SERVICE MANUAL

DUKE

Rev. 1 - 2021/05

SERVICE MANUAL

ENGLISH

progeo ACTIVE DESIGN

GENERAL WARNINGS

ANY ADJUSTMENT CAN BE CARRIED OUT EXCLUSIVELY BY QUALIFIED AND AUTHORIZED BY REHATEAM S.R.L. PERSONNEL.

It is forbidden to carry out any modifications, even when possible, to the original design.

Any adjustments and/or any modification that is carried out by non-authorized personnel will immediately void the warranty on the product and it relieves Rehateam s.r.l. from any responsibility on any malfunctioning and/or damage due to such adjustments/modifications.

Always contact Rehateam s.r.l. and its technicians for any non-standard requirements or modifications to allow them to evaluate such modifications and verify that they will not compromise the normal and safe use of the wheelchair.

Any modification of the original parameters and set up could seriously compromise the safe operation of the wheelchair causing damage to both the user and the wheelchair itself.

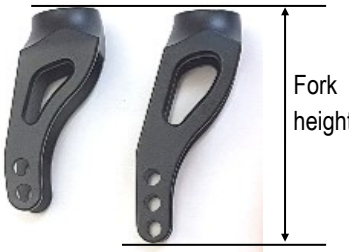
After every adjustment made to the wheelchair, check carefully that all parts are correctly fixed. Check that all screws and nuts are tightened and that all moving parts are functioning correctly.

After any adjustment, always test the wheelchair before giving the product to user and/or his/her attendant.

Rehateam s.r.l. disclaims any responsibility for damage to the product, to any object or to people due to any modification that is not properly performed or that, in any case, does not guarantee safety to the user.

FRONT HEIGHT

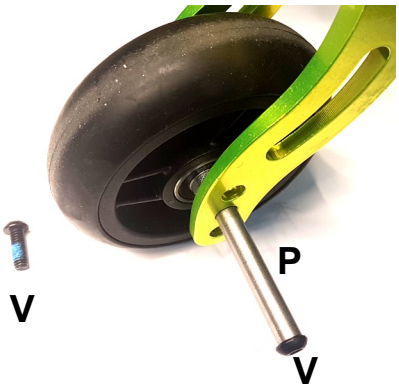
caster on fork



Holes intervals – 12,7 mm

Sport – 2 holes – h. 88

Piccola – 3 holes– h. 112



The entity of the adjustment obviously depends on the caster and fork's sizes.

Screw off the bolt **V** while holding the other.

Remove the axle **P**.

Position the caster to another hole, insert the axle and fix the bolt **V** holding the one on the other side.

Pay attention to the spacers between caster and fork.

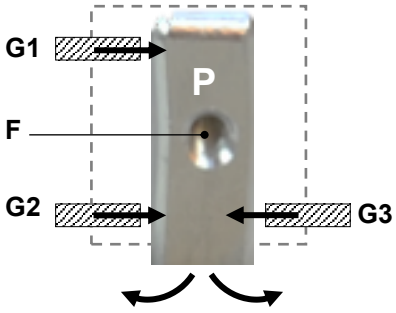
It is advisable to spread a drop of mild lock thread glue on the bolts **V**.

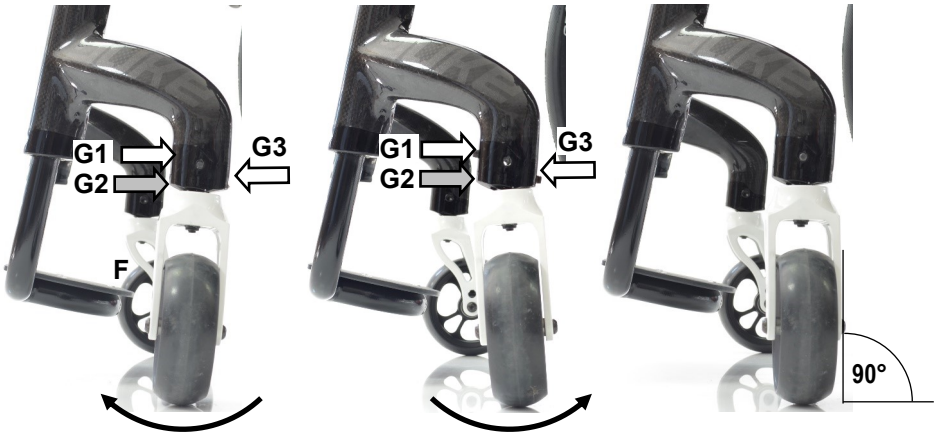
FORK ANGLE

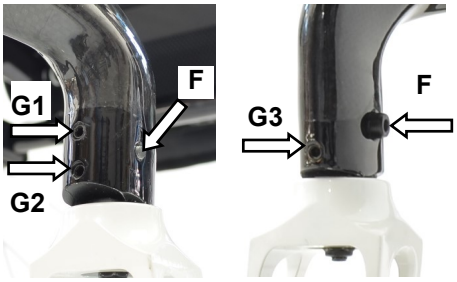
WORK ON A FLAT AND EVEN SURFACE

Whenever the seat height is changed or as periodic maintenance, check the fork angle and, if necessary, adjust it in order to have the fork axis perpendicular to the ground.

The adjustment is possible by means of the four grab screws **G1**, **G2** and **G3** that make the axle **P** turn on the fulcrum **F**.







To turn the fork backward
Loosen **G2**.
Screw **G1** and **G3**

To turn the fork fronward
Loosen **G1** and **G3**
Screw **G2**

Perpendicularity
You can check the perpendicularity with the help of a square (or similar) vertically aligned to the caster turned 90° with respect to the driving direction of the wheelchair

To adjust the fork, once you know the direction (frontward or backward) towards which it is necessary to move the fork's axle, proceed as above-mentioned until reaching the correct angle.

You can also measure the perpendicularity by turning the fork by 360°: during the full turn, the wheel has to touch the surface in all positions.

If a headless bolt results hard to unscrew, DO NOT FORCE IT, but try to loosen the other two first.

If the fork's axle (the axle **P**) results hard to move, slightly loosen the bolt of the fulcrum **F** (remember to screw it after adjustment).

Once you reach the correct angle, screw all three headless bolts all the way down to the axle **P**, but without tightening.

In order to fix the system, tighten first one and then the other less than a quarter of a turn at once, the grab screws **G1** and **G2** (the front ones) checking the perpendicularity; in fact, it may slightly change during this phase.

Should that happen, correct the angle proceeding in the same manner.

When you have tightened both headless bolts **G1** and **G2**, you can tighten the headless bolt **G3**.

Check the perpendicularity again and, if necessary, correct it.

It is advisable to pread a drop of mild lock thread glue on all grab screws **G**.

DIRECTIONALITY

A very important aspect of any wheelchair is its directionality.

To check if the wheelchair goes straight, sit on it, push it and let it go until it stops.

If something is wrong, the slower the wheelchairs moves forward (momentum close to nothing), the more likely it turns right or left. Therefore, if no or irrelevant turn occurs, the wheelchair is properly adjusted.

Cause	Reason	Solution
SURFACE	The surface where the test is being performed is not even and flat	Test the chair on even and flat surface
REAR WHEELS	The rear wheel are not equally inflated	Inflate both tyres at the same pressure
	The tyres of the two rear wheel are different or differently worn out	Change the tyres
	The rear wheels are not adjusted at the same height	Adjust the rear wheel height
	The camber of right and left wheels are different or differently adjusted	Adjust the camber.
	The wheel, when turning, touches the side guard or the brakes	Fix or replace the side guard. Add spacer on the receiver. Adjust the brake.
	The wheels doe not turn smoothly	Clean or change the bearings
FRONT WHEELS	The casters are not adjusted at the same height	Adjust the front wheels at the same height
	The tyres of the two front wheels are different or differently worn out	Change the wheels
	The fixing bolts of the fork/fork support/clamp are loosened	Check and tighten all fixing bolts
	The caster does not turn smoothly	Clean the bearings.
	Either or both forks are not adjusted so as their axis is perpendicular to the ground.	Adjust the fork axis inclination.
FOOTPLATE	The footplate tubes are adjusted at different height.	Adjust the tubes at the same height

If the wheelchairs does not go straight, in most cases the reason is the fork angle adjustment.

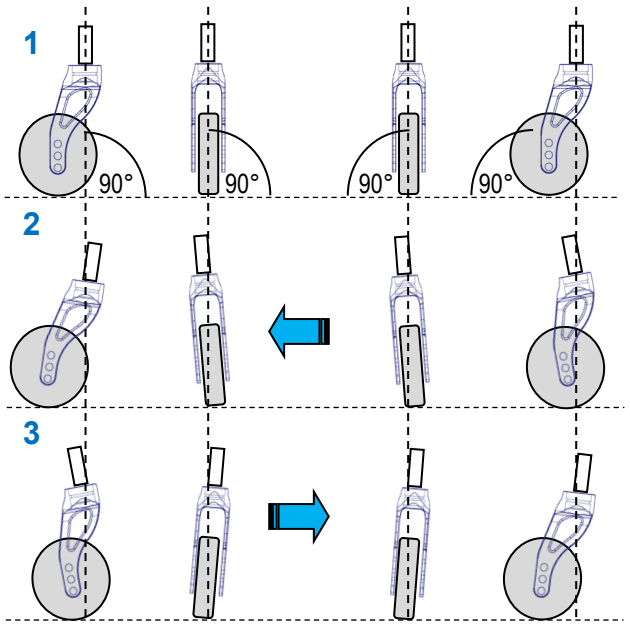
However, before working on the fork angle adjustment, check all the points above mentioned.

First, make the test along a flat even surface to check the directionality.

1 The correct adjustment has both forks perpendicular to the ground, that is, their axis at 90°.

2 If the wheelchair **TURN RIGHT,** the cause is one or more of the following:
The **RIGHT** fork is tilted **inwardly** and/or **backward**
The **LEFT** fork is tilted **outwardly** and/or **frontward**

3 If the wheelchair **TURN LEFTT,** the cause is one or more of the following:
The **LEFT** fork is tilted **inwardly** and/or **backward**
The **RIGHT** fork is tilted **outwardly** and/or **frontward**



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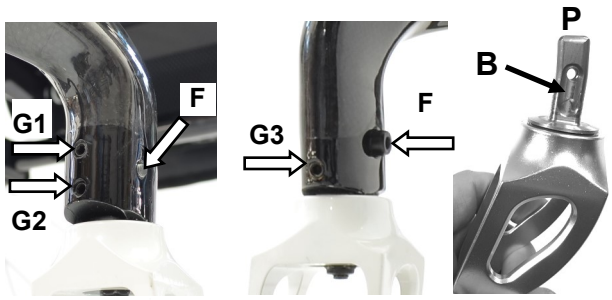
DIRECTIONALITY



ADJUSTING THE DIRECTIONALITY

Check that the two forks are perpendicular to the ground. If they are not, proceed with the adjustment of the fork angle following the instructions on the sheet FORK ANGLE ADJUSTMENT.

If both forks axis are correct but the wheelchair still turns right or left, it means that the latitudinal angle is not perfect.

This may be due to hit, to improper pressure exercised on the fork or its support, or to a tiny imperfection among all parts fixed together due to their manufacturing tolerances.

You can fix the fork axle **P** in three different angles to correct the directionality.

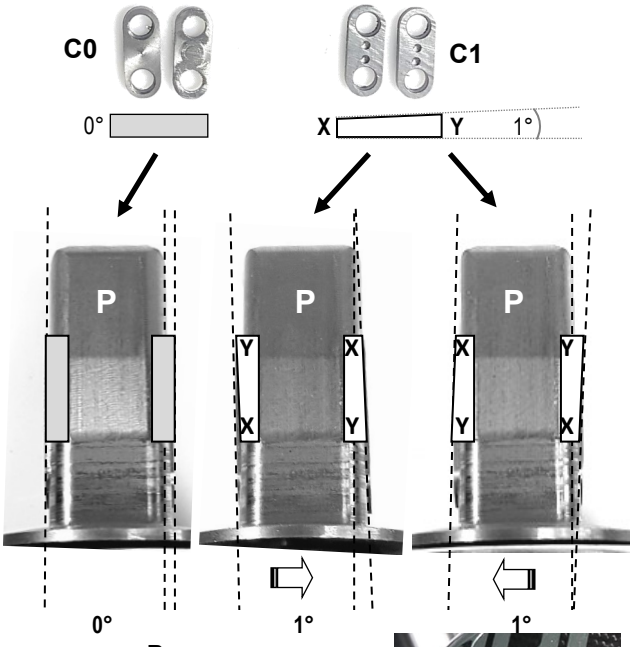
Loosen all four grab screws **G**, remove the bolt **F** and slide off the fork complete with the axle **P**.

The axle has two side hollows **B** where you have to cast the flat inserts **C0** or the 1° titled inserts **C1** that are recognizable thanks to two dots.

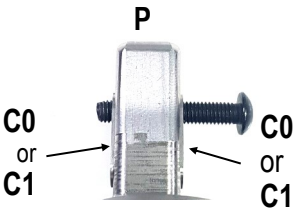
With the flat inserts **C0**, the axle keep its original inclination.

With the tilted inserts **C1**, the axle tilts by 1° right or left according to how to cast them in the hollows—see images.

Note: you can cast the inserts only as indicated in these images.



Once you have casted the inserts **C0** or **C2**, it is advisable to try to screw the bolt **F** to check there is no difficulty. Sometimes, in fact, the holes of the inserts may have working burr that make the bolt hard to go through.

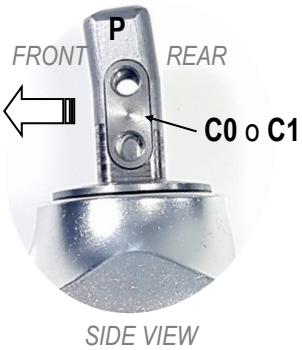


To mount the fork unit. Insert the axle **P** in the fork support paying attention to the orientation of the same axle. In fact, the axle is not straight, but it shows a bend. Such bend must be facing to the rear of the wheelchair.

Insert and screw the bolt **F** without tightening it much (it is enough to screw it up to stop).

Adjust the fork angle — see sheet “fork angle”.

Note. This type of adjustment can take place even at original assembly, therefore, you may find the inserts **C0** on one axle and **C1** on the other, for instance.
The wheelchair is not supplied with supplementary inserts, therefore, it will be necessary to order them when needed.



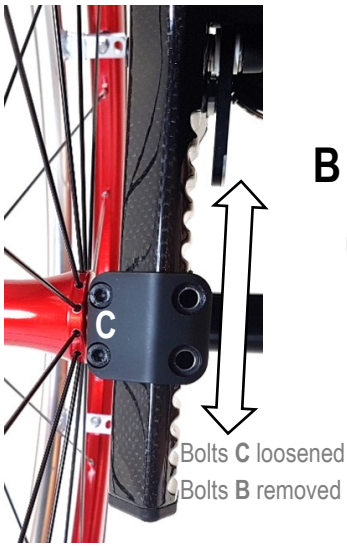
SIDE VIEW

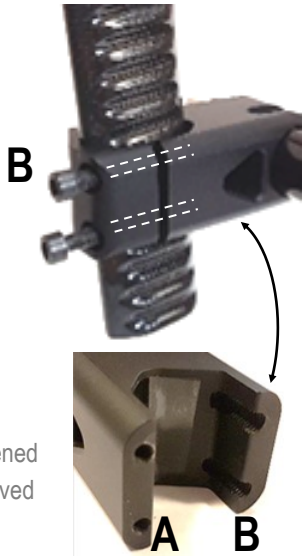
Axles without inserts

Until 2019 the axles had no inserts **C0** or **C1.** There were 0°, 1°rh and 1°lh axles. To adjust the directionality, it is necessary to change the axle.

REAR HEIGHT

STANDARD REAR UNIT





For each rear wheel plate (right and left), loosen the two bolts **A** and screw off the two bolts **B**.

If you need to lower the seat height, it is necessary to remove the mudguard before adjustment because the tyre will touch the mudguard.

If the side guards are straight, you may leave them where they are.

Slide the rear unit which is made of the two wheel plates and the axle (no need to remove the rear wheels) upward or downward to the desired height.

Insert the two bolts **B** taking care they pass through with no effort, even by screwing them, along the grooves and until they screw into the threaded hole of the rear part of the wheel plate.

If the bolts do not pass easily, not even when screwing them, until the hole rear part of the plate, DO NOT force them, DO NOT hit them because you may damage the carbon fibre, but adjust the height of the plate until the position that allows the bolts to go through with no effort.

Once you have inserted the two bolts **B** on both wheel plates, screw them without tightening them.

Now, both wheel plates are positioned at the same height (make sure), but with both bolts **A** and **B** loosened.

The positioning of the wheel plate is quite precise, however, in order to let the bolts **B** pass through the grooves, there is a minimum vertical play; it means that, at worst, once both wheel plates are fixed, there may be a maximum difference of 0.5 mm between right and left side.

In order to avoid such difference, while you fix the plate, push it upward.

Now, fix the two bolts **A** and then the two bolts **B**.

Check/adjust the brakes.

Remember that the rear height adjustment can affect the seat inclination, thus, it is necessary to check and adjust the fork angle, see adjustment sheet "*fork angle*".

Adapt the mudguard, see adjustment sheet "*side guard*".

Push it up while tightening the bolts A and B.

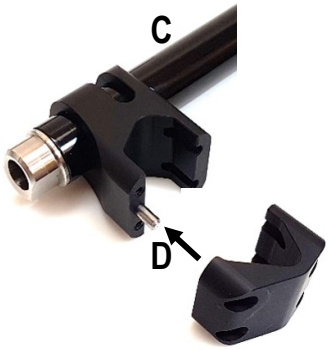
It is advisable to spread a drop of mild lock thread glue on the on the bolts **A** and **B**.

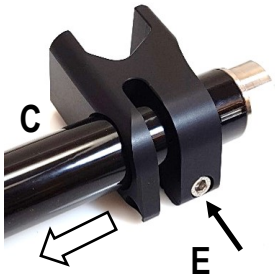
SETTING (point of balance)

The model DUKE has three different settings (prudential, standard, active).
There are three lengths of rear wheel plate, each of which gives a different setting.
Thus, you can adjust the setting by changing the rear wheel plate.

You can also change the point of balance by moving the backrest from point 1 (default position) to point 2 (1.5 cm more active) or the other way round.
See adjustment sheet "*seat depth*".
This way, however, the seat depth is affected, too.

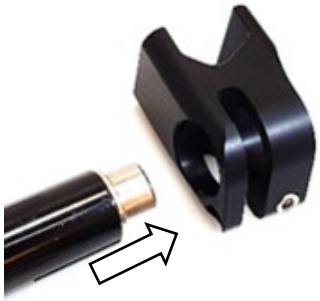
Changing the rear wheel plate.
Remove the bolts **A** and **B** of the rear wheel plates that are fixed to the adjustment post.
Remove the rear wheel plates from the posts.
Now, the rear axle **C** is still fixed to the rear part of the wheel plates.
The pin **D** may remain within the front or the rear part of the wheel plate, or it may come off.

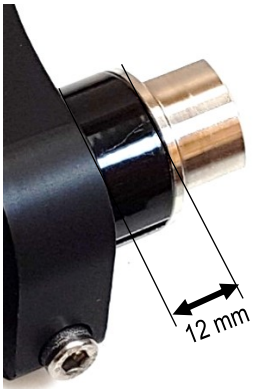




Loosen the bolt **E** and slide the rear axle off the wheel plate.
Insert the rear axle **C** into the rear side of the new wheel plate until it leans off 12 mm.
A point of reference may be the position of the pin **F**, in fact, it should be half covered by the wheel plate where indicated in the picture.

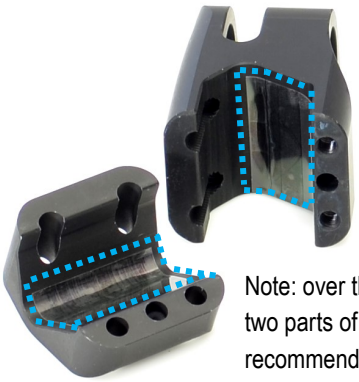
Assemble the front side of the wheel plate with the pin **D**, insert the two bolts **A** and screw them until leaving 2-3 mm gap between the two parts of the wheel plate.
Assemble the other wheel plate in the same way.



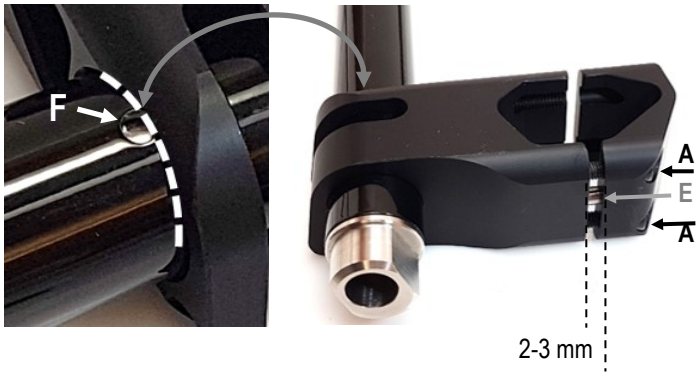


Insert the two wheel plates of the rear unit into the posts to the desired height.
Now proceed following the instructions of the adjustment sheet "*rear height*".

Adjust the convergence (if cambered wheels), the brakes, and the fork angle and, if necessary, adapt the side guards.



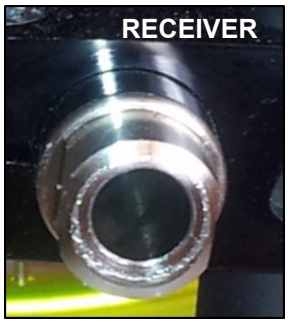
Note: over the inner side of the two parts of the wheel plate, it is recommended to stick a film to further improve the grip on the

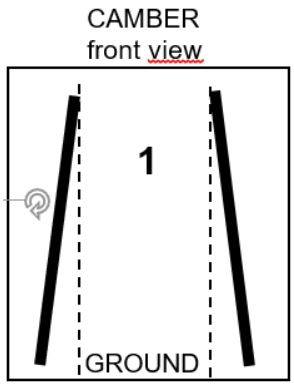


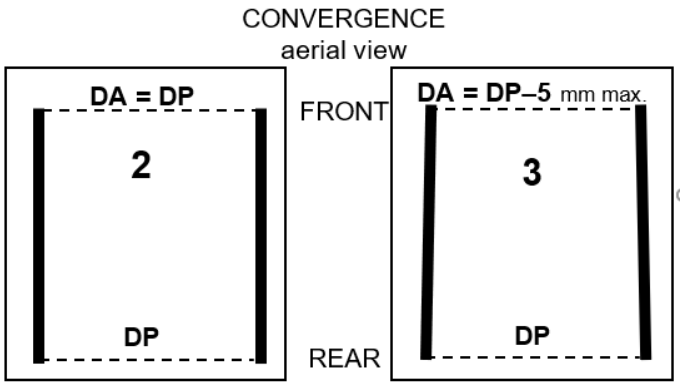
It is advisable to spread a drop of mild lock thread glue on the on the grab screws **A** and **B**.

CAMBER AND CONVERGENCY

WORK ON A FLAT AND EVEN SURFACE







The wheel receiver gives the rear wheel camber (cambered receiver).

The two wheel receivers are fixed to the rear axle, thus, to adjust the convergence, it is necessary to turn the axle.

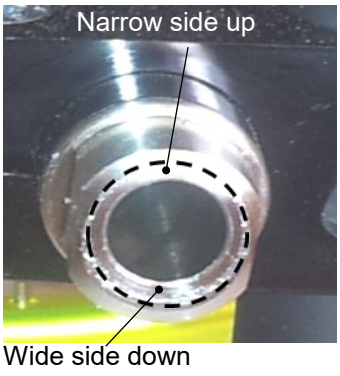
The drawing **1** shows same inclination (camber) of both rear wheels.

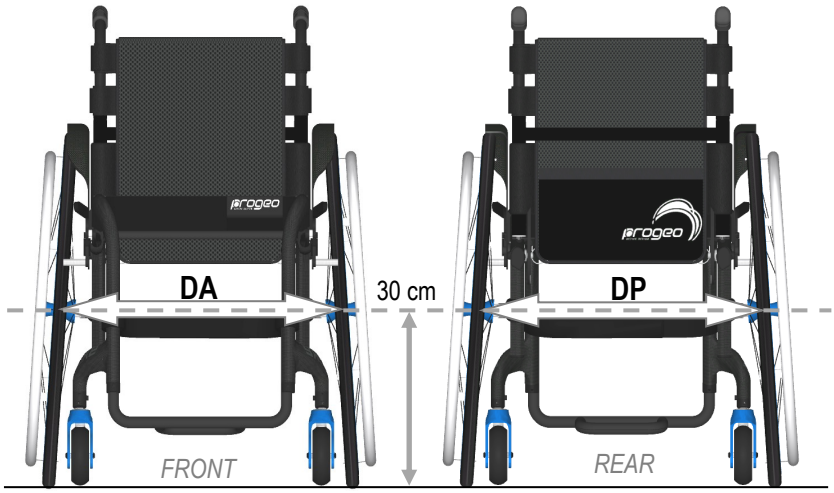
With cambered wheels, it is necessary to check/adjust the convergence, the distance between the two wheels in front and at rear.

The drawing **2** shows the aerial view of the wheels and the front distance **DA** is equal to the rear distance **DP**, while the drawing **3**, **DA** is narrower than **DP** by maximum 5 mm.

We can say that a good convergence has the **front distance DA** equal to or slightly narrower than the **rear distance DP.**

DA must not be wider than **DP**. In such case, the fluency of wheelchair will not be good.





The hole of the cambered receiver, since it is inclined, is not centered.

Therefore, check the wheel receiver its narrow edge looking upward and its wider edge down. If opposite, the convergence is opposite, too (the wheels are opening apart at top!).

At 30 cm from the floor, take the measure centre-to-centre between the two tyres in front and at rear.

If the two measures are equal or the front one is slightly narrower (max. 5 mm), you have a good convergence as drawing 2 or 3.

If different, you have to adjust the convergence.

Se differente, è necessario regolare la campanatura.

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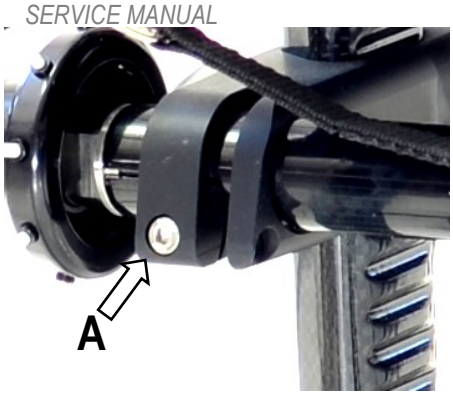
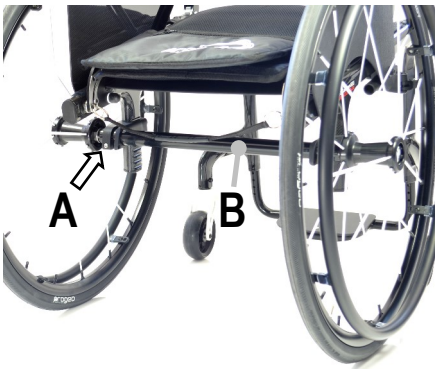
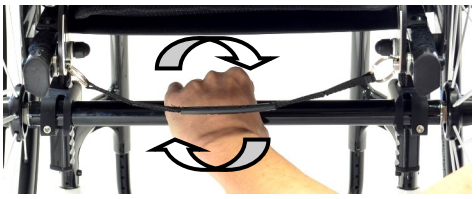
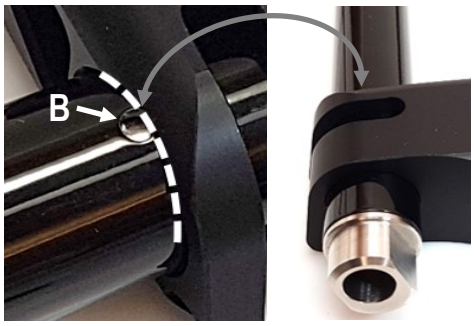
CAMBER AND CONVERGENCY







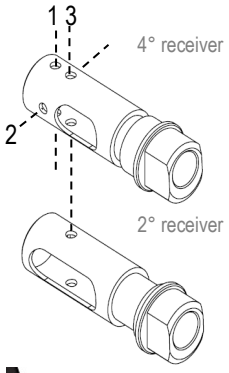


*L*oosen the bolt **A** of both clamps that fix the rear axle **B.**

Loosen the above mentioned screws just enough to let you turn the rear axle with your hand but without the clamp sliding along the axle. If that occurs, you can continue with the adjustment. You will fix that later.

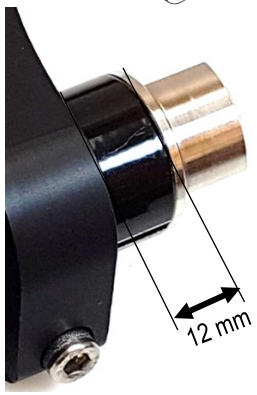
Turn the rear axle (clockwise or anticlockwise) and observe how and to what extent the wheels move.

A good reference is the pin **B**, in fact its axis, should be perpendicular to the ground, except for the 4° receiver fixed in the centre position (2) which is rotated by 90° with respect to the other two positions (1 and 3); in such case, the bolt D should be parallel to the ground.



Take the measures again and if necessary, repeat the same operation until you reach the correct convergence, se previous page.

If the clamp moved when you loosened the fixing bolts, position the axle's end (not the receiver) at 12 mm from the clamp. A point of reference may also be the position of the pin **B**, in fact, it should be half covered by the wheel plate where indicated in the picture.

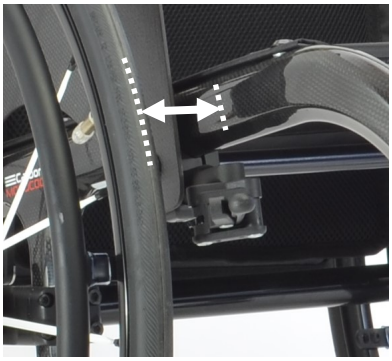


Now, tighten the bolt **A** of one side only.

Before fixing the other side, check the front wheels (considered already adjusted at the same height) are both touching the ground. If one do not touch, turn the frame on axle on its loosened side to the necessary extent.

If the quick release axle of the rear wheel hardly or do not pass through the receiver, loosen the bolt **A** and remove it. Then, tighten all parts again, but first pass the hole with a ½" reamer to remove any possible tiny deformation (see also adjustment sheet "*quick release axle*").

It may be a little harder to position and fix the other side due to the pressure given by the seat canvas, but you have to respect the same distance.

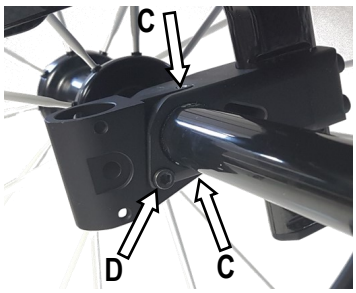


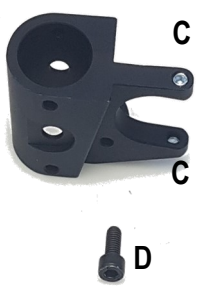
Check the measure from a fix point of the frame to the centre of the tyre on each side. Should there be a difference greater than 2-3 mm, check the distance between clamp and axle as above mentioned.

If necessary, correct the adjustment.

If the optional support is present, it is necessary to remove it to get access to the bolt **A**.

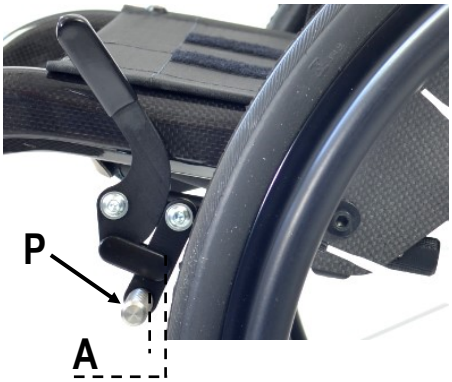
To remove it, unscrew (no need to remove it) the two grab screws **C**, screw off the bolt **D** and slide the support off.





BRAKE

WHEN ADJUSTING THE BRAKES, THE TURES MUST BE INFLATED TO THE CORRECT PRESSURE (except solid tyre)
The position of the brake depends on the position of the rear wheel.



Loosen the headless bolt **A** located in the lower side of the support **B**.

Position the brake-knurled rod **P** at a distance **D** of a few millimetres and parallel to the ground.

Temporarily tighten the headless bolt **A** and try the brake out to check if the adjustment is good.

If necessary, repeat the same operation to reach the good adjustment.

A good adjustment has the brake not too hard to engage but braking, so you will have to find the suitable compromise.

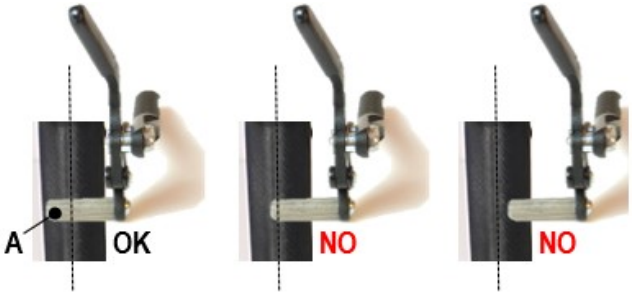
Once reached the correct position, tighten the headless bolt **A**.

Carry out the same operation on the other side.

The adjustment for the sport brake is the same except for the distance **D**, in fact, the brake, in its resting position is far away from the tyre. Just make a few tries.

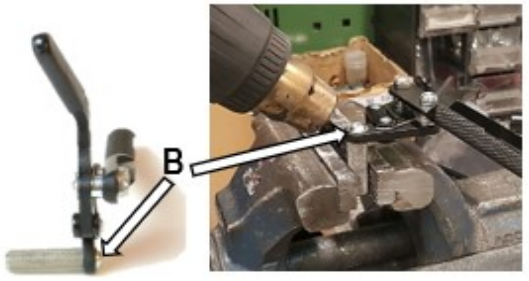
BRAKE SPACING

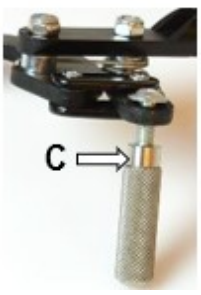
In several cases, the distance between the tyre and the frame can be such as to make need moving the knurled rod **P** more external.
When originally assembling the wheelchair, such possible modification is already taken into account.
In case of a post-sale modification that results in the rear wheels being more external (from 0° to 2° or 4° camber; seat width enlargement; a different wheel), the brake may not work efficiently anymore, therefore, you will have to move the knurled rod. The brake is efficient if the knurled rod **P** is at least 5 mm beyond the tyre's mid-line.

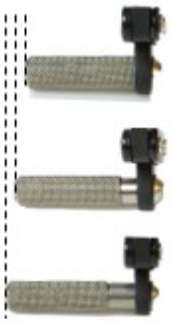


In all cases, check the brake efficiency.

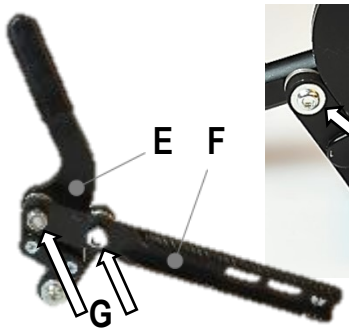
Remove the bolt **B**. In order to remove it, put the knurled rod in a vice and heat it with a hot air blower because the bolt is locked with strong lock thread glue. DO NOT FORCE WHEN UNSCREWING IT, you may damage the bolt's head irremediably.
Once you have removed the bolt, the knurled rod comes off, too. Replace the bolt **B** according to the spacer **C** (7 or 11 mm) you will add.
Put some strong lock thread glue on the bolt **B** and assemble the spacer **C** and the knurled rod **A**.
Put the knurled rod in a vice and tighten the bolt **B** hard.

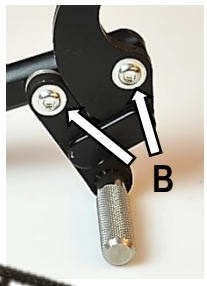






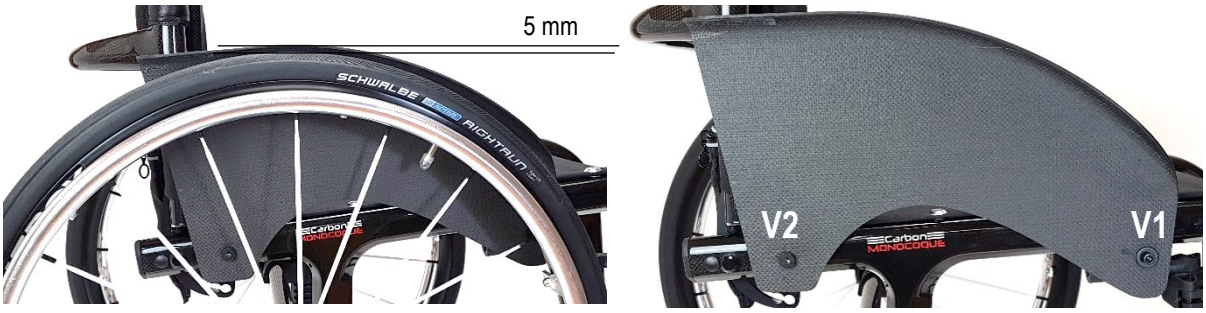
Spread some strong thread lock glue on the bolt **B**.





It is also possible to move the brake structure **E** from the adjustment rod **F**.
Remove the two nuts **G** and then the two bolts **B**.
Remove the spacers **H** around which the spring is assembles.
Observe how the spring is assembled because you will have to assemble it back later in the same way (you can always have a look at the other brake that is symmetric).
Insert the spacers **H** (**H_1** = original; **H_2** = 7 mm longer).
Position the spring and assemble the structure to the adjustment rod.
Start screwing the two bolts **B** all the way down and then the two nuts **G**.
Should the brake movement be hard, slightly loosen the bolts **B**.

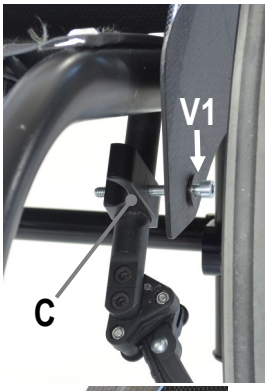
SIDE GUARD

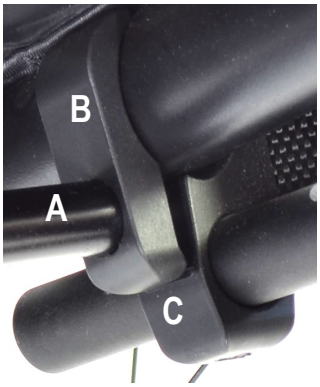


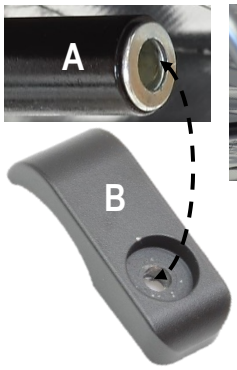
Whenever changing the rear wheel position, you have to adjust the side guard.
The side guard should be adjusted at approx. 5 mm from the tyre and it is fixed to the front frame with the bolt/washer **V1** (this bolt also fixes the backrest plate) and to the front clamp with the bolt/washer **V2**.
Each side guard is shaped to measure according to the configuration of the wheelchair when originally assembled.
The shape of the side guard always allow for a reasonable good margin of adaptation.
If the side guard is straight, you may leave it as it is.

Bolt V1 fixing

The bolt/washer **V1** is screwed into a threaded rivet fixed to the front axle **A**. When removing this bolt, the front clamp, made of the inner plate **B** and the brake support **C** (with the brake fixed to it), comes off the frame (if the axle turn when unscrewing V1, hold it with one hand).
Note: with the carbon fibre rigid seat, the axle is not present and the bolt is fixed with a nut.





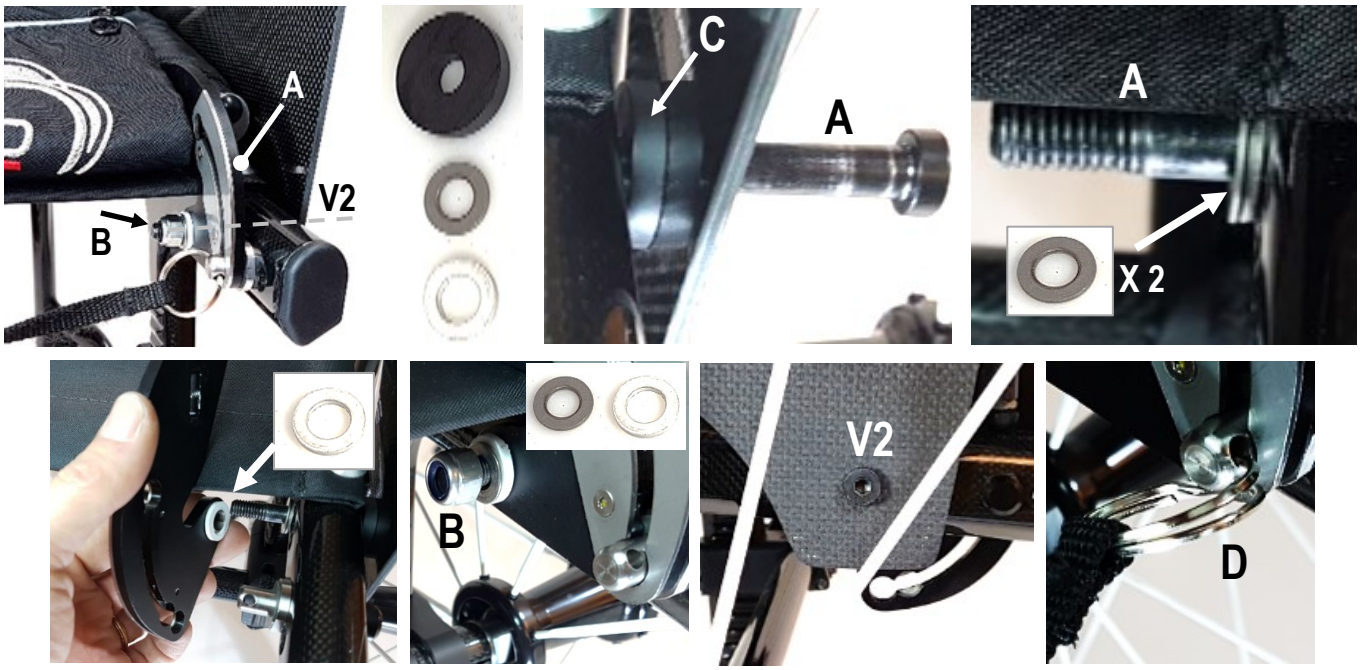


Note: in these pictures, the wheelchair is a Joker R2. for the model Duke, the assembly is the same, just the section of the frame and, thus, of the clamps changes.

To assemble the parts, let the bolt/washer **V1** through the hole of the side guard and through the hole of the brake support **C.**
Position the support **C** on the frame.
Position the plate **B** and screw the bolt **V1** into the axle **A**. Make sure the axle is cast into the housing of the plate.
While screwing the bolt **V1**, hold the axle **A** so that it will not turn and make sure the plate **B** is well leant against the frame.
To fix the other side, the operation is quite the same, but it is advisable to insert the axle **A** into the housing of the plate **B** and lean it against the frame before positioning the support **C**.
This operation may need a little forcing due to the pressure given by the seat canvas.
Finally, tighten the bolt **V1**.

Follows next page

SIDE GUARD



Bolt V2 fixing

The bolt **V2** fixes both the side guard and the backrest plate **A**.

To remove the bolt, hold it, screw the nut **B** off and pull the bolt off.

Pay attention to all washers that are present.

Now, to make operations easier and to better see the parts, in these pictures we removed both the backrest and the ring **D** of the lock string. See also adjustment sheet "*backrest positioning*".
You can carry out these operations without removing those components.

To re-assemble the bolt **V2**, insert it through the hole of side guard.

Insert the spacer **C**, let the bolt **V2** go through the frame and insert the two steel washers.

Position the white nylon washer on the plate and insert the plate. Then, put another white nylon washer, a steel washer and tighten the nut **B** while holding the bolt **V2**.

WARNING! DO NOT tighten the bolt/nut too much; you may damage the carbon fibre tube. When you feel the nut starts to tighten, the torque is enough to make the side guard rigid.

Follows next page

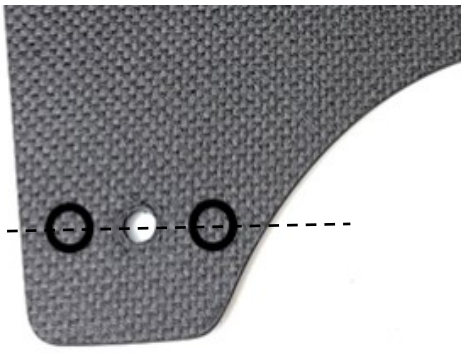
SIDE GUARD

Setting (point of balance) change

You can change the setting only by replacing the rear wheel plate – see adjustment sheet "*setting*".

There are three settings, each of which is determined by the length of the rear wheel plate.

The interval from one setting to the next one is 15 mm.



Adapting the side guard.

Mark the point where you will have to drill a new hole on the rear side of side guard, 15 mm from the centre of the bolt **V2**, ahead (if more prudential) or behind (if more active) according to the new setting.

Remove the bolt **V2** and turn the side guard upward.

Drill a new 8 mm hole (possibly starting with a hole 3 mm wide, then 6 mm and finally 8 mm) on the side guard where you marked it.

Repeat the same operation for the other side guard.

Loosen the bolt **V1** of both side guards.

Slide the side guard until aligning the new 8 mm hole to that on the frame from where you earlier removed the bolt **V2**.

If sliding the side guard result difficult, loosen the bolt **V1** a little more.

Insert the bolt **V2**, the different washers and tighten it with the nut. Same operation for the other side guard.

Tighten the bolt **V1** of both side guards.

Note: drilling the hole on the side guards results easier if you remove them.

To remove them, it is necessary to screw off the bolts **V1**, too.

To re-assemble them, proceed as mentioned above starting with the side guards front fixed with the bolts **V1** loosened.

It is not necessary to adjust the brakes.

Adjust the fork angle.

Notes: if you change the setting from active to prudential or vice-versa (30 mm) the side guard may not be big enough. You may need to change it.

According to the adjustment, you may need to cut off a a little part of the rear side of the side guard to prevent interference with the nut **B**.

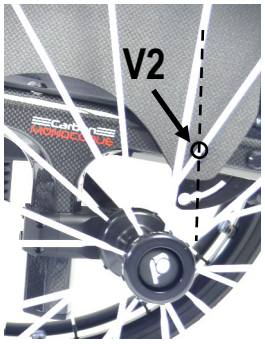
Follows next page

SIDE GUARD

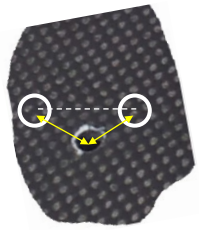
When increasing the rear height, you have to lower the side guard and bring it to approx. 5 mm from the tyre and parallel to it.
If the side guard is straight, you can decide whether to modify it or not.

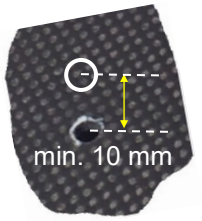
After the adjustment, put the rear wheel on and measure the distance **X** between the mudguard and the tyre. From that measure, take off 5-6 mm. The result will be the measure you will use as reference to mark the point where to drill the new hole for the bolt **V2**.
Example: if **X**= 25 mm; 25 – 5 = 20; the new hole will have to be 20 mm above the existing one.

Mark the point in vertical line from the centre of the bolt **V2**. The distance centre-to-centre from two holes should not be less than 10 mm, however, the interval of the rear height adjustment is 10 mm.



Remove both the bolt **V1** and **V2**.
Remove the side guard and drill a 8 mm hole where you marked for the **V2**.
Mount the side guard with the plastic spacer and temporarily fix it with the bolt **V2**.





Position the side guard at 5 mm from the tyre and parallel to it.
On the front inner side of the sideguard, in order to make marking the point easier, you can put some sticky paper tape. While holding the support **C** with the brake well leant against the frame, mark with a point, a pencil or else, where you will have to drill the new hole for the bolt **V1**.

Check that the point you marked is not too close to the edge of the side guard or to existing hole. In either case, move the support a few millimetres away and mark the point again.

Remove the **V2**, remove the side guard and drill a 6 mm hole where you marked it.
Mount the side guard fixing **V2** and then **V1**.

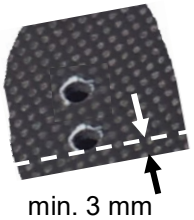
Repeat the same operations for the other side guard, fixing the front axle, too.

Adjust the brakes and the fork angle.

When you decrease the rear height, you have to move the side guard up.
The adjustment is limited to the lower edge of the side guard.
Usually, the margin is approximately 15-20 mm.
If the side guard is straight, you can decide whether to modify it or not.

Mark the point where to drill the new hole

To mark the point where to drill the new hole, proceed likewise described above and taking into consideration the entity of the adjustment.
Therefore, if the adjustment is 20 mm, the new hole will be 20 mm below the existing one.



Between the new hole and the edge of the sideguard there must be at least 3 mm.
Adjust the brakes and the fork angle.

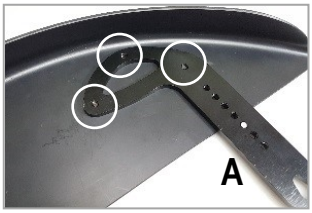
When changing both the setting and the rear height, proceed combining the two instructions.

SIDE GUARD

STANDARD REAR UNIT

After every adjustment of the rear wheel, you have to adjust the position of the side guard. You have to adjust the side guard at approximately 5 mm from the tyre.

The side guard is fixed to three points on the blade **A** that slides in the support **B** fixed to the frame.



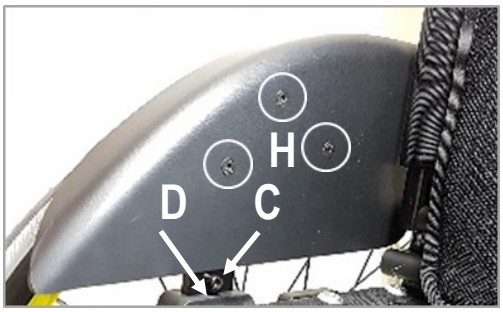
HEIGHT ADJUSTMENT

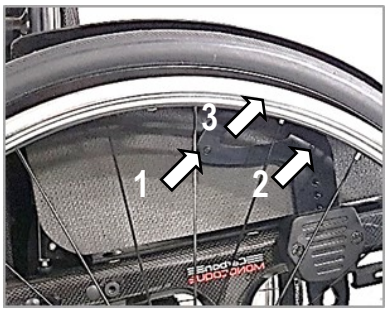
The blade **A** shows, in its vertical side, a series of holes to fix the bolt **C** that inserts in the hollow **D** of the support **B**. Therefore, to change the height, just remove the bolt **C** and screw it in another hole.
Warning: do not tighten the bolt **C** excessively: it may damage the threaded hole until making it unusable.

SIDE GUARD MODIFICATION

If one, the other or the combination of both adjustment above mentioned are not satisfactory, you can modify the side guard.
Every side guard is shaped to measure according to the configuration of the wheelchair when originally assembled.
The shape of the side guard always allow for a reasonable good range of adaptation.
Note: if the side guard is straight, you can decide to modify it or not.

A **When you decrease the rear height**, you have to move the side guard





1. Remove the three bolts **H** to take the side guard off the blade.
2. Position the side guard at approximately 5 mm from the tyre, always leant on the blade **A**. The bolt **C** on the blade must be inserted in the hollow **D** of the support.
3. While holding this position, mark the point where it is necessary to drill the first new hole (1 or 2; 3 is usually not accessible with the rear wheel on).
4. To do so, use a point and let it through the accessible hole. If the rear height adjustment is remarkable, you may need a new sideguard.
5. Drill a 5 mm on the sideguard where you have marked it.
6. Countersink the hole.
7. Insert and screw the bolt **H**.
8. To drill the second hole on the side guard, follow instruction from 3 to 7.
9. To drill the third hole, remove the side guard, mark the point where to drill and follow instruction from 5 to 7.

Advice for drilling. While drilling a hole, such hole may result slightly moved with respect to the precise point you marked. For the first hole, that move does not cause any trouble. On the other hand, for the second and third hole, it may cause a non-alignment between hole on the side guard and hole on the blade. A good method to be more precise, once you reach point 5, is to use a 4 mm drill pin (in order to avoid damaging the thread of the hole on the blade) and drill the side guard. Then, use and let a M5 tap through the threaded hole of the blade and out of the side guard.

At each adjustment, spread some mild lock thread glue on the bolts **C** and **H**.

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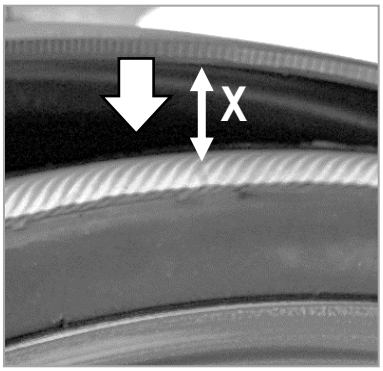
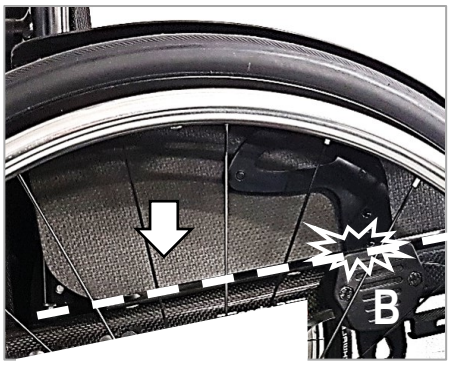
SIDE GUARD

STANDARD REAR UNIT

B **When you increase the rear height**, you have to move the side guard down.





If the lower side of the side guard is in contact with the support, it is necessary to cut it.
Measure the distance **X** from side guard and tyre and subtract 5 mm (es: 18-5 = 13 mm to cut).
Remove the three bolts **H** to take the side guard off the blade.
Draw the cut line according to the result you got.
Saw the side guard along the drawn line and round off the edges with a scissors blade or thin sand paper.
Continue with instruction .

C **When you change the setting**, you have to move the side guard frontward or backward according to the new position of the rear wheel, but the height of the side guard remains the same.
Proceed with instruction **A**.

D **When you change both the rear height and the setting**, you have to move the side guard up or down **and** forward or backward.
Continue with instruction **A** and, if necessary, instruction **B**, too

At each adjustment, spread some mild lock thread glue on the bolts **C** and **H**.

FOOTPLATE DISTANCE

Screw off the bolt **A** of both side of the frame.

Slide the tubes to the necessary height.

Make sure the height of the two sides is the same.

Insert the bolt **A** paying attention to fitting it with no effort into the threaded hole **B** on the rear side of the support **C**.

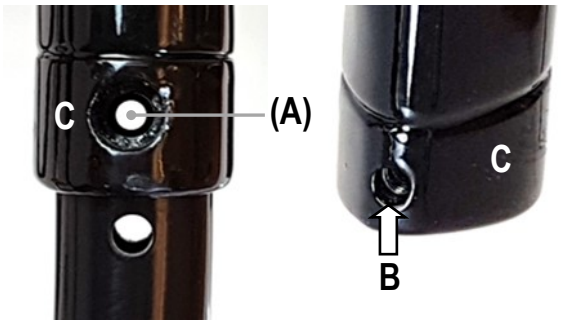
The footplate tube's holes and the hole of the support **B** must be aligned.

Finally, tighten the bolt **A** on both sides of the frame.

Do not force screwing the bolt, you may damage the thread of the hole **B**. Should that occur, you can remedy by pass the threaded hole with a M5 tap starting from the rear side of the support. If the thread is too damaged to be repaired, you can pass the hole with a 5 mm drill bit and fix the tube with a longer bolt, washer and nut.

You can not change the support **C**.

After adjustment, check that between the lower side of the footplate and the ground there is at least 2 cm and that there is no interference between footplate and casters.



FRONT *REAR*

TUBULAR ALUMINIUM FOOTPLATE

It can be provided with or without plastic plate.

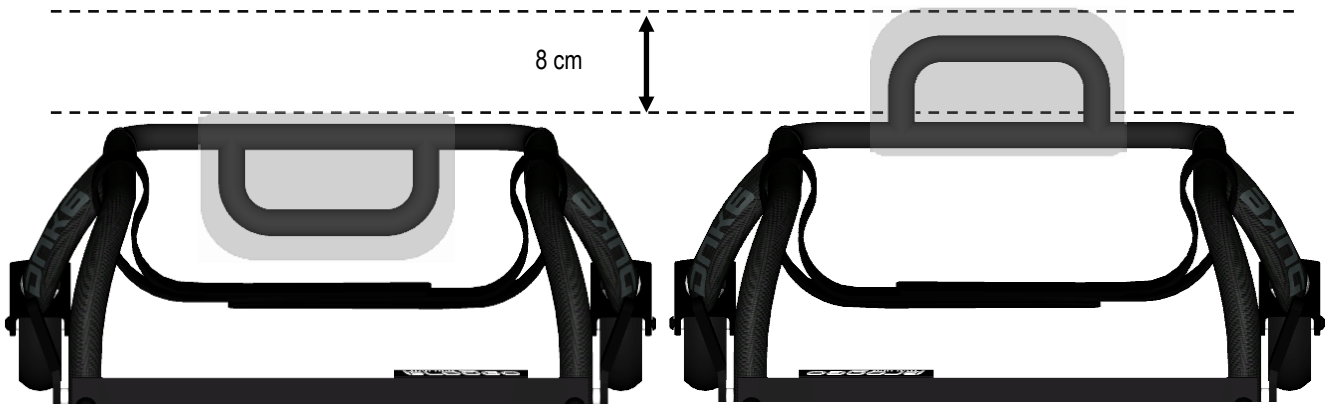
Angle adjustment:

NOT adjustable in angle.

Position adjustment:

2 positions: internal; external.

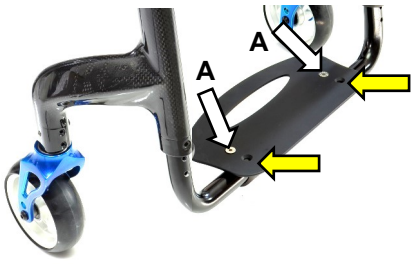
To change position, remove bolts that fix the footplate tubes to the frame (see “footplate distance”); remove the footplate and mount it reversed.

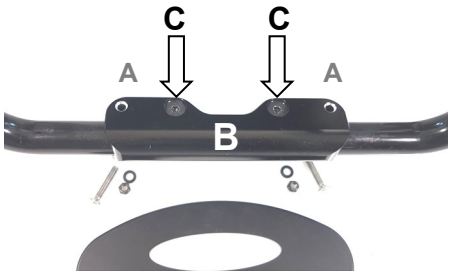


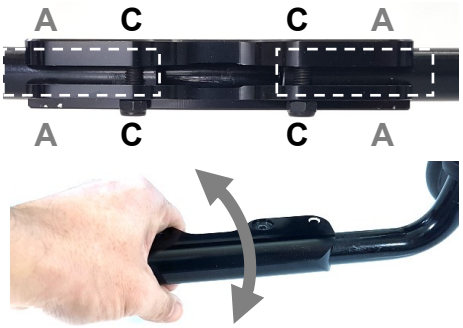
ALUMINIUM FOOTPLATE WITH CURVED TUBES

Angle adjustment:

Remove the two bolts and nuts **A** that fix the footrest plate to the clamp **B**.
Loosen the two bolts and nuts **C** that fix the clamp **B** to the two tubes.
Turn the clamp until the necessary inclination.
Lay the footrest plate on the clamp to check the inclination.
Firmly tighten the bolts and nuts **C**.
Finally. Fix the plates with the two bolts and nuts **A**.

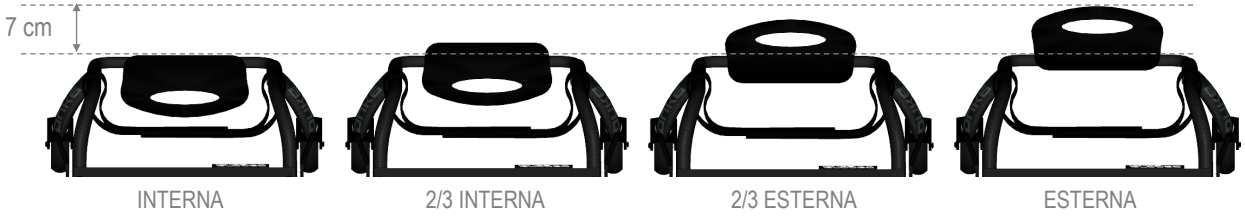


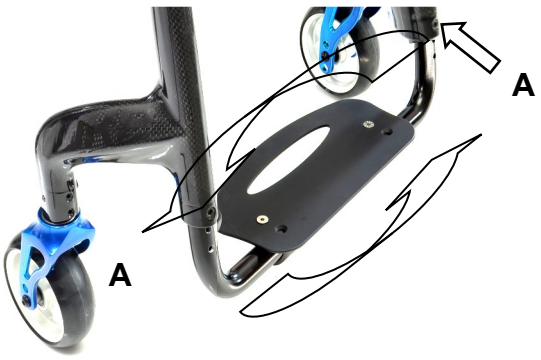




Position adjustment:

4 positions: internal; 2/3 internal; 2/3 external; external
Remove the two bolts and nuts **A** and fix the plate using the other two holes on the same plate. You can also fix the plate facing front or rear without the need (even though possible) of reversing the clamp.
If you wish to reverse the clamp, remove the bolts/washer/nuts fixing the footplate tubes to the frame (see “footplate distance”) and remove the footplate.
Reverse the assembly, fix the tube at the necessary height and adjust the angle as above mentioned.
To make inserting the tubes easier, if possible, remove the rubber adaptor from the frame and slide it along the footplate tube; that will create more room for the passage of footplate tubes.
It will be necessary to adjust the inclination.





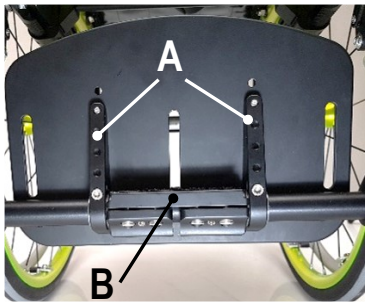
ALUMINIUM FLIP-BACK FOOTPLATE

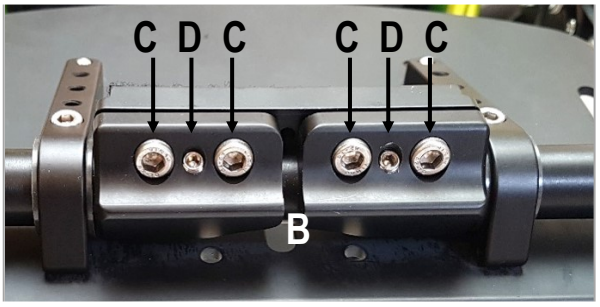
Angle adjustment

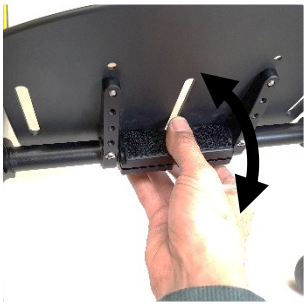
Raise the plate.
The arms **A** allow for raising the plate, but they are not involved in the angle adjustment.
The clamp **B** is the component that allows for angle adjustment.

Loosen the two grab screws **D** and the four bolts **C**.
With one hand, turn the clamp to the desired inclination.
Swing the plate down and let it rest on the clamp to check its inclination.

If you need more inclination, repeat the steps you made so far.
If you need less inclination, you can now simply push the plate down until the desired inclination.
Finally, raise the plate and tighten the bolts **C** first and then the grab screws **D**.



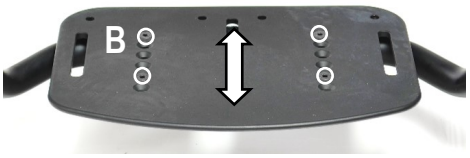


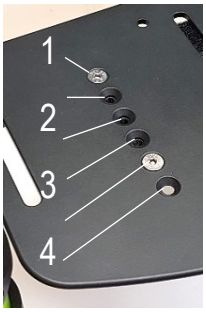


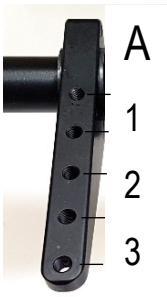
Regolazione in profondità

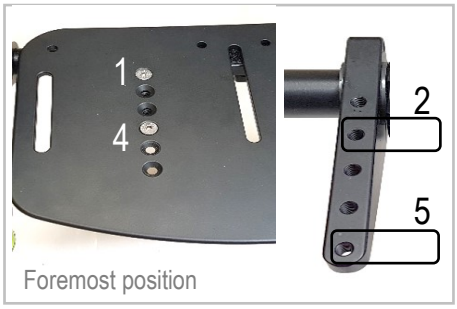
The plate is fixed to the rotation arms **A** with four bolts **B**.
The plate has six pre-drilled holes, whereas, the arms have five pre-drilled holes.

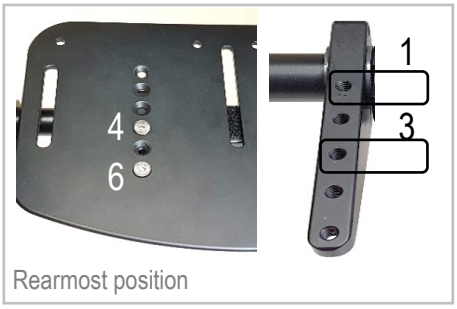
To change the position of the plate, remove the four bolts **B**.
Move the plate frontward or backward to the new position.
Insert and fix the four bolts **B** positioning them, as far from each other as possible.











The foremost position of the plate is given when you fix it through its holes 1 and 4 and those of the arm **A** 2 and 5.
DO NOT position the plate more forward than the provided foremost position: the plate will not lean over the clamp below.

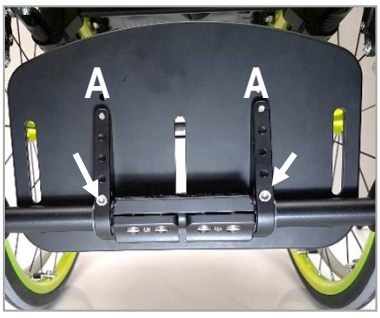
The rearmost position of the plate, you have to fix the plate through its holes 4 and 6 and the arm's **A** 1 and 3.
DO NOT position the plate more backward than the provided foremost position: the points of the arms **A** will lean out of the plate.

Note: between the foremost and the rearmost positions, there are 6 cm.

Friction of flip-back movement

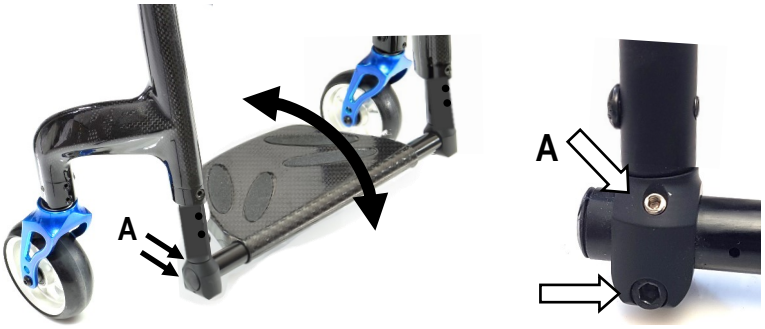
The arms **A** allow for raising the plate and you can adjust them in order to make the movement more or less fluent.

You can adjust the movement by screwing (harder movement) or unscrewing (lighter movement) the two bolts **E**.
If you tighten the two bolts hard, the plate will results nearly fixed.



At each adjustment, spread some mild lock thread glue on the bolts **B**.

CARBON FIBRE FOOTPLATE



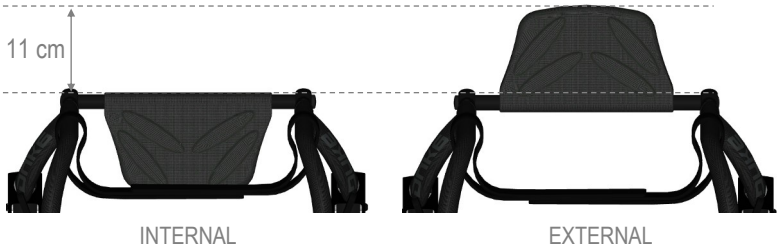
Angle adjustment:

Loosen the grab screw **A** and the bolt **B** of both supports (right and left) just enough to be able to turn the footplate.
Adjust the inclination of the plate until the necessary angle.
Finally, tighten the bolt **B** first and then the grab screw **A** of both supports.

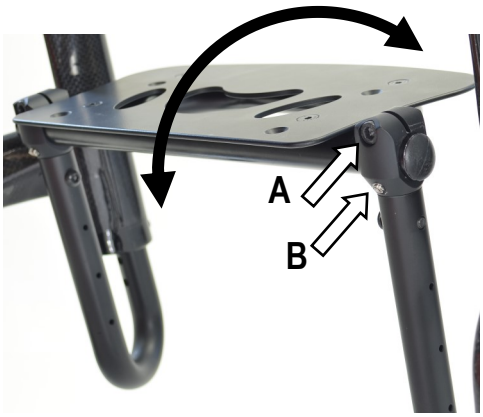
Position adjustment:

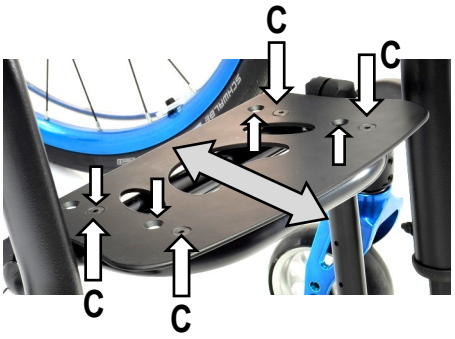
2 positions: internal; external

Remove the bolts/nuts that fix the footplate tubes to the frame (see “footplate distance”) and remove the footplate.
Reverse the assembly, fix the tube at the necessary height and adjust the angle as above mentioned.



"U" TUBE ALUMINIUM FOOTPLATE





Angle adjustment:
Loosen the bolt **A** and the grab screw **B** of both supports (right and left) just enough to be able to turn the footplate.
Adjust the inclination of the plate until the necessary angle.
Finally, tighten the bolt **A** first and then the grab screw **B** of both supports.

Position adjustment:
The "U" tubes are always mounted facing backward, whereas the footplate tubular facing frontward.
The footrest plate, with respect to the footplate tubular, can be fixed in two positions.
To change position, remove the 4 bolts **C**, move the plate and fix it using the other set of holes.

Other configurations are possible (not present in the order form), in fact, both the "U" tubes and the footplate tubular can be facing frontward and backward.

To reverse the entire footplate group (see pictures **1**, **2** and **4**), remove the bolts/washers/nuts that fix the footplate tubes to the frame (see "*footplate distance*") and remove the footplate.
Reverse the assembly of the entire group and fix it to the necessary height.
You will need to adjust the angle.

To reverse only the position of the footplate tubular (see pictures **1**, **2, 3** and **5** or **4, 2, 3** and **6**) remove the entire footpalte group as above mentioned.
Loosen the bolts **A** and the grab screws **B** until you can slide the two tubes off the footplate tubular.
Reverse the assembly without tightening the bolts and grab screws. Insert the tubes to the necessary height.
Centre the footplate and adjust the angle as above mentioned while paying attention to keeping the two tubes parallel to each other.
To make inserting the tubes easier, if possible, remove the rubber adaptor from the frame and slide it along the footplate tube; that will create more room for the passage of footplate tubes.

Tubes facing backward and footplate frontward

Footplate group Disassembled group

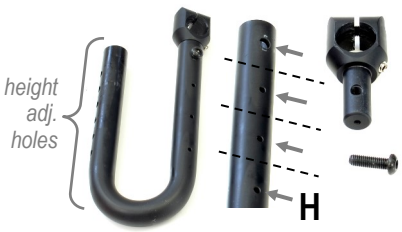
Tubes facing frontward and footplate backward

Tubes fand footplate facing backward

Tubes fand footplate facing frontward

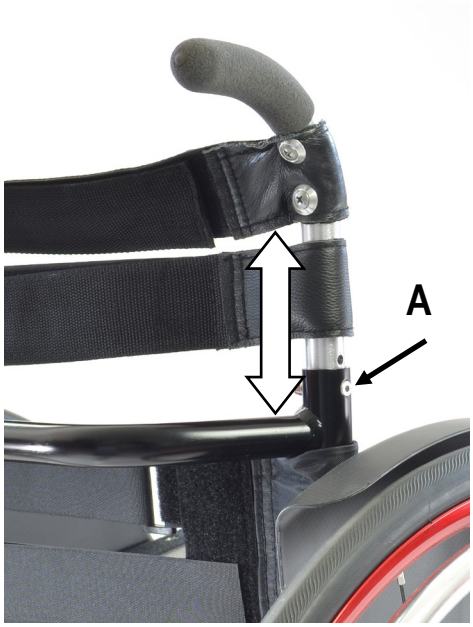
In addition to the height adjustment holes, the "U" tubes has other holes (**H**) meant to fix the footplate adjustment support.
You can cut off, every 3 cm, the part of the tube where you fix the support. You will need to enlarge the predrilled hole to 6 mm and fix the support with the bolt (spread some thread lock glue).

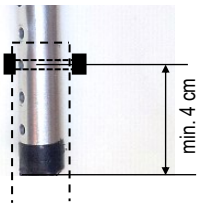
This operation may be necessary:
1)you need to increase the footplate distance, but the holes for height adjustment do not allow to do so.
2) to avoid interference between the curve of the tube and the caster's rotation, in fact, you can adjust the curve higher and the part of the tube with the support short in order to keep the same footplate distance of a configuration with the curve low and the support tube long.



BACKREST HEIGHT

Aluminium or titanium backrest





Remove the backrest upholstery and slide up the protecting sleeves of the backrest bands along the tube until the fixing screws are visible.

If the bolt is not accessible, remove the mudguard if it is removable or tilt the backrest backward by means of its adjustment system (see backrest angle adjustment sheet).

Remove bolt and nut **A** and raise or lower the backrest tubes to the desired height.

If the minimum height you can reach is not enough, it is necessary to cut the lower side of the.

If the maximum height you can reach is not enough, it is necessary to change the tube.

Warning: to guarantee a good stability, between the fixing hole and the lower side of the tube, there should be at least 4 cm. If the tube is cut, the lower hole will be only a few millimetres front the end of the tube; therefore, you should not use that hole, the next and, sometimes even the third to fix the backrest height.

Replace the screws and tighten.

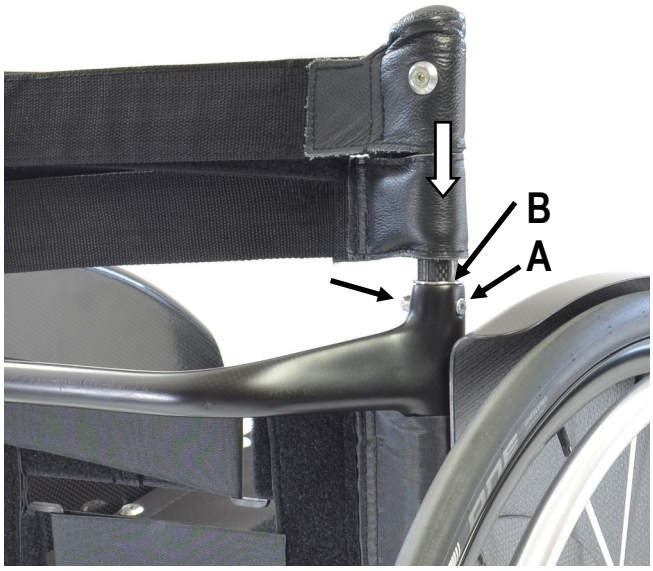
To reduce possible play and possible noise, you can put some sticky tape around the inner tube at its bottom and at its fixing point (or just under it).

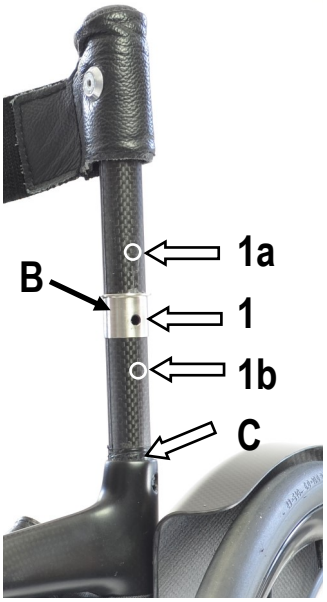
Note: if the backrest tube is in carbon fibre, follow the instructions of the adjustment sheet "*backrest height—carbon fibre backrest*".

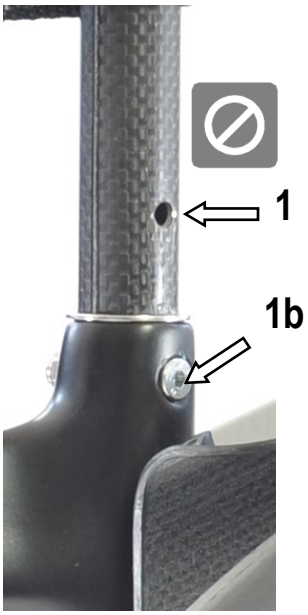
The titanium backrest structure includes a plastic adaptor, just follow the same instructions above.

BACKREST HEIGHT

Carbon fibre backrest







Remove the backrest upholstery and slide up the protecting sleeves of the backrest bands along the tube until the fixing screws **A** are visible.

In the fixing point, you will also see a steel buckle **B**.

If the bolt is not accessible, remove the mudguard if it is removable or tilt the backrest backward by means of its adjustment system (see backrest angle adjustment sheet).

Remove bolt and nut **A.**

The backrest tubes have only one hole that is originally drilled according to the height requested in the order form.

On the pictures above, you can see that the fixing point is the **1**.

The point **1a** could be a new hole to lower the backrest height and that is possible without creating problem (you may need to cut off the bottom side of the tube), in fact, the hole **1** will be underneath and within the tube of the backrest structure. While drilling the hole on the tube, pay attention to aligning the handle grip (if present).

Should you cut off the bottom side the tube, insert the buckle **B** on the tube and put a few turns of sticky tape **C** around the extremity of the tube to reduce a possible play.

Insert bolt and nut **A** and tighten **without overtightening** to avoid damaging the carbon fibre.

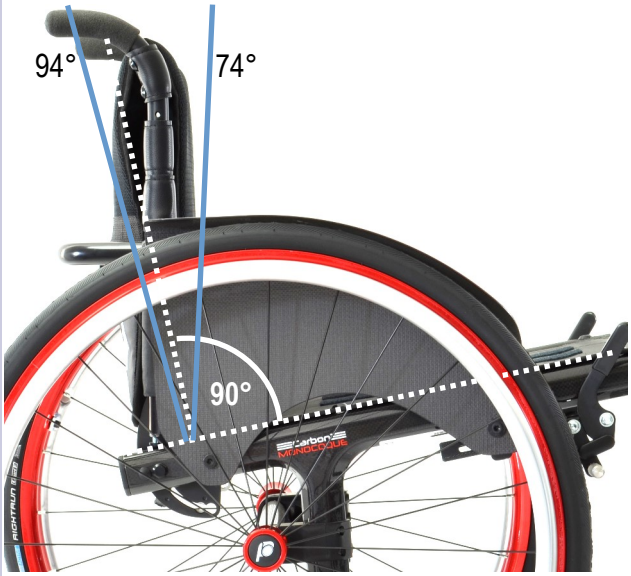
The **1b**, on the other hand, would be the point where to drill a new hole to increase the backrest height, but, by doing so, the hole **1** would be out of the backrest structure and it would create a situation of possible breakage of the tube during normal use of the wheelchair. This operation is not allowed.

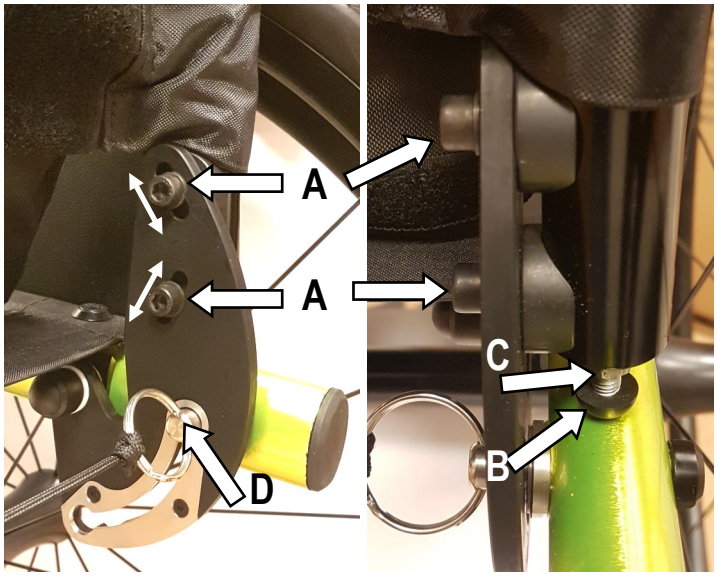
Warning: to guarantee a good stability, between the fixing hole and the lower side of the tube, there should be at least 4 cm.

The carbon fibre backrest tube is not suitable to fixing any clamps, such as those used for a postural system hardware.

Note: if the backrest tube is assembled on a aluminium or titanium backrest structure, follows these same instructions.

BACKREST ANGLE





Adjustment from 16° close, tilted frontward (74°) to 4° open, tilted backward (94°) with respect to 90° to the seat.

If you need to open (tilt backward) the angle, before proceeding, with the adjustment, fold the backrest, loosen the nut **C** and screw the bolt **B** that determine the end run, that it the point where it will lean on the frame. Such operations are not necessary when you need to close (tilt forward) the angle.

The adjustment can be performed thanks to the two bolts **A** sliding along the slots through which they pass and fix the backrest tube.

Therefore, loosen the two bolts **A** on both backrest plates, tilt the backrest to the desired inclination and securely tighten the bolts.

Now check the locking system.

If the locking pin **D** does not lock, or there is too much play, it is necessary to adjust the end run bolt **B**.

Loose the nut **C**, fold the backrest and screw or unscrew the bolt **B**.

Open the backrest and check if it locks and its play.

To check the play, with the locked backrest, gently pull back it and forth.

If the play is still a lot, loosen the bolt **B**, whereas, if the backrest does not lock, screw the bolt **B**.

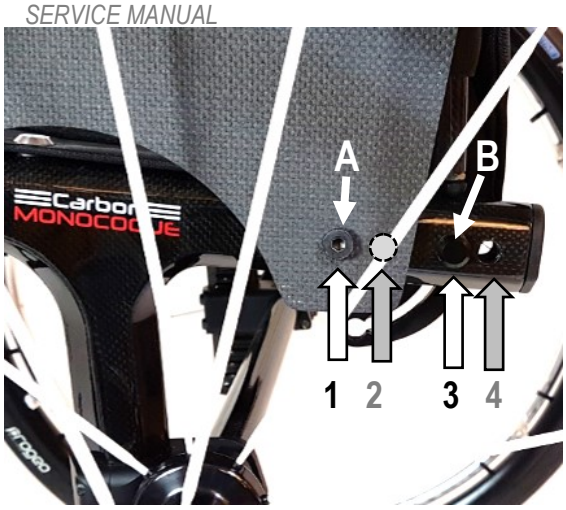
The correct adjustment is when the pin locks and the play is minimum. Then screw the nut **C** towards the tube.

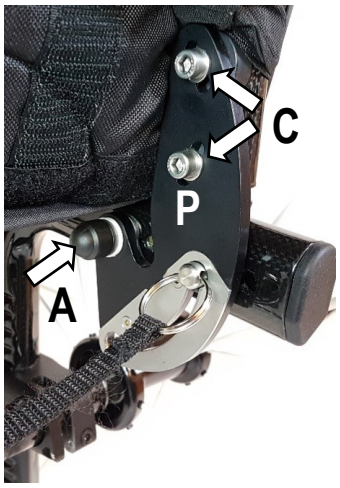
Not only does the end run bolt **B** reduce the backrest play, but also it is very important as point of support of the backrest. In fact if it is badly adjusted (a lot of play) the lock pin **D** will support all the backrest stress and it may be damaged or even brake.

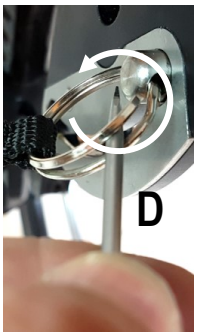
Remember that the backrest angle can affect the point of balance of the wheelchair. In fact, with tilted backward backrest (open angle), the wheelchair becomes less stable.

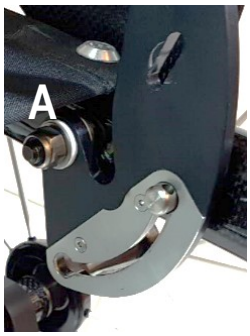
BACKREST POSITIONING

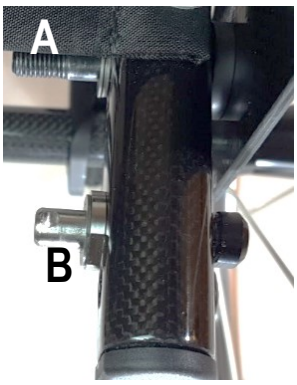
Seat depth / setting (point of balance)











The frame allows for two positions of the backrest plate **P.**

Usually, the wheelchair is provided with the plate **P** fixed in the frontward position with the bolt **A** through the hole **1** and the lock axle **B** fixed through the hole **3**.

The holes **2** and **4** are located 15 mm behind the holes **1** and **3**.

Before proceeding with moving the plate **P**, it is advisable to remove the backrest unit. To do that, screw off the two bolts **C** on both plates.

Without the backrest, the following operations will result much easier.

Remove the ring **D** of the release string. While holding the bolt **A,** screw off the corresponding nut.

Remove the plate.

Screw off the lock axle **B** and nut.

Remove the bolt **A** and swing the side guard away.

Note: in case of removable side guards, the side guards are not involved in the

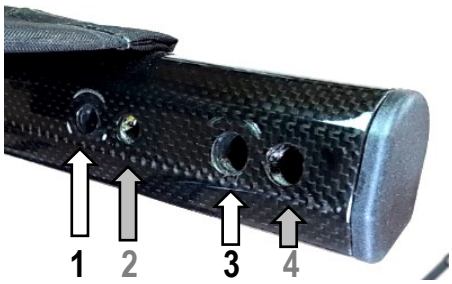
Pay attention to all washers and spacers.

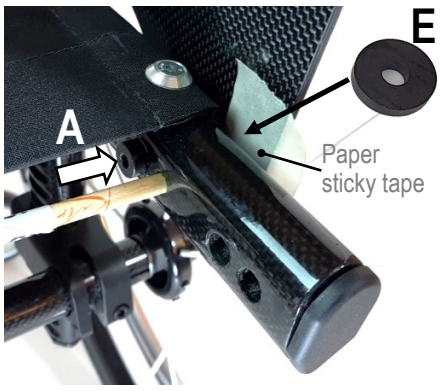
Attach a piece of paper sticky tape over the part of the side guard where you will have to drill a new hole.

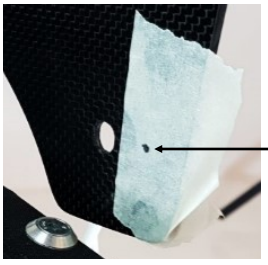
Insert the bolt **A** and position the side guard using the existing hole and putting the spacer **E**.

With a pen/pencil through the hole for the new position, mark the point where to drill the hole on the side guard.

Drill an 8 mm hole on the side guard. If you want to remove the side guard to drill it, it is necessary to free it from the from fixing point – see adjustment sheet "*side guard*".







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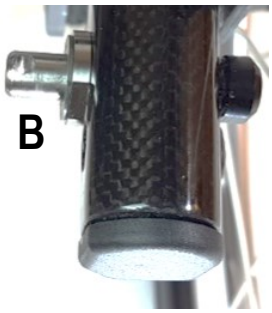
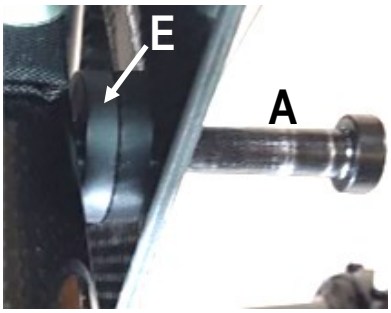
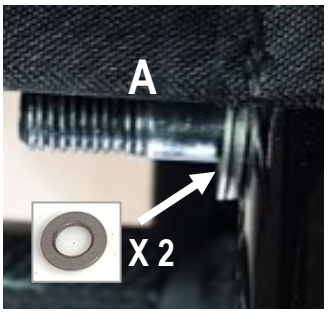
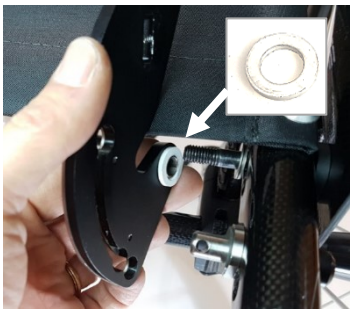
BACKREST POSITIONING

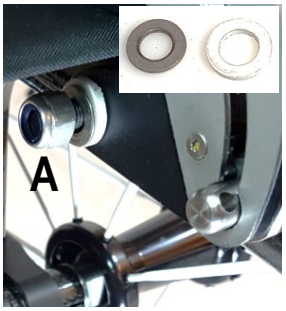
Seat depth / setting (point of balance)

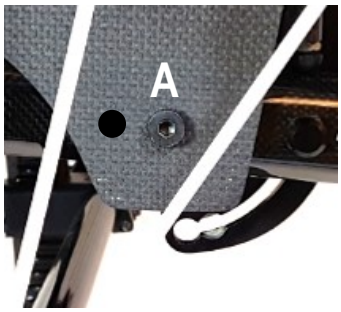


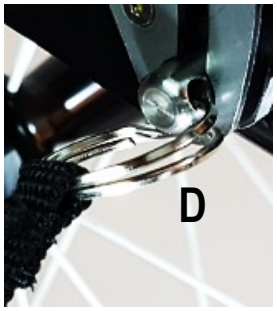












Assemble the lock axle **B** with the corresponding nut. **WARNING!** DO NOT tighten the nut much; you may damage the carbon fibre tube. When you feel the nut starts to tighten, the torque is enough.

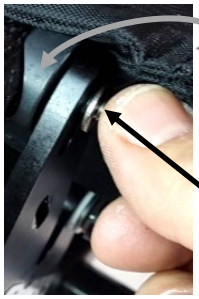
Assemble the side guard with the bolt **A** and the spacer **E**.

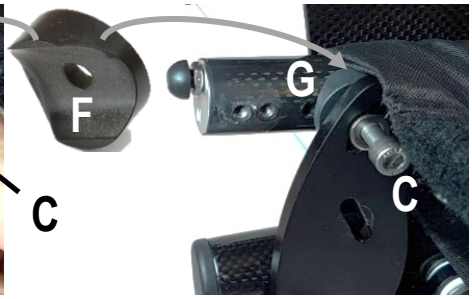
Let the bolt **A** through and insert two steel washers.

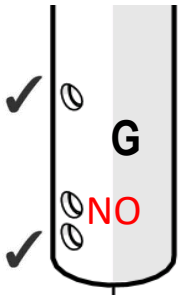
Position the white nylon washer on the plate and insert the plate. Then, put another white nylon washer, a steel washer and tighten the nut while holding the bolt **A**. **WARNING!** DO NOT tighten the bolt/nut **A** too much; you may damage the carbon fibre tube. When you feel the nut starts to tighten, the torque is enough to make the side guard rigid.

Insert the ring **D** of the release string through the hole of the lock axle.

Once you have assembled both plates **P**, proceed with assembling the backrest.







Lean the backrest onto the seat.

Insert one bolt **C** plus washer through the upper slot of the plate and the spacer **F** and partly screw it into the upper hole of the backrest tube **G**.

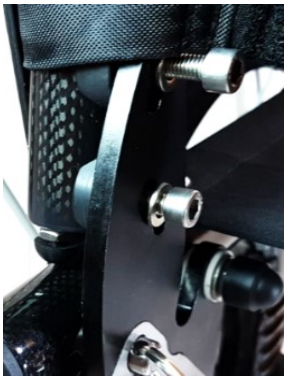
Carry out the same operation on the other side.

Turn the backrest until you can insert the second bolt **C** plus washer through the lower slot of the plate and the spacer **F** and screw it into the lower hole of the backrest tube **G**.

Do not use the intermediate holes on the tube **G**.

Carry out the same operation on the other side.

Finally, adjust the backrest inclination – see adjustment sheet "*backrest angle*".



At each adjustment, spread some mild lock thread glue on the bolts **C**.

SEAT WIDTH ENLARGEMENT

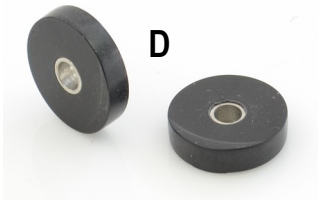
You can enlarge the seat by maximum 5 mm each side by modifying the side guard fixing.

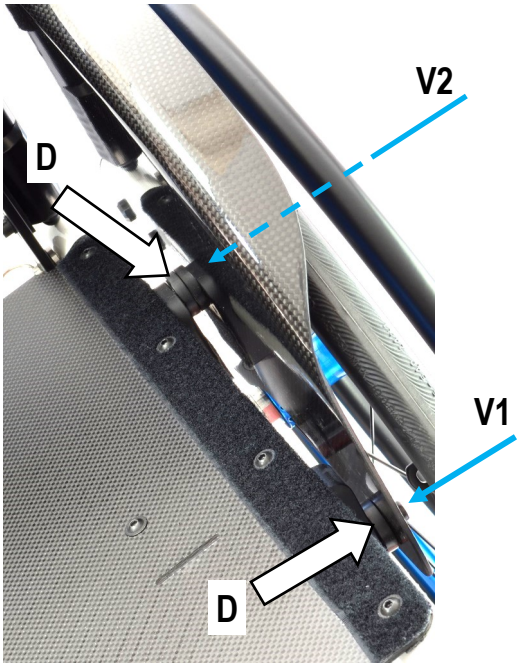
This is possible by means of proper 5 mm spacers **A** to mount between the side guard and the frame.

The bolt **V1** remains the same.

The bolt **V2** has to be changed with a 5 mm longer one.

To assemble the side guard, follow the instructions of the adjustment sheet "*side guard*".

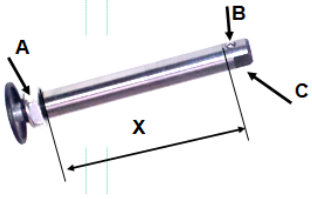




At each adjustment, it is advisable to spread a drop of mild lock thread glue on the bolts **V2**.

QUICK RELEASE AXLE

(rear wheel)



Adjust the quick release axle so that the rear wheel is safely fixed with no risk that it comes off accidentally.

At the same time, there should be no or very little play.

To check if the rear wheel is safely fixed, take hold of the hub without pressing the release button, and try to pull the wheel in and out.

As regular maintenance, it is advisable to clean the quick release axle and spread a little of grease on it.

If the wheel comes off, the distance **X** between the nut **A** and the balls **B** is too short, therefore, it is necessary to unscrew the nut **A** while holding the point **C** of the axle. **If there is play,** the distance **X** between the nut **A** and the balls **B** is too long, therefore, it is necessary to screw the nut **A** while holding the point **C** of the axle

In both cases, make a few tries until the correct adjustment. There is no need to remove the axle from the wheel.

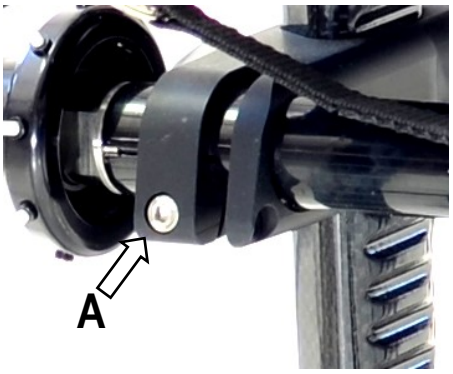
It may happen that you adjust the axle so that the wheel only seems properly fixed, but it is not safe.
In fact, to check the adjustment, you have also to try to press the button just a little bit (as guidance, ¼ of its run) and pull the wheel. If it comes off, it means that it may come off while driving! Therefore, this is a very important **safety check**.
If the wheels comes off, unscrew the nut a little bit until you have the proper adjustment.

If the wheel (the axle) gets stuck in the receiver, you can proceed in two ways:

Press the quick release button, pull the rear wheel and, at the same time, with a mallet, gently hit (a little harder if necessary) the hub or spokes of the wheel and try to remove it.

Loosen the bolt **A** and try to remove the wheel .

Tighten the bolts **A** (see also sheet "*camber and convergency*).



The reasons why the wheel can get stuck can be two.

- the receiver is slightly damaged; in this case, with a ½ reamer, re-pass the receiver's hole.
- when pushing the axle's button, the balls do not fall inside the axle's shaft; first, clean the axle, then try to push the button a few times a see if you have solved the problem; if not, press the button, hold the axle's pin with a wrench and unscrew the button half of a turn. Check and if necessary do the same with another half turn. Do not unscrew the button too much: the pin will come off and, consequently, the balls will fall to the ground.