: red=medium | yellow=hard.

B) adjusting the small clutch plates up or down on the pedal arm slot hole. Loosen the M6 bolts (green) and retighten when done. You might need to take the preload off to be able to move the plates (loosen the bolts on the back).

- Moving the plates up makes the clutch pressure plate feel less prominent and slightly add to the overall stiffness of the pedal.
- Moving the plates down makes the clutch pressure plate feel more prominent and makes the overall stiffness a bit softer.



3. Software (Before May 2023)

3.1. General

1. Always calibrate (adjust the dead zones) the pedals after mechanical changes, and before starting the simulation.
2. Adjusting the dead zones: Position of the horizontal lines defines the area on the sensor range that is read as an input. Only the area between the lines is read as an input signal.
3. **Always close the software after making adjustments.** Some simulations will not recognize the pedals, if you have the app open during simulation start up.
4. Using the "save config" function saves all the settings together in a file.
5. It is not necessary to save a configuration to a file using the "save config" button. Changes are saved automatically and stored to the board.
6. If you have a clutch, it needs to be enabled on the software using the tick box.
7. **Close the software after you've done the needed changes**.

Note, the signal value will always move around / vary slightly, but if the range of variation is more than 10 units (out of 4096), we recommend adding the grounding cable just to be on the safe side. Refer to section 1.6.

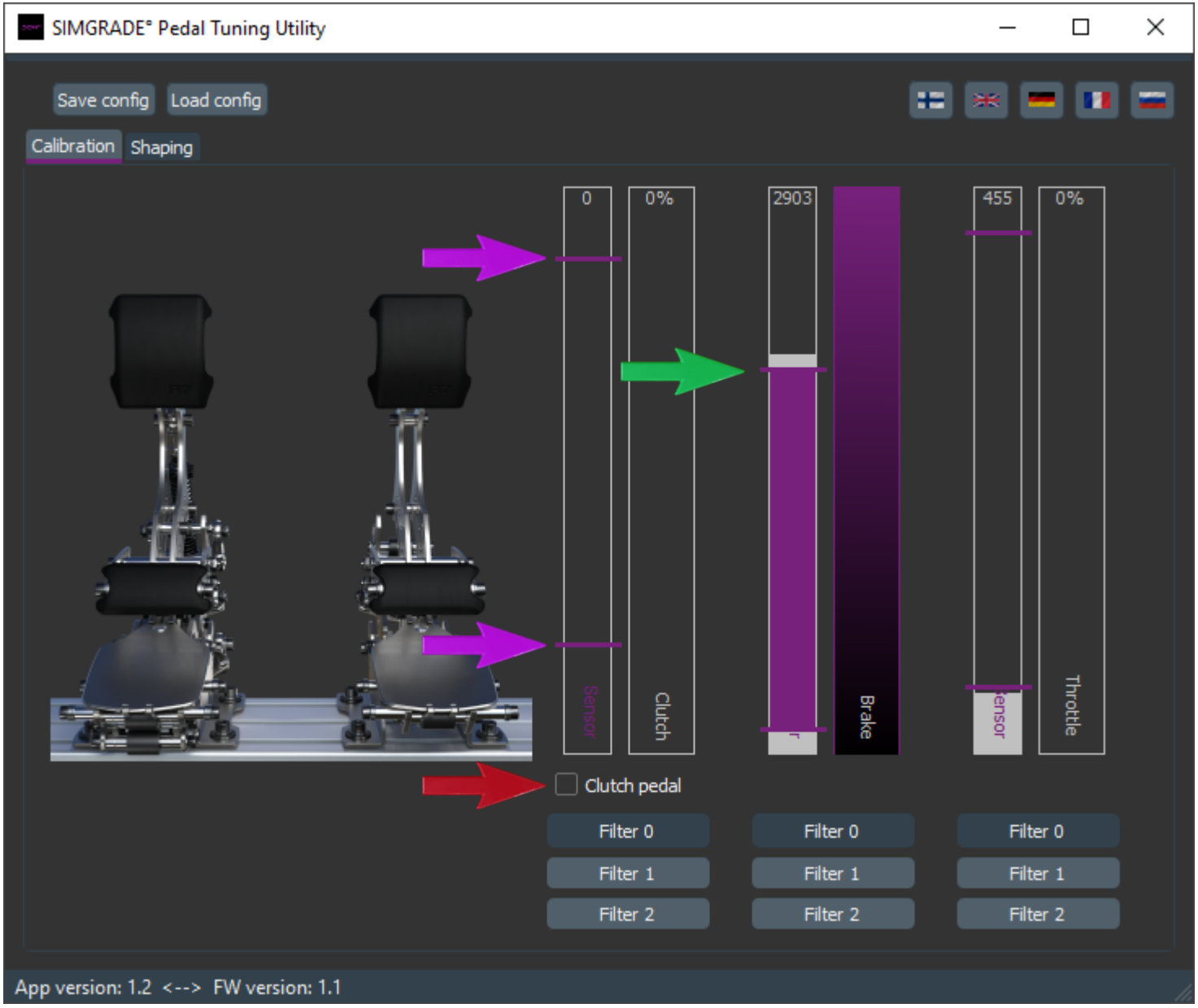
Filter buttons are for adding a level of signal smoothing.

3.2. Layout

Purple = Horizontal lines for adjusting the dead zones.

Red = Toggle switch for activating / deactivating the clutch.

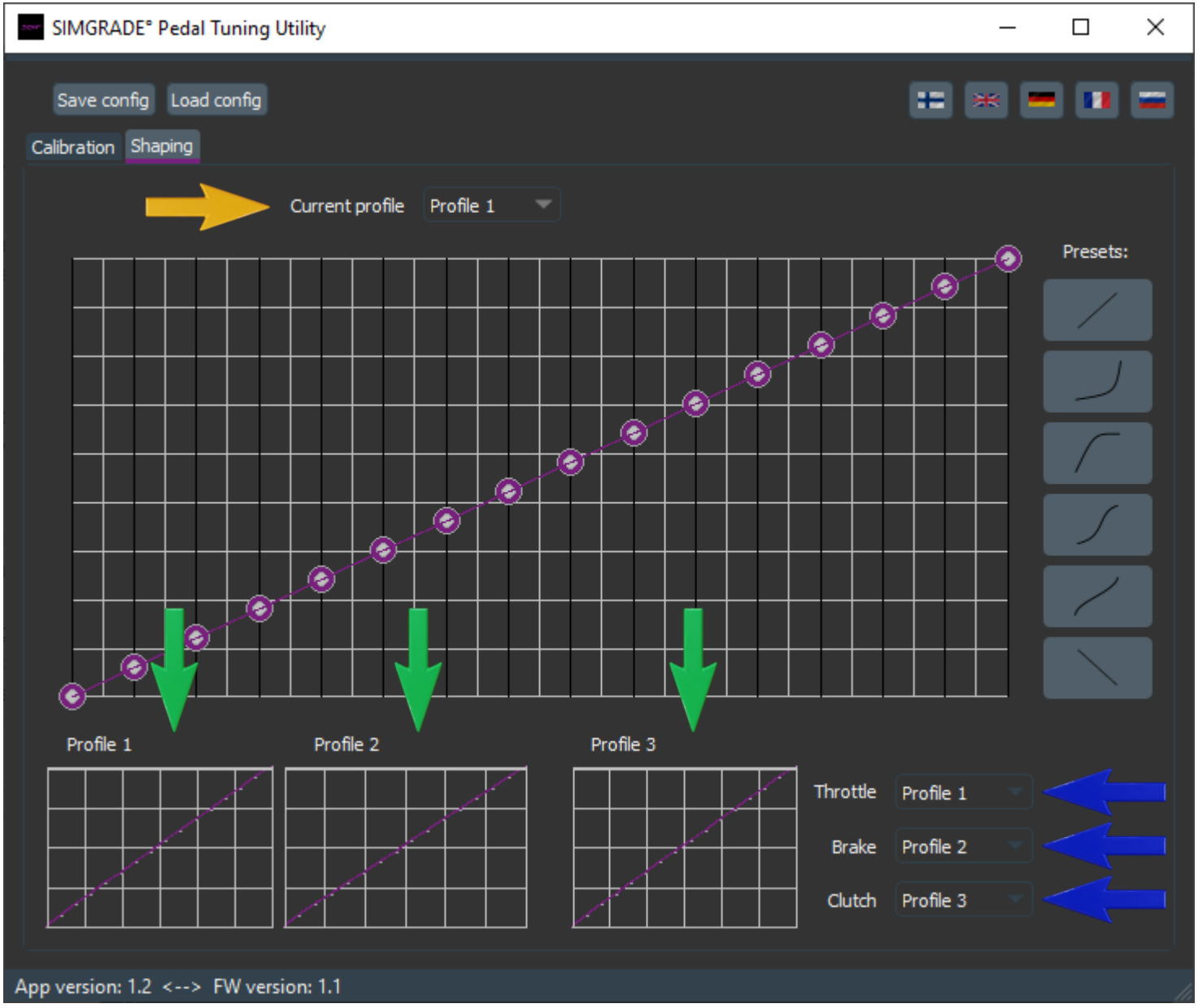
- Calibration on the app is done, when you have put the sliders for every pedal where you want them.
- Filters are for smoothing out the signal.
- Profile saving from the top left corner.
- Adjusting the brake needed maximum force level is done moving the top line on the sensor bar (green).



Orange = Name of the profile that is being edited.

Blue = Profiles that are being used for each pedal.

Green = Your profile preview windows. Windows also work as selection buttons.



3.3. Limiting the maximum braking signal with the software

Although we don’t recommend using this method, below are the steps to do it.

1. Put linear profile on the brake, and put the upper deadzone limit on the ‘signal’ bar so high that you can just reach it with ‘too much force’ (so a bit more force to reach the line, than what you want to be using after capping the signal as the maximum pedal force)
2. Calibrate the pedals in iRacing, reaching the max. value of 4096 for the brake.
3. After the iRacing calibration tool is done and closed, go back to the app, and change the brake curve so that the line/dots never reach the top. The last dot will define how much % the brake will reach with maximum pedal force (top is 100%)

Note, by doing this, you will be limiting yourself from learning - and you will never be as good as you could be.

4. Software (After May 2023)

- Connect the Controller Box to the PC, then connect the pedals to the Box.
    - Throttle = RIGHT = Z | Brake = MIDDLE = Y | Clutch = LEFT = X
- Download the software from https://simgrade.fi/support/
- Open the software.
- Click [**Read config from Device**]
- Calibrate pedals, if needed
    - 1. Click [**Calibrate**] while the pedal is in zero position
    - 2. Push the pedal down and release
    - 3. Click [**Stop & Save**]
    - 4. Apply new values with the [**Write config to Device**] button
    - ^repeat 1-3 for all pedals / channels individually

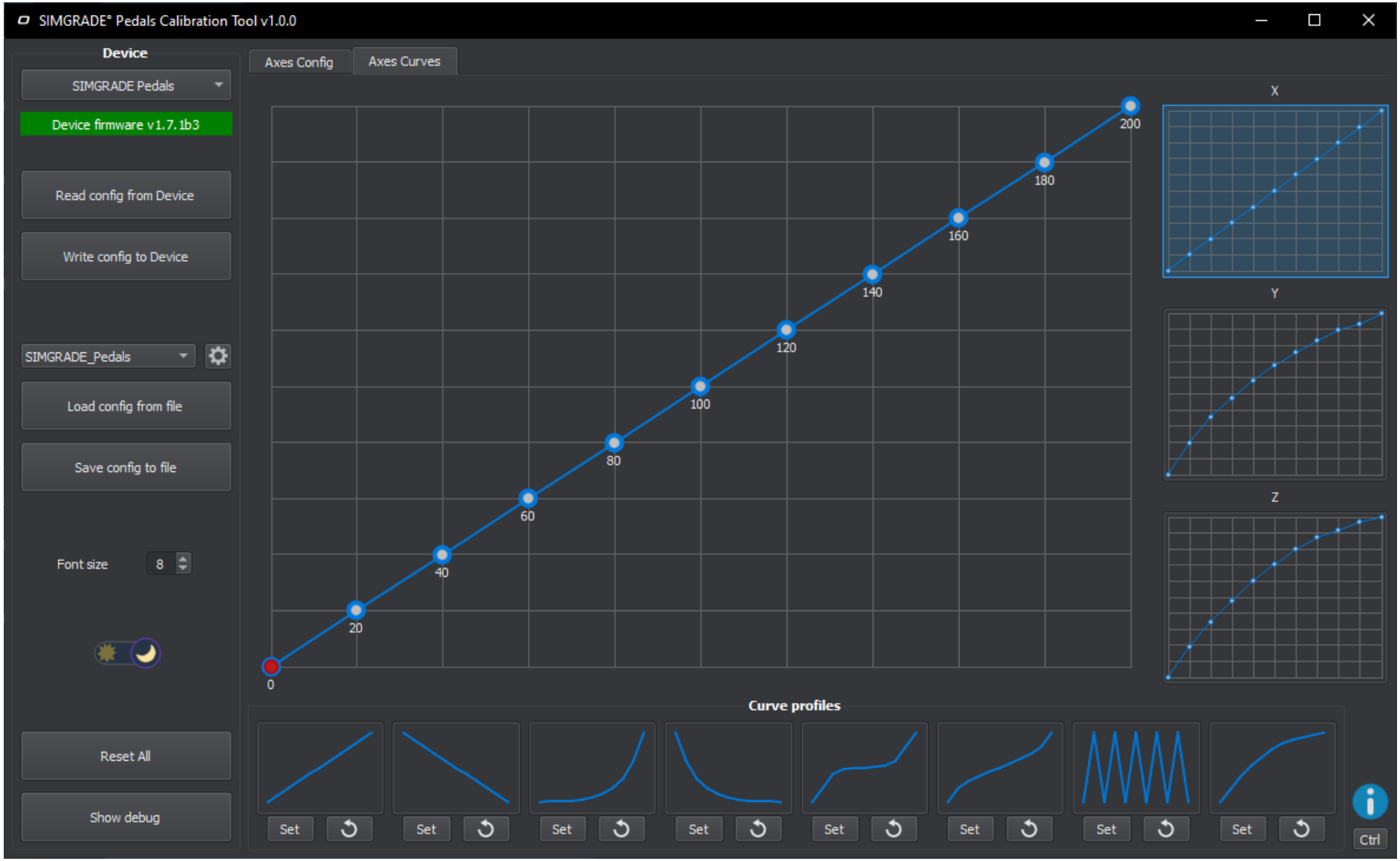
You can also manually type in the values. Deadzones are added by adjusting the "Minimum" and "Maximum" values. Do not exceed 17000 maximum raw value on the brake (Y-Channel).

- Every change needs to be sent to the PCB using the [**Write config to Device**] button before it is taken into effect. So you can play around and test things freely on the app, nothing will be used by the game until you do this.
- You can save settings to a file using the [**Save config to file**] button and load settings from the file using the [**Load config from file**] button.
- Drop down menu shows the recently used files.
- Under the gear icon, you can choose the default directory for saving the settings.
- You can enable / disable channels from the bottom (on the next picture, the X axis (clutch) has been disabled).
- On the "Axes Curves" tab, small curve profile "slots" can be used as storage for different curve shapes. Store the current curve to a slot by using the "**Set**" button. Select the channel (X, Y, Z) you want to edit from the right, active channel is highlighted.
- Do not use the "Inverted" tick box - it is not meant to be used with racing pedals.
- If you have trouble configuring the pedals, see sections 6. & 7.

If you disconnect the USB-cable, you need to close the app and open it again after the USB has been reconnected to the PC.

5. Software Layout: “Axes Config” Tab

6. Software Layout: “Axes Curves” Tab



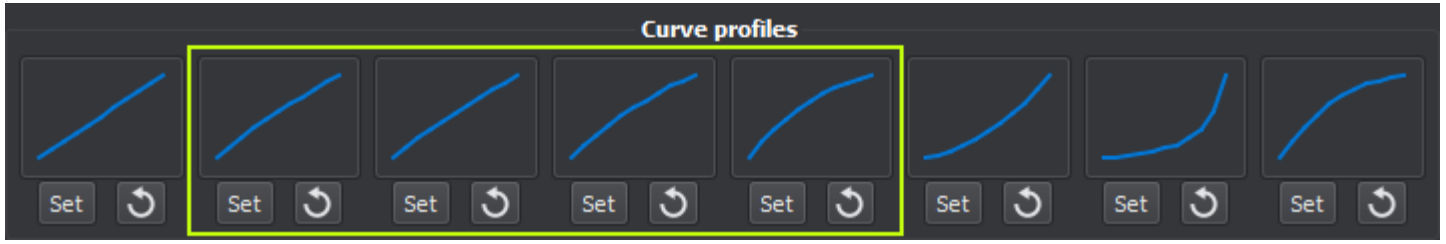
7. Software: Reset to Factory defaults

1. Download our default profile (“SIMGRADE_Factory_xx.xx.2023.cfg”) from here:

   https://drive.google.com/drive/folders/1-eYLxy8xybP9b80pAnt_rqGty7ul9En5?usp=drive_link

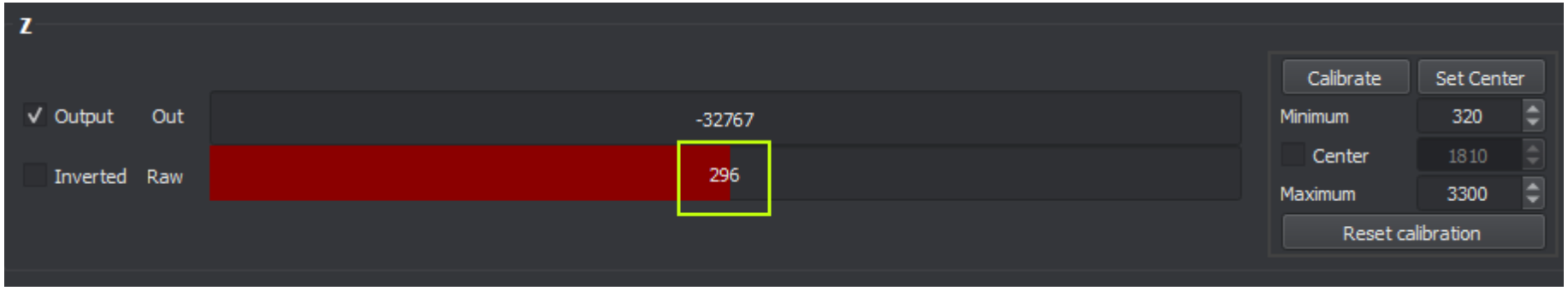
2. Make sure the pedals are connected to the PC with USB-C
3. Close the software if it is open
4. Open the software
5. Load the downloaded default profile file using "load config from file"
6. Write the loaded settings to the PCB, with "write config to device"

Note, the file contains some example profile shapes to make the throttle feel more linear:

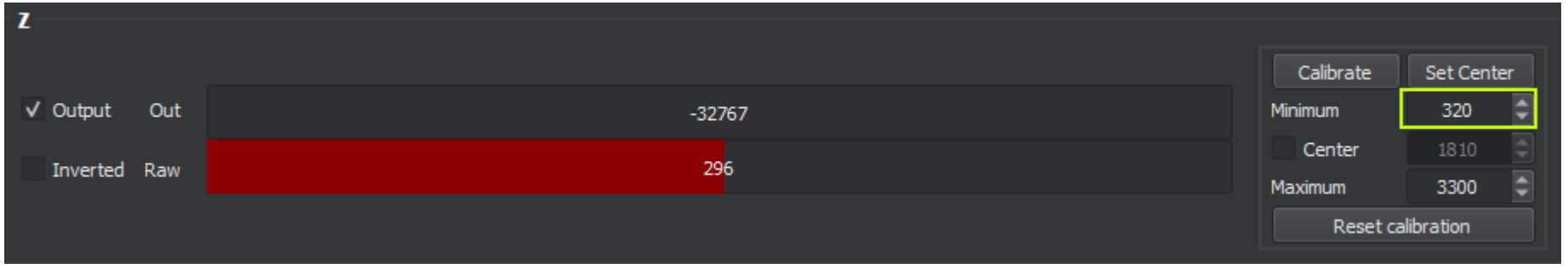


8. Software: Manual Calibration (any pedal)

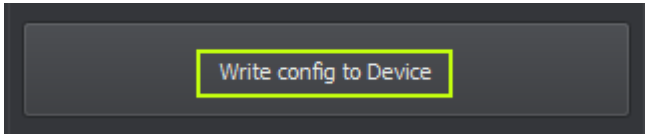
1. Check what is your "default **raw value**" in zero position (pedal is not being pressed):



2. Input the "default **raw value**" plus some margin (in this example, +24 is used to create a small deadzone) to the "Minimum":



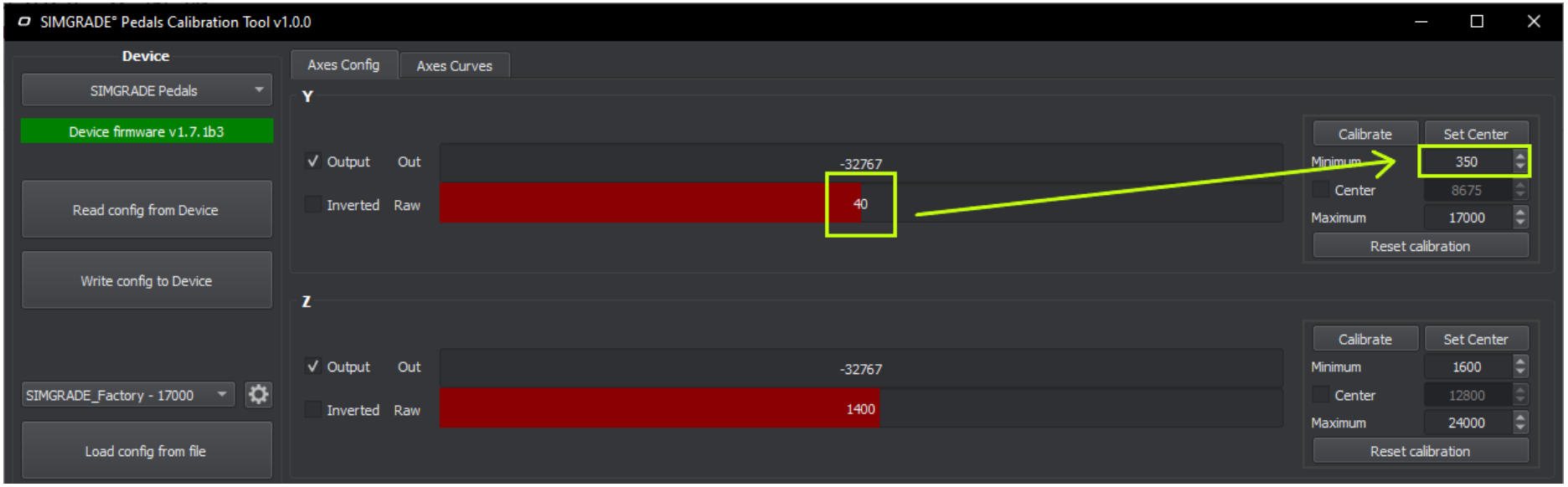
3. Push down the pedal and see what the "max **raw value"** is.
4. Input the "max **raw value**" to the "Maximum" (for throttle pedal use slightly smaller number to create top end deadzone)
5. Click "Write config to Device" to save the changes.



Example #1: Adjusting a pedal bottom deadzone (pedal in “zero” position):

1. Check the “Raw” value while pedal is stationary (40 in the picture below)
2. Type in a value slightly bigger as the “Minimum”. The bigger the gap between the values (Raw vs. Minimum), the bigger deadzone you’ll have in the start of the pedal travel. In this example we would recommend changing the value 350 to around 80.
3. Apply the new value by using the [**Write config to device**] button.

Note, that the amount of preload will affect the “Raw” value in pedal zero position.



Example #2: Red balloon (indicates pedal position) is not following the curve:

1. This happens when you have changed the curve, but not yet sent the changes to the PCB.
2. Use the [**Write config to device**] button to apply the curve changes, and the ball will start to follow the curve.