SIMGRADE°

R7 PEDALS

Manual v.2.0

30.08.2021

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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.

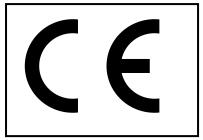
1.1.2. Takuu

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.

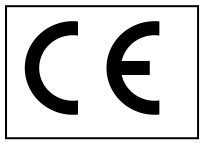
1.1.2. Warranty

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 and in front of the pedals. In these use cases mounting on to a 40x120 aluminium profile is the optimum solution.
- 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).
- Controller box can also be mounted with bolts (M4, DIN912). For aluminium profile, use L=25 mm bolts.

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

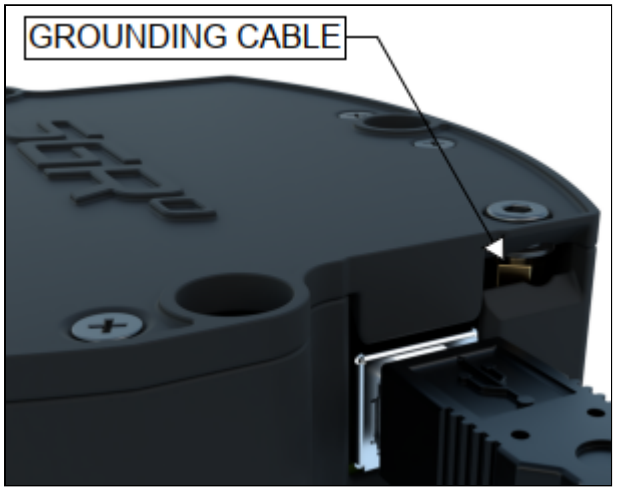
Connect the brake pedal to the middle port, and throttle on the side of the USB-out port. The 3rd port is for the clutch.

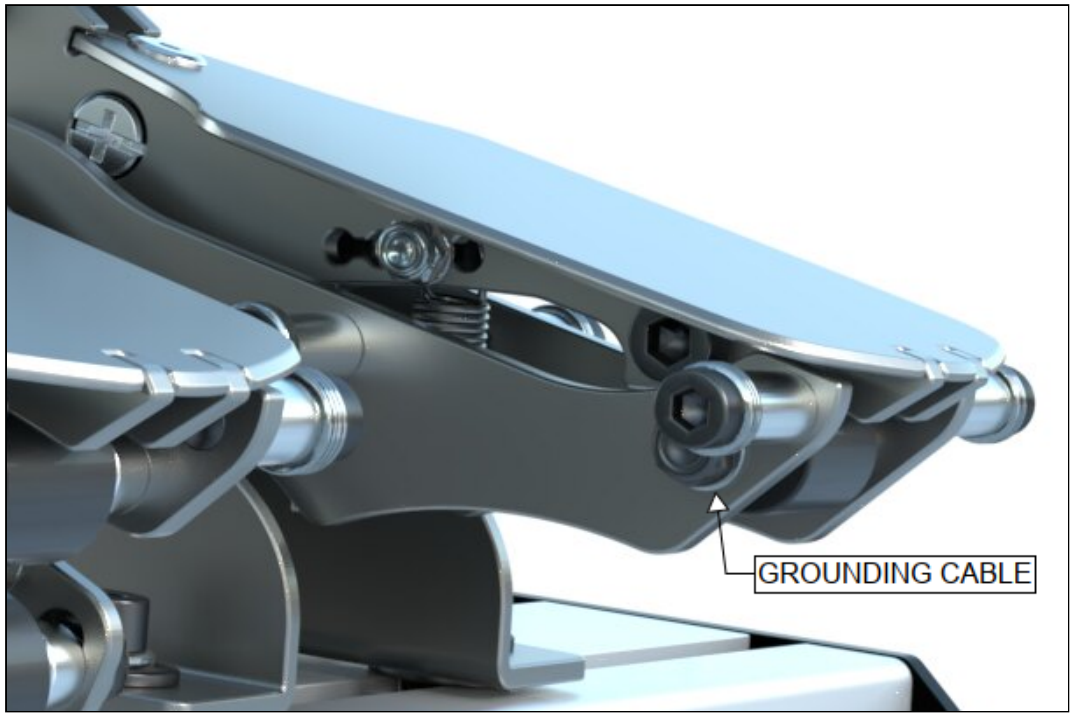
It is recommended to connect the pedals directly to the motherboard of the PC (back of the computer), into a USB 2.0 slot (black). We do not recommend using USB-hubs with the pedals.

1.6. Grounding

In case you have some installed hardware, or some other environmental issue, that is creating EMI problems or other electrical interference (i.e. signal from the pedals is not stable), you might need to ground the pedals by connecting a cable from the controller box to the **throttle** pedal. Connect the grounding cable to the locations shown in the pictures below. Make sure the pedal end of the cable is directly connected to the frame plate, between the washer and the frame. The controller box end is M3 (ring), and the pedal end is M5 (fork). Tighten the pedal end firmly, but do not use excess force while tightening the box end.

There's no harm in adding the grounding cable regardless if you have a real EMI problem, but it is not needed if the signal is stable. The signal value will always move around / vary slightly, but if the range of variation is more than 10 units (out of 4096) while having the pedals stationary, we recommend adding the cable just to be on the safe side.





1.7. 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 stoppers should last a considerably long time (years). 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).

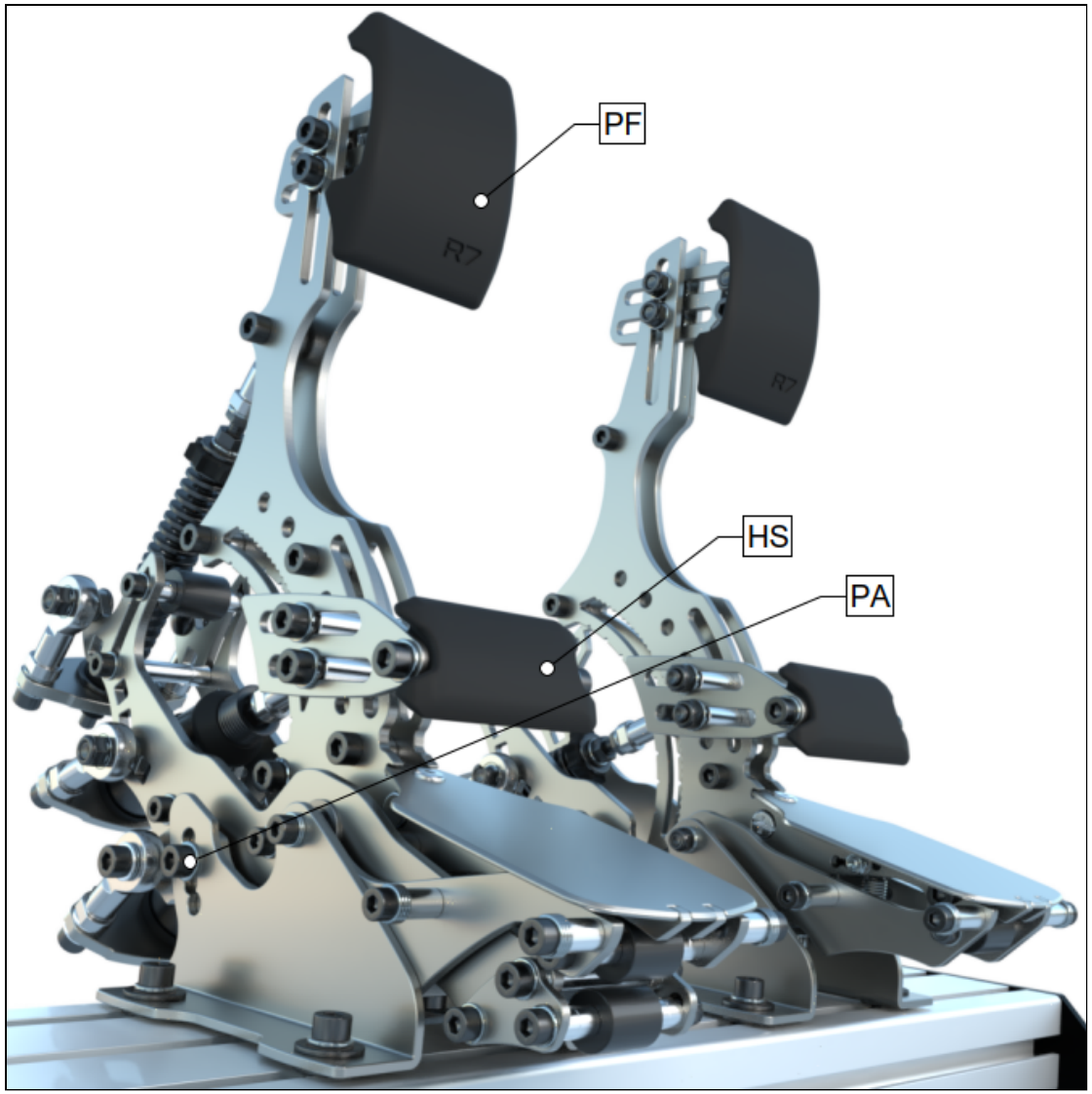
2. Mechanical Adjustments

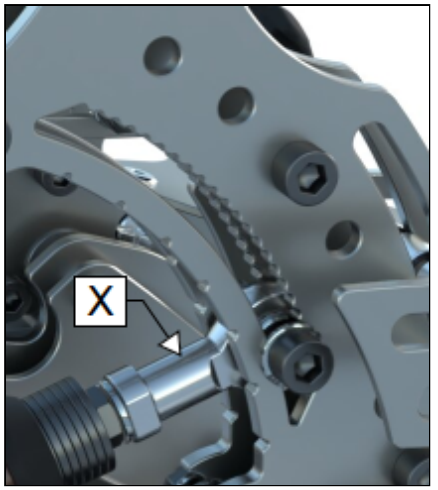
2.1. General

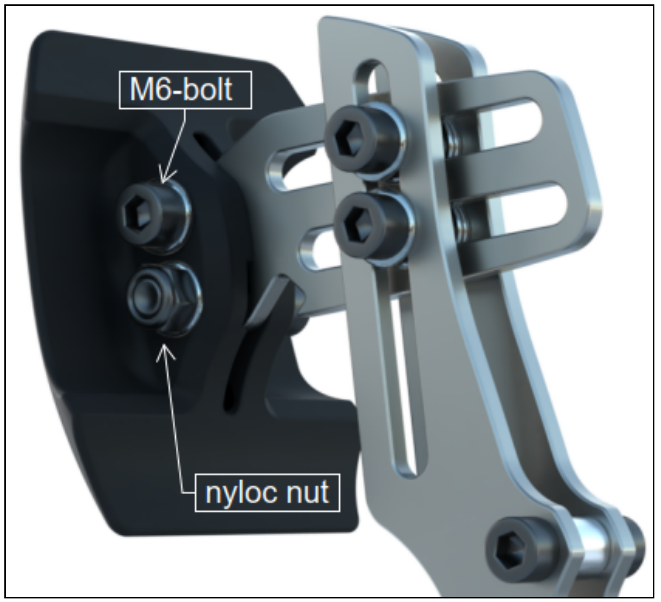
- To achieve a more traditional feel to the pedals, adjust the heel support (HS) closer to the pedal arm. This will reduce the movement of your heel, which might feel more comfortable at first. It is recommended that you gradually learn to use the heel supports further away from the pedal arms, as this will increase the control you have on the pedals.
- It is good practise to first adjust the angle of the whole pedal using the bolts on the back (PA) and then fine tune by adjusting the pedal face(s) (PF). Tip: On the throttle use allen key to hold the spacer between the plates in place (brake has no spacer).
- 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. 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 (PA) one step higher, and then slide the pedal face (PF) back, closer to the pedal arm. This way there is less strain on the pedal.
- If you notice that the plastic part of the pedal face (PF) is loose, follow these steps:

  1) Loosen the nyloc nuts on both sides.

  2) Tighten the M6-bolt (there is another nut inside the PF) 3) tighten the nyloc nut while keeping the bolt secured. Don’t overtighten (so much that the plastic starts to deform).

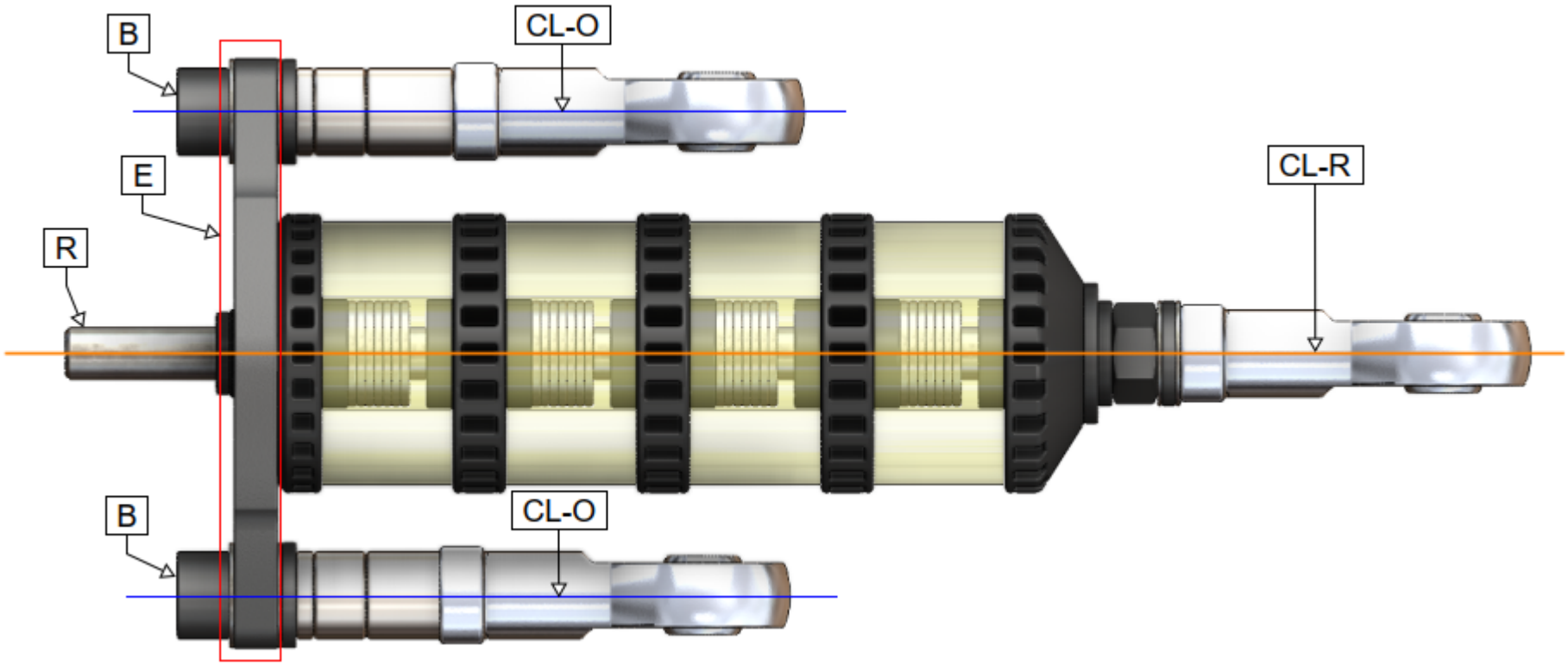

PF
HS
PA


X


M6-bolt
nyloc nut

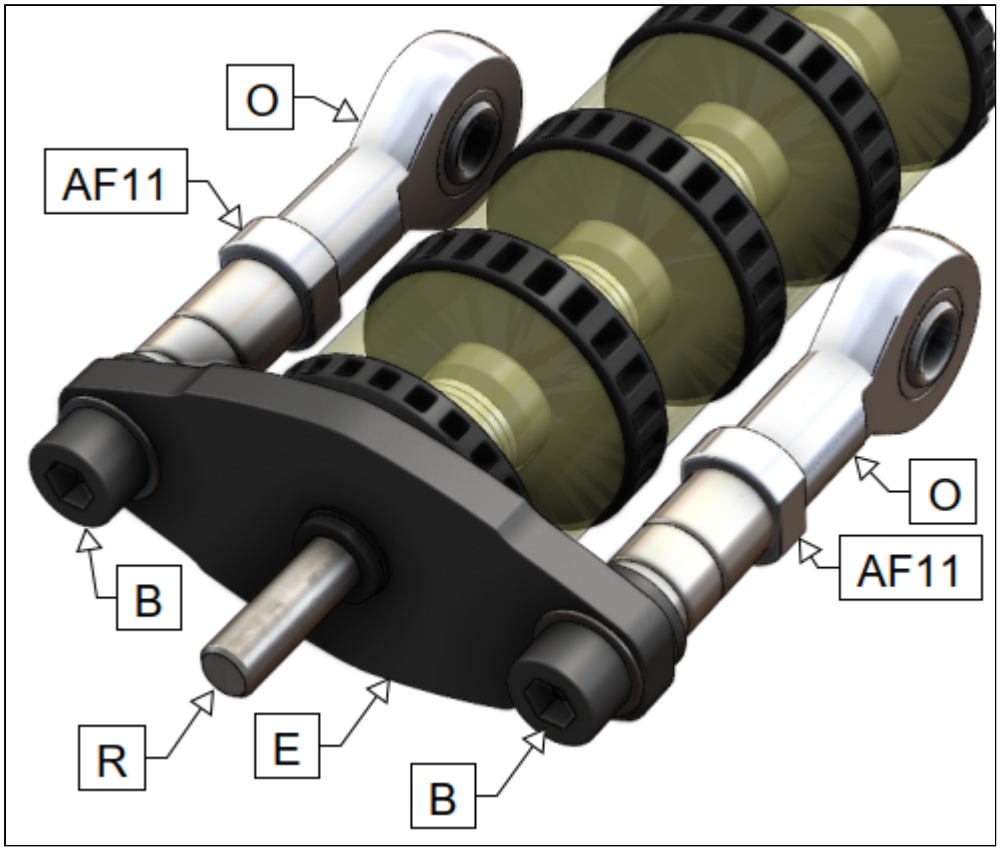
Tightening the two rod-end bolts on the back of the pedal

For changing the elastomers / springs you need to open the bolts marked with a (B). Putting them back on, there are few things to pay attention to. After the tightening, the alignment of the rod-end centerlines (CL-O) and the push-rod centerline (CL-R) should be parallel, and the push-rod center line should be in the middle of the pedal. Because of the manufacturing tolerances, in some cases they do not align absolutely perfectly but it’s nothing to worry about - just a matter to pay attention to and to get as close as possible. There are slot holes on the end-plate (E) to allow the alignment line up better.



As a good working practice, follow these steps to make the alignment as easy as possible while tightening:

1. Looking from the back of the pedal, turn the spherical rod-ends (O) as much clockwise as they go (while the bolts (B) are still loose).
2. Tighten the bolts (B) evenly (one turn at a time for each), while keeping the alignments for the rod-ends (O) and the push-rod (R) straight and in the middle. Do not use full tightening torque yet, just snug them so they don’t turn easily anymore.
3. Straighten the rod-ends with a wrench (AF 11mm).
4. Tighten the bolts fully, while securing the rod-end with the wrench.



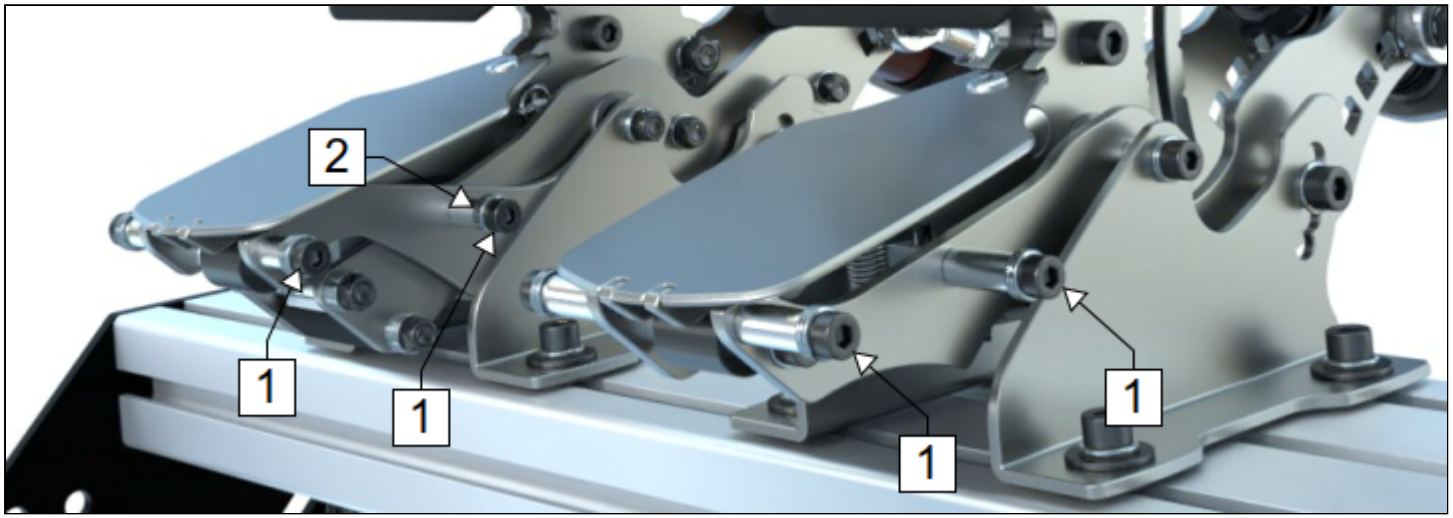
2.1.1. Fixed heel supports

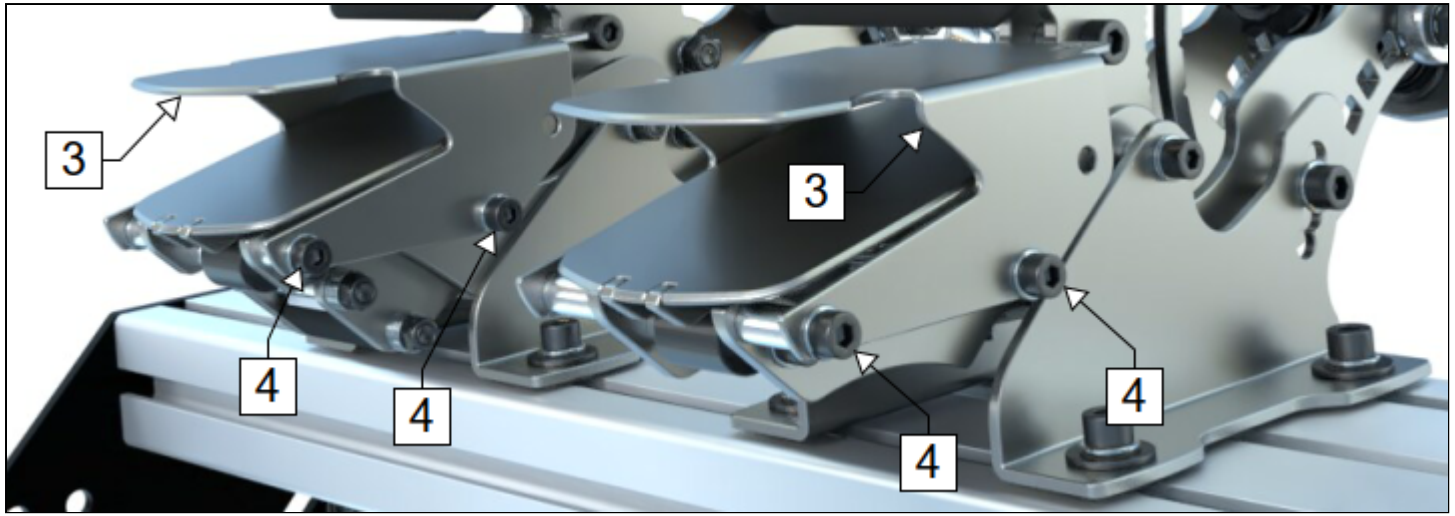
As an alternative for the moving heel supports, you can use the fixed supports. There are individual supports (so you can even choose to use one only on the brake, for example), and a full width heel plate, to create an even surface for your feet to move on.

Installing the fixed supports: **(1)** Loosen the four M5-bolts from the sides of the pedal. **(2)** remove the stainless (clear) washers from the brake (only from the two bolts in the rear) and put the bolts back on with the black washers. **(3)** Slide the single supports on their place (washers go to the outside of the support). You might need to slide the heel stoppers (HS) upwards, to get them out of the way. **(4)** Tighten the bolts.

Installing the full width heel plate: **(5)** Align the pedals laterally on the same distance from the driver. **(6)** Mount the plate with the M5-bolts (button head) and Nyloc nuts to the slot hole.

NOTE: When using the fixed supports, the throttle travel needs to be limited. Install the provided limiter bolt with spacers (L) behind the end-stop.

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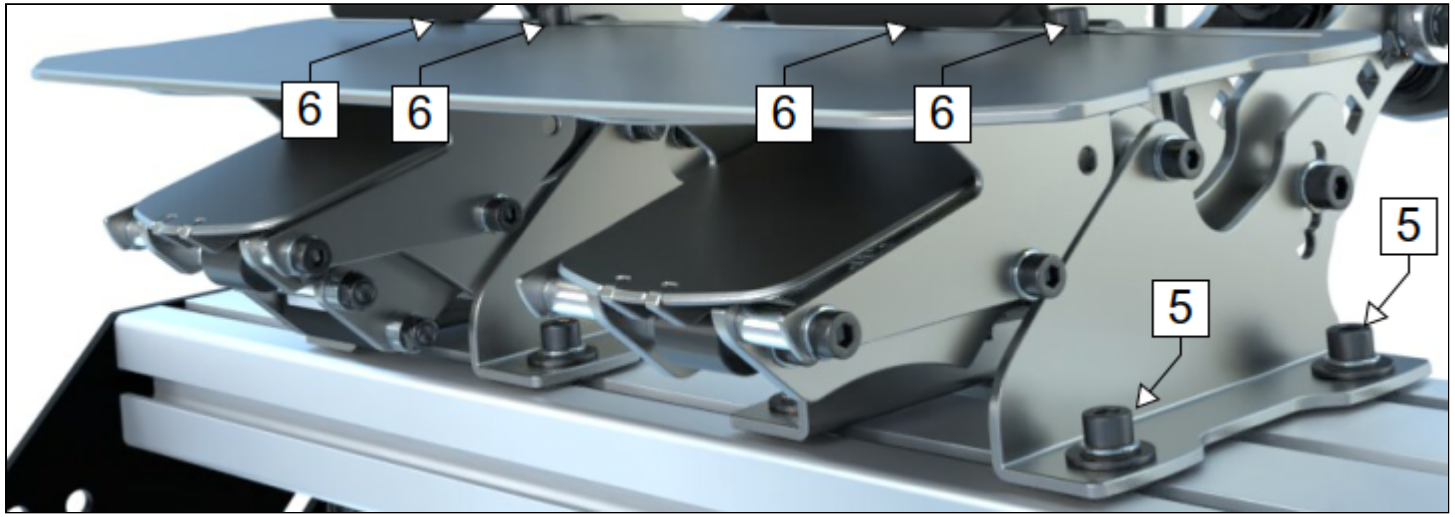
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6
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5
5


L

2.2. Brake

The pedals come with polyurethane springs (elastomers) and with steel diecast springs as optional alternatives. Both provide a great progressive feel and smooth responsive return phase for the pedal, so it's up to you to decide which ones to use. If you like a really sharp return for the pedal, we recommend you to also try the spring option, as this characteristic is even more pronounced with them. With the adjustable leverage ratio, you have 23 different pedal softness settings for each installed combination of elastomers / spring.

Additionally to the main elastomer / spring pack, you have the option to install three other separate elements:

- **LC-load limiter #1** (2.2.3.): The load taken by this elastomer is deducted from the load that goes to the load cell. Adds to the resistance you feel with your foot.
- **Separate preload spring** (2.2.4.): Separately adjustable spring to enhance / adjust the amount of preload and the pedal return phase feel.
- **LC-load limiter #2** (2.2.5.): The load taken by this elastomer is deducted from the load that goes to the load cell. Does not add to the resistance you feel with your foot.

- Three default elastomer sets are provided with the pedals (OD=30mm, ID=13mm):
  - **Road car**: 5x L=10mm [soft elastomers: ShA 50]
  - **GT**: 4x L=15mm [medium elastomers: ShA 70]
  - **F1**: 2x L=30mm [hard elastomers: ShA 90]
- Additionally, there are three spring options included:
  - **Road car**: Blue (soft)
  - **GT**: Red (medium)
  - **F1**: Yellow (hard)
- Preload is created with the two bolts (B) on the back. The amount of preload is adjusted by changing the total length of the spacer stack (S) between the rod-end (O) and the end-plate (E). See 2.2.1. Additionally, adding washers or spacers in front of the elastomer set is allowed and possible, but for the instructed 'default' combinations these washers are identical (DIN 125 + DIN

9021) **(***. As a general good working method, first the rough adjustment for the preload is done to the front of the elastomer set with spacer and washers, which then is fine tuned with the spacer stack (S).

- Washers (W) are used inside the elastomers. You should always have correct amount of washers installed. These will protect the elastomers from overcompression and allow you to fine tune the pedal feel, as you can limit the amount of maximum compression for each element, and thus adjust the feel of the pedal. Washers according to DIN 125 and DIN 988 are allowed (OD=12mm, ID>6mm), but the thickness should not be less than 0,5mm (0,5mm washers are included).
- Allowed adjustment range for the washers inside the provided elastomers (**recommended starting point is to keep these at minimum**):

  L=10mm: **Min.=1mm | Max.=3mm**

  L=15mm: **Min.=5mm | Max.=7mm**

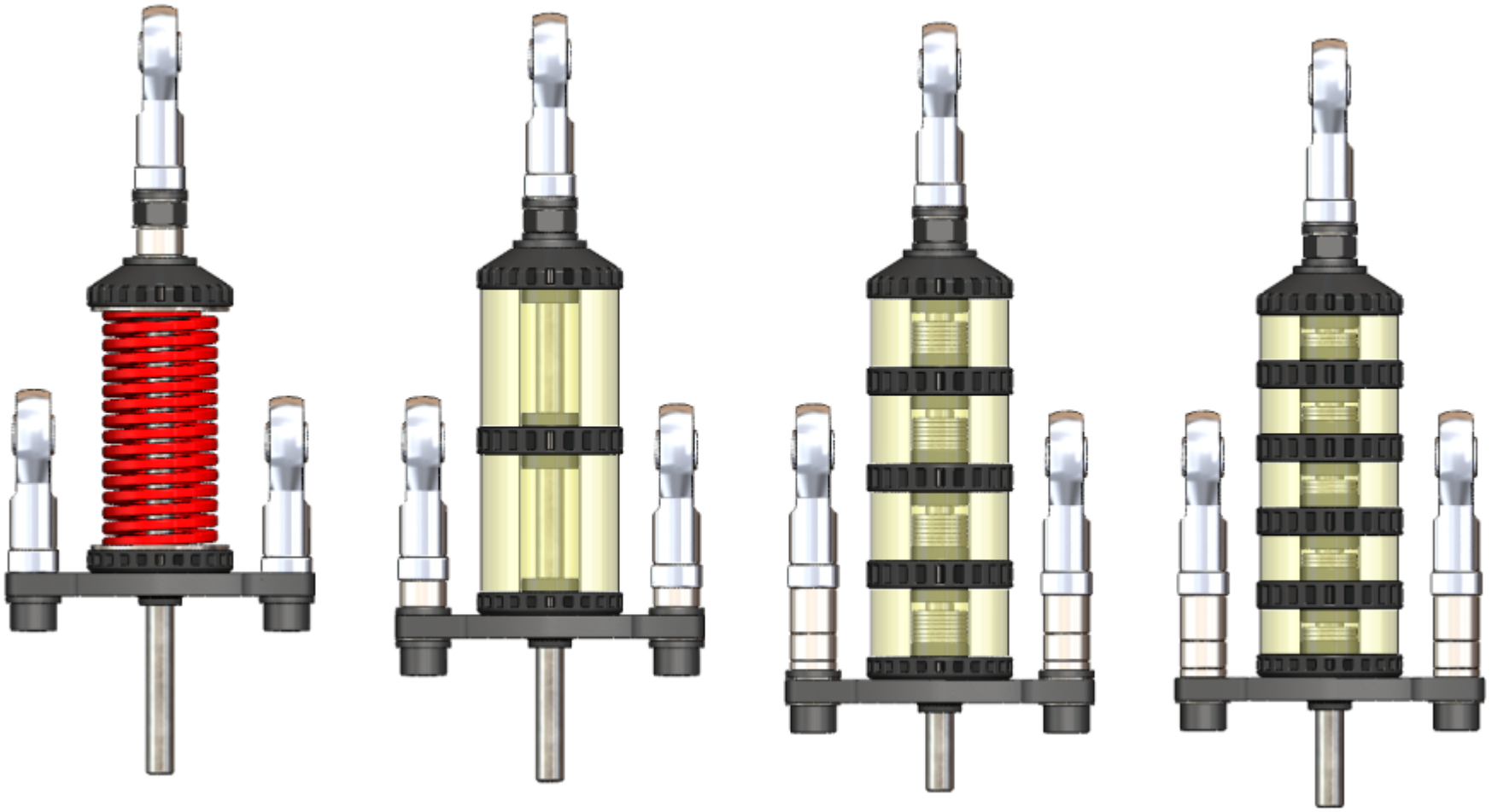
  L=30mm: **no washers required**

  If you're using different length/type elastomers, always leave min. 2 mm of empty space inside each for a small amount of compression to happen. For the maximum compression limit, follow the manufacturer's instructions of the maximum allowed amount of compression.

- If you use elastomers with different specifications, always put the softest on the back (next to the end-plate).
- When a spring is used, it should not compress fully with your maximum braking force, if it does, change to a stronger spring. If you're using any of the provided springs, follow the pictures on section 2.2.2. for the bolts (B), washers (W) and spacers (S).
- The brake has a mechanical limiter for the load cell maximum load, so it is not possible to load the LC over the 'safe overload' limit.
- **It is possible to move the main elastomer pack to the threaded M6-holes higher on the frame, but if you do you might need to tighten the bolt connecting the rod-end to the pedal arm, to prevent the bolt from sliding out of place.**

- Recommended general workflow sequence for adjusting the brake pedal feel with an elastomer set:
    1. Install the chosen elastomers with washers inside. If you're using provided elastomers, follow the pictures on section 2.2.1. for the bolts (B), washers (W) and spacers (S).
    2. Tighten the bolts on the back (B) and check that the amount of preload is correct. Add or remove washers / spacers (S) as needed to adjust the level of preload. Make sure the spherical rod-ends (O) on the sides are aligned correctly and are not touching the frame of the pedal. Also carefully make sure the push-rod (R) is aligned straight & on the middle of the pedal.
    3. Adjust the rod-end on the pedal arm (X, see page 11) to a good starting point position, which are:
        - **Road car**: Top 1/3rd of the adjustment slot
        - **GT**: Middle 1/3rd of the adjustment slot, or higher
        - **F1**: Bottom 1/3rd of the adjustment slot
    4. Test the pedal. If it feels too firm, lower the rod-end on the pedal arm to make the pedal feel softer with more travel.
    5. If you need to change the combination of elastomers / inner washers / preload, start the procedure from the beginning.
    6. Calibrate the pedal (check the dead zones from the software). Do this after any mechanical changes. See section 'Software' for detailed instructions.
- You are free to experiment with different length combinations, or use different amounts of elastomers, just remember to keep the washers inside the elastomer within the allowed range. You can use any of the bolt lengths for the back (B): 16mm / 25mm / 30mm. Adjusting the preload always works the same as instructed above. The less amount of elastomers you have, the stiffer the pedal will feel.
- ***) NOTE! Always keep the DIN 9021 washer (WW) in front of the top bushing (T). This washer has a larger outer diameter (OD=16mm) to reduce the surface pressure against the top bushing.**

Note: It's normal for a small amount of initial settling to happen when the pedals are new, or after you've changed a mechanical setting, i.e. you may feel the brake preload loosening up a bit first. If it happens, follow the above instructions to adjust the preload to a correct level. Make sure this settling has happened, before a race or a timed lap.



1) Spring (GT) 2) F1 3) GT 4) Road car

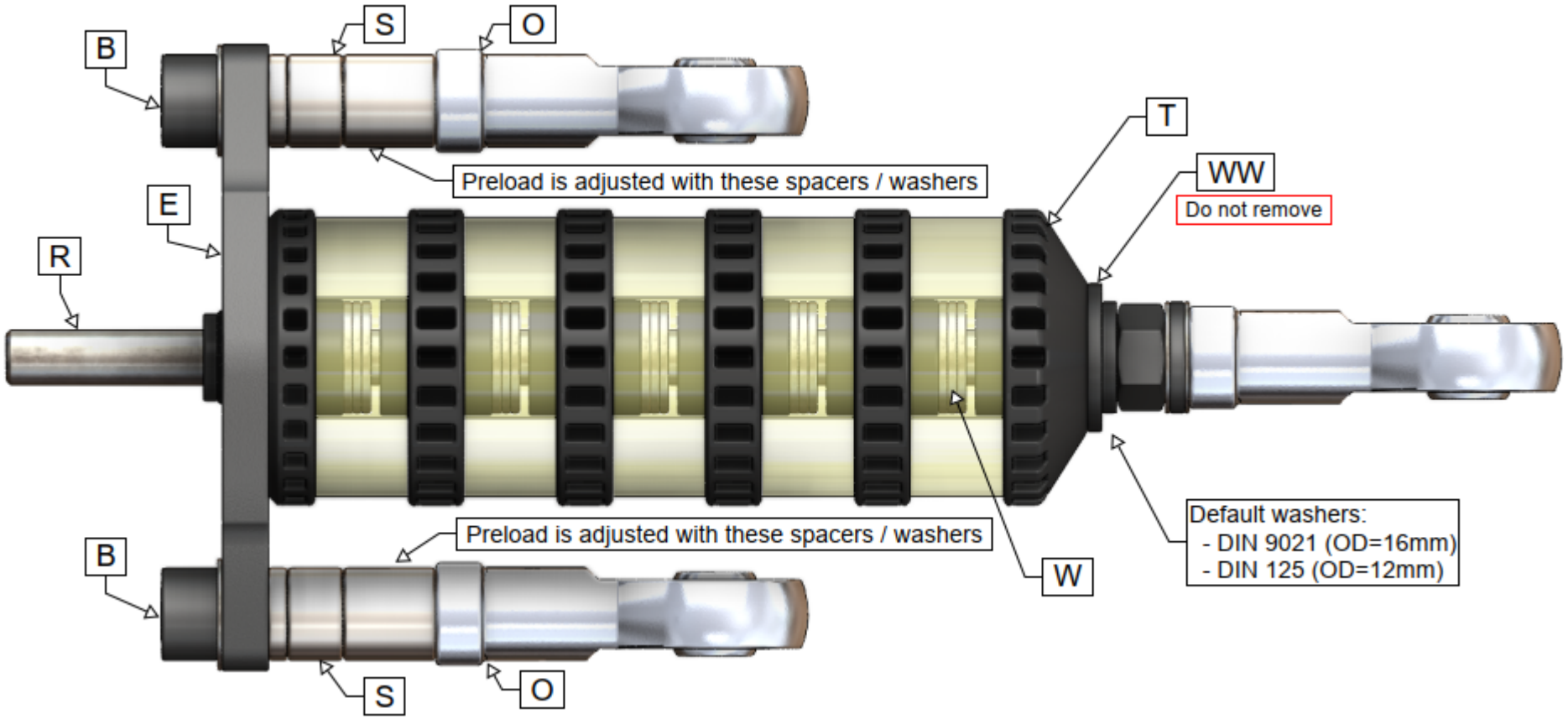
Preview of the default combinations for the main elastomer / spring sets. On the next pages they are displayed in more detail.

2.2.1. Default elastomer configurations & mechanical setup

Road car: Elastomers 5x L=10mm | Washers (W): Min.=1mm | Max.=3mm (visible on the picture)

Bolt (B): M6-30 + Washer DIN 988 0,5mm

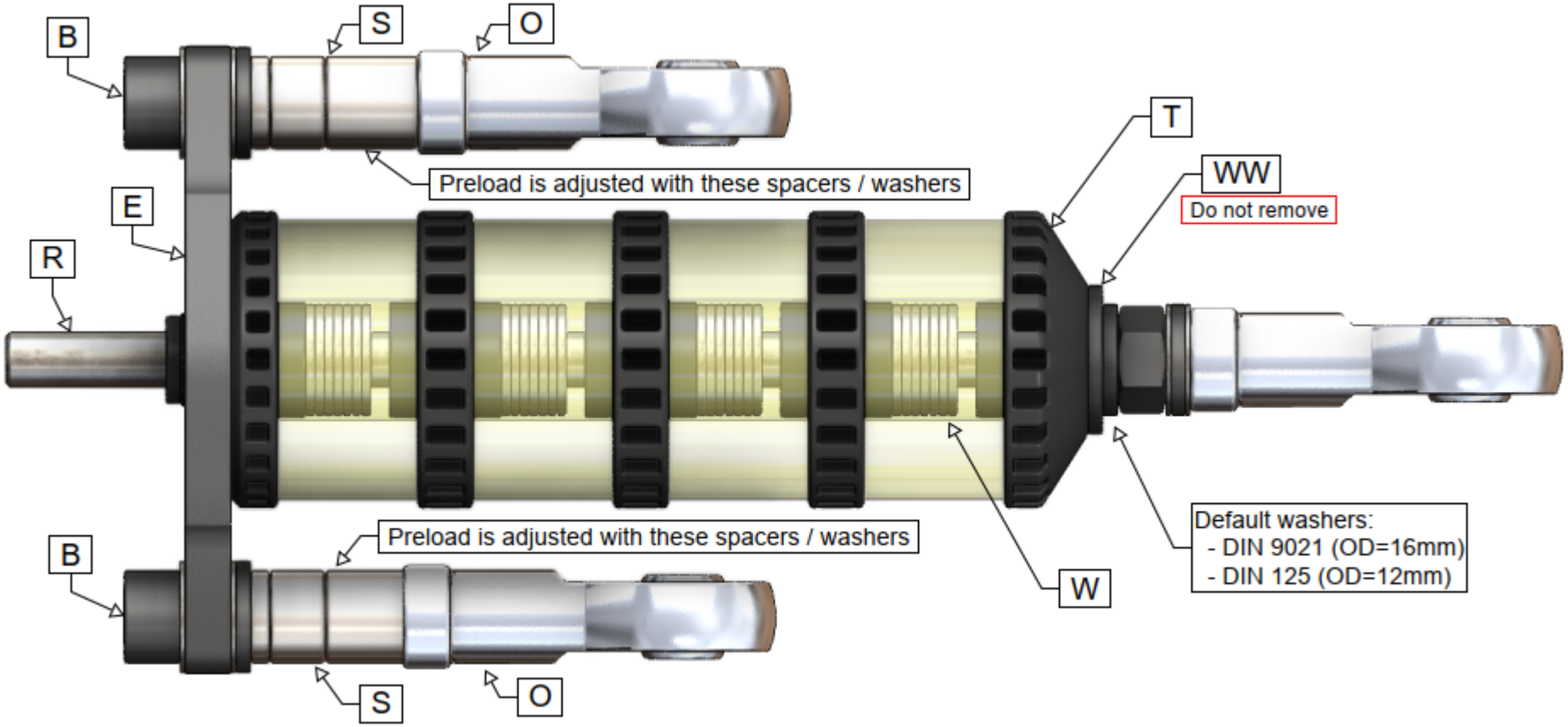
Spacers (S): 2mm + 6mm + 10mm



GT: Elastomers 4x L=15mm | Washers (W): Min.=5mm | Max.=7mm (visible on the picture)

Bolt (B): M6-30 + Washer DIN 988 (0,5mm)

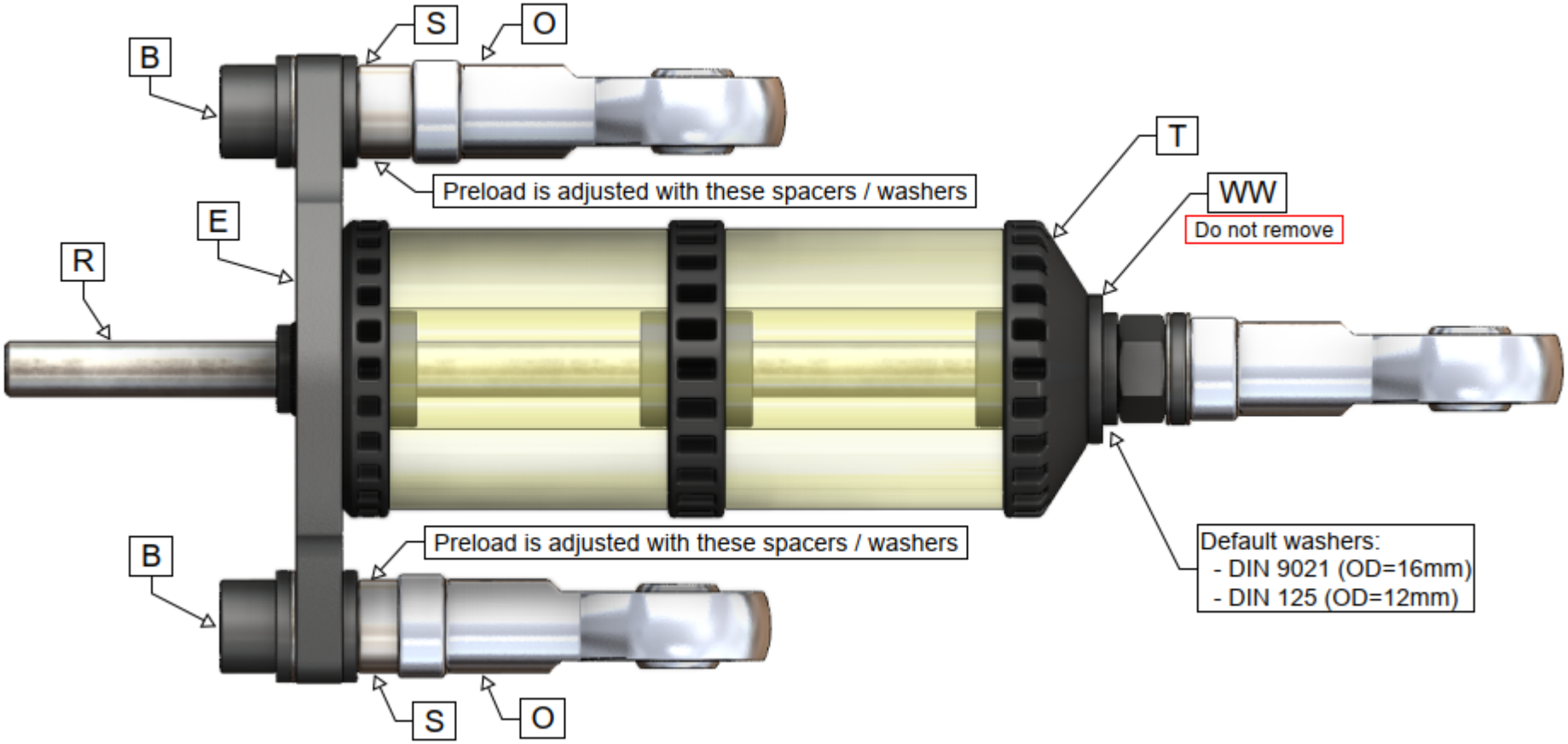
Spacers (S): 0,5mm + 1,6mm(* + 2mm + 6mm + 10mm (* DIN 125



F1: Elastomers 2x L=30mm | no washers (W) required inside the elastomer

Bolt (B): M6-25 + Washer DIN 125 (1,6mm) + Washer DIN 988 (0,5mm)

Spacers (S): 1,6mm(* + 6mm (* DIN 125

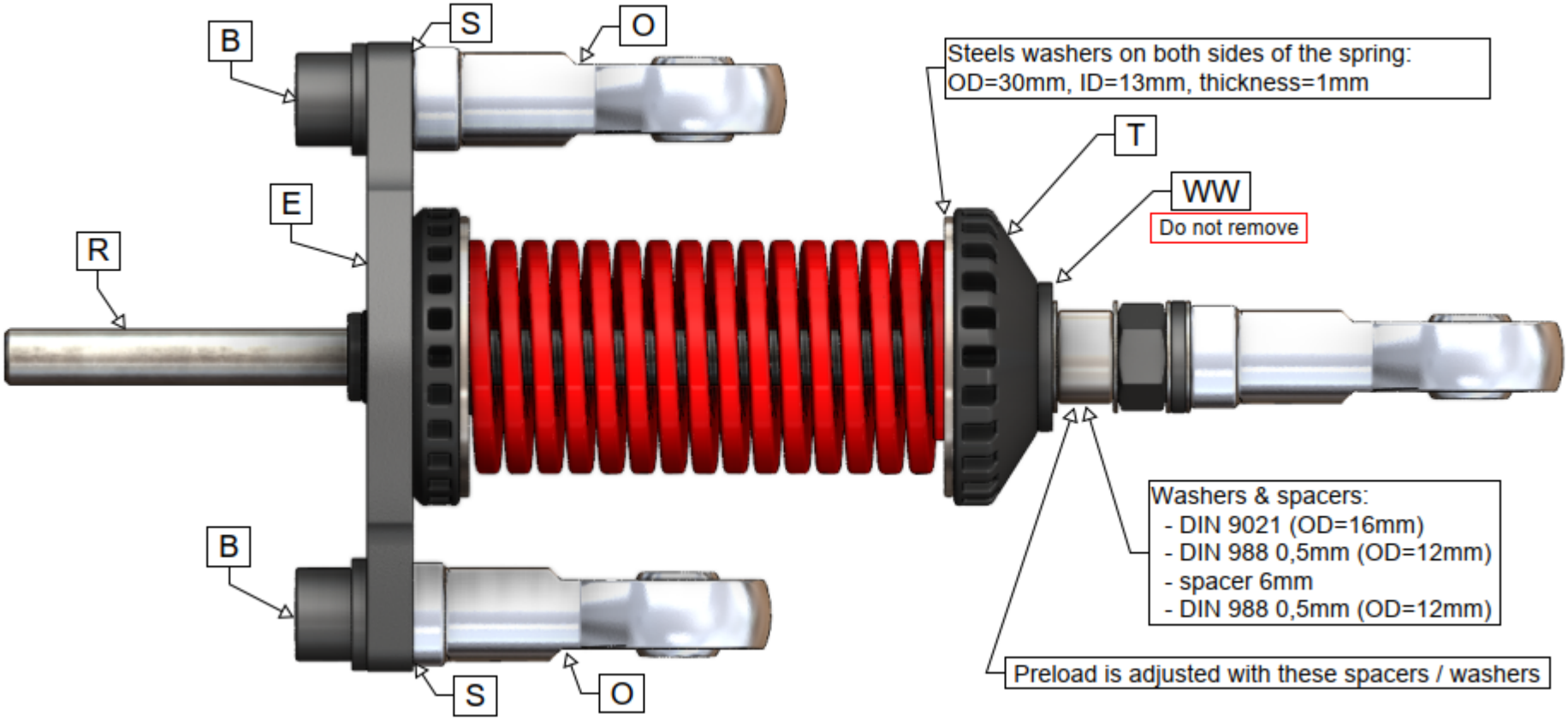


2.2.2. Default spring combinations & mechanical setup

Same mechanical setup is used for every spring:

Bolt (B): M6-16 + Washer DIN 125 (1,6mm)

Spacers (S): None for the location S - Adjust the preload by adding or removing washers in front of the spring (see pic. below).

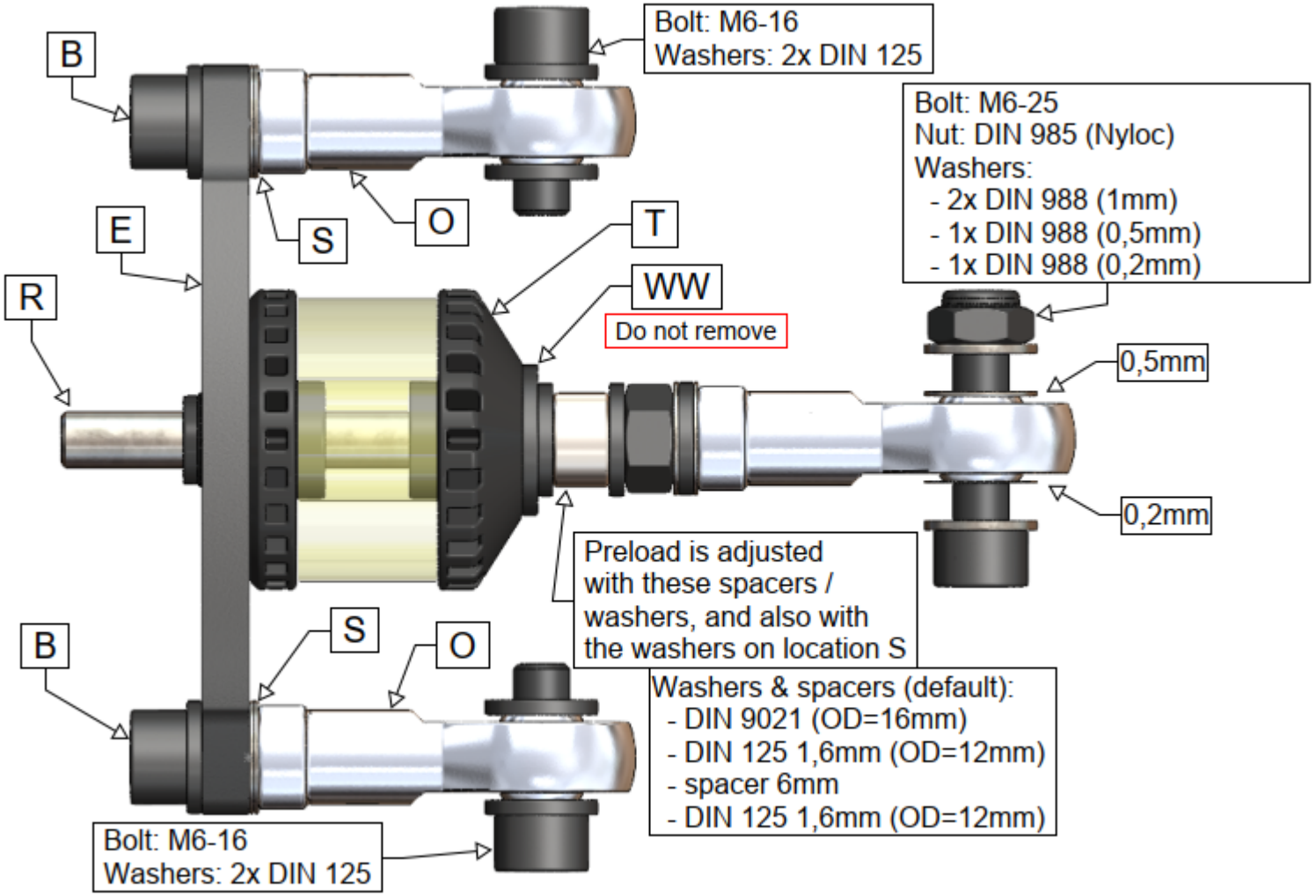


2.2.3. LC-load limiter #1 (extra PU-spring)

Elastomers 1x L=15mm | no washers (W) required inside the elastomer

Bolt (B): M6-16 + Washer DIN 125 (1,6mm)

Spacers (S): 0,5mm + 0,5mm

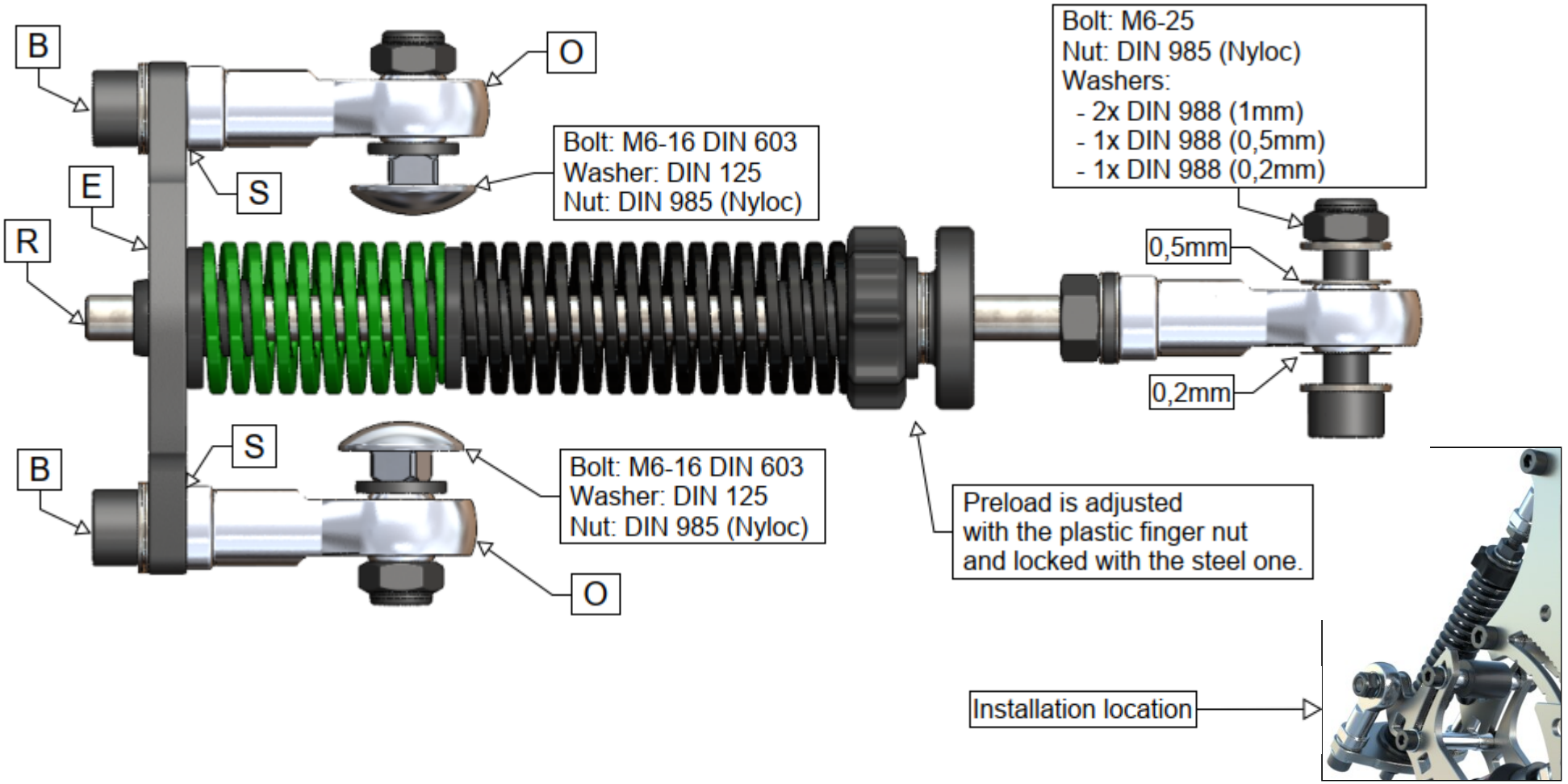


2.2.4. Separate preload spring

Springs: 1x L=32mm + 1x L=51mm

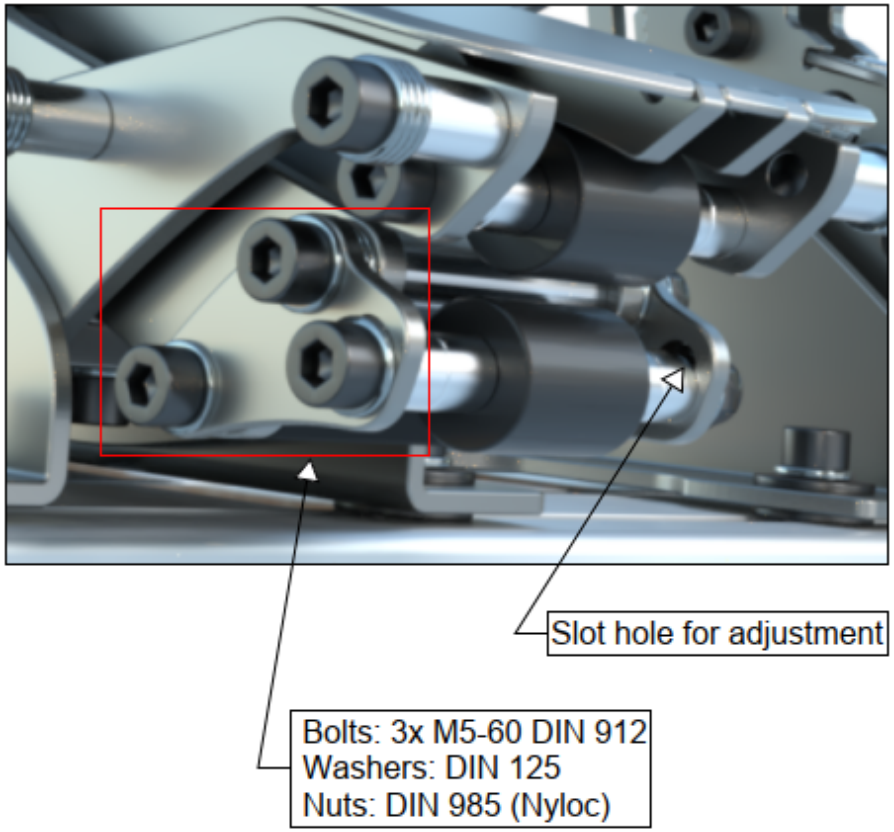
Bolt (B): M6-16 + Washer DIN 988 (0,5mm) + wave washer + Washer DIN 988 (0,5mm)

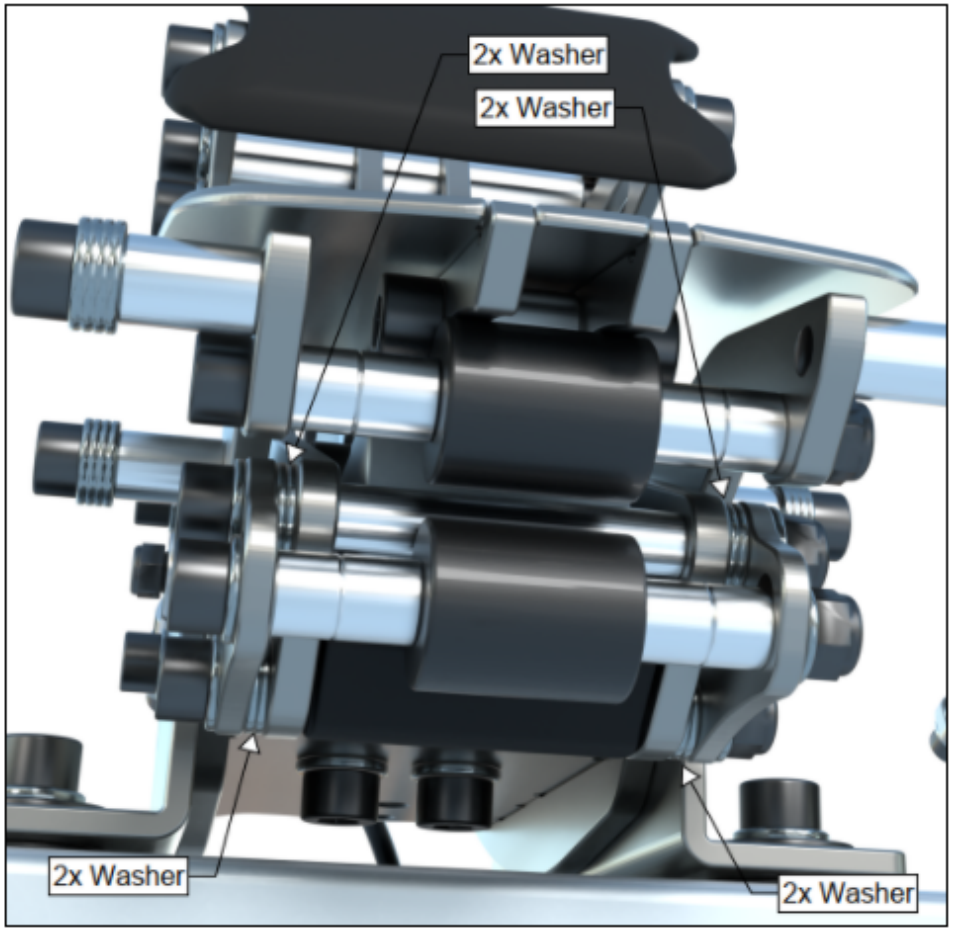
Spacers (S): None for the location S - Adjust the preload with the finger nuts (see pic. below).



2.2.5. LC-load limiter #2

This option enables creating a mechanical soft stop for the load transferred to the load cell. When the polyurethane stoppers touch, they softly start limiting the load transferred to the load cell. Note: remove all preload from the pedal before installation. There is a slot hole for adjusting the location of the bottom polyurethane stopper, adjust them so that they barely touch when the pedal is in rest position (in the pictures the limiter is adjusted so that it isn't active, the stoppers won't touch at all). You have three different hardnesses for the PU-stoppers available; black=soft | yellow=medium | red=hard.



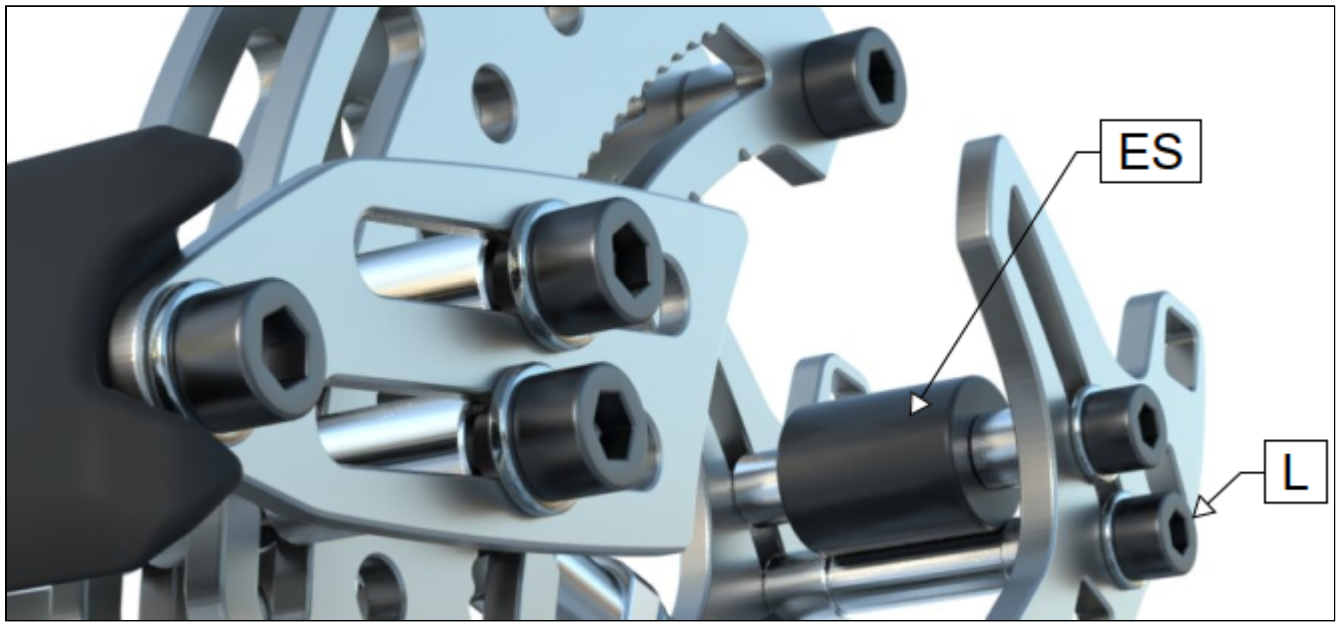


2.2.6. Brake travel limiter

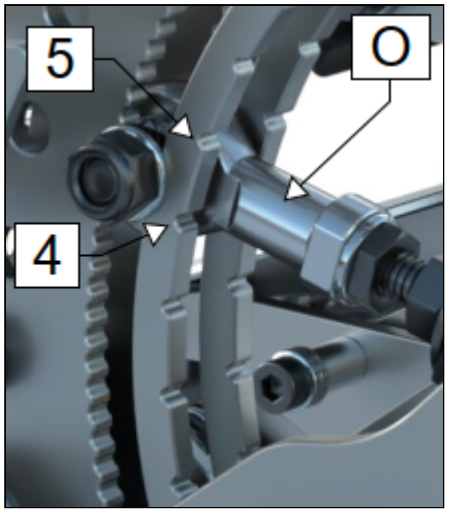
Even though it is usually not needed to have or use a travel limiter on the brake (in addition to the actual compression elements), it is available for you to use, and can be very beneficial in some situations. The travel stopper (ES) is adjusted just the same as in the throttle, but on the brake, do not remove the supporting bolt on the back (L).

Because the stopper is mounted on the loading frame, it only limits the travel of the pedal - not the loading of the load cell. So you can push ‘through’ it, and the brake will read more inputs even after you’re in contact with the limiter. So it can be used as a haptic point at the end of the wanted pedal travel. Normal use case is to adjust it for the hardest or the second hardest braking point, and you can feel the moment each time you reach it - always ending up with the same amount of braking force with high consistency.

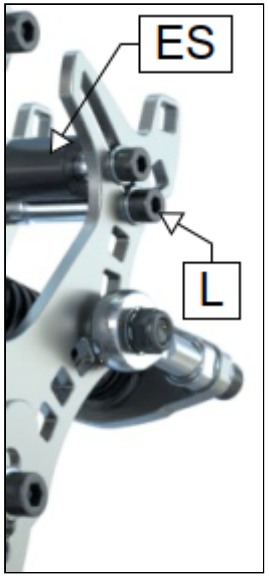
Note that additionally to the elastomers / springs, also the load cell is constantly bending under the load, giving maximum of 3,3° of travel for the pedal, so even if you limit the travel with the limiter, you will always have a little of ‘travel’ left. Additionally to this, the limiter is made of polyurethane so it will also compress a little - so you will always feel some softness even when in contact with the limiter. For the brake, always move the limiter (ES) and the supporting bolt (L) together while adjusting.

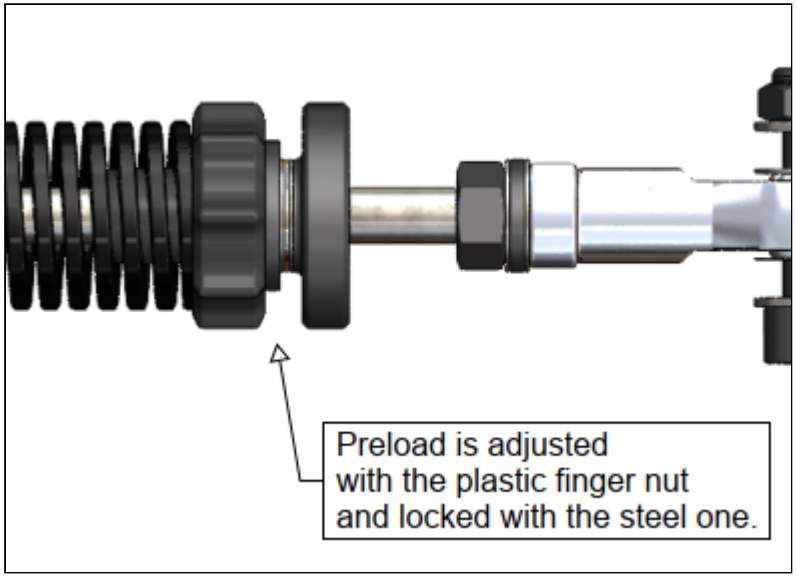


2.3. Throttle



- 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 (O) 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, if needed.
- Throttle travel is adjusted by changing the location of the end stopper (ES). Remember to calibrate after a change.
- The supporting bolt behind the stopper (L) needs to be installed if you're using the fixed heel supports, otherwise it can be removed (not installed by default).
- Throttle is factory calibrated for full travel.
- Recommendations for the resistance progressivity adjustment:
    - With full travel enabled (L removed), keep the rod-end (O) lower than the 4th slot marked on the arm plates (4)
    - With limited travel (L installed), keep the rod-end (O) lower than the 5th slot marked on the arm plates (5)





We recommend using as little angle as possible on the push-rod, and use more preload to give the wanted amount of resistance. This makes the resistance rise more slowly throughout the travel, and makes it less tiresome to keep the throttle fully down on straights. You can even make the pedal feel a bit clutch-like by adjusting the rod-end really low (getting weaker at the end). For example, this might be beneficial in an endurance race where you don't want to strain your foot too much.

2.4. Clutch

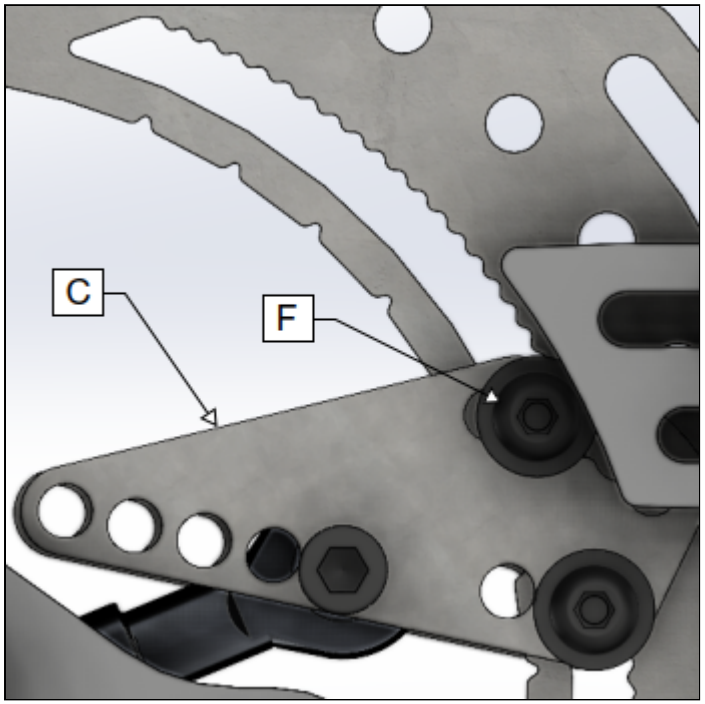
The advised adjustment options for the clutch are

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

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

If you’re willing to experiment, you can do so with all the optional holes and the long slot holes on the arm. These will allow you to finetune the feel with more variations, but you should not expect any substantial gains.



3. Software

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 (DZ) defines the area on the sensor range that is read as an input. Only the area between the (DZ) lines is read as an input signal. You have to push the pedal while adjusting the top (DZ) line.
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 (C).

   TIP: After the simulation has started, you may open the app again, and even adjust the dead zones / needed braking force on the fly (changes are saved automatically).

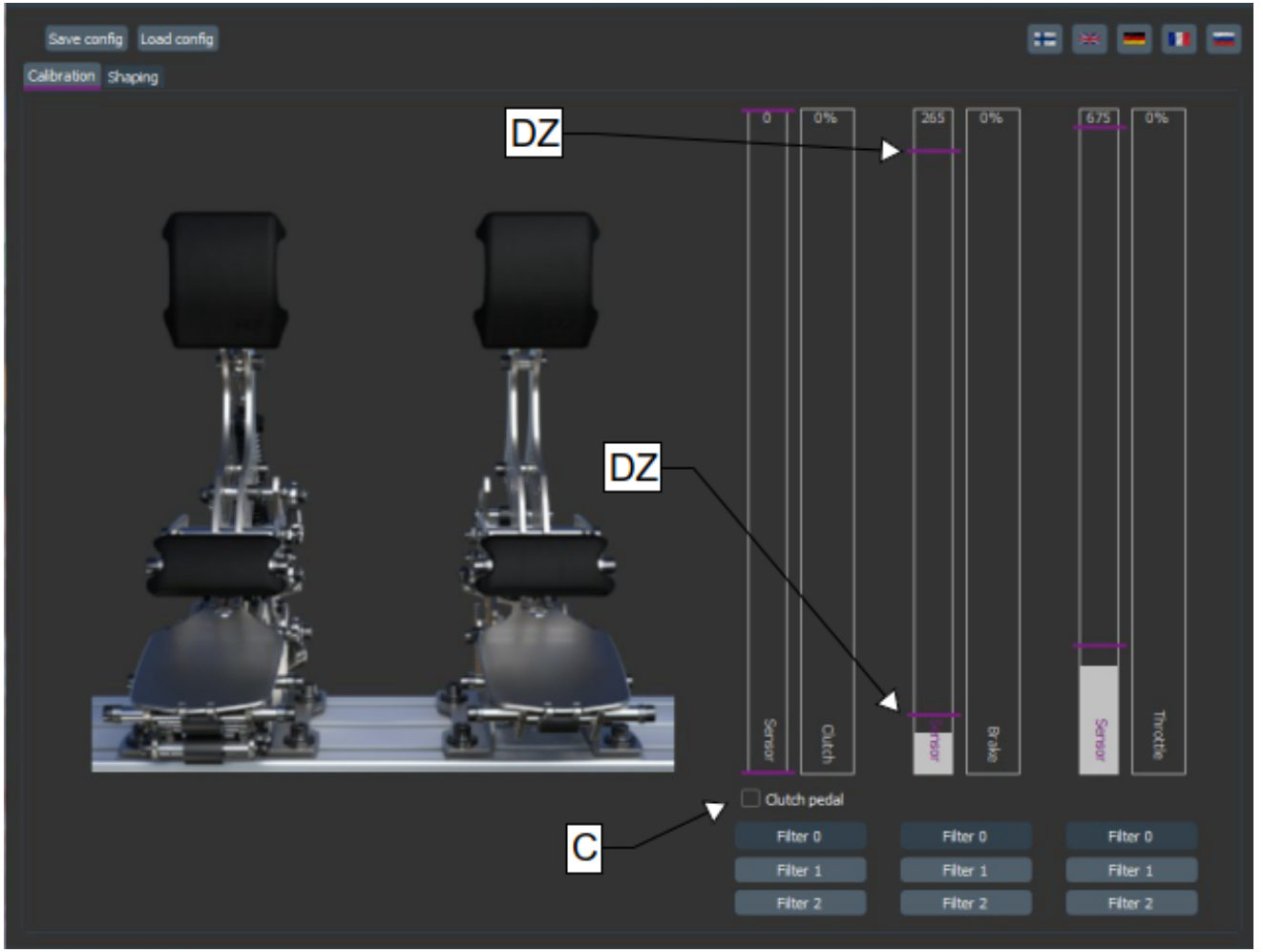
Note, the signal value will always move around / vary slightly, but if the range of variation is more than 10 units (out of 4096), we recommend adding the grounding cable just to be on the safe side. Refer to section 1.6.

3.2. Layout

DZ = Horizontal lines for adjusting the dead zones.

C = Toggle switch for activating / deactivating the clutch.

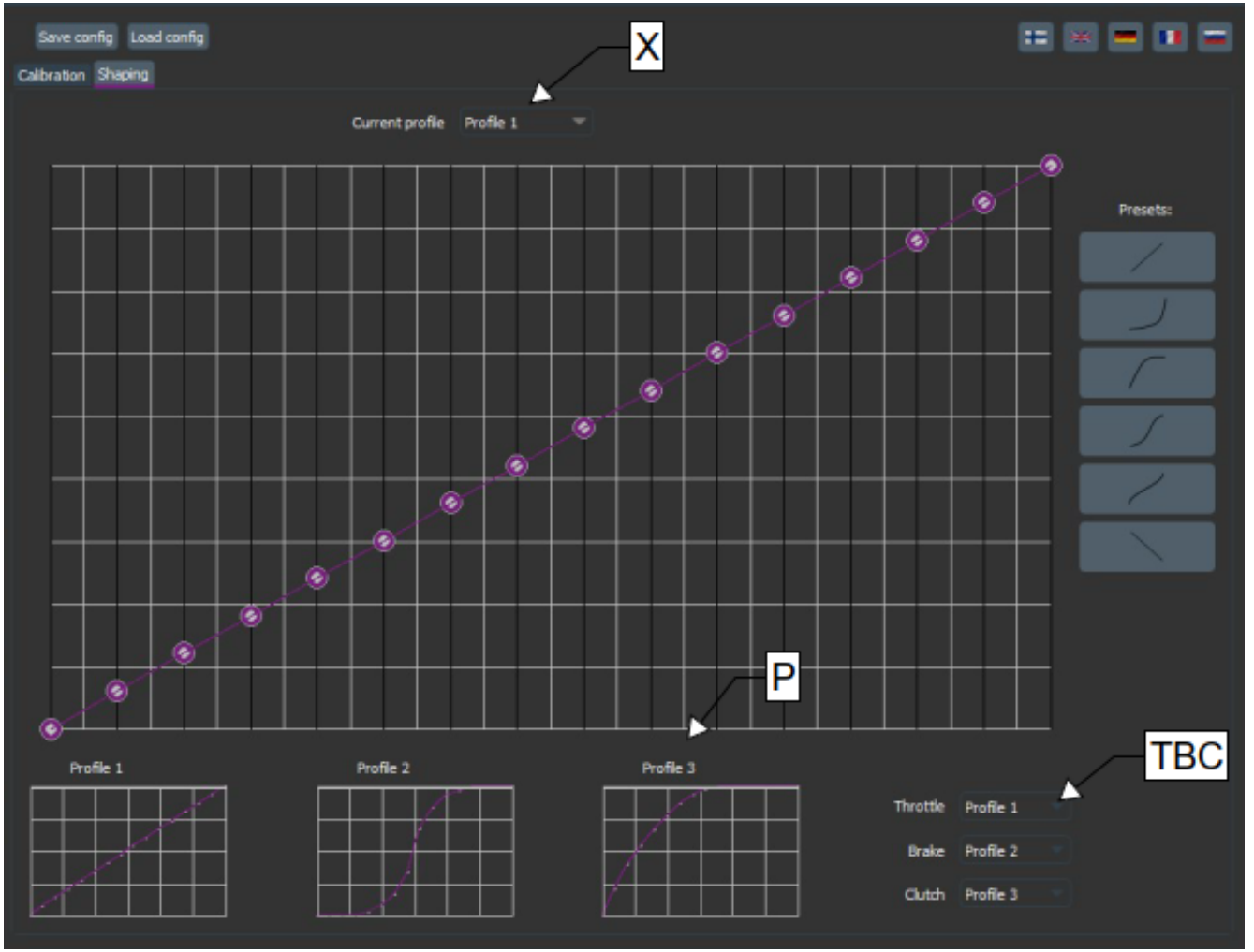
- Calibration on the app is done, when you have put the (DZ) sliders for every pedal where you want them.
- Filters are for smoothing out the signal.
- Profile saving from the top left corner.



X = Name of the profile that is being edited.

TBC = Profiles that are being used for each pedal.

P = 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.