



OEM Literature for Manufacturers

Rohloff SPEEDHUB 500/14

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The Rohloff AG reserves the right to change technical specifications without prior warning (EN 04/2013).



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Different types of SPEEDHUBs and their assembly

1. Version 1: OEM Axleplate with a specially designed *Rohloff SPEEDHUB* 500/14 compatible dropout



Fig. 1: Left dropout mounted with *Rohloff SPEEDHUB 500/14*





Fig. 2: *Rohloff SPEEDHUB 500/14* with CC OEM axle plate

Fig. 3: CC OEM axle plate (also available as a TS OEM axle plate)

This version is particularly suitable for rear suspension frames. In order to compensate for the altering chain length as the rear triangle moves, an external chain tensioner will also be required (Rohloff accessories, Article No. 8250).

As far as this version is concerned the left dropout of the frame has to be modified. All necessary dimensions are shown on drawing OA 11B.

Please pay attention that the dimensions of 32 - 0.5mm are strictly adhered to, so that the external cable box can still be correctly mounted. A quick release axle version (CC), and a threaded axle version (TS) of the SPEEDHUB can both be used in this frame type.



2. Version No 2-1: OEM axle plate (brazed on section) for adjustable dropouts

Version 2 - 1: Steel or aluminum dropout





Fig.4: Steel or aluminum cluster (seat), Left-hand side

Fig. 5: Steel or aluminum cluster (seat), right-hand side

The exact dimensions are shown on the technical drawing # OA04.



3. Version No. 2-2:

Adjustable dropout insert with derailleur hanger, for installing either a *Rohloff SPEEDHUB 500/14* or a rear derailleur







Fig. 6: left dropout OA13

Fig. 7: right dropout OA14

Fig. 8: right dropout with derailleur hanger OA28

The dropout as in shown Figure 8 must be fitted to all full suspension bikes where the chain length changes.

This dropout also allows the mounting of a rear derailleur. It can therefore be used with the *Rohloff SPEEDHUB 500/14* or a conventional derailleur system.

With regards to the installation of a disc brake, the following dropout will be necessary:





Fig. 9: OEM dropout insert (DB), disc brake left-hand side

Fig. 10: OEM dropout DB, fully assembled

The exact dimensions are shown on technical drawing # OA25.



4. Version 3: OEM2 axle plate; bicycle frame with disc brake mount (International Standard IS-1999), but without disc brake

Dropout with disc brake mount (International Standard IS-1999):

If a disc brake is not mounted, the rear disc brake mount can be used instead of a standard long torque arm. The Axle plate CC/TS-OEM2 and its components will be required. From the inside of the frame, a bolt has is inserted into the lower disc brake caliper mounting point. The axle plate CC/TS-OEM2 can lock itself around this bolt.



Fig. 11: Dropout with disc brake mount (IS-1999)

The OEM2 axleplate cannot be used to mount a *Rohloff SPEEDHUB 500/14* into frames with vertical dropout slots where the IS or Postmount disc brake mount is positioned on the chainstay. The only exception to this rule is when an additional hole is drilled into the dropout behind a vertical line through the axle (as shown in Fig. 12b). This hole must accept an M6 bolt or an M5 bolt in connection with the special M5-OEM2 adapter (Article #8552).



Fig. 12a:

Fig. 12b:



5. Version 4: OEM2 axle plate; bicycle frame with disc brake mounts of International Standard (IS-1999), and a mounted disc brake

Dropout with disc brake mount (International Standard IS-1999):

If a disc brake is mounted, the torque can be supported by either the axleplate CC/TS and the long torque arm, or through the use of the SPEEDBONE or the Monkeybone with the CC/TS-OEM2 axleplate.



- **Fig. 12c:** Mounting the OEM2 axleplate with a SPEEDBONE
- Fig. 13: The *ROHLOFF SPEEDHUB* 500/14 can also be fitted on frames featuring a 'Horst-Link' with disc brake mounts (International Standard IS-1999) by using an OEM2 axleplate together with a SPEEDBONE or Monkeybone.
- Fig. 12d: Mounting the OEM2 axleplate with a Monkeybone





6. Versions 3 and 4: General requirements for frames with International Standard (IS-1999) disc brake mounts:

Frames with International Standard (IS-1999) disc brake mounts:

If the disc brake mount on the frame is used to support the torque, then the following minimum dimensions must be observed.



Fig. 14: Dropouts with a disc brake mount of International Standard (IS 1999) 16,3mm.

If the above dimensions are kept and the frame material is faultless, the manufacturer may safely install the *Rohloff SPEEDHUB 500/14*, as described for versions 3 and 4 below. The technical OEM2 data sheet must be referred to when using this product!

Furthermore it is necessary to grant retailers permission to use this method of supporting the output torque produced by the *Rohloff SPEEDHUB 500/14*!



7. All Versions: Disc brake version DB, External Gear Mechanism EX.

The External Gear Mechanism (**EX**) must be used when equipping a bicycle with a *Rohloff SPEEDHUB 500/14* and Disc Brakes (**DB**).

The external transfer box must be positioned so that an optimal cable routing is achieved.

The shifting box can be rotated in 30° increments to achieve this perfect cable routing.

Cables should be routed as close to the pivot point as possible when mounting a *Rohloff SPEEDHUB 500/14* into a full-suspension bike. This helps reduce the additional friction created in the cables as they try to move as the rear triangle is activated. Generally we recommend routing the cables along the downtube and chainstay for full-suspension bicycles.



SPEEDHUB 500/14 CC DB OEM **SPEEDHUB 500/14** TS DB OEM

Best cable routing for hubs with external shifting mech

Fig. 15: External Gear Mechanism

The external gear mechanism should be used when internal routing is not possible for any reason e.g. an extremely short rear triangle where there the possibility to mount a cable guide is not foreseen. This is also the preferred gear mechanism for long distance expedition/touring bikes due to the easy availability and replacement of the inner shifter cables.



8. All versions: Internal Gear Mechanism – disc brake mounting not permitted



Fig. 16: Internal cable routing via chainstay

The Internal Gear Mechanism can be chosen whenever rim brakes are used and a cable guide can be installed - with regards to the given dimensions - either onto the brake boss or clamped to the chainstay.

If routing the cables via the chainstay, please order the appropriate cable guide, 'Cable Guide (0°) ' (Article # 8260).



Fig. 17: Internal Gear Mech cable routing via brake boss.



09. Spoke length and rim diameters: Spoke lengths: 29" - 28" - 26" - 24" - 20" - 18"

The *Rohloff SPEEDHUB 500/14* is available with either 32, or 36 spoke holes forming a hole diameter of 100mm. 26"-wheels therefore, require shorter spokes which are slightly more difficult to source. Along with the SPEEDHUB, we can also provide silver Sapim Race spokes 2,0/1,8/2,0mm in all even lengths between 228mm and 244mm. We also offer the most common spoke length of 238mm in black. The table below shows the required spoke lengths for the most commonly found ERDs currently used for bicycle rims. As the hub flange is symmetric, all spokes required for lacing the *Rohloff SPEEDHUB 500/14* will be the same length:

Laufrad größe / Wheel size	Anzahl Kreuzungen / Number of Spoke Crosses	ERD	32-Loch Speichen- länge / 32-Hole Spoke lengths	Laufrad größe / Wheel size	Anzahl Kreuzungen / Number of Spoke Crosses	ERD	36-Loch Speichen- länge / 36-Hole Spoke lengths
18''	1-X	341-343	128	18''	1-X	341	126
		344	130			342-344	128
20''	1-X	374-376	144	20''	1-X	374-375	142
		377	146			376-377	144
24''	1-X	472-474	192	24''	1-X	472	190
		475-478	194			473-476	192
		479-482	196			477-480	194
		483-486	198			481-484	196
		487-490	200			485-488	198
		491-495	202			489-493	200
		496-499	204			494-497	202
		500-503	206			498-501	204
26''	2-X	516-517	226			503-506	206
		518-521	228	26''	2-X	516	222
		522-525	230			517-520	224
		526-529	232			521-525	226
		530-533	234			526-529	228
		534-537	236			530-533	230
		538-541	238			534-537	232
		542-545	240			538-541	234
		546-549	242			542-545	236
28''	2-X	586	260			546-549	238
		587-590	262	28''	2-X	586	256
		591-594	264			587-590	258
		595-598	266			591-594	260
		599-602	268			595-598	262
		603-606	270			599-602	264
		607-610	272			603-606	266
29''	2-X	611-614	274			607-610	268
		615-618	276	29''	2-X	611-614	270
		619-622	278			615-618	272
		623-626	280			619-622	274
		627-629	282			623-626	276
						627-629	278



Small wheels:

Wheels smaller than 26" must be laced using a single cross lacing pattern in order to guarantee the spokes will have the correct angle of entry to the rim.

Radial lacing the Rohloff SPEEDHUB 500/14 is not permitted.

The *Rohloff SPEEDHUB 500/14* should not be used with rims smaller than 18" as the angle between rim and the high hub flange would become to acute, causing spokes to kink where they enter the nipples leading to premature spoke failure.

Wheel stability:

The *Rohloff SPEEDHUB 500/14*, when laced into a 32 spoke rim, generally creates a stronger wheel than traditional 36-spoke derailleur wheels.

The SPEEDHUB 500/14 wheel stability corresponds to that of a Tandem wheel with 48 spokes!

The spoke flanges of the *Rohloff SPEEDHUB 500/14* are symmetrical. The rim is therefore centrally placed between the hub flanges, the spokes radiate from both sides of the hub at an equal angle to the rim and the resulting wheel is not dished. All spokes from a *Rohloff SPEEDHUB 500/14* wheel will therefore be of the same length and should have exactly the same spoke tension (min. 900-1100N).

To build a strong wheel, quality spokes should be pre-tensioned with a minimum tension of 900N. This value cannot always be reached with an un-dished wheel, because the spokes on the sprocket side of the hub have to be tensioned to around 1.200N which can cause problems at the rim. The spoke tension on an 8-speed cassette hub is usually only 600N on the opposing flange side. (See comparison on the following page to an MTB 8-speed wheel.

Because of the larger diameter hub flange, the spokes have, despite only being double crossed, approximately the same angle to the rim as the spokes of a triple cross laced wheel with a low-flange hub. Due to the fact that the spokes coming from the *Rohloff SPEEDHUB* 500/14 radiate from a larger circle, they are not subjected to the same amounts of stress. It therefore follows that the force passed on to the rim is far less, in comparison to that passed on by the spokes of a traditional low-flange hub (Torque = Force x Lever).



Comparison of spoke tensions measured during our tests:

(Values in brackets showing the absolute minimum spoke tension 900N with quality spokes)



The values for the Tandem 8-speed hub turn out more favorable despite there being 2 riders, because there are 48 spokes and because more symmetric flange width than the values for the MTB wheel. However, the values of the *Rohloff SPEEDHUB 500/14* wheel are, with 1.206N in comparison to 1.409N, still better.

Rohloff SPEEDHUB 500/14 on Tandems:

All versions of the **Rohloff SPEEDHUB 500/14** are drilled with 2.7mm spoke holes and can therefore be used on tandems as long as the frame spacing remains 135mm. The Article number/description is extended by the appendix **'T'**. (Example: CC-T or TS-EX-T). The tandem versions differ to the regular **Rohloff SPEEDHUB 500/14** only through the length of cable supplied in the kit. All tandem versions are supplied with cables of 2.5m in length. As the only difference is the cable length, these hubs are also suitable for recumbents, HPVs and other applications where longer cables are required.

Rohloff SPEEDHUB 500/14

Different hub types and their assembly instructions

10. Drive:- General Info

The hub will be delivered from us with a 16-tooth steel sprocket, unless otherwise requested (sizes 13, 15 and 17 teeth are also available). As far as the front chainring is concerned, we recommend chainrings of a size of 40, 42, 44 or 46 teeth, depending on how the bike will be used. We offer a special sprocket with 13 teeth for use with the *Rohloff SPEEDHUB 500/14* on bikes with small rear wheels (for example 20" recumbent or folding bicycles). By using this sprocket great overall gear ratios can also be achieved even with this size wheel. This sprocket however, requires a modified chain line (57,5mm instead of 54mm) and is not designed as a reversible sprocket.

The *Rohloff SPEEDHUB 500/14* is constructed for use in races, the high loads which arise during races are therefore not sufficient to overload the *Rohloff SPEEDHUB 500/14*. The high gear-ratio (for example 42/16) transforms the low revolutions at the crank to higher revolutions at the rear sprocket and thereby reduces the input torque for the hub. For safety reasons and in order to guarantee that the SPEEDHUB gear-unit cannot be overloaded, there are certain primary transmission ratios which may not be undercut. **The smallest allowed gear ratios (transmission factor 2.1 for solo cyclists under 100kg) are 36/17, 34/16, 32/15 and 28/13** when mounted in a normal bicycle (i.e. not a tandem). The smallest gear of the *Rohloff SPEEDHUB 500/14* corresponds in each case to a 20/34 ratio with derailleur gears. The fastest gear corresponds to the following derailleur gear ratio: The same front chainring combined with an 11-tooth rear sprocket of a derailleur system. There are no upper limits concerning the choice of the chainring size.

Use with two chain rings:

It is possible to use two chainrings, a front derailleur and a handlebar shifter in order to extend the gear ratio for extreme use. Please regard that the chainrings must possess a tooth difference of 13% in order to actually create one additional gear, or approximately 29% for two additional gears. When for example, you use a 50-tooth chainring and an additional 39-tooth chainring, the total transmission range would result in 678 %.

Chain line:

The optimum chain line on the *Rohloff SPEEDHUB 500/14* with sprockets of 15, 16 and 17 teeth is 54mm, the 13 tooth sprocket requires a chainline of 57,5mm measured from the middle of the frame. With triple crank-sets, this corresponds to the chain line of the outermost chainring. With double crank-sets, the outer chainring should be used as the slight inclination is not noticeable when cycling.



11. All versions: Components

Chain tensioner:

An external chain tensioner is necessary for frames where there is no other possibility to tension the chain (i.e. via an adjustable dropout, a dropout with a long slot, or an eccentric BB). A chain tensioner is also required with dropouts where the axle has less than 25mm room for adjustment (fig. 20). This also refers to bikes with rear suspension (except models with swing arms), as the chain length changes as the rear shock is activated. The tension capacity of our chain tensioner is 10 links.



Fig. 18: Adjustment of chain length using an EBB (min. 13mm) in combination with an OEM dropout.



Fig.19: Adjustment of chain length using an EBB (min 13mm) in combination with a standard dropout including disc brake mounts (IS-1999) and an OEM 2 axleplate.



Fig. 20: Dropouts with adjustment room > 25 mm, an external chain tensioner is not necessary. Dropouts with adjustment room < 25 mm, an external chain tensioner will be required.



Use of a Disc Brake (DB):

Disc Brake versions of the *Rohloff SPEEDHUB 500/14* are fitted with a special hub cap and an external gear mech. The flange of the hub cap has 4 tapped holes M8x0,75 onto which the brake disc can be mounted. Only brake discs with a special bolt pattern for the *Rohloff SPEEDHUB 500/14* can be used, (65 mm diameter bolt diameter, inner circle diameter 52 mm). Rohloff offers suitable brake discs for:

160/2,0mm	Hope Mono (Art.Nr.8280)
160/2,0mm	Magura Storm (Art.Nr.8288)
180/2,0mm	Magura Storm (Art.Nr.8289)
160/1,8mm	Shimano, Hayes, Formula, Avid (Art.Nr.8281)
203/1,8mm	Hayes, Shimano, Avid (Art.Nr.8286)
180/1 , 8mm	Shimano, Formula, Hayes, Avid (Art.Nr.8287)

The company Magura is also able to deliver the current "Storm" style discs in the sizes 160mm and 180mm.

Magura, Avid, Hope and Formula can deliver manufacturers with disc brake packages direct with the corresponding rear disc.

Brake discs with a smaller diameter than 150mm can not be used. We recommend that the suitable brake disc is ordered simultaneously with the SPEEDHUB.

Chain guide:

Rohloff also offers a chain guide that may be mounted additionally. This is necessary on fullsuspension bikes and bikes used for hard cross-country riding should also have a chain guide in order to prevent the chain from jumping off of the chainring. We would actually advise this component is mounted to all bikes that use a spring loaded, self-adjusting chain tensioning system.



Fig. 21: Chain guide Rohloff SPEEDHUB 500/14



12. Package contents of the *Rohloff SPEEDHUB 500/14*

The OEM hub will be delivered singularly packed and comes assembled with the correct axle plate as well as with the required sprocket type (13, 15, 16, or 17-tooth sprockets). All components for assembly are packed together. If required by the customer the hubs can be filled with oil.

OEM supplied SPEEDHUBs are dispatched pre-filled with SPEEDHUB all-season-oil!

Also contained in the package are all components required for the respective hub version:

-twist shifter,
-gear cables in the required length (180 cm and/or 250 cm)
-internal cable routing
-bayonet fixing
-cable guide
-external cable box
etc.

Also included: - Oil (if the hub was not factory filled),

- Owners manual,
- Warranty Card
- Information on the *Rohloff SPEEDHUB 500/14*.

These last 4 items must be passed on to the customer when the complete bicycle is shipped.

Rohloff SPEEDHUB 500/14

Different hub types and their assembly instructions

13. General information

<u>Maintenance:</u>

In comparison to a derailleur gear system, the *Rohloff SPEEDHUB 500/14* is relatively maintenance-free. The internal gearing runs encapsulated in an oil bath; it is protected by seals against dirt and moisture and is completely maintenance-free. All bearings are either sealed cartridge bearings or run also inside the hub within the oil bath. Therefore, maintenance of the *Rohloff SPEEDHUB 500/14* is reduced to an annual oil change.

The indexed gearing of the *Rohloff SPEEDHUB 500/14* is located directly within the hub. The cable tension has no effect on the gear shift precision.

On the *Rohloff SPEEDHUB 500/14* the chain is running straight and is only driven by one large chainring. Therefore, the wear on the drive chain is fundamentally lower than with a comparable derailleur system.

Brake-in period:

All gears and coupling elements of the *Rohloff SPEEDHUB 500/14* are manufactured from hardened steel and are machined to a high precision. The break-in period is approximately 1.000km due to the high wear resistance of all parts. The gears get finally smoothened out by the moving of the parts under pedaling force. The result of this process is less operational noise and a much smoother operation. The hub shell of the *Rohloff SPEEDHUB 500/14* has specially constructed seals. These also take about 1.000 km to break-in; it is quite normal with a new hub, for the cranks to rotate when the bicycle is pushed, this is because the new hub seals force the sprocket to rotate with the hub. This effect recedes over time and has no influence upon riding comfort.

Operational Noise:

On the *Rohloff SPEEDHUB 500/14* three sets of planetary gears work in line to achieve 14 different speeds. The first two sets of planet gears produce seven gears (8th to 14th). When these seven gears are set against the third set of planet gears, then gears from 1st to 7th are produced. The third set of planetary gears rotate at extreme speeds, the highest RPM being in the 7th gear. The rotation of these planetary gears can be heard as a humming noise which is transmitted via the axle into the frame. Depending on frame type, material and other components fitted around the axle (fenders, luggage racks, kickstand etc) this noise is either more or less audible. The more the hub is ridden, the quieter these noises become. These high RPM planetary gears are not in use and the upper 7 speeds and the result is an almost silently running SPEEDHUB. When coasting along, different freewheels may work depending on the gear selected. This too can result in different noises.

Oil change:

The *Rohloff SPEEDHUB 500/14* is filled with 25ml of special gear oil (all season oil). This ensures:

- a) moving parts lubricated.
- b) steel parts protected from corrosion.
- c) freewheeling and gear noises subdued.



OEM PRICE LIST



The minimal requirements laid down by the Rohloff AG must be met when mounting a *Rohloff SPEEDHUB* 500/14 OEM2 version in connection with a support bolt, Speedbone or Monkeybone (mounted to the disc brake mount) or an alternative OEM2 M5 bolt adapter (for luggage rack/fender mount tapped hole). Faultless materials and first grade workmanship must be guaranteed.

Mounting a *Rohloff SPEEDHUB 500/14* with OEM2 axleplate into a tandem is only permitted when using the Speedbone.

Release from liability - *Speedbone* or *Monkeybone* (OEM2 axle plate)

Manufacturer:

I hereby declare that the OEM2 axle plate with or without either a Speedbone, Monkeybone, or special OEM2 Adapter for M5 anchor bolt, is fitted to the following bicycles:

I herewith release the company 'Rohloff AG' from product liability concerning possible arising damages to the disc brake mount of the frame as well as from resulting damages or injuries to persons or items caused by the use of the OEM2/SPEEDBONE or OEM2/Monkeybone version within this type.

Date, Signature (responsible)