LAMBDA TUNING

ENJOY BIKING

Installation instructions

Aero armrests


LAMBDA TUNING

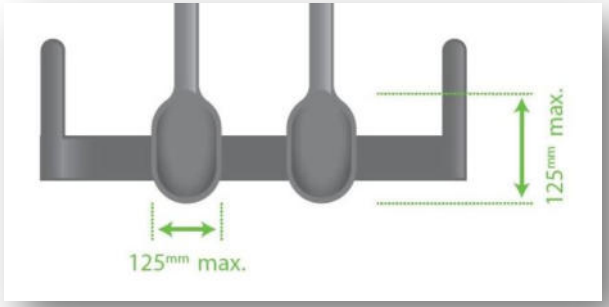

LAMBDA TUNING

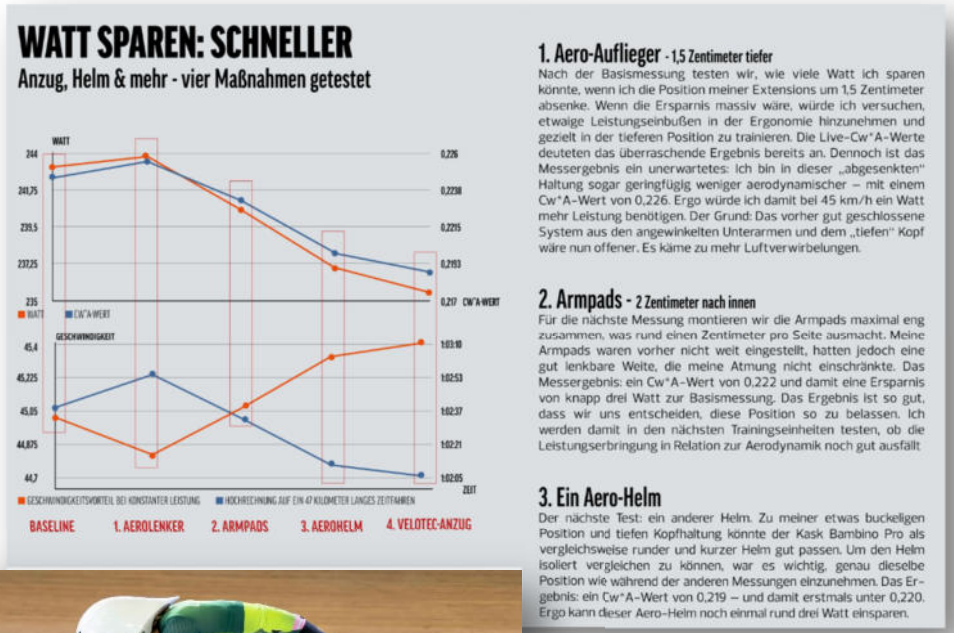

HAMMERHEAD
LAMBDA TUNING

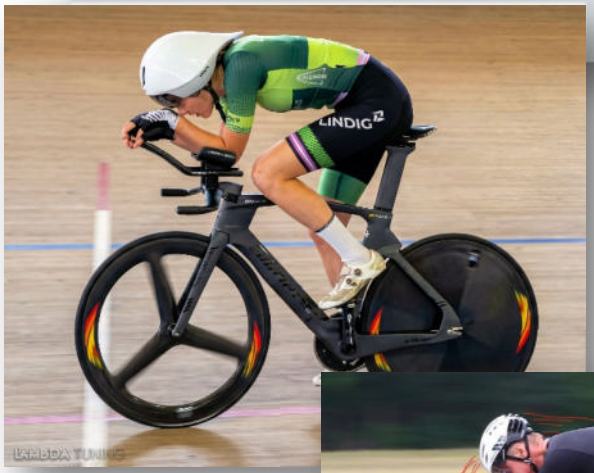
April 2026

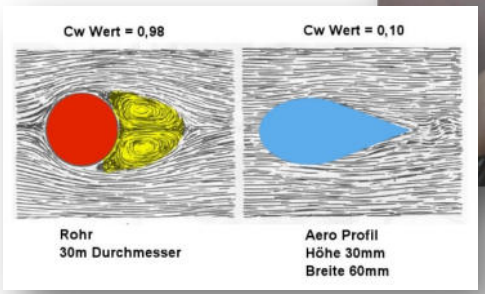
"Aerodynamics is for athletes who want to win."

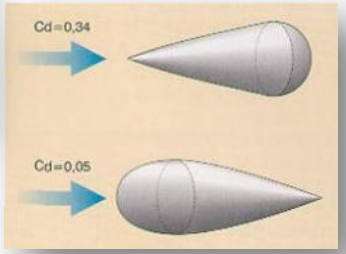
The greatest energy savings are achieved by an optimized seating position. Aero armrests help to achieve an aerodynamically better position that is less fatigue-free over long distances.











1. General information

The manual must have been read and understood by the user and installer prior to assembly and use.

LAMBDA-Tuning GmbH is constantly working on improving the products. For this reason, we reserve the right to make changes to the illustrations and descriptions of this manual. Technical specifications, dimensions and weights are understood with tolerances.

Meaning of the symbols:

Danger Indicates a hazard with danger to life or serious bodily injury

Caution Risk of injury or damage to property

If you have any further questions after reading through or during assembly, please contact us by e-mail (info@Lambda-Tuning.de).

Proper mounting of the aero armrests is crucial for safety and functionality.

As with any mechanical part, the service life is limited, depending on the stress and material fatigue. If you are heavy, drive a lot or even on bad roads, the armrests will have to be replaced more often than with a lower load.

The following factors influence the service life: riding time, rider weight, stress due to pressure, ground, fall, maintenance and temperature. Due to the various influences, it is not possible to give an exact time for a replacement. A generally valid recommendation is five years.

For safety reasons, it is advisable to replace the armrests in the event of special events (accident, overload, exposure to heat).

Danger

Compliance with the following instructions is a prerequisite for accident-free operation and proper functioning:

- Incorrect handling, incorrect assembly, incorrect use and incorrect maintenance can lead to accidents.
- The armrests are made of plastic and do not have the same durability as aluminum or carbon armrests. However, this is the only way to make individual production possible. Damaged armrests can break off and lead to an accident or fall.
- A high load (due to forces or temperature) can lead to damage or breakage. The interior is filled with a honeycomb construction. Damage can be inside or on the surface. Damage caused by excessive clamping forces, bending, impacts, falls or heat may not be detected.
- If there is damage or signs of damage (e.g. cracks, cracking, crunching, flexibility), the armrests must not be used.
- The aero armrests are to be used exclusively on smooth roads and velodrome.

Caution

- Loosened, incorrect or over-tightened screws can damage the armrests. Components using 3D printing are particularly sensitive to crushing due to excessive clamping force.

- The maximum permissible bolt torque is **2 Nm**. An **additional threadlocker varnish** (e.g. Loctite) must be used. The screws must have a flat head.
- Follow the instructions for use and instructions for using your torque wrench. Mistakes can quickly be made here. The adjustment range of the torque wrench must not be greater than 15 Nm, otherwise it will be too coarse and inaccurate.
- The armrests must be compatible with the mounting surface of the bike and must not be altered or modified.
- Check the armrests for damage after every hard impact and after every bike falls over.
- Due to the higher sidewall, the transition from the aero position to the brakes on the base bar may take longer. Please pay all the more attention to the surroundings here.
- The contact surface must be sufficiently large (area next to the threaded holes > 10mm) to give the armrests sufficient support.

2. Application area

Danger

Any use other than the intended use can lead to accidents resulting in death or serious injury.

The aero armrests are only to be used on commercially available time trial or track bikes on roads (tarred) or velodrome.

Do not drive at an air temperature below -5°C and not above 40°C.

The following driving styles (in aero position) cause premature material fatigue, which can lead to fractures and thus to a risk of injury:

- Riding on cobblestones or nature trails
- Potholes
- Any abnormal use of the armrests (e.g. when riding, holding on to the armrests with your hands instead of the base handlebars)

The maximum permissible rider weight (rider, clothing, helmet) is **90 kg**.

3. Special features of ASA plastic

The aero armrests are made of ASA (acrylic-styrene-acrylic nitrite copolymer) using a 3D printer. ASA plastic has good thermal and chemical stability as well as high impact resistance at low temperatures.

Furthermore, the material convinces with:

- Very high stiffness and toughness
- High UV resistance
- High resistance to weather influences
- High chemical resistance.

The filament is inconsistent with numerous esters, ketones and ethers. If it comes into contact with these materials, the surface swells. This can lead to stress cracking. It is also soluble in concentrated mineral acids, chlorinated hydrocarbons and hydrocarbons.

The aero armrests must not be exposed to temperatures **below -5°C** and **above 50°C** during transport or storage. This is especially important in summer when transporting by car.

Do not use a high-pressure cleaner or aggressive or solvent-based cleaning agents (e.g. paint thinner, nitro, acetone) for cleaning.

Technik 2: Der "Shoulder Shrug" – Schultern zu den Ohren ziehen.

Der Shrug ist eine der effektivsten Methoden, den CdA-Wert zu senken. Er reduziert die Stirnfläche (A) und verbessert den Strömungsverlauf (Cw) dramatisch.

Die Ausführung: Schultern aktiv hoch zu den Ohren ziehen, Kopf absenken, sodass er hinter den Händen "verschwindet". Der Helm schließt die Lücke zum Rücken.

Ein Test im Specialized Windkanal zeigte: Ein korrekt ausgeführter Shoulder Shrug kann **15 Watt einsparen**. Das ist "gratis" Geschwindigkeit.

15 WATT ERSPARNIS

4. Aero armrests

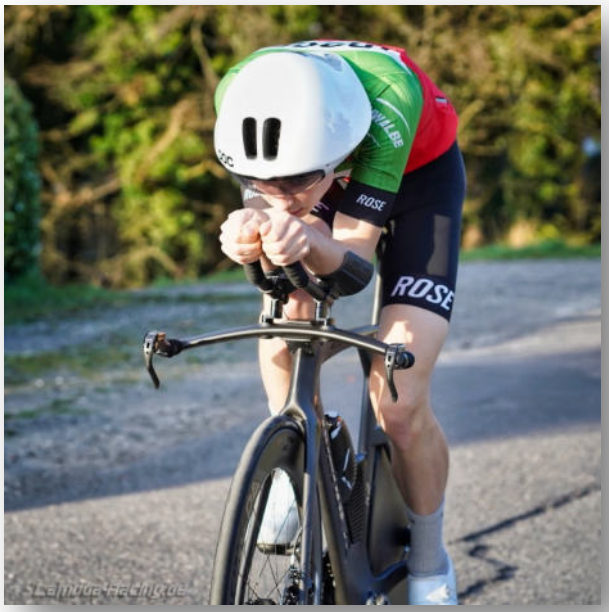
The aero armrests can be made with time trial handlebars with a hole spacing (in the direction of travel) to attach **14mm, 15mm, 20mm, 25mm, 28mm or 30mm** and **M5 or M6** screws. 15mm hole spacing across the direction of travel is also possible.

It is important that the contact surface is large enough.

In the picture on the left, only the middle and right threaded holes can be used. On the left ones, the arm-rests have **too little surface to support**.

The aero armrests are individually made according to the diameter of your forearms. This enables a firm and secure hold and has two major advantages:

1. The aero armrests allow for an effectively more aero-dynamic position. The arms are held closer together without their own muscle power. This is very pleasant and fatigue-free. Aero measurements with narrow forearms result in a reduction of 15-25 watts at 45 km/h.



2. The additional fixed holder of the forearms makes the time trial bike easier to steer and is noticeably less susceptible to wind.

Furthermore, the aero armrests are manufactured with different angles. This is the angle between the forearm rest and the mounting plate. For the standard K2, TM6 and TM5 time trial handlebars you need the 3° angle. Only if you use other extension/boom with more elevation at the end is a larger angle needed.

Note on races with UCI rules:

To comply with the UCI rules, the armrest must not be angled more than **30°** and the height difference (middle of the aero armrests to the highest point of the extensions) must not exceed 10-14cm. The maximum length and width of the aero armrests is 12.5cm.

The shorter the forearms, the greater the angle required for the aero armrests.

The following are the current UCI rules (does not apply to triathlon):

Height Category, cm

CATEGORY 1	CATEGORY 2	CATEGORY 3
<180.0	180.0-189.9	≥ 190.0

S - the horizontal distance between the peak tip of the saddle and the vertical line passing through the bottom bracket
E - the horizontal distance between the vertical planes passing through the bottom bracket axle and the extremity of the fixed time trial extension handlebar
F - the horizontal distance between the front line of the Forearm support box and the vertical plane passing through the extremity of the extension. The minimum distance is set for 180mm
H - the height difference (the vertical distance) between the midpoint of the forearm support and the highest or lowest point of the extension (including accessory)

Exemptions, Article 1.3.013

Saddle, mm

	CATEGORY 1	CATEGORY 2	CATEGORY 3
S*	0 ≤ S ≤ 50*		
E	≤ 750		
F	≥ 180		
H	<100	< 120	< 140

OR

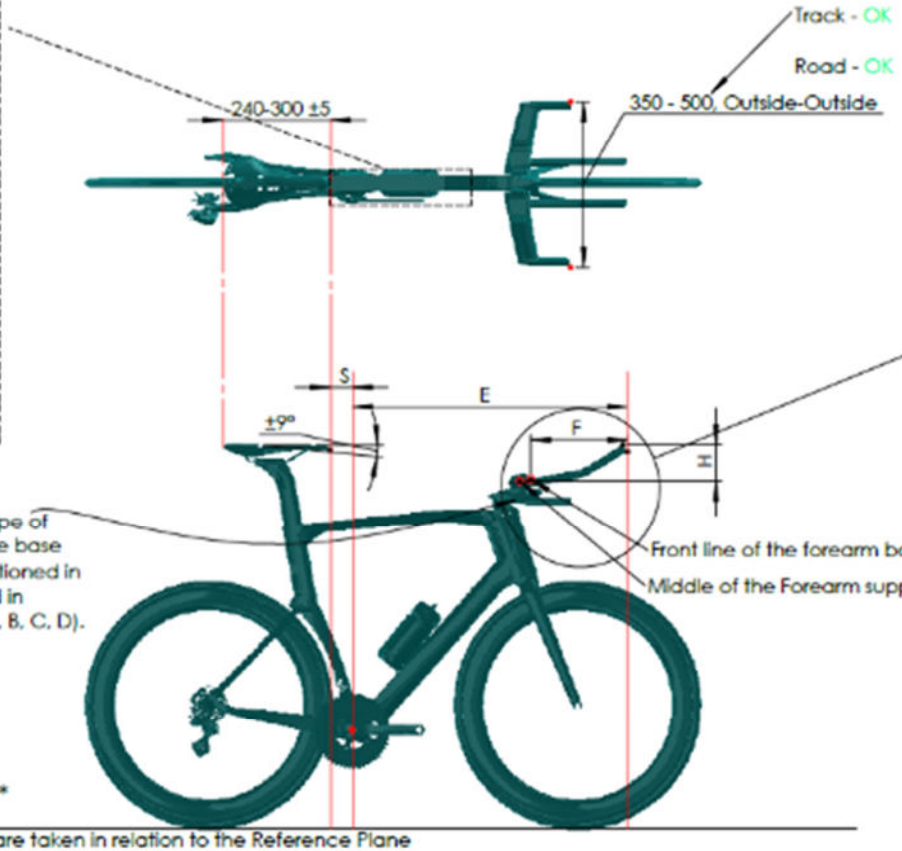
Extensions, mm

	CATEGORY 1	CATEGORY 2	CATEGORY 3
S	> 50		
E	≤ 800	≤ 830	≤ 850
F	≥ 180		
H	< 100	< 120	< 140

* - In no case the peak of the saddle can exceed the vertical line passing through the bottom bracket spindle

The UCI Height Category Label must be applied on a frame, the upper side of the top tube area.

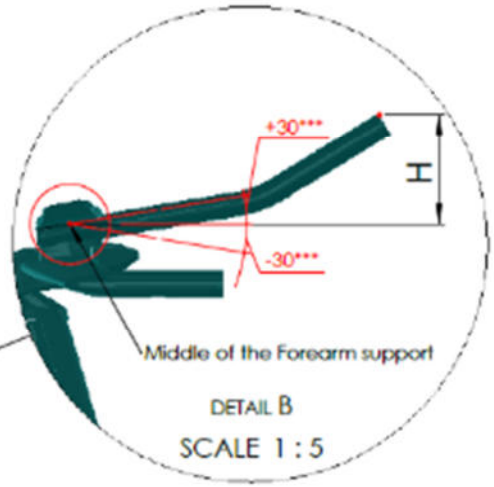
Please note: a bicycle without the UCI Height Category Label will measured by the UCI Commissaire under the Default Measurements as per Article 1.3.023.



The traditional type of handlebars or the base bar must be positioned in the area defined in article 1.3.022 (A, B, C, D).

Reference plane**

** - all measurements are taken in relation to the Reference Plane



*** - inclination of the forearm support

UCI Equipment Page

Please note, the infograph covers the some major areas of the UCI Regulations, however by no means it is exhaustive. For more details please refer to the UCI Regulations and the UCI Clarification Guide of the UCI Technical Regulations.

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:	FINISH:		DEBURR AND BREAK SHARP EDGES	DO NOT SCALE DRAWING	REVISION
				UCI Innovation Unit	
	NAME	SIGNATURE	DATE	TITLE: 2023 Technical Regulations	
DRAWN	Andrei Krasilnikau		1 Jan 2023		
CHK'D					
APPV'D					
MFG					
Q.A				MATERIAL:	DWG NO. Individual/Team Events **Track / Road** A3
					SCALE:1:10 SHEET 1 OF 1

5. Assembly

The exchange is easy. It is important to use the supplied M5 or M6 stainless steel pan head screws with the large head and a maximum torque of 2 Nm. You need a 3mm Allen screwdriver for this. Preferably without a ball tip like this ...

To secure loosening screws, please use medium-strength **safety varnish**.

The screws are inserted through the neoprene and screwed in place with a **3mm Allen key** and **2 Nm torque** (left picture below).

It is very helpful if the screw head is sprayed with **silicone spray**. This means that they do not stick to the adhesive surface of the neoprene. Alternatively, spray some silicone spray from below through the holes onto the adhesive surface.

For an even more precise adjustment of the height, we also offer spacers in 5mm and 10mm height (right picture). This also requires longer screws.

The horizontal angle can be adjusted with the slotted holes. To do this, you should sit in your aero position on the bike.

6. Mounting the angle adapters

You mount the angle adapter to the base handlebar with the 35mm M5 screws.

The spacers are mounted on the angle adapter. The screws are inserted from below and screwed into the holder of the extensions at the top.

For each spacer height, four screws and the corresponding spacers are required.

- without spacer = 10mm
- 10mm Spacer = 20mm
- 20mm spacer = 30mm
- 30mm spacer = 40mm etc.

When the angle adapter is mounted, the screws that go through the spacers are 30mm shorter than without this adapter.

Please do not use screws that are too long here, as they can drill into the extensions.

You can swap all parts from left to right. Then the distance between the armrests becomes wider or narrower. In the wide version (both adapters move outwards), you can mount the armrests in the inner position.

The advantage of the tight variant is that the extensions are also close together. That looks much better.

7. Further aerodynamic optimisation

From an aerodynamic point of view, your arms should be as close together as possible. However, this takes some getting used to. The armrests can be moved transversely by approx. 15mm with the two rows of holes.

For further optimization of the position, you can mount various extensions with 22.2mm clamping to the clamps and move them lengthwise. This can create a very aerodynamic position, even if a lower cant is used.

Here is an example with extensions that have a 50° angle. The aero armrests have an angle of 25°.

Please do several test drives and adjust the position in small steps. A bike fitting is not helpful here, as you should ride the positions for a longer period of time. Familiarize yourself with all the settings beforehand.

Please also read our "Aero Secrets for Time Trial Trials" (www.lambda-racing.de/blog).

We used a CdA knife for aerodynamic optimization. This is a device for measuring the wind resistance coefficient. This allowed us to verify the aerodynamic improvements.

Exact statements on how to reduce the power (at the same speed) or increase the speed with the same power are very individual. However, values of 10-20 watts at 40 km/h or 0.8-1.0 km/h at 280 watts are usually measured for everyone. In some cases, even with a lower elevation.

As already written, you can find more information about this in our blog "**Aero-Geheimnisse für Zeitfahrräder**".

8. Cleaning and care

Caution

After 100 km at the latest, the tightening torque of the four screws must be checked. Check the tightening torque and assembly condition every additional 30 driving hours or 1000 km and at least once a year.

Do not use a knife to remove the neoprene padding, as this could cause nicks. Check the armrests for damage, surface change and scratches/cracks.

The upholstery is cleaned with warm water, a soft sponge and suitable detergents (e.g. washing-up liquid or soap without abrasive particles).

No high-pressure cleaners and aggressive cleaning agents or surfactants may be used. Isopropanol, alcohol or gasoline may be used carefully. However, avoid vigorous rubbing and long exposure times.

After about three years, the aero armrests have aged to such an extent that they have to be carefully checked and, if necessary, replaced.

We can send you new arm pads to stick on yourself for 5 euros.

9. Warranty

We grant the statutory material defect liability (warranty) on material and workmanship on all products.

The liability period of two years begins with the first purchase of the corresponding product. Warranty claims can only be asserted with proof of purchase and only by the consumer.

There is no entitlement to warranty in the following cases:

- Normal wear or tear from the use of the aero armrests
- Improper assembly, too high or too low clamping forces and modification
- Use of unsuitable attachments
- Improper use, overload (maximum torque) or abuse (e.g. cobblestones)
- Rental, commercial use or commercial use
- Damage caused by accidents or external influences (e.g. falling, falling over, etc.)
- Commercially permissible or technically unavoidable fluctuations in texture and appearance

Cycling races are not an exclusion of warranty.

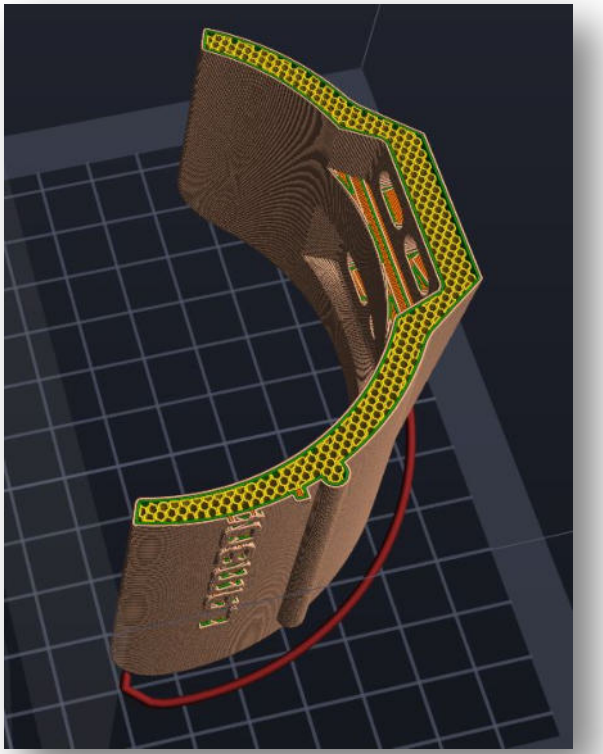
We are not liable for indirect or consequential damages.

The place of jurisdiction and performance is Siegburg (Germany). German law applies.

10. Crash Replacement

In the event of irreparable damage to functionality (e.g. due to an accident or fall), we grant the first buyer a discount of **50% on the current sales price within two years of purchase**.

If this regulation is used, the irreparable armrests remain in our possession after our assessment. Shipping is at your own expense.



We wish you a lot of fun and success with your new aero arm shells from LAMBDA-Tuning GmbH.

Tina and Jan

Company:

LAMBDA-Tuning GmbHGescal Sports Scientist Tina Smekal

Technical development:
Dipl.-Ing. Aerospace Engineering Jan Smekal

Address:

Pfarrer-Stauf-Str. 64
53819 Neunkirchen-Seelscheid

Germany

Accessibility:

Phone: +49 (0) 2247-913025
Mobile: +49 15 15 1 80 10 40

Webpage: www.Lambda-Tuning.de
Email: info@Lambda-Tuning.de

Responsibilities:

For order processing and goods distribution:
Tina Smekal

For websites and technical correspondence:
Jan Smekal

Product safety:LAMBDA-Tuning GmbH


POC
ROSE
ROSE
GARMIN
KALIBUR
Lamboa-Racing.de