Pony4 - Operating and Service Manual

1 Introduction

Dear Customer, First of all, we would like to thank you for choosing Pony4 (P4) to meet your transportation needs. We hope you will be happy to ride any number of kilometers or miles with our product to improve the environment on planet earth.

Our team believes that any human powered vehicle can be adapted to almost any transportation need, and if it doesn't exist, it hasn't been developed yet.

In this manual we will go through all aspects of living with a P4 from delivery, initial installation, alignment, safety, maintenance, and finally durability and warranty. Because this process can be quite complex, we have marked the important parts with the word CAUTION: For a better understanding, you will also find links to our video channel: Pony4bike in some cases.

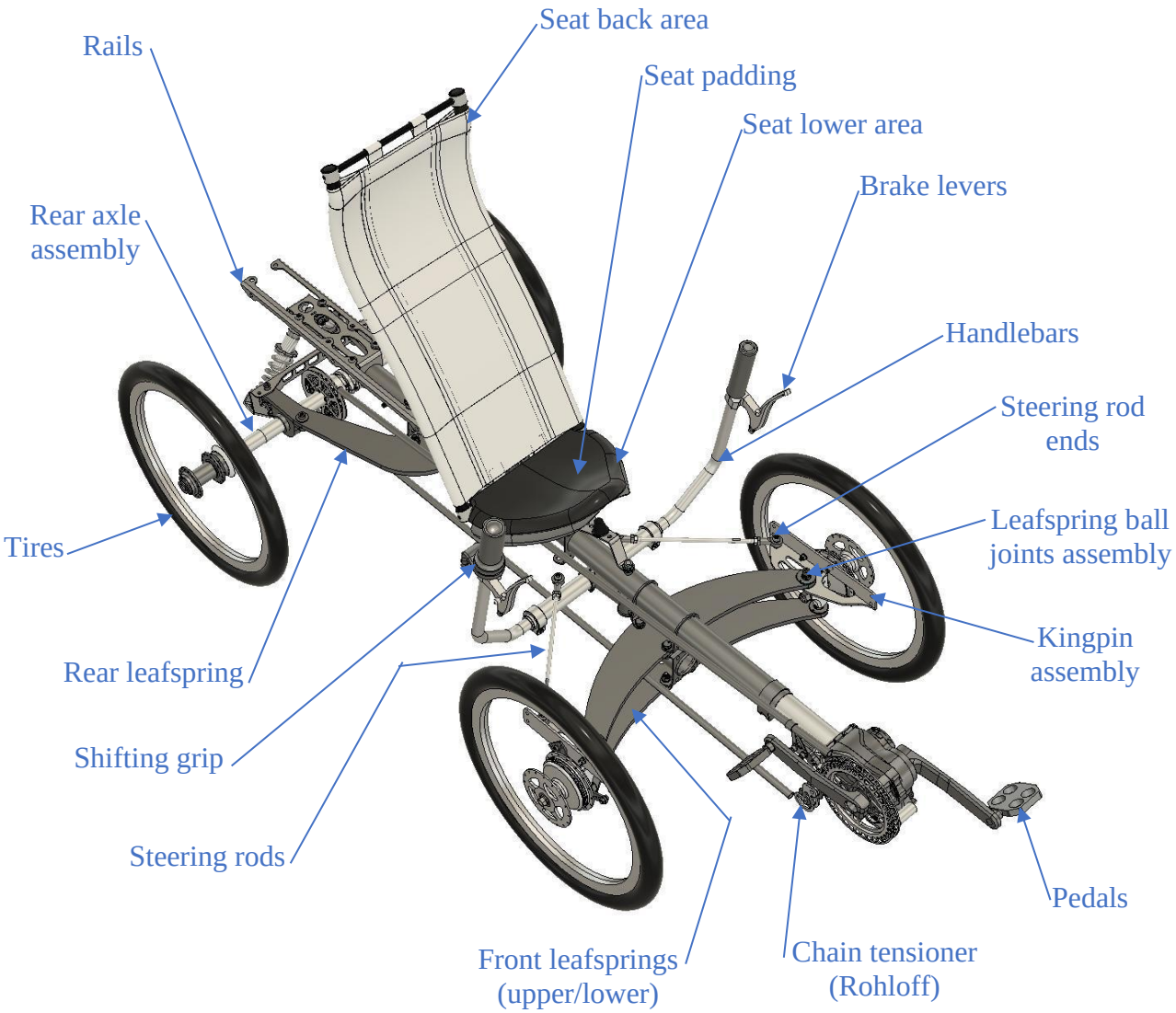
If you are unsure about any details in our instructions or other things related to the P4, please visit our website. We have a lot of useful information there combined with some video tutorials and drawings.

For components and parts from other manufacturers (e.g. internal gear systems, brakes, etc.), we recommend that you study those manufacturers' specific manuals. These manuals contain specific procedures for assembly, disassembly and maintenance of these parts. Familiarize yourself with them, as failure to follow these procedures may result in damage to the parts and limitation of the warranty. Please note that some tasks can only be completely performed by the manufacturers (for example, disassembly of the internal parts of Rohloff hub gears).

1.1 Description

P4 is considered as a bicycle due to human power (and limited electric assist) in a lot of countries. However, sometimes local rules may differ, so familiarise yourself with them and contact the authorities on this matter. For some parts you will find great similarity with bicycles and recumbents such as wheels, transmissions, drum brakes, seat, etc. Other parts will be completely new for you, for example leaf springs, rear axle, etc. For these parts we will have a more detailed review in the manual. Since each P4 bike is built to a specific order with optional extras, some parts may vary from bike to bike.

Basic important P4 parts with terminology can be seen at followed scheme:



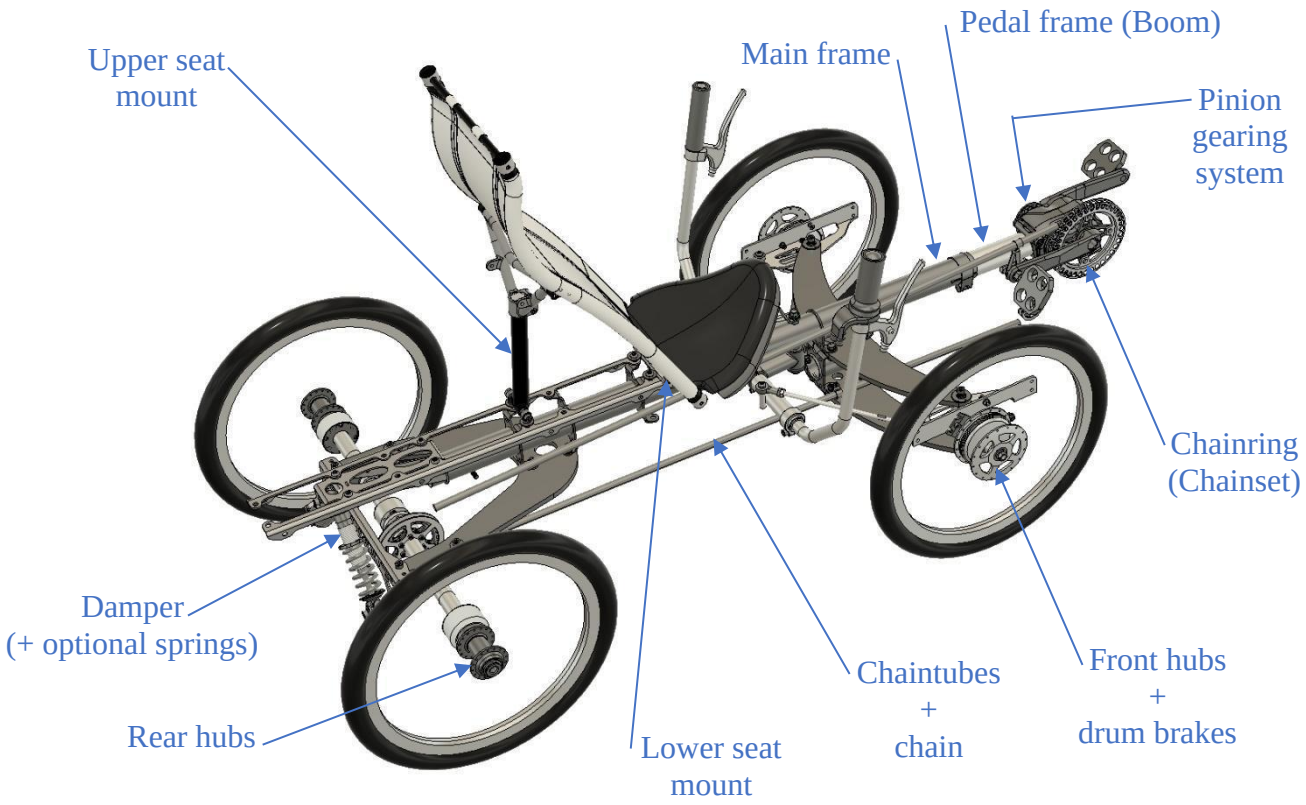


Fig. 1. *Pony4 basic scheme with terminology*

1.2 Variants, specifications and options

We have developed three basic variants of the P4. All variants share the same principle of frame construction and transmission. For light cargo applications there is a **SHORT *FRAME / LIGHTWEIGHT*** version with one damper on the rear axle. For compact cargo with more weight, we have a **SHORT *FRAME / HEAVY LOAD*** version with two dampers with optional steel springs on the rear axle. And finally for bulkier and more heavy cargo we have the **LONG *FRAME / HEAVY LOAD*** version with two dampers and optional steel springs on the rear axle.

Fig. 2. *Pony4* ***LIGHTWEIGHT*** *(left) and* ***HEAVY LOAD*** *(right) with* ***Flat Cargo Platforms***

Fig. 3. *Pony4* ***HEAVY LOAD Short - Cargo Box Low*** *(L),* ***Cargo Box High*** *(R)*

Fig. 4. *Pony4* ***HEAVY LOAD Long*** *with* ***Cargo Box Low***

Pony 4 is equipped with 90 mm front drum brakes with improved cooling. Rear axle is without brakes. For transmissions, we offer Pinion gearboxes in two variants with one chain drive. Second option is the Rohloff hub in the middle position with two chains. E-assist, a pedelec system, is offered in several variants. Simple version, combined with Pinion, is mounted in the front of front leaf springs with 250 W motor and 30 Nm or 45 Nm torque levels . For heavy cargo and more hilly terrain a mid-drive motor located in cranks together with Rohloff is better suited.
You will find detailed variants and parameters description on Fig.5. Complete options list can be found in order form at followed link:

https://www.pony4.bike/wp-content/uploads/2021/02/PONY4-ORDER-FORM.pdf

BASIC VERSION	SH0RT FRAME / LIGHT WEIGHT	SH0RT FRAME / HEAVY LOAD	LONG FRAME / HEAVY LOAD
frame	Chromium-Molybdenum Steel Alloy Frame with telescopic Aluminium Alloy pedal boom		
suspension	4 wheels suspended with Glass/Carbon fibre composite leaf springs		
additional suspension	adjustable hydraulic damper on rear axle	2 shocks with adjustable spring and hydraulic damper on rear axle	
frame mounts	only under seat	two rails under seat and load platform	
wheels	20''(406), TLE ready rims, 32 spokes, Schwalbe Marathon 40-406, tubes with French valve		
transmission	Pinion C1.6 gearbox with 36t chain ring. 155 mm cranks. 9 spd chain. 26t sprocket on rear axle. ratio 295%		
differential	power transmission on slowest turning rear wheel solved with double freewheel		
brakes	independent drum brakes on both front wheels. Sturmey Archer 90 mm drums modified for lighter weight and better cooling. parking brake on both levers.		
seat	ergonomic, adjustable seat with ventilated mesh as back rest. basic seat pad in foam. Choice between sizes M till 170 cm, L till 190 cm, XL till 200 cm		
steering	double L- form Aluminium Alloy handles, adjustable in angle and width.		
standard colours	white (RAL 9010), red (RAL 3001), blue (RAL 5015), green (RAL 6018), grey (RAL 7012), black (RAL 9005)		
NOT included in basic but optional	front and rear lights, mudguards, mirrors, bar-ends, neck-rest, ventisit seat pad, different types of cargo platform or boxes with child seat, etc.		

BASIC VERSION	SH0RT FRAME / LIGHT WEIGHT	SH0RT FRAME / HEAVY LOAD	LONG FRAME / HEAVY LOAD
total length	1900 mm, extended pedal boom		2200 mm, extended pedal boom
total width	799 mm		
total height	980-1080 mm depending on seat size/angle		
ground clearance	150 mm (except for heels while pedaling)		
bottom bracket height	340 mm		
seat height	420-460 mm		
seat angle	50° +/- 15°		
wheel track	705 mm		
wheel base	1000 mm		1310 mm
weight of naked bike	24,5 kg	27,5 kg	28,5 kg
max weight incl. driver	135 kg	185 kg	

Fig. 5. *Pony4 variants and basic parameters*

2 Delivery

All Pony4 bikes can be ordered directly from us or through our dealers. In the case of direct sales, each bike is packed in an oversized cardboard box and is assembled with the exception of the seat, boom (in the case of long frames) and specific accessories (mudguards, etc.). Handlebars are attached and folded. We use recycled materials for packaging of disassembled parts and spare parts to avoid possible damage. These boxes are usually hot-glued to the outer box to prevent movement. To avoid having to wrap the outer carton during shipping, we use empty cartons inside to fill the empty space. Check all boxes inside the packaging for parts before discarding them when unpacking.

2.1 Unpacking

Unpacking is simple. First cut the outer straps, then cut the tape on the top to open the box. Remove the seat which is usually fixed with zip ties to the wheel and handlebars. Check for other parts possibly attached to P4. After that it is better to lift the P4 from the box. Then inside of the big box there will be smaller paper boxes with other parts including extra options (usually manual, boom with chainset, mudguards, etc.). ***LONG FRAME*** *P4* versions have a pedal frame (boom) with cranks and chainset removed from frame. Boom with the option of Pinion gearbox is packed inside front leaf springs due to connection of shifting cables. Some parts are fragile when not mounted so handle them with care (for example composite mudguards).

Unpacking can be seen in the first part of this tutorial video:

PONY4 - unpack and prepare for your first ride

2.2 First assembly and adjustments for rider

First assembly is rather easy and intuitive if you follow this order: **S**eat, **H**andlebars, **P**edal frame, **C**hain, **B**rakes, **M**irrors.

Seat is attached to the frame in two places. Seat lower area is resting on a conic shaped silentblock.

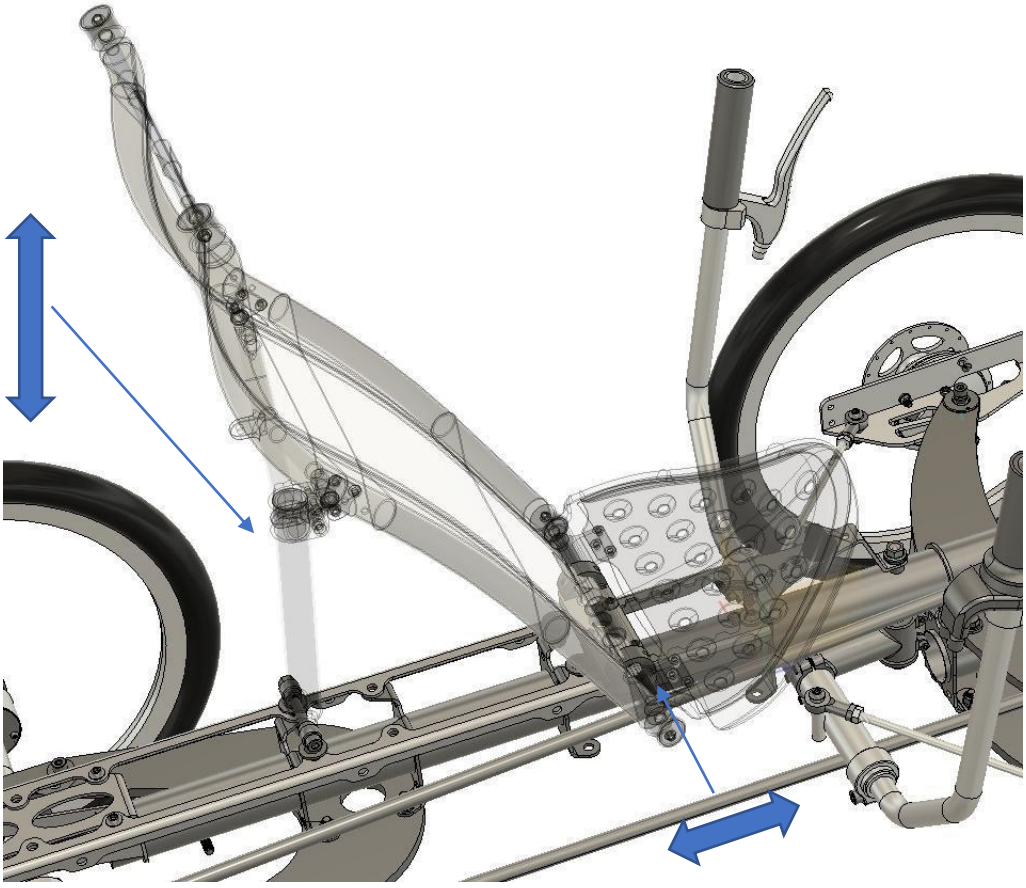


Fig. 6. *Seat adjustment movements*

Fig. 7. *Seat adjustment - upper mount*

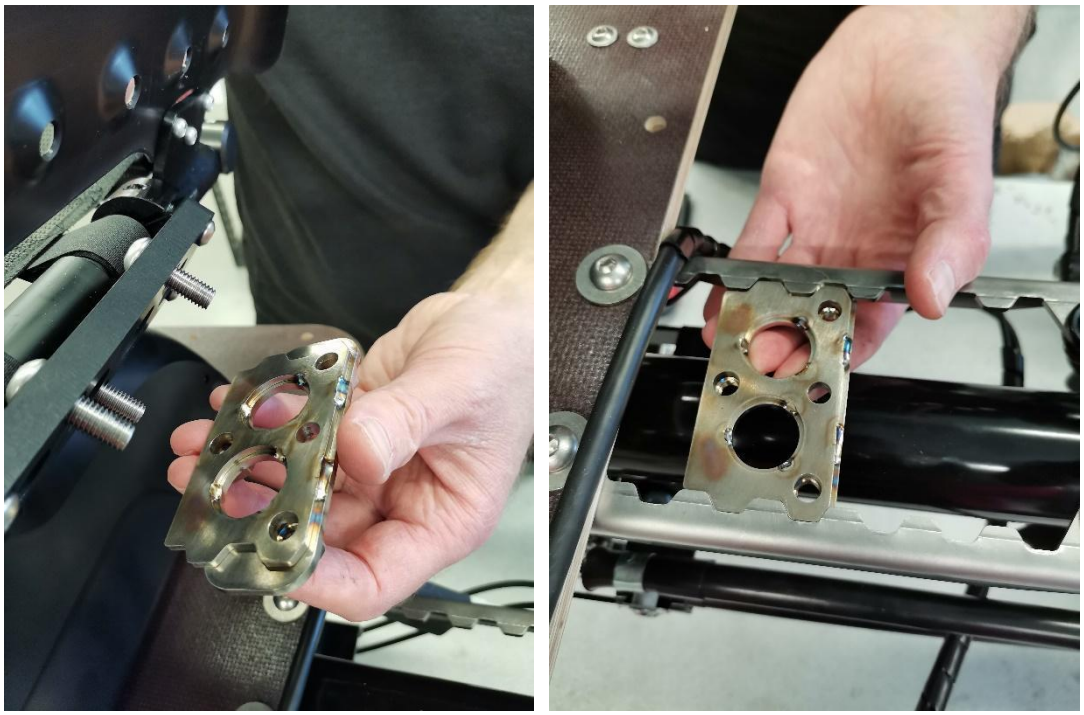


Fig. 8. *Seat adjustment - lower mount, attached on the seat for transport (L) different positions of the seat in the rails (R)*

Fig. 9. *Seat adjustment - lower mount fixation*

2.3 Front boom assembly

Pedal frame (boom) is already installed, in a short frame variant, and set to your specified leg-length. This variant requires only minor adjustments due to human body variations. In case of a long frame variant, your pedal frame is taken out of the frame for transport. Carefully install the pedal frame inside the front part of the frame. *Do not clean the front boom*. We use special paste to increase friction. Same is used for front boom assembly with crankset.

2.3.1 Front boom assembly Pinion or Crankset

Due to Pinion shifting cables, boom assembly is placed inside of front leaf springs for transport. Carefully unpack assembly. Be sure that the main stainless-steel clamp on the frame is not tightened. Do not clean the front boom, we use special friction paste! Be sure that the right handlebar is directing horizontally backwards.Boom installation needs all slack of shifting cables.

Fig. 10. *Sliding the boom inside the frame*

Place the boom inside the frame and slide it with force inside the frame. Adjust the boom to your desired leg length position and align the bottom bracket axis to be horizontal. Tighten stainless-steel clamps temporarily.

Next step is to assemble the chain tensioner with the tube holder in place.

Fig. 11. *Chain tensioner installed*

Last step is to put the chain carefully on the sprocket.

Fig. 12. *Chain placed on the sprocket*

2.3.2 Front boom assembly Long frame with Pinion and motor

For this assembly you will need Inbus (Allen) key set

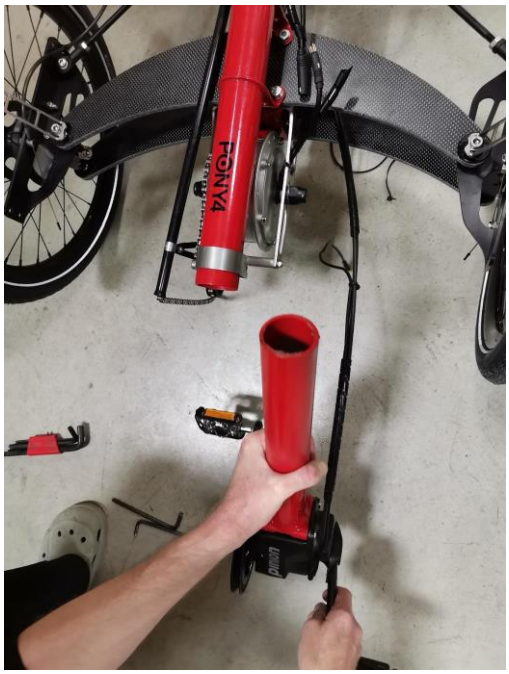


Fig. 13. *Front boom*

Do not clean the inserting part of the boom, we use special friction paste!

Due to Pinion shifting cables, boom assembly is placed inside of front leaf springs for transport. Carefully unpack assembly, do not hold the assembly via plastic part for magnet holder

which is placed on the left crank near bottom bracket axle. Be sure that the main stainless-steel clamp on the frame is not tightened.

Fig. 14. *Handlebar position for boom inserting*

Be sure that the right handlebar is directing horizontally backwards. Boom installation needs all slack of shifting cables.

Fig. 15. *Front boom insertion*

Place the boom inside the frame and slide it with force inside the frame. Adjust the boom to your desired leg length position and align the bottom bracket axis to be horizontal. Tighten stainless-steel clamps temporarily.

Fig. 16. *Assembled all electric assist cable connectors. Each one has a specific shape*

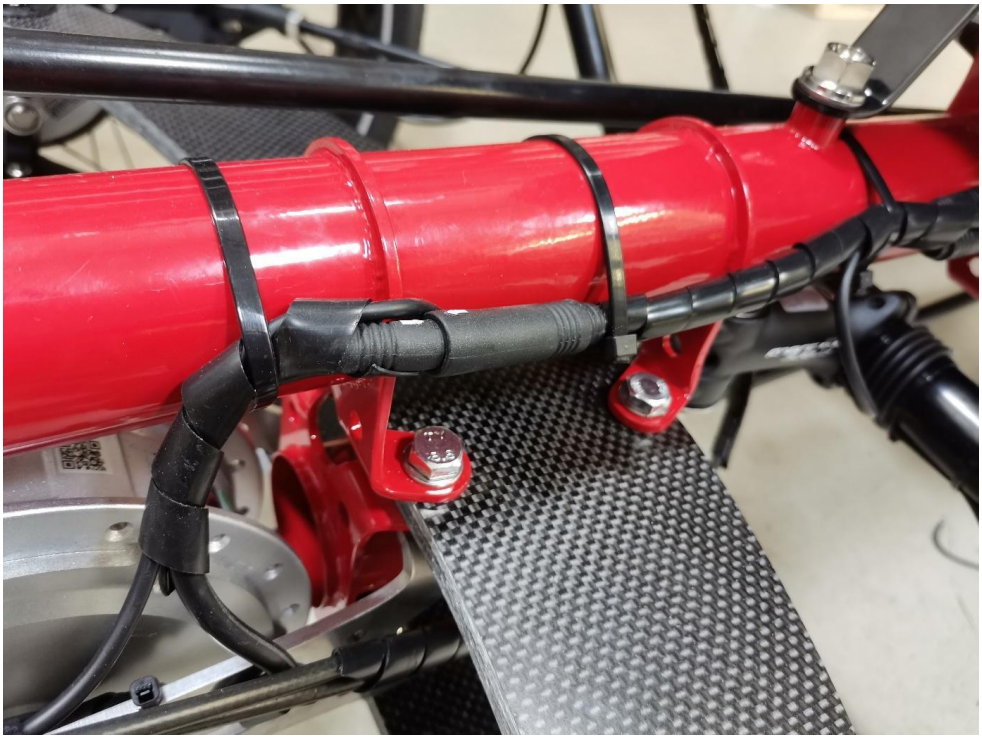


Fig. 17. *Final cable assembly should look like above*

Fig. 18. *Pinion cable attachment near the motor. Be sure that nothing is in contact with the moving parts of the motor.*

Fig. 19. *Loose attachment of Pinion shifting cables by zip-ties to the frame and handlebar*

Fig. 20. *Installation chain on chainring and chain tube holder on the boom*

Check that the chain is correctly fitted to all sprockets and chainrings. Make sure that the chain line is straight and that the chain is centered in the chain tube. Check that the Rohloff chain tensioner bracket is not touching the engine and that the chain tensioner always has a little extra slack to tension the chain when the rear axle moves due to the suspension. Check the extension of the pedal boom with your leg length and block it by tightening the steel clamp.

2.3.3 Front boom assembly Long frame with Rohloff and motor

Be sure that the front boom clamp is free and not tightened on the frame tube.

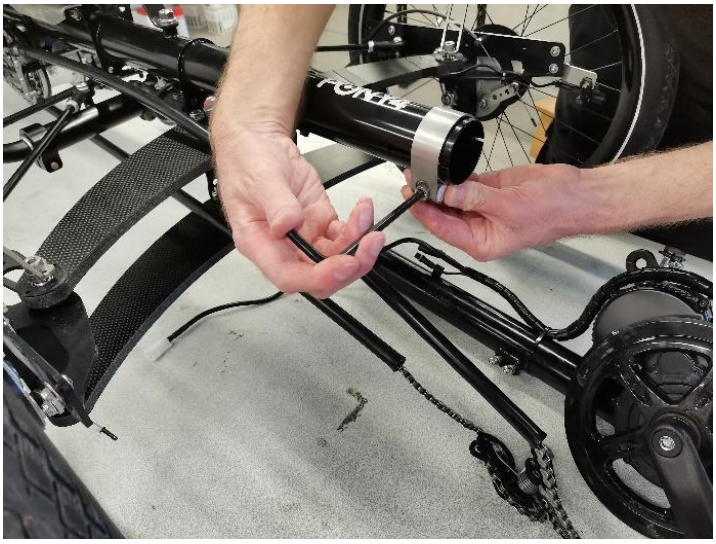


Fig. 21. *Front boom clamp*

Place the boom inside the frame and slide it with force inside the frame. Do not clean the boom, we use special friction paste for better friction.

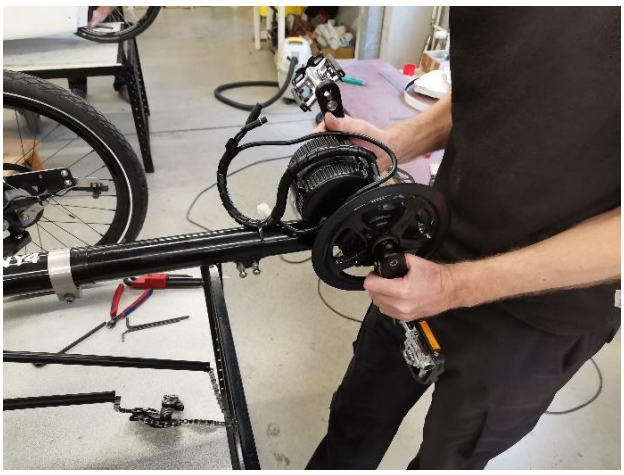


Fig. 22. *Boom insertion*

Install chain tensioner onto frame, Fig. 23. The chain tensioner must rotate freely on the main tensioner bolt (M10x1 bolt for rear mech hook for standard bicycles).

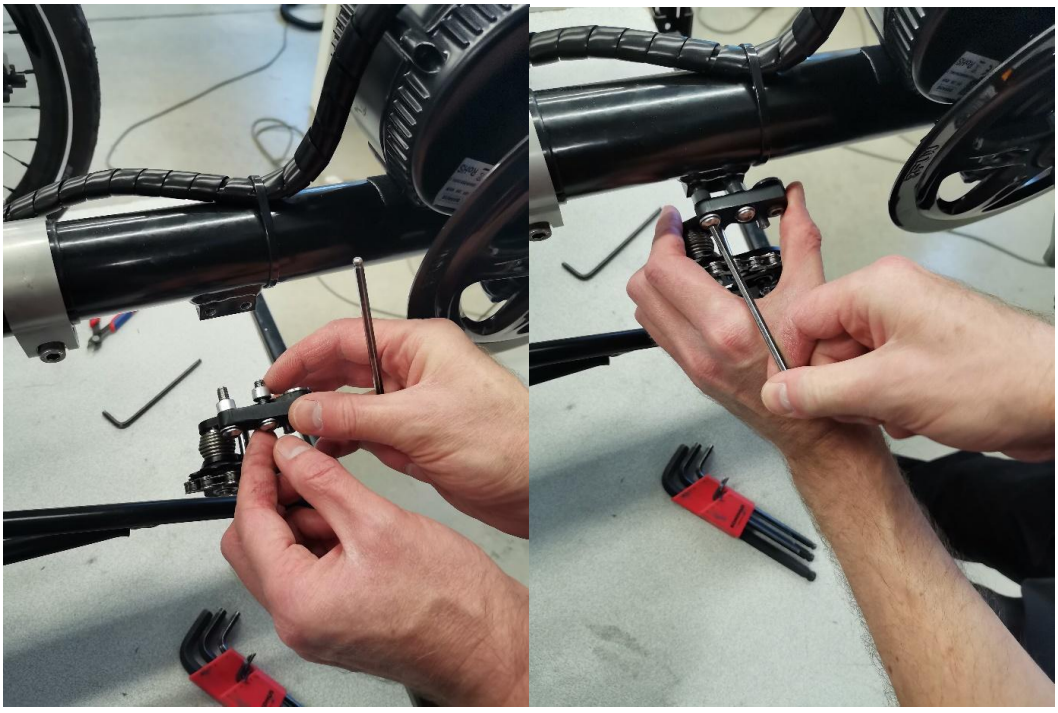


Fig. 23. *Chain tensioner installation*

Install chain on chainring. Be sure that chain is engaged correctly on the whole sprocket.

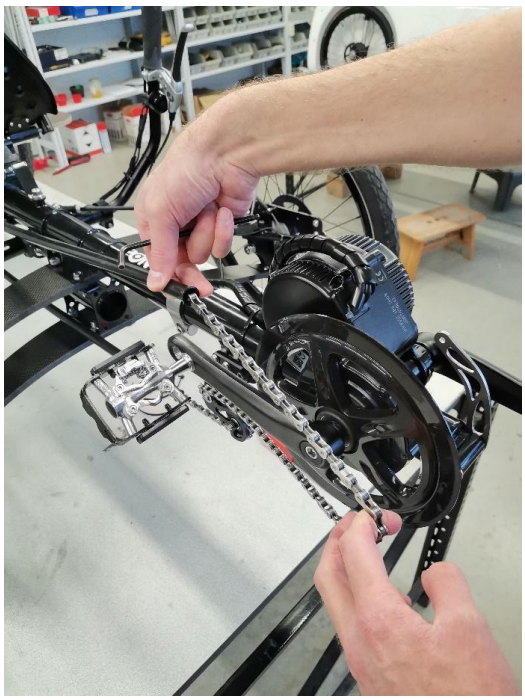


Fig. 24. *Chain-chainring installation*

Adjust the boom for your leg length and tighten the boom clamp. Be sure that the front boom clamp is located cca 5 mm from the edge of the main frame tube, shown on picture below.

Fig. 25. *Right front boom clamp position*

To finalize your Pony4 you need to connect three remaining cables for electric assist. All have specific connectors to avoid misplacement. Cables are positioned along the frame. Sensor and display connectors are located next to each other.

Fig. 26. Sensor and display connectors

Fig. 27. *Battery connector is located under the seat*

It is necessary to finalize battery cable attachment to the frame with 2 zip-ties to avoid future damage. Position is clearly seen at Fig. 28. Cut the excess of zip-ties with pliers. Cover battery connector with prepared plastic cover from shrinking tube (to avoid direct water contact).

Fig. 28. *Battery cable attachment*

2.4 Basic check after assembly

Check for cable interference with front mudguards (brake levers, cable housings). Remember also, that wheels (and mudguards) can change vertical positions due to bigger load with suspension travel.

The general rule for adjusting **Handlebars** is that they should be in the right position in relation to the seat. Usually a slight tilt to the front is the position to look for combined with proper width adjustment for your body size. Once you've found the right setting, be sure to test the entire handlebar movement from full left to full right lock while fully seated with your feet on the pedals.

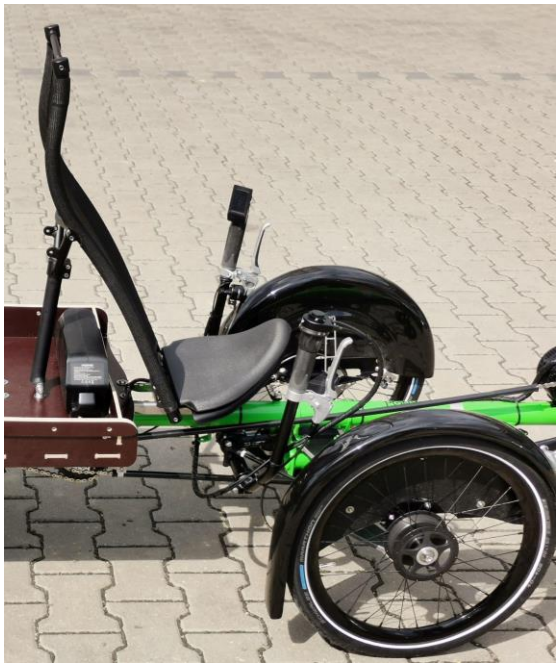


Fig. 29. *Handlebars position*

Chain

The chain must be correctly mounted on the sprockets and chainrings, on the chain tensioners (if used), on the mid position (Rohloff hub) and on the rear axle sprocket. Also pay attention to the correct chain length and chain slack, as chain tension can vary not only with boom adjustment but also with rear suspension travel. The front chain tensioner (Rohloff 2-pulley tensioner) can handle small variations, but for larger changes you will need to shorten or lengthen the chain. If you're not sure, it's always best to shorten the chain in smaller steps with a breaker tool and use a quick connector for connection. To lengthen the chain, use a short piece of chain with two quick links. After this chain modification, we recommend checking all the chain tubes to make sure they are in the correct position (no friction, correct angle). If you plan to share the P4 between riders of different heights, it is also possible to use the bottom of the seat adjustment to set the correct leg length.

Fig. 30. *Example of right chain installation*

Fig. 31. *Chain line (chain tubes perfectly aligned with frame)*

Brakes are the most essential part for operating the P4. On P4, only front drum brakes are used due to simplicity and longevity. Each lever operates its own brake caliper, left and right. Parking brake function is activated by a small lock pin on the outer side of levers.

Mirrors (optional) are attached on the handlebars. It is possible to use another system for traffic orientation behind you (small mirror on glasses, turning your head), but we advise you to use regular mirrors for best overall performance. Adjust them on straight sections of road to have the best view for the rear section and reference.

You can follow this pdf or watch it online on Youtube. First assembly can be seen in the second part of the following video: PONY4 - unpack and prepare for your first ride

3 Operation

3.1 Basics

The P4 family of quad bikes is very similar to recumbent trikes. The seat position is slightly higher and the pedals are almost level with a fairly upright seat angle. All of this is considered best for comfortable seating and suitable for beginner riders looking to enter the recumbent world or as a non-performance style of riding. However, for any beginner recumbent cyclist, you will need approximately 250 km or 3-6 months for an adaptation period as this activity is completely new to your body. During this time you will experience soreness in some muscles, which is completely normal. Consider this and plan your trips accordingly, with step by step prolongation. Also, try to avoid pedaling in a square (pushing/pulling your feet) when using higher gear ratios and practice a circular pedaling style when using higher cadences with lower gears (one gear lower, short cranks and clipless pedals will help). This is especially important for the knees, as inappropriate use of higher gears and low cadence can damage them at higher peak loads.

3.2 Vehicle

Seat

The P4 seat is equipped with a mesh backrest and a solid shell base with optional Ventisit cover. The stiffness of the seat mesh can be changed by bolts on the side. The seat can be adjusted in two ways. The lower (front) seat backrest can be moved horizontally, see Fig. 32. The upper (rear) seat mount can be moved along the support tube to change the vertical position and angle of the seat.

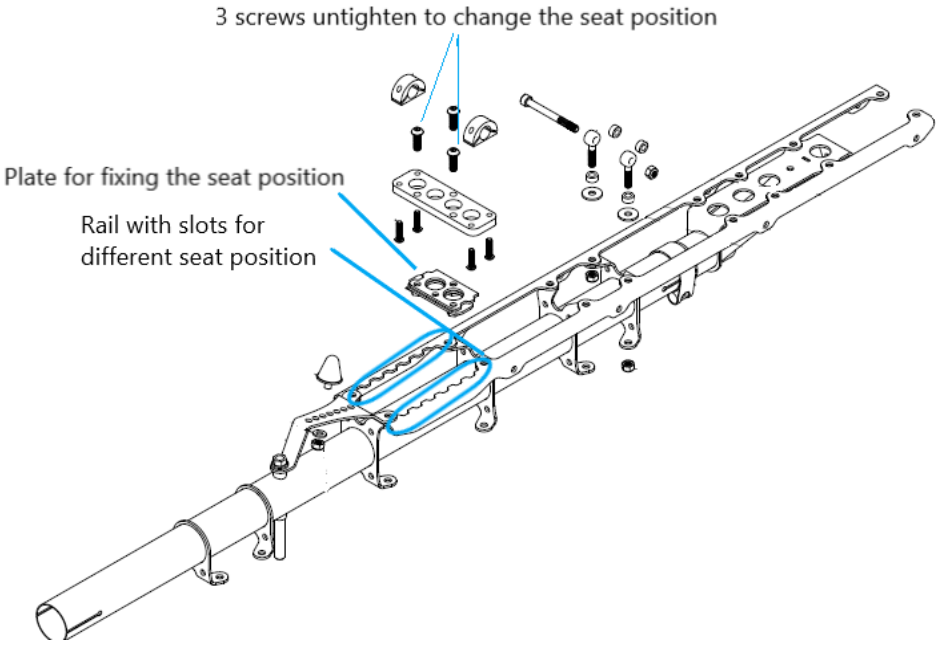


Fig. 32. *Scheme of Seat adjustment* ***HEAVY LOAD*** *frames*

Steering and handlebars

P4 uses indirect steering under the seat. This system consists of a vertical axle that is attached to the frame. The axle has industrial bearings in the stem. On the other side of the stem, a steering tube is attached that holds the left and right handlebars and connects the left and right steering pins with adjustable left/right threaded steering rods and ball joints. Both handlebars can be adjusted for width and angle. The steering system can be seen in the picture below. The steering is adjusted so that the handlebar locks onto the frame (the bottom of the handlebar touches the frame in the full lock position)

Fig. 33. *Steering system - Full lock*

Brakes

The function of the brakes is to stop the vehicle from moving. Two 90 mm Sturmey-Archer front independent drum brakes are fitted to the P4. These mechanically operated brakes are often used on recumbents and velomobiles. The independent brakes mean that each brake is controlled by its own brake lever. Both levers have included a parking brake pin which is located on the outer side of the lever and activates when you squeeze the brake completely after that just push the pin and release the lever. Brake steering is very low thanks to specially tuned steering geometry that minimizes the scrub radius. However, we recommend always using both brakes for braking when decelerating quickly. In long and continuous descents please pay attention to brake overheating that causes fading. This is usually caused by long kilometers of descent or high load on P4. If that occurs don't hesitate to stop and let the brakes cool down. After a couple minutes of cooldown the brakes are ready for another adventure.

Gears

Each P4 unit is equipped with a shifting mechanism. Shifting grip is located on the right handlebar and operates the gearbox located either on the pedal frame (boom) in the case of the Pinion gearbox, or in the mid drive position under the seat (Rohloff). Both systems have internal gears, meaning all parts of the gearbox are hidden, which has the advantage of longer life. Another advantage of internal gears is that you can shift when the chain isn't moving (for example, when stopped at a red light); however, compared to standard derailleur bicycle gears, they don't shift well under load. When using these systems with gear hubs, always release pressure on the pedals when shifting.

Attention: We strongly advise you to read the product manual for your chosen gearbox variant (Pinion/Rohloff).

Suspension

Front and rear suspension is a key element of P4 construction. It is a combination of composite leaf springs which combine support and suspension functions into one structural element and are attached onto the main steel frame. For the front we used two leaf springs of different size located above each other with spherical bearings for steering kingpin attachment. For the rear we use one leaf spring of horseshoe shape. Rear suspension is always equipped with adjustable damper(s). All ***HEAVY LOAD*** frames are using two adjustable dampers with option to mount additional steel springs of different stiffness for load adjustment. The damper attachment part also acts as a torsion stabilizer.

Fig. 34. *Suspension systems, front (left), rear heavy duty variant (right)*

Electric assist

We use two main pedelec systems for electric assist. Simple E-assist versions consist of a hub motor located onto the special mount in front of front leaf springs. Mid drive option uses a motor located in the chainset and requires use of a Rohloff hub for gears. All electric wirings are assembled with specific connectors which prevents misplacement.
All systems are operated via buttons on the LCD panel that is placed on the handlebars. Main power switch is located on the battery, which includes a security key lock to prevent stealing.
Regarding riding style, electric assist can also alter your typical shifting pattern as the motor is engaged in a longer portion of pedal stroke than your actual pedal force when you want to change gear. In that case, for a beginner, it can look like the shifting is not working properly. The best solution for smooth operation is to incorporate slight time delay between pedal force lowering and gear shifting actions. Consider this and get accustomed to it.

Attention: For complete understanding of E-assist bicycle legislation limitations and possibilities we also advise you to check your local government laws and regulations.

Fig. 35. *Simple E-assist , Hub motor 30 Nm variant (left), Hub motor 45 Nm variant (right)*

Fig. 36. *E-assist, Mid drive motor variant*

Lighting system

By standard every P4 has installed on the boom a light holder console. If you have chosen a light system as an option, you will find on your P4 regular bicycle lights. High performance front light is installed. It has a rechargeable battery with settings from permanent to flashing light. For the rear we have used two lights installed higher on the seat with high performance LED, multiple flash patterns and with good usability for AAA batteries. As our mounts are compatible with most of the standard lights for bicycles, you can use any light you prefer. Basic information for these lights are always included with the P4 delivery.

Fig. 37. *Light holder console*

Other additional accessories

Your P4 can be equipped with options such as mudguards, mirrors, bar ends etc. All these options are specified in the recent order form and can be found at our website.
These items are subject to change without notice and the latest updates can be found on our current order form.

3.3 Load carrying

The P4 can be equipped with several options for transporting cargo. All options are possible for long or short frames. They are attached to the mainframe using rails. **Cross stiffeners** are used for better load distribution, 2 pcs for the short and 3 pcs for the long version. You can change their position at different points according to the typical cargo.
The maximum permissible weight is 135 kg for the light version of the Pony4 and 200 kg for the heavy version. This weight includes the weight of the rider, the Pony4 bike and the additional cargo.

Fig. 38. *Cross stiffeners, long frame*

Basic option is ***Flat cargo platform*** that is manufactured from 9 mm exterior grade plywood with anti-slip side facing up. It is best suited for transports of bulky single items.

Fig. 39. *Flat cargo platforms short and long*

Second option is ***Cargo box low*** which is a more sophisticated solution with side panels and reinforced edges. It is best suited for running errands with a lot of items in small bags or boxes.

Fig. 40. Cargo box low*: long (left), short (right)*

Third option is ***Cargo box high*** which is specifically designed to carry two small children or one child with some cargo space left. Main goal is to provide a more secure option for child transport similar to well-known Dutch bakfiets. Back support of the child seat has a variety of positions or can be completely removed for open cargo space. Children are secured with three-point safety harnesses with size adjustment possibilities. Seat is padded.

Fig. 41. Cargo box high*, long (left), short (right)*

The basic rule for securing cargo is placing it low front. This means that any heavy load must be placed as low and as far forward of the platform as possible to keep the transport stable. Be aware that any load, even if properly positioned and secured, changes the centre of gravity and therefore the behaviour of the loaded vehicle. We recommend that you practice braking and cornering during the first few metres of driving with a loaded P4 before entering traffic. Avoid rapid changes of direction when driving with a heavy load as this can affect the stability of the vehicle.

Load securing can be done with bungee cords, which may work for light loads. However, for heavier loads, it is best to use ratchet straps without rubber elements. Route them under the platform or cargo box and around the mainframe to get the best support, remembering to avoid chains and suspension parts. Always check the tightening of the attachment straps after the first 100 metres of travel and then continue driving. You will find holes around the perimeter of all cargo options for securing the load. All platforms and cargo boxes also have integrated points for attaching either composite rear fenders or single rear fenders via special parts.

4 Safety

4.1 General

We advise you to always use a helmet even if according to your local law it is not necessary. Gloves are not essential but preferable even in summertime for better shifting grip.

PONY4 - safety

4.2 Visibility

We advise you to do maximum to be seen on the road and the best way is to use bright lights (flashing mode if possible) during day hours and use high visibility futures. Wearing reflective and high visibility clothing is a good way to improve your appearance on the road. Using additional reflecting areas on the bike will also help to be seen on the road especially when overall visibility is low.

And keep in mind that your riding style can greatly contribute to the visibility issue. Ride defensively and predictably. Do not hide behind bigger cars, always try to predict low visibility situations not only in front of you but also from behind (use mirrors regularly). If you are not sure about your visibility in any situation on the road it is **always** better to be safe than sorry.

4.3 Rider position

The most important point of your seating position is the correct leg length adjustment, which was mentioned earlier with the front boom assembly. However, during the adaptation period, feel free to make small adjustments to find your sweet spot. You can also change the position of your butt on the seat during the ride to see how it feels. Try this before you start readjusting the boom or the seat itself. Make sure your hands can move freely to turn the handlebars from the right locked position to the left locked position when you are sitting comfortably with your spine resting on the seat back, if not, adjust the handlebar angle and seat angle a little. Always ride with both hands on the handlebars and reduce the signal time when steering with one hand, as road imperfections can affect your steering movement.

4.4 Shoes with clipless and other systems

The Pony4 includes SPD clipless pedals as standard. We strongly recommend using the clipless system on the P4. Theoretically, when riding any multi-tracked exercise bike with the axle behind the pedal frame, your feet can slip off the pedals on rough roads or in other cases, which can result in serious injury, so keep this in mind. There are several system options for attaching your shoes to the pedals. With the P4, there is no need to unclip shoes from the pedals during traffic stops, so overall use is a bit easier. There are other options on how to secure your shoes on pedals such as straps and Power Grip strap system. For beginners, we recommend using SPD shoes with less rigid soles for better walking ability.

4.5 Load securing

Make sure the load does not exceed the load limits for your P4. The second important thing is to secure the load correctly. When carrying a load, you must ensure that no part of your load is loose and that it does not interfere with parts of your bike or other road users. You must also make sure that the load does not adversely affect other functions of the bike that are essential for safe riding (lights, cornering, sufficient suspension travel and chain tension).

4.6 Pre ride check

Attention: Before every ride check followed items:

- Visually check P4 from all sides. Check if everything is in the right place, no parts are missing, nothing is loose and if all parts look correctly to your eye. If not, investigate more.
- Check all wheels for free trued spin and correct axle assembly. Check tire wear and correct tire pressure (recommended max. and min. pressure is always written on tire sidewalls).
- Check function of each brake separately including parking functions.
- Check if chains and chainset is moving freely and chains are lubricated.
- Check pedal frame (boom) alignment and tightness on the clip.
- Check if shifting works correctly.
- Check the steering mechanism for free movement, no interference, and no excessive play and tightness of handlebar clamps.
- Check your cargo for the correct position and attachment.
- Ensure that all lights are working and are visible (correct direction, no hidden by load, etc.). Check the mirror's position.

4.7 The ride

In today's world, there is only one rule for safe transportation from point A to point B in transport. The most important rule is **defensive riding**. Always consider when cycling that your goal is only one, to get from point A to point B safely, and how fast is not that important. It may sound simple enough, but small mistakes and rushing can lead to bigger problems.

After a few hundred meters of ride, stop and check your cargo load for secure attachment and not interfering with moving parts of P4 (wheels, transmissions, steering).

Thanks to the improved stability of the 4 wheels, cornering and turning can be done more safely than on standard bicycles. However, no vehicle's stability is unlimited and even cars can roll over. To better understand the behaviour, progress with speed and your driving skills in small steps. The P4 seats also act as lateral supports in corners and it may be useful to brace your inside arm to counteract centrifugal forces and limit torso movements. In extreme situations, you can still lean into corners with your upper body to prevent rollovers. It's not just your riding style that can affect stability. Think ahead to the overall situation around you, adjusting to the terrain ahead. The road surface changes (riding over sloping curbs, etc.) and the wind situation can affect you as well.

The braking effect of P4 is sufficient and is most effective when both brakes are applied simultaneously. In the learning phase, try to understand the braking behaviour correctly, we recommend you try all possible situations, try stopping from different speeds and corners and especially try the maximum braking power (use both brakes!) for an emergency stop. Also consider that your weight distribution may play a role when braking and that you may lift the rear wheels when braking hard if your centre of gravity is in front of the vehicle (driving without a load).

Driving with a load not only affects stopping distances (so you need to adjust your judgement), but also stability. Be sure to control the vehicle safely under these new conditions, as the weight of the load can have a greater effect on the position of the centre of gravity of the whole system (vehicle + rider + load).

Attention: In real-life situations, the overall braking performance varies depending on the terrain and the actual load. Unlike cars, which can also use their engines for braking, we can only rely on mechanical brakes (and aerodynamic drag for good measure). With heavy loads and on hilly terrain, brakes will have their limitations and overheating and fade (slight loss of brake function, brake lever "softening") may occur. If you are planning such trips, pumping the brakes will help for some descents, but for really long descents consider including a few safety stops to cool the brake system. Always be sure to be able to safely stop the P4 in any driving situation.

4.8 After the ride

Make sure that your P4 is secured in the car park and clearly visible or hidden depending on the situation. In parking spaces, the P4 may be overlooked by car users, so remember to avoid this. For shorter parking periods, for example at work, parking brakes can be used, but for longer parking or storage at home for the winter, it is better to use some other system to block the movement of the wheels (piece of wood, car wedges) to keep the P4 in place.

Do not apply the parking brake for an extended period of time immediately after a long downhill run when you want to end the run. The drum brake function consists of two calipers that are spaced inside a steel drum liner in the aluminum hub shell. If the heat is high and the parking brake is on during the cool-down period the hub geometry may change.

Attention: After your ride, always park your P4 to prevent moving without notice.

5 Service

5.1 In general

A well maintained P4 is essential for your safety and overall vehicle performance. Clean your quad regularly and maintain it by our recommendations.

Do not use pressured water for cleaning due to possible water damage of bearings etc. Do not use any solvents for cleaning as it may damage plastic and rubber parts. Always remember, that it is always better to service a properly cleaned vehicle. First step is to visually check the frame for any damage then move with the inspection on all essential parts.

5.2 Brake-in period

Each part that is produced in the factory is within certain tolerances and some parts are fitted together during assembly. Break-in time is the process that allows these parts to settle into the correct positions. Typically, this break-in process is done under less load. For the P4, this means that any moving parts may feel a little stiffer and make more noise than usual (e.g. steering system, Rohloff, rear axle assembly). After this period, all connections need to be checked for proper tightening and some parts will require re-adjustment (brake cables, shifters), which is quite normal.

5.3 Frame and Rails

Frame and Rails are made of Cr-Mo steel and stainless steel. Both items need only a little attention which is represented by regular cleaning and checking for damage. Frame outer surfaces are powder coated and inside surfaces are protected with anti-rust treatment.

5.4 Boom

Boom is made of aluminium alloy and powder coated. It needs only little attention and regular cleaning except the place on the front boom that is inserted into the frame where special friction paste is used.

5.5 Seat and seat brackets

Seat consists of two main parts, the back resting area and lower seat area. Hinged lower seat is made of aluminium alloy sheet and standard or Ventisit padding. Back resting area uses plastic mesh and aluminium alloy frame to support your back with ability to adjust tightness of the mesh by narrowing or widening the seat frame. We advise you to clean seat parts with water and soap regularly to prevent any health impact.

5.6 Steering and geometry alignment (tracking)

The P4 uses an indirect steering mechanism with handlebars under the seat to steer the front wheels. Some new riders may find the Pony4's steering stiffer. This is normal in the early stages. Over time, as the ball joints break in, the system will have less friction.

Every P4 assembled by our company has the correct geometry under average load (with a person in the seat). If you plan to use the vehicle with really heavy loads most of the time, we recommend you adjust the geometry for this purpose.

Fig. 42. *Rider with typical cargo*

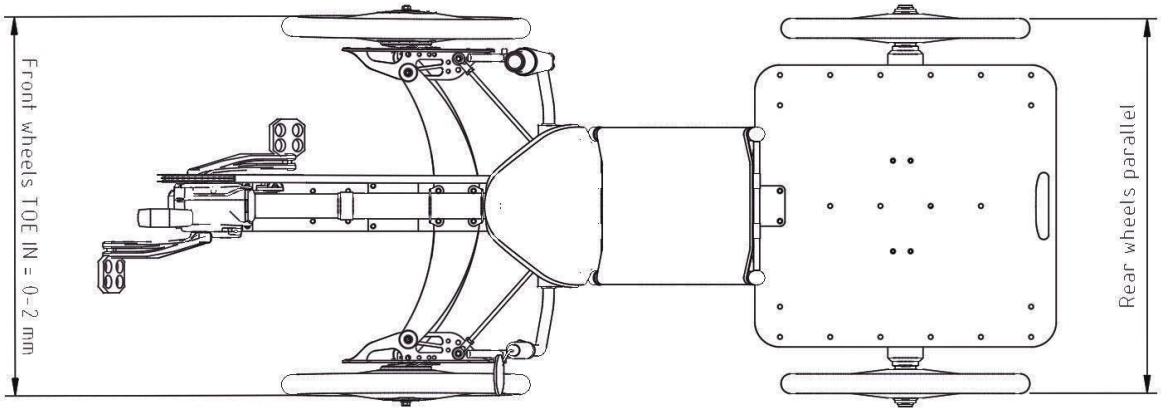


Fig. 43. *Toe in* check in

P4 vehicles have 0 or slight toe in on the front wheels. First you need to measure the rear part of the front wheels.

Difference in the front wheels have to be the same or 2 mm toe in maximum. This is to prevent uneven tire wear. We recommend checking toe in when your tire wear on front tires is higher then on the rear tires.

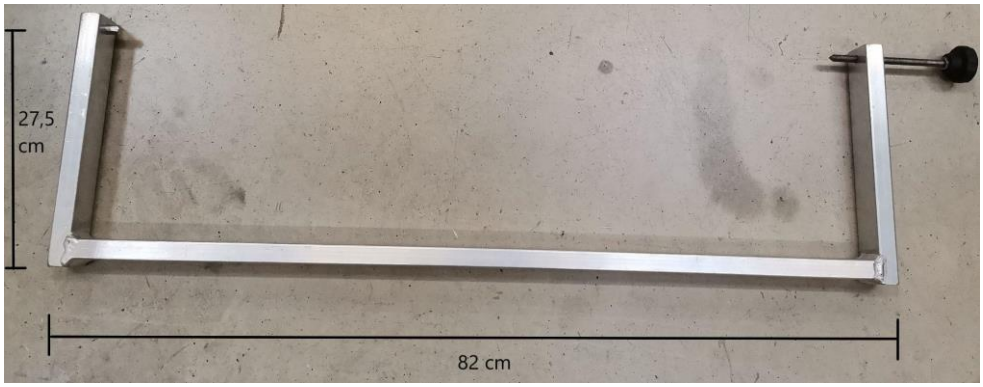


Fig. 44. *Measuring tool for toe in.*

Fig. 45. *Rear side of front tires tool placement*

Fig. 46. *Front tires tool placement with toe in tolerance (0-2 mm)*

In the pictures above you can see the measuring process of the toe in. To do this at your home you can create your own measuring tool. For example make this U from wooden profile or two try-squares can do the same job.

Toe in adjustment is done via steering rods. Make sure that handlebars are in a central position. Make sure that rod ends have identical orientation regarding the rod bar. Each rod bar has left and right threads so for length adjustment you can twist the rod bar with a 7 mm socket key.

P4 vehicles are using slight negative **camber** angle of front wheels. This can be easily measured by try-square on the flat smooth ground, placing the try-square right in front of the kingpin bolt as shown in the picture below. Same is done on the opposite side.

Fig. 47. Negative camber checking with try-square

Adjustment is done by untightening lower front leaf spring and leveling of steering L-profiles via spirit level. Always wheel camber angle must be checked and verified for both wheels. Accepted maximum difference between left and right wheel is 2 mm. As only difference is relevant here, it can be done without the rider sitting on the seat.

Attention: Geometry (tracking):

- Steering alignment is a key point for correct vehicle behaviour and, if not done correctly, can also lead to excessive tire wear (over several hundred km).
- Proper adjustment should be checked at least once a year or after driving under excessive load.

5.7 Brakes

Drum brakes on the P4 are an efficient, low-maintenance solution. Brake pads typically last for several 10,000 km, depending on driving style and frequency of cargo transport. A squealing brake sound when your P4 is parked for a while is normal. It means the drums are slightly corroded and will subside after some braking. The only thing you need to pay attention to is the correct tension of the brake cable. After a break-in period or after driving more kilometres, the brake lever may not brake as sharply as it did at the start. First, check the brake cable tension for correct tension and adjust it with a brake cable barrel adjuster if necessary. Keep in mind that the brake cable adjuster must be firmly screwed in the brake lever and secured by the nut. If you unscrew it too much, it will not hold in the place. If after this adjustment it still does not brake sharply enough (too soft feeling on the brake lever or insufficient effect during emergency braking): Screw the adjuster all the way in, loosen the brake cable clamping screw. Check if the brake cable isn't damaged, if yes replace it with new cable and then tension the cable and tighten the clamping screw.

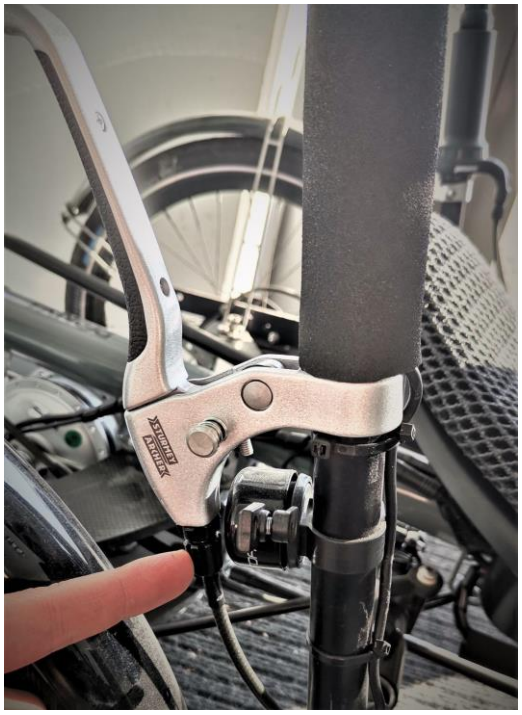


Fig. 48. *Brake cable adjuster*

Fig. 49. *Brake cable clamping screw*

Attention: Ensure the brakes stop your P4 correctly. If they do not work, do not ride your P4.

5.8 Gears

The P4 transmission option is either a Pinion drive in the crank set or the Rohloff hub used in the middle position that connects the primary and secondary chain. Both gearboxes must be maintained in accordance with the original manufacturer's instructions supplied and should be followed for all servicing.

We use a 9 speed chain for the gears. Chain tension is achieved by adjusting the boom and Rohloff tensioner or single tensioner (for secondary chain). Make sure that in all riding positions the chain tensioners have sufficient movement to handle the arm adjustment and rear suspension travel. We recommend checking chain wear at intervals according to riding style.

5.9 Suspension

All P4 wheels are suspended by composite leaf springs. There are two leaf springs at the front and one at the rear. The rear suspension is equipped with a torsion bar with one or two shock absorbers. For Heavy Load versions these shock absorbers can be fitted with additional coil springs. These options depend on the use of the Pony4 and your preference.

For mounting or removing the coil and retaining rings you will need to remove the small red button as shown below. For this operation is needed only 1.5 mm allen key

Fig. 50. *Parts needed for mounting/unmounting of the coil*

Fig. 51. *Bottom coil holder ring. (screw it all the way)*

Fig. 52. *Installation of the top coil cup holder*

5.10 Wheels

Wheel size on all Pony 4 is 20"(406). Rims are Tubeless ready, 32 stainless spokes in each wheel. Front hubs are combined with drum brakes, rear hubs were customized by our company. On pony 4 there are more options available for different types of tires. Every tire has their specification written on their side wall. Follow these specifications for using the right tire pressure. If tires don't have tread wear indicators and you are repeatedly getting flats from small stones and pieces of glass that is an indication that the tread could have worn thin and it's time to replace your tires. If the protection layer or the casing is showing through, it's definitely time for some new rubber.

5.11 Rear axle light variant

The design of the rear axle is quite unique. Axle is equipped with two bearings with mounts for rear leaf springs, two freewheels, and a shrink disc assembly with sprocket as you can see on the picture below. Two freewheels allow different speeds on each wheel when cornering. This prevents loss of traction and allows smoother cornering.

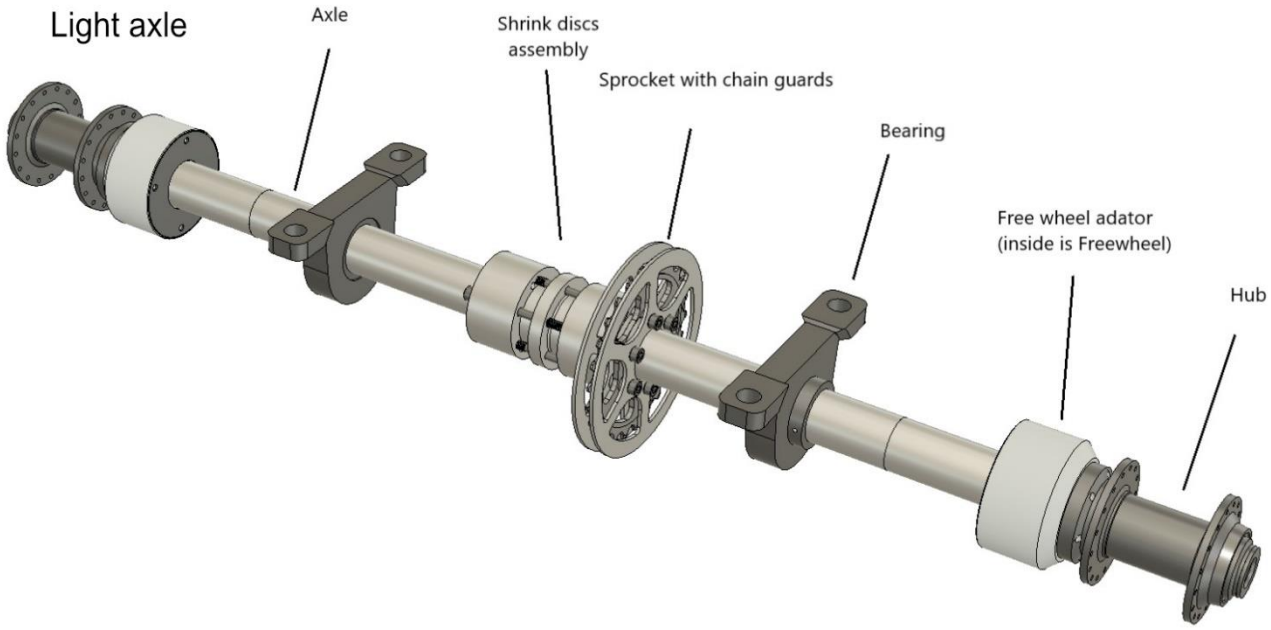


Fig. 53. *Rear axle assembly*

Fig. 54. Rear axle installation

Be aware that freewheels make quite a loud sound. This sound can change over time. Keep in mind to lubricate them regularly. Same with bearings that are in mounts, keep in mind that especially if you are riding in winter or storing a pony4 for a longer period it is better to lubricate freewheels and bearings more periodically.

How to know if the freewheels are close to being replaced? One sign is excessive axial play, another and definitive sign is that when you are pedaling and the freewheel is not engaging meaning the rear wheel isn't spinning. If the freewheels are damaged, replace the subassembly.

Check the rear sprocket for wear. Heavy cargo loads and bumpy roads can have a negative impact on the rear axle and reduce its lifetime. If you are in this mode, check it more often. With gathered feedback we are in the process of developing a new more durable heavy duty rear axle especially for heavier cargo transporting.

How to take apart the rear axle is on this video: [PONY4 - unmount the rear axle]

5.12 Heavy duty axle

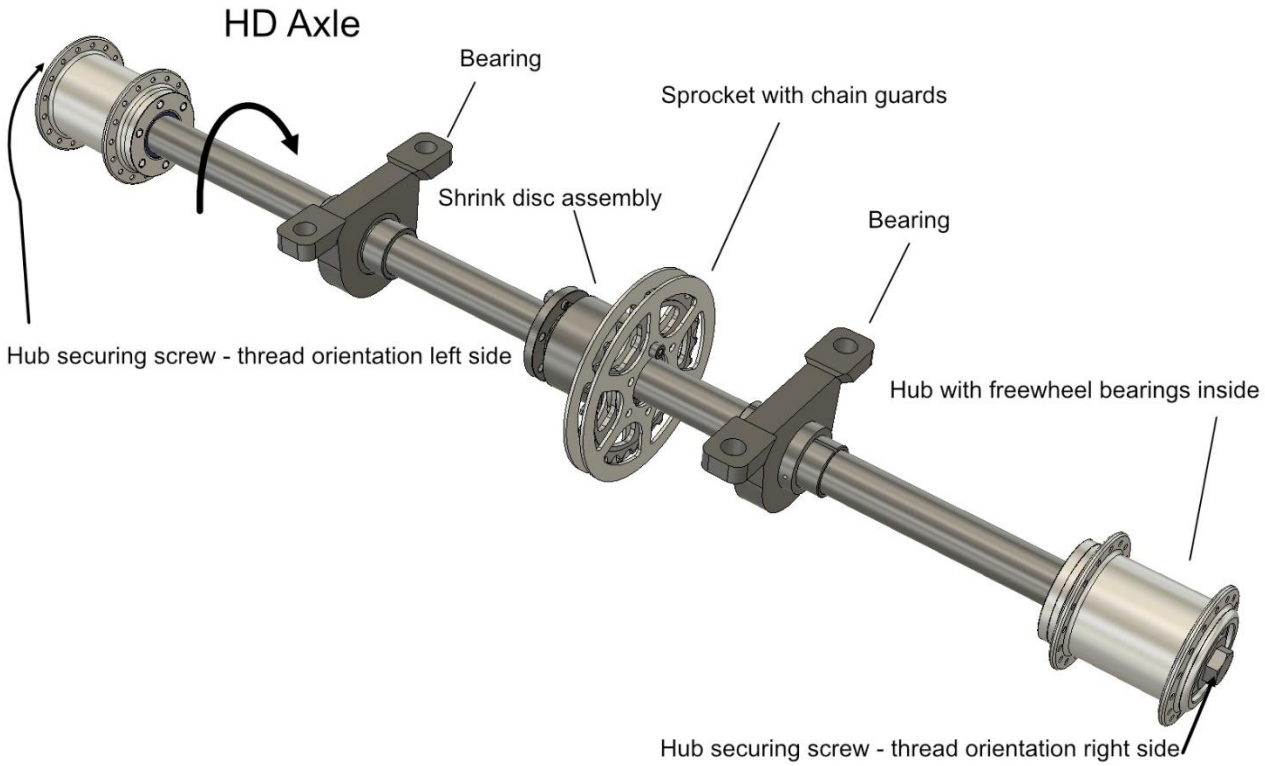


Fig. 55. Rear HD axle schematics

5.12.1 HD axle maintanence

Main difference between the lighter version of the axle and the new heavy duty axle is that freewheels are included in the wheel hubs.
This allowed us to simplify the design of the axle itself. Main axle is made from more durable steel but it is not corrosion resistant as the previous model. It is capable of handling higher loads and longer durability.

How to maintain your axle.
Apply WD-40 spray inside every cover (together 4 of them). Cut both of the zip ties from both ends and check for corrosion. Spray WD-40 inside and rotate the cover to spread it evenly. This is anti rust prevency. Do this every 3 months. If you are living near the sea or in a very humid area, do this process more frequently.
Over some time little corrosion can appear on the axle, it is not a big problem regarding the use of the bike. Only limitation could be difficult disassembly when parts need to come off. To prevent that we recommend spraying with WD-40 as mentioned before and adding vaseline to the shrink disc assembly every year.

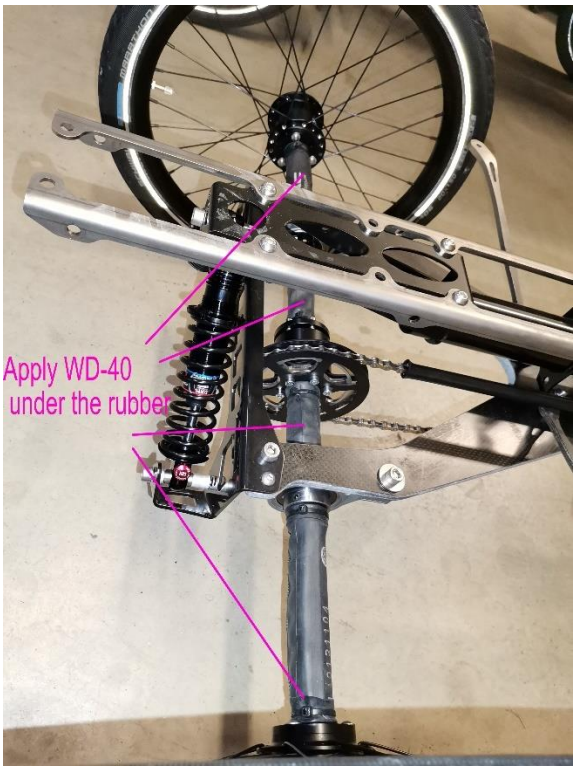


Fig. 56. Where to spray WD-40

Fig. 57. WD-40 application on the outside of the axle

Apply oil to the inside of the hub when removing the wheel.

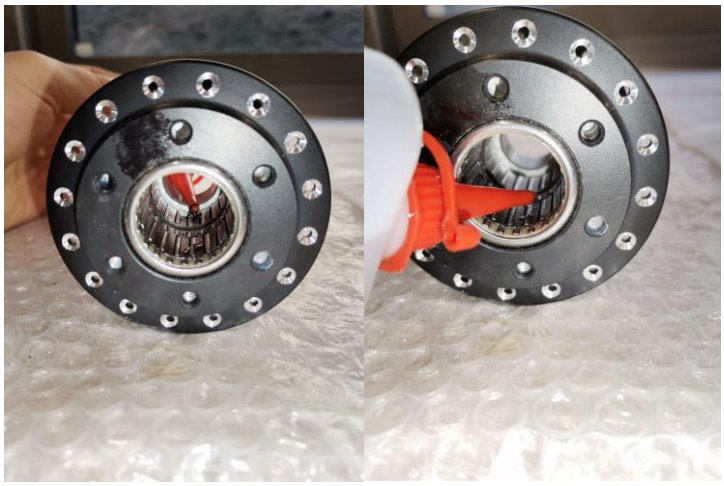


Fig. 58. Oil application inside of the hub (type of oil SKF LGMT2)

When reassembling the hub onto the axle, be sure to clean the surface, especially where the hub is seated. This will allow the sleeve freewheel bearings to run without additional friction. Hubs are marked L and R**.**

Fig. 59. Recommended oil type (SKF LGMT2)

Attention: *Always use a little bit of medium-strength thread locker when retightening screws securing the hub on the axle apply it on the inside thread in the axle. Be careful not to spill any thread locker on the outside surface of the axle!*

Fig. 60. Thread locker application

5.13 Mudguards

P4 is offered with two types of mudguards, simple and composite mudguards. Cargo box high option uses integrated rear mudguards together with simple front mudguards. All types are attached via stainless steel brackets to the kingpins (front) or to the Cargo Plate or Box (rear). Required maintenance is periodical cleaning and checking for interference with wheels and possible damage as mudguards are usually the part of the P4 quad which are closest to the other things during riding (walls, poles etc.). If damaged, repair or replace to avoid riding with sharp edges or prevent even more damage.

Fig. 61. and ***Fig. 62.*** Simple mudguards (left) Composite mudguards with Cargo Box Low (right)

5.14 Cargo options

Cargo options consist of Cargo Plates and Cargo Boxes. All flat surfaces are made of foiled birch plywood with exterior grade glue (including foiled surfaces) and different thicknesses. Assembly is completed with stainless steel/zinc plated parts and stainless-steel fasteners.

Clean and check for damage and tightness of all fasteners regularly and especially in case of Cargo Box High options which can be used to transport up to two children. Be sure that seat belts attachment points are tightened to the Cargo Box structure properly and securely.

5.15 Torque table

Torque tables represent tightening torque values for specified mechanical joints on P4. Stated value is considered minimum for greased threads (friction coefficient value = 0.125). Please do follow manufacturers manuals for specific parts. For better understanding bolt size and key size are mentioned with the following examples: A5 refers to Allen key size 5, W10 refers to open-end or socket wrench size 10, T35 refers to Thorx size 35, L243 refers to the use of Loctite 243 or similar product. If not specified otherwise all fasteners must be A2-70 stainless steel. Every joint which uses a self locking nut can be replaced only by the same type of nut to prevent loss by vibrations.

Part description	**Joint**	**Bolt / Key size**	**Torque**
Drum brakes			**[Nm]**
- Brake lever	Handlebars / Lever clamp	M6 / A5	4
- Brake plate arm	Brake plate / Steering L	M6 / A4, W10	10
- Brake cable	Brake cable / Brake actuation arm	M5 / W8	6
- Brake actuation arm	Brake actuation arm / Brake plate	Whitworth / W11	10
Frame			**[Nm]**
- Rails	Rails / Main frame	M8 / A5, W13	20
Front axle			**[Nm]**
- Front wheel axle	Front wheel / Kingpin	M12 / W14, W19	50
- Ball joints	Kingpin / Leaf Spring ball joints	M8 / A6, T35	25, L243
- Leaf Springs	Leaf Springs / Main frame, Subframe	M8 / W13 (Zn 8.8)	40
Steering			**[Nm]**
- Steering L	Kingpin / Steering L	M8 / A6, T35	25, L243
- Steering rod	Kingpin / Steering rod end	M8 / A6, W13	20
	Steering rod / Steering rod ends	M8 / W13, W14	14
	Steering rod end / Steering tube	M8 / A6	20, L243
- Steering tube	Steering tube / Stem	M5 / A4	5
- Handlebars	Steering tube + Handlebars + Steering reduction / Clamp 32	M8 / A6	25
- Main steering hinge	Stem / Ball bearings (Steering axle)	M5 / A4	5
- Steering axle	Steering axle / Main frame + Seat support	M12 / W14, W19	50

Rear axle			**[Nm]**
- Rear wheel end cup	Wheel / Axle 20	M18x1 / A5	20, L222
- Main rear bearings	Bearing 30 mm / Leaf Spring rear	M8 / A6, W13	40
- Bearing fixation	Main rear bearings / Axle 30	M3 / A2	1
- Torsion bar	Torsion bar / Leafspring rear	M6 / A4, W10	10
Part description	**Joint**	**Bolt / Key size**	**Torque**
- Leaf Spring rear	Leaf Spring rear / Main frame	M8 / W13 (Zn 8.8)	40
- Shocks	Shocks / Torsion bar + Main frame	M8 / A6, W13	25
- Shrink disc assembly	Shrink discs outer / Shrink disc inner	M5 / A4	6
- Sprocket	Sprocket / Shrink disc outer	M5 / A4	6
- Adaptor freewheel	Adaptor freewheel / Rear hub	M5 / T25	6
- Adaptor cover	Adaptor cover / Adaptor freewheel	M4 / A3	3, L222
- Axle shim	Axle shim / Axle clamp 32	M5 / A4	5
- Centering ring	Centering ring / Axle 20	M6 / A3	5
Seat			**[Nm]**
- Silentblock	Silent Block / Seat support	M8 / W13	15
- Seat bracket	Seat plate upper / Seat bracket	M6 / A4	8
- Seat plates	Seat plate / Seat plate upper	M8 / A6	25
- Seat clamp	Seat clamp / Seat pole	M6 / A5	10
- Seat rear mount	Seat pole / Eye bolts	M8 / A6, W13	25
	Eye bolts / Main Frame + Rails	M8 / W13	25
Rohloff mount			**[Nm]**
- Rohloff bracket	Rohloff bracket / Main frame	M8 / W13 (Zn 8.8)	40
	Rohloff torque arm lock	M6 / A5, W10	10
	Chain tube holders / Rohloff bracket	M5 / A3, W8	5
Boom			**[Nm]**
- Boom clamp	Boom clamp / Main frame	M8 / A6	40
- Chain tube holder	Chain tube holder / Boom	M6 / A4, A5	6, L243
Mudguards			**[Nm]**
- Simple mudguards		M5 / A3, W8	5
- Composite mudguards	Front mudguard / Front middle bracket	M5 / A3, W8	5
	Front mudguard / Steering L	M5 / A3, W8	5
Options			**[Nm]**
- Motor bracket	Motor bracket / Leafsprings + Mainframe, Subframe	M8 / W13 (Zn 8.8)	40
- Chain tensioner holder	Chain tensioner holder / Motor bracket	M6, M10 / A5, W10	10
- Stiffeners	Stiffeners / Main frame + Rails + Cargo plates and boxes	M6 / A4, W10	6, L243
- Cargo plates, boxes	Cargo plates and boxes / Main frame + Rails	M6 / A4, W10	6

5.16 Maintenance intervals

Item	Page	What to do	Before Every ride	Monthly	Annually	Note
Tires		Check tread and sidewall Check tire pressure	 x	x		
Brakes		Check proper function Check parking brake Check brake pads for wear Check brake cable tension	x x	 x	 x	Drum brakes lifetime is several 10 000 km
Gearing system		Check functionality and maintain properly				According to producer manual
Chainset		Check bottom bracket play Check and tighten cranks			x x	
Pedals		Check pedal tightness Check bearing play			x x	
Chains **- tensioners**		Check for wear and grease Check proper chain tension		x	 x	
Chain Tubes		Check for wear Modify ends or replace		x	 x	Depends on riding conditions
Frame+Rails		Clean and check for damage Check pedal boom clamping	 x	x		
Seat		Check seat assembly for damage and tightness Check back mesh for tightness		x	 x	
Handlebars		Check for damage (bends)		x		
Wheels		Check trueing and spokes Check hub bearings for play Check rims condition		x	 x x	
Steering		Check all joints Check for excessive play Check for damage Check geometry (tracking)	x	 x x	 x	Toe in, Camber
Front suspension		Check all joints Check leaf springs condition Check play in ball joints	x		 x x	
Rear suspension		Check all joints Check leaf spring condition Check damper function and attachment, Maintain properly	x		 x	According to producer manual
Rear axle		Check axle end cups (M18) Check slippage of 30 mm axles Check rear sprocket Check freewheels		x x	 x x	See white markings
Mudguards		Check position and damage	x			
E-assist		Check battery Check cables and connectors Check motor attachment	x x	 x		
Lights		Check functionality and clean Adjust angle	x	 x		
Paint		Clean, conserve and repair			x	
Cables		Disassemble, replace			x	
Cargo options		Clean, check joints tightness		x		

5.17 Storage

Before storing your P4 for a longer period of time, clean it properly and protect it from corrosion. Store it in a clean and dry place with a stable temperature. Do not use parking brakes for long storage use some other system to block the movement of the wheels (piece of wood, car wedges) to keep the P4 in place to prevent cable and springs wear on the brakes. Lubricate the chain, cables and check the tires for right pressure. Tires over a long period of time lose pressure. Storing P4 on empty tires can damage the tires itself so check them regularly

6 Warranty

Each P4 quad is fully assembled in our factory according to manufacturing order. Last part of this process is the final check and test ride. By this process we ensure that all P4 are fully functional and in line with our assembly standards. For transport, they are partially disassembled to fit our standard packaging box.

Our standard warranty period is 2 years for the original owner on the frame, wheel suspension, seat, cargo options and steering components.

This warranty does not apply to companies that use the P4 for rental or cargo delivery. The component's warranty is assessed according to the laws in the country of purchase.

The warranty does not cover normal wear and tear on components, damage from accidents and irregular use of our products including lack of maintenance (overloading, off-road driving, modifications, improper installation, activities not intended, theft). Bending of parts may also be considered as a manifestation of improper use. The warranty applies only to genuine P4 parts and in case of warranty, after careful examination, we will replace or repair damaged parts with new parts of the same functionality or parts of our choice. The warranty does not cover any labor, transport, and any other secondary costs.

For any warranty claims, please contact your dealer or us directly. We believe in the P4 product family and will do everything we can to resolve your problem with our product. For warranty claim you will need your P4 Serial Number which is marked on the bottom of the rear of the main frame near the upper suspension shock mounting points.

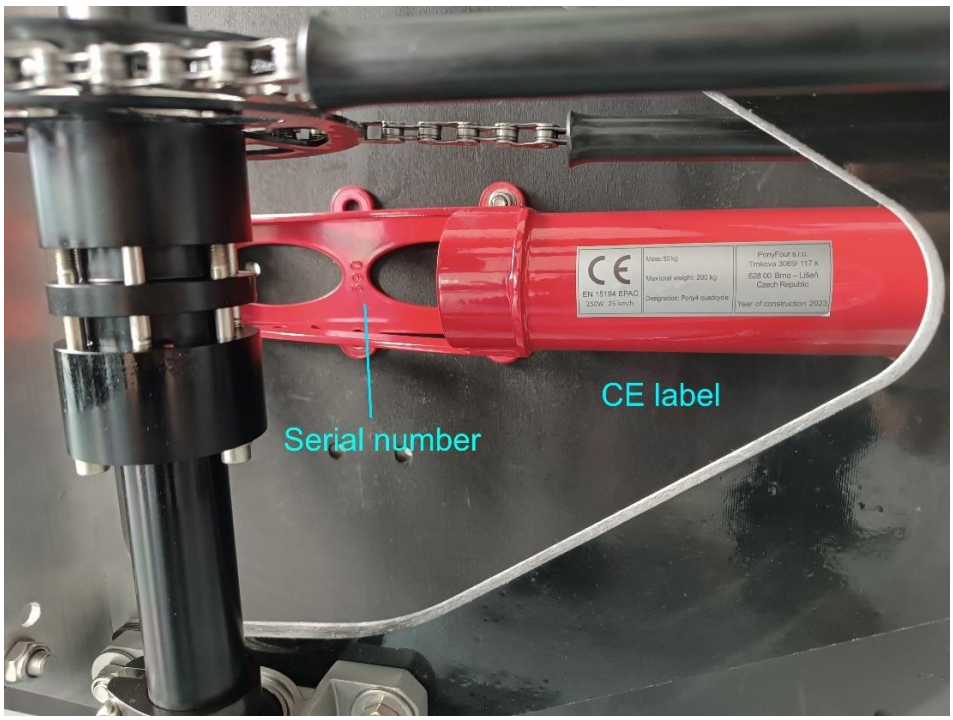


Fig. 63. *P4 serial number and CE label on frame placement*

7 Legal requirements

As a traffic participant you should always comply with your local legislation requirements. Please discuss this topic with your local dealer if you are not familiar with them and have some doubts. However, even if it is not sometimes mandatory, your safety is greatly increased with your front and rear lights and helmet used together with your cycling behavior on the road.

8 Contact information

PonyFour s.r.o.
Trnkova 3069/ 117 k
628 00 Brno – Líšeň
Czech Republic

Identification number: 08750912
VAT identification number: CZ08750912
Court record C 115240 at the regional court in Brno

E-Mail: info@pony4.bike
Phone: +420 724 247 156
www.pony4.bike

We do have social media, however for questions please use our email only. Thank you.

https://www.instagram.com/challenge/?next=/pony4bike/
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https://www.facebook.com/profile.php?id=100080595100011