
SIMGRADE^o

Thera Pedals

Manual v.1.8



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1. General

Please read the manual carefully as it contains important information regarding the pedals and safe usage of them. Do not use the pedals before reading the

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 Thera'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.**
- **Käytä suojahanskoja kun vaihdat tai lisäät osia polkimiin, tai poistat osia polkimista.**
- Älä käytä maaöljypohjaisia voiteluaineita polkimien kanssa, ne vahingoittavat osia polkimista. Mikäli voitelua tarvitaan, suosittelemme PTFE-kuivavoitelusuihkettä.
- 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® THERA 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.

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 5 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® Thera



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.**
- **Use protective gloves when changing or adding parts to the pedals, or when removing parts from them.**
- 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° THERA PEDALS is meant to be used as an USB-input device on a computer. The manufacturer is not liable for any damage or injury 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.

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 5-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° Thera



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.
- Always use all 4 mounting bolts (M6) with washers on each pedal. Mounting pattern for one pedal is 80 mm (longitudinal) x 24 mm (lateral).

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

It is recommended to connect the pedals directly to the motherboard of the PC (back of the computer), into a USB 2.0 slot. 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.

2. Mechanical Adjustments

2.1. General - read carefully!

- **Do not open the connection between the pedal arm and the push rod top end. You're not allowed to change the mounting slot on the pedal arm. Changing the slot might lead to permanent damage to the load cell. Changing the slot voids warranty (all pedals).**
- **Use protective gloves when changing or adding parts to the pedals, or when removing parts from them. Particularly when changing the spring or elastomer on the brake or clutch, or when adding washers on the stack to adjust preload (all pedals).**
- **Proceed with caution when pressing the rear of the spring / elastomer down to its place. The assembly will snap suddenly to its place (the higher the level of preload, the faster the snap), and you need to be extra careful not to get your fingers in between. Locate the parts carefully between the bearings and make sure you push it down evenly. It is recommended to do this operation only while the pedals are securely mounted on a stable base (for example a rig). DO NOT keep your fingers under the assembly while pressing down. Only press from the top side paying close attention to keep everything lined up correctly.**
- **To prevent accidents - only adjust the pedals while they are securely mounted on a firm base (for example on a rig).**
- All pedals are load based, which means every time you change any mechanical setting on a pedal, you need to recalibrate that particular pedal. This is done in the app by adjusting the signal cut off lines up or down (bottom line & top line). See the "Software" section for more details. The only exception to this is that the top line for the brake needs to be changed only when you want to change the maximum braking force - adding or removing preload has no effect on this.
- The angle of the pedal can be changed (+/-8,5 degrees) by opening the rear bolts on the side, and rotating the pedal.
- The maximum allowed pedal force (110kg) is only achieved with the red spring and with the pedal face adjusted to low position.

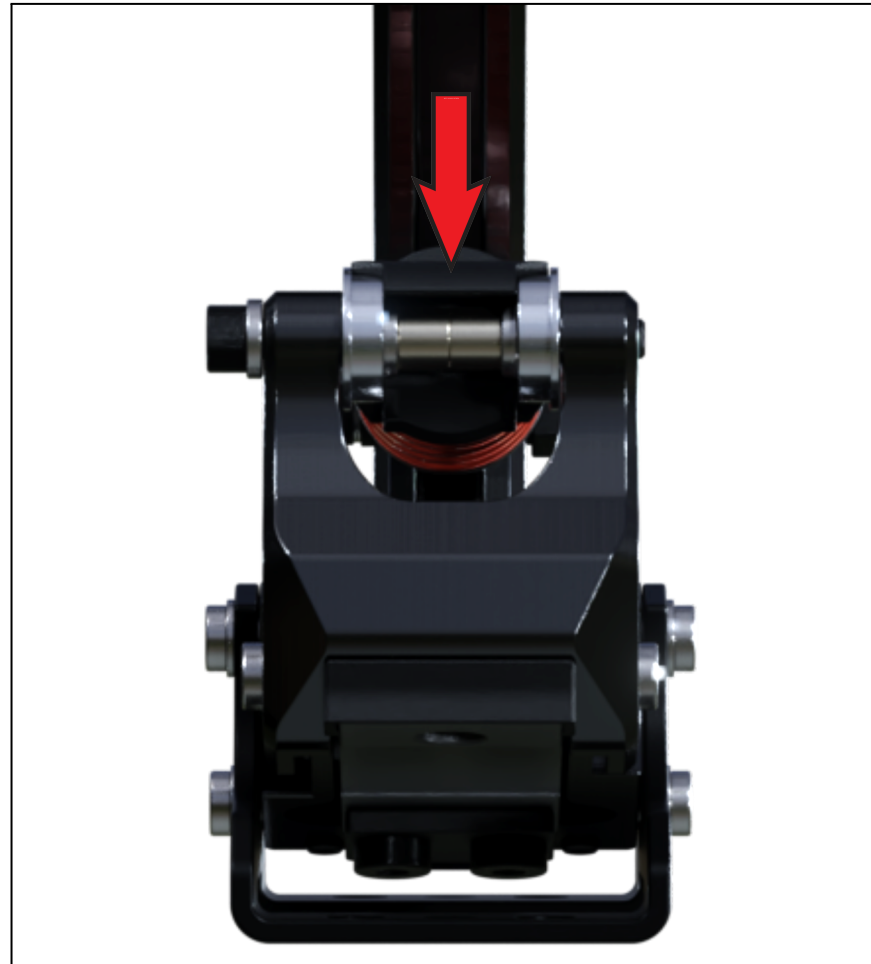
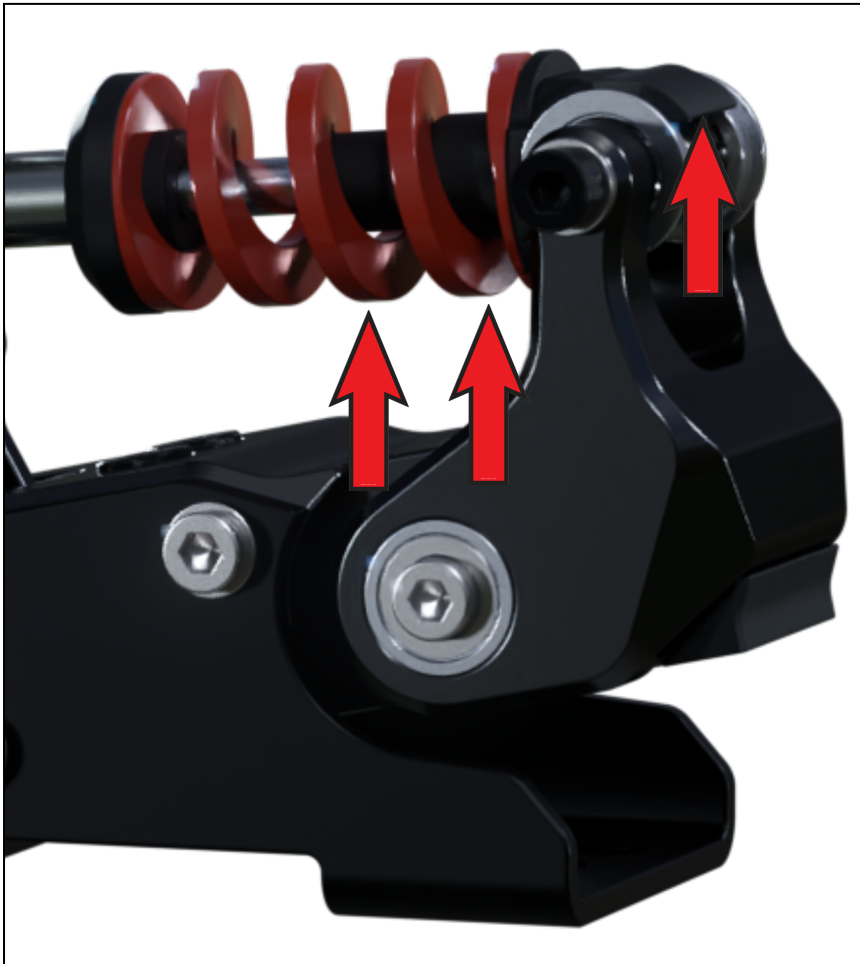
2.1.1 Brake feel - a good starting point / initial setup

- The brake pedal was delivered to you with the elastomer installed and the push-rod angle at the highest setting, see picture below. Test the pedal with this setting and try to achieve a wanted level of pedal travel with the preferred amount of force, by changing the push-rod angle and testing between the spring and the elastomer. See sections 2.2.1 and 2.2.2 to adjust the relationship between the amount of travel and the used force.
- You should use as much force as possible while braking, without feeling any discomfort. Don't use so high a force that you cannot reach the wanted brake input level easily and consistently.
- Calibrate the brake pedal so that the upper limit is reached with around 5 % - 30 % higher force than your comfortable and repeatable braking force (the force you actually want to be using while driving). The optimal percentage for this varies from car to car and between different simulations, so a good starting point is about 20%. Just keep this in mind, if you're having difficulties perfecting the braking, and especially the crucial trail braking phase. You may want to adjust this differently for every different car in the end, and probably also use different profiles on different simulations. See section 3 for saving profiles into files.
- To finetune the preload, follow the instructions on section 2.2.3



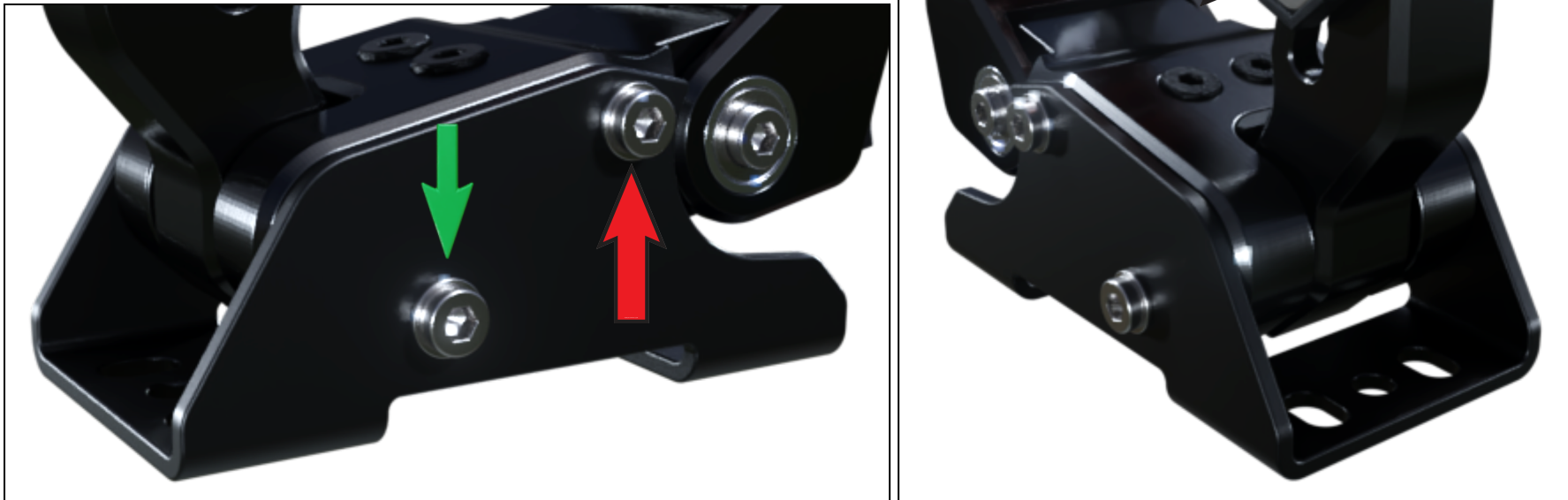
Lifting up and pressing down the rear of the pushrod assembly. It is recommended to only lift the rear up, while the pedal is mounted.

- Lift up from the lip at the back. You can also support the lift from the spring / elastomer underside with your other hand.
- **Only press down from the middle of the top side. DO NOT keep your fingers on the underside or one the edges.**





^After you've lifted the rear up, you can change the spring / elastomer or add / remove preload for the pedal.



^ Left picture: **Pedal angle adjustment:** Loosen the front bolts (green) and remove the rear ones (red) from both sides to adjust the angle of the pedal (the aluminium frame has 3x threaded holes for the angle adjustment).

^ Right picture: You are not allowed to open this bolt and change the mounting slot on the pedal arm (all pedals).

2.2. Brake & Clutch

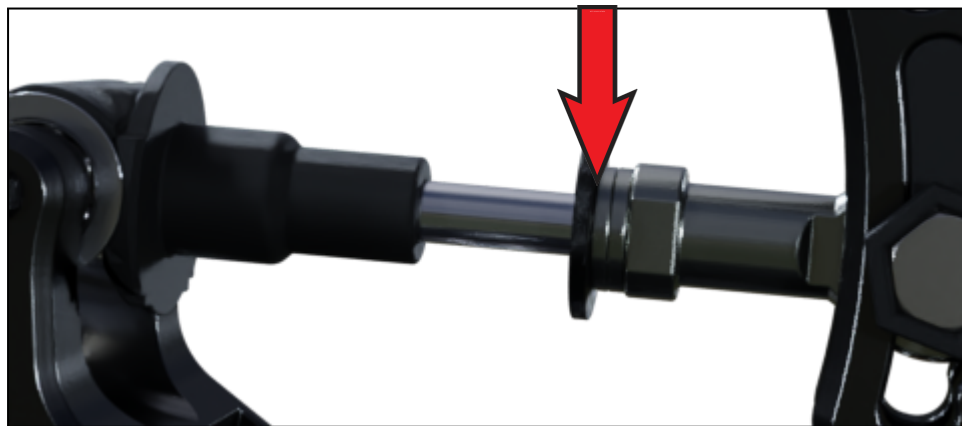
To get stiffer pedal you can:

- Adjust the pushrod top connection to a higher position (changes mechanical leverage ratio)
- Use the included spring (optional on the brake)
- Add preload by adding washers on the rod assembly

To get softer pedal you can:

- Adjust the pushrod top connection to a lower position (changes mechanical leverage ratio)
- Use the included elastomer (only brake)
- remove preload by removing small washers from the rod assembly

If the spherical rod-end is not moving easily on the pedal arm slot hole, lift up the rear of the spring / elastomer assembly and then adjust while there is no preload compression. This is the easiest to do once the pedals are mounted on the rig.



2.2.1 Brake max load and pedal travel with the spring

On the brake, you have eight different positions on the pedal arm to adjust the push-rod position (from red to green). On the below chart you can find the needed pedal loads to reach 100% signal level, and the corresponding amounts of pedal travel. Note that the chart is only valid when the red coil spring is in use. Load and travel is measured at the height of the pedal face middle mounting hole. The chart does not count in the effect of the load cell bending, that will add slightly the amount of travel, although it is strongly dependent on the used load.

PF HIGH = Pedal Face is mounted to the top position

PF LOW = Pedal Face is mounted to the bottom position

Push-Rod Position	Max Pedal Load (KG) (PF HIGH)	Pedal Travel (mm) (PF HIGH)	Push-Rod Position	Max Pedal Load (KG) (PF LOW)	Pedal Travel (mm) (PF LOW)
1	93	19.1	1	110	16.3
2	91	19.5	2	107	16.6
3	89	20.0	3	105	17.1
4	87	20.6	4	102	17.5
5	84	21.3	5	99	18.1
6	81	22.1	6	95	18.8
7	78	23.0	7	91	19.6
8	74	24.1	8	87	20.5



2.2.2 Brake load with the elastomer

Recommended max pedal load with the elastomer is 75kg. On the below chart you can find indicative recommended pedal loads when the elastomer is in use.

PF HIGH = Pedal Face is mounted to the top position

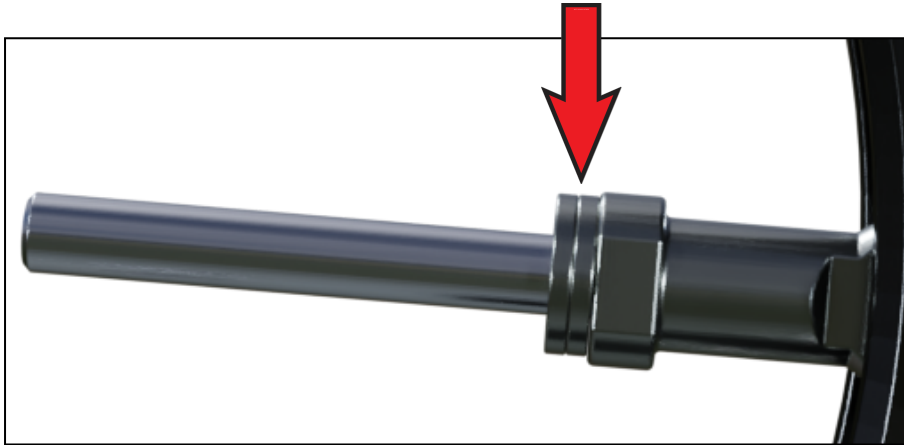
PF LOW = Pedal Face is mounted to the bottom position

Push-Rod Position	Recommended Max Load (KG) (PF HIGH)	Push-Rod Position	Recommended Max Load (KG) (PF LOW)
1	64	1	75
2	63	2	74
3	61	3	72
4	59	4	70
5	57	5	68
6	55	6	65
7	53	7	62
8	51	8	60



2.2.3 Adjusting the brake preload

- Use the included washers to finetune the amount of preload. Note that after the first few hard pedal presses (especially with the spring) some settling might occur and you might need to readjust the amount of preload at the start.
- The washers are installed to the top of the spring pack - see the picture below.



2.3. Throttle

To get stiffer pedal you can:

- Adjust the pushrod top connection to a higher position (4 different positions)
- Add preload by adding a washer on the rod assembly, next to the spring (if not yet installed)

To get softer pedal you can:

- Adjust the pushrod top connection to a lower position
- remove preload by removing the washer from the rod assembly

Maximum allowed amount of preload is achieved with one washer on either side of the spring. Do not add more preload to the throttle.

The pedal is shipped with maximum preload configuration.



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.

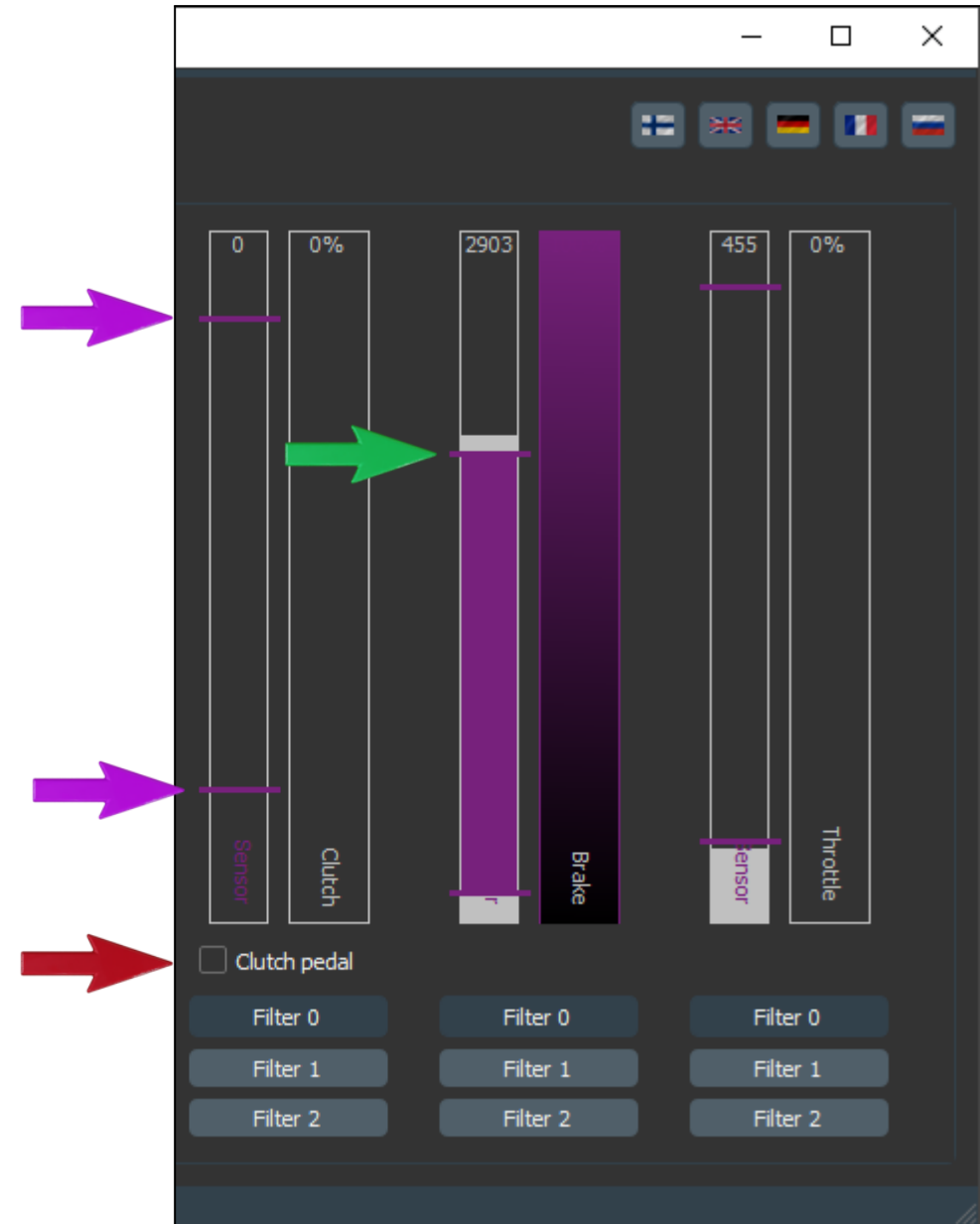
You can adjust the settings while driving, just close the app after the adjustments are done.

3.2. Layout

Purple = Horizontal lines for adjusting the dead zones. After any mechanical changes on a pedal, you need to adjust these lines for that particular pedal to match the mechanical settings, and to get your dead zones right. The only exception to this is the brake max. force - this only needs to be adjusted if you want to change the actual max. needed braking force for 100% brake input.

Red = Toggle switch for activating / deactivating the clutch.

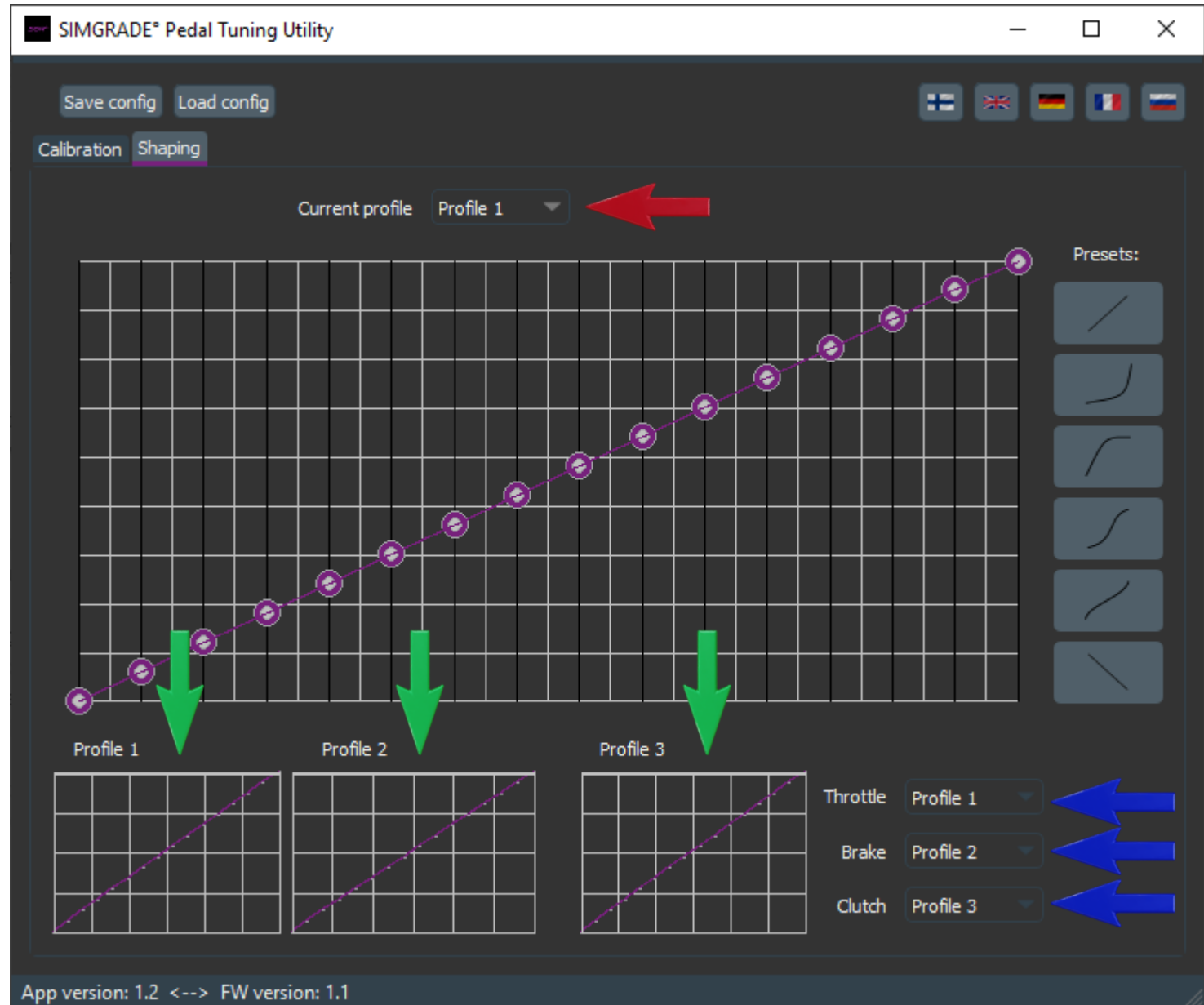
- Calibration on the app is done, when you have put the sliders for every pedal where you want them.
- Filters are for smoothing out the signal. Value at 0 (=no smoothing) is recommended if the signal is stable.
- Profile saving from the top left corner.
- Adjusting the brake needed maximum force level is done moving the top line on the sensor bar (green).



Blue = Profiles that are being used for each pedal.

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

“Current profile” tells you the profile that is being modified.



4. Software (After May 2023)

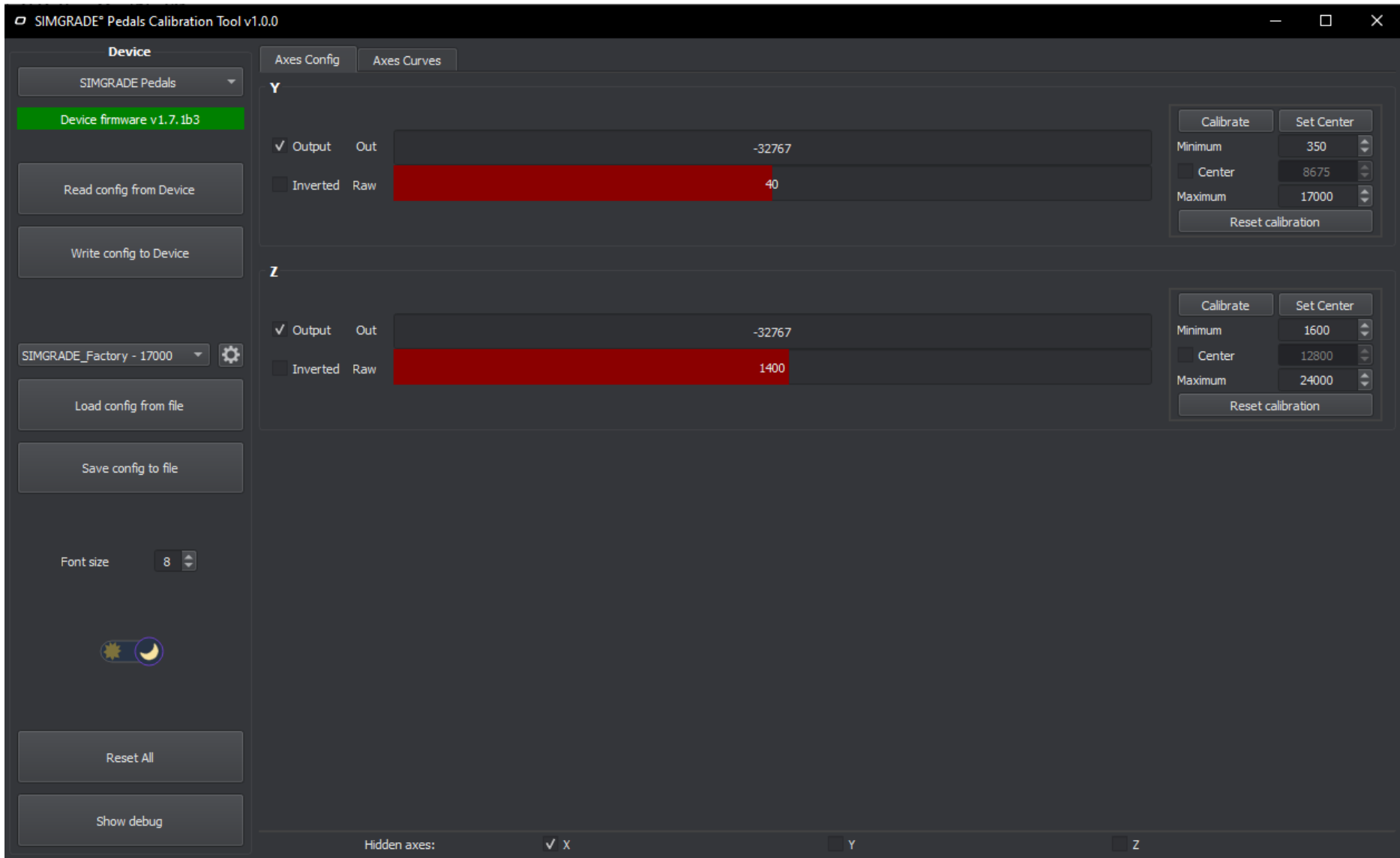
- Connect the Controller Box to the PC, then connect the pedals to the Box.
 - Throttle = RIGHT = Z | Brake = MIDDLE = Y | Clutch = LEFT = X
- Download the software from <https://simgrade.fi/support/>
- Open the software.
- Click [**Read config from Device**]
- Calibrate pedals, if needed
 - 1. Click [**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).**

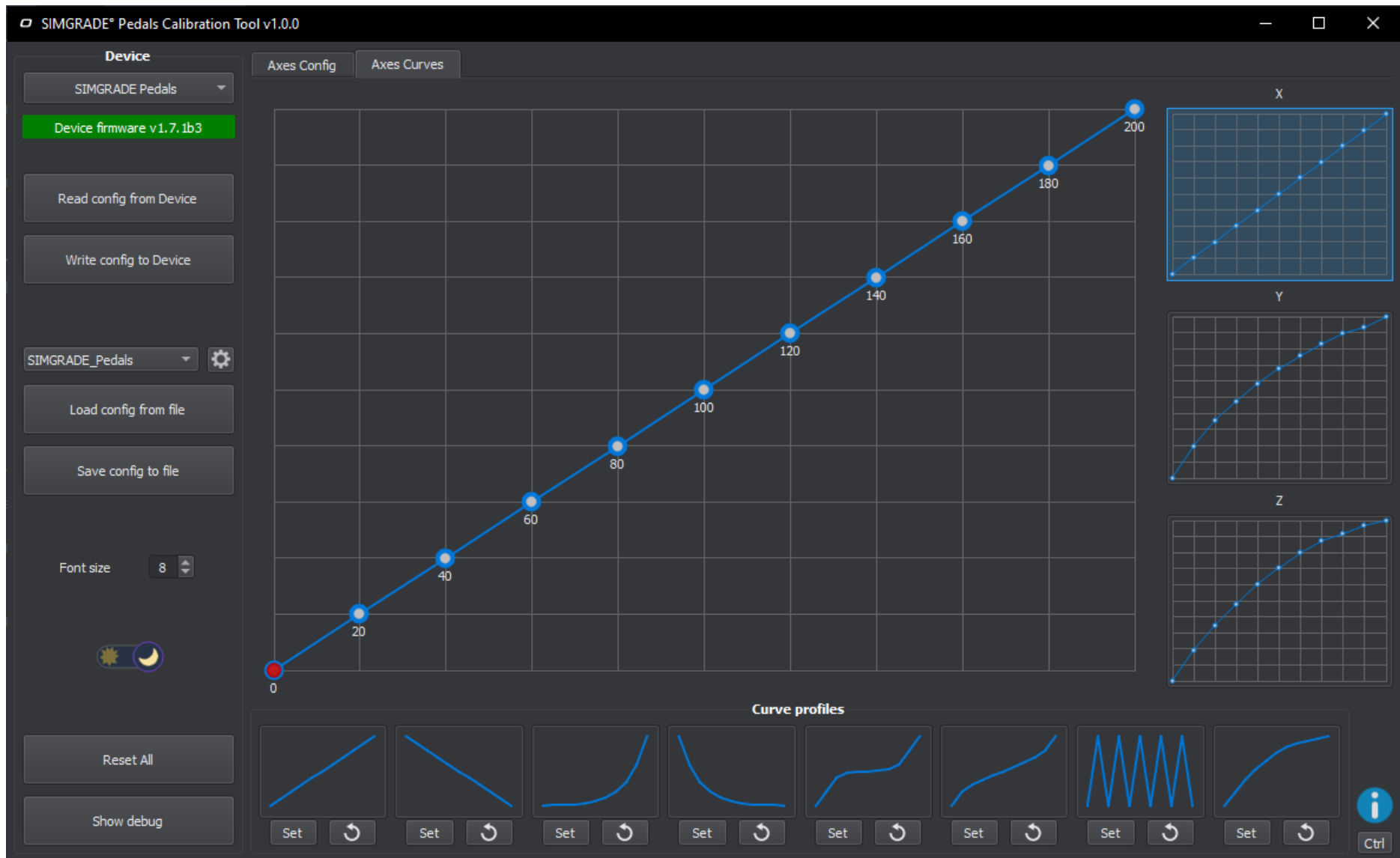
- **Every change needs to be sent to the PCB using the [**Write config to Device**] button before it is taken into effect.** So you can play around and test things freely on the app, nothing will be used by the game until you do this.
- You can save settings to a file using the [**Save config to file**] 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



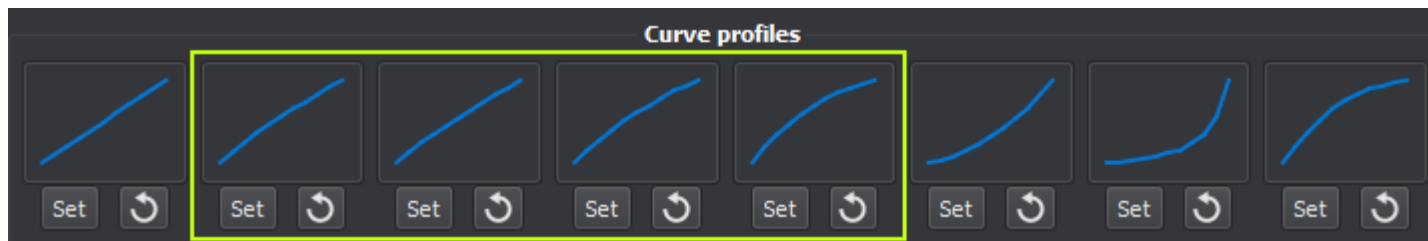
7. Software: Reset to Factory defaults

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

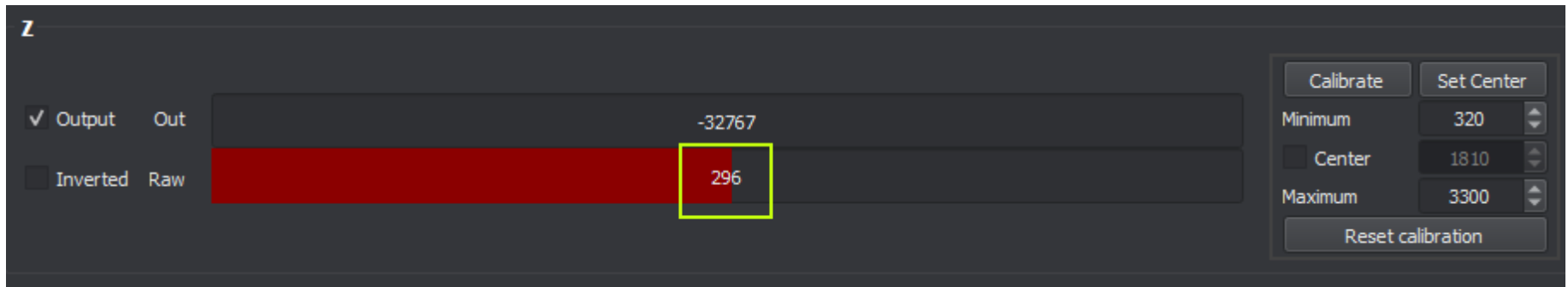
2. Make sure the pedals are connected to the PC with USB-C
3. Close the software if it is open
4. Open the software
5. Load the downloaded default profile file using "load config from file"
6. Write the loaded settings to the PCB, with "write config to device"

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

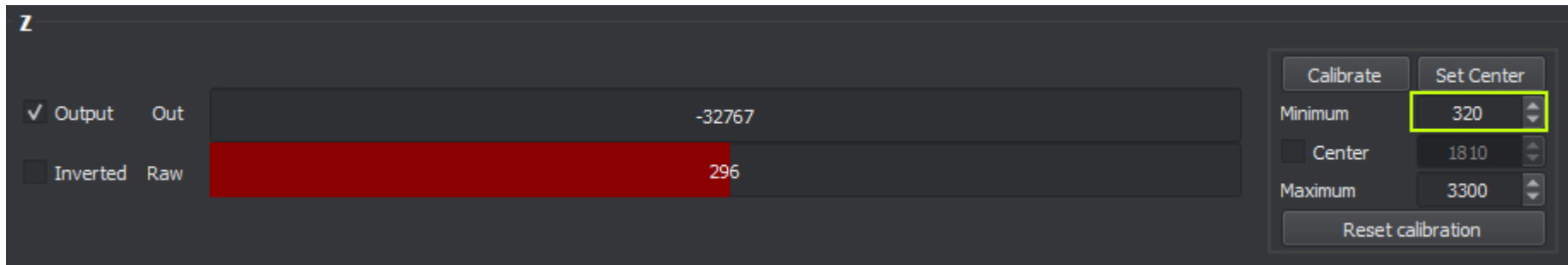


8. Software: Manual Calibration (any pedal)

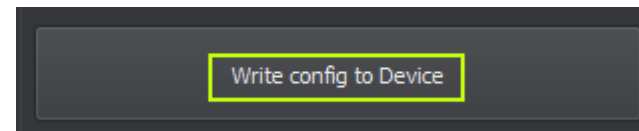
1. Check what is your "default **raw value**" in zero position (pedal is not being pressed):



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



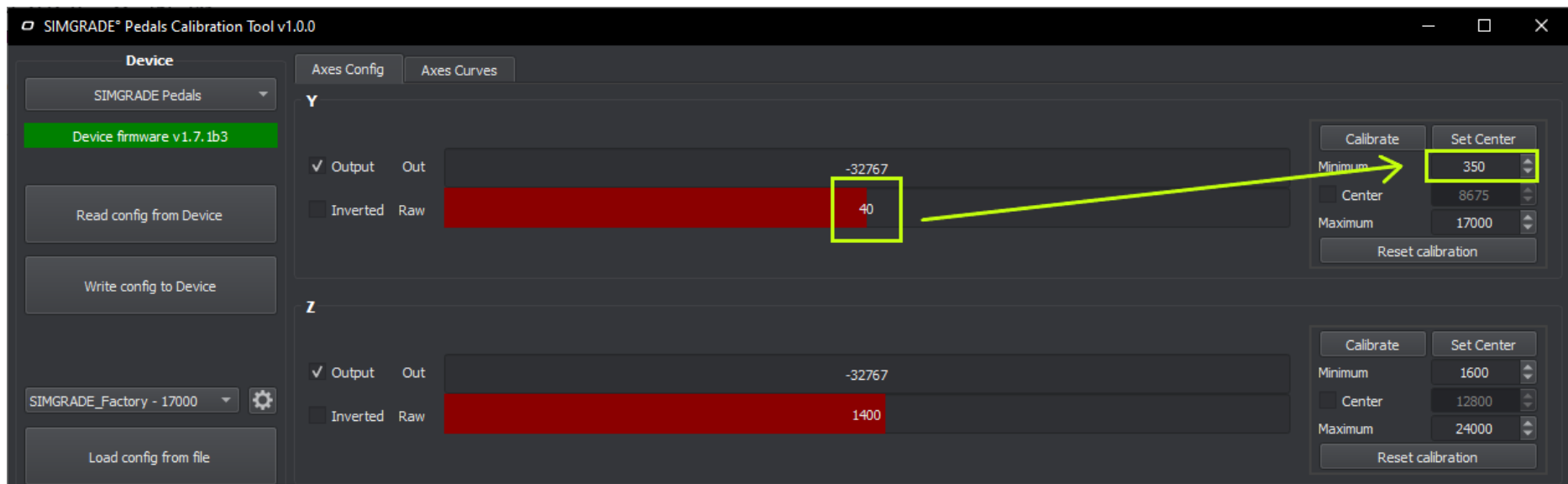
3. Push down the pedal and see what the "max **raw value**" is.
4. Input the "max **raw value**" to the "Maximum" (for throttle pedal use slightly smaller number to create top end deadzone)
5. Click "Write config to Device" to save the changes.



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.

