



SHIFT YOUR RIDE

Technical Manual
Rotary Shift | v2026.06

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1. General Information

The 3X3 gear hub is designed for use in a wide variety of applications. For e-bikes as well as for conventional bikes. Whether urban, cargo, trekking or MTB. Our gearbox stands for more freedom, fun and autonomy while biking.

Why?

3X3 offers bike technology that will make riding, and especially shifting, as easy and intuitive as possible in the future. Made in Germany with the highest quality promise.

This manual is an integral part of your 3X3 gear hub and provides the essential technical information and safety instructions for operation, assembly and maintenance. Before using our gearbox, we therefore strongly advise you to read this manual and observe the safety instructions.

When installing the 3X3 gear hub, it is essential to consider the compatibility of all components with each other. Therefore, also pay attention to the manuals of the other components of your bike (belt, wheel, chain, quick release, etc.).

1.1 Target Audience

The target group of this manual is the original equipment manufacturer / the assembler of the gear hub in the bicycle.

Assembly and maintenance works of the gear hub requires basic knowledge in bicycle technology. If there is any doubt, a trained bicycle mechanic or the 3X3 service team (service@3x3.bike) should be consulted.

Incorrect assembly or incorrect maintenance of the gear hub can lead to serious accidents with fatal consequences!

1.2 Validity

This manual is valid for the technical condition of the 3X3 gear hub in July 2026. We reserve the right to make design changes. Graphics and technical drawings may vary.

1.3 Tools

Work on the gear hub may only be carried out using suitable tools. Screw connections must be tightened to a defined torque using a torque wrench.

Only tools that are in perfect working order and undamaged can ensure that components are installed or removed properly.

1.4 Warranty and Guarantee

All information about warranty and guarantee can be found at www.3x3.bike.

1.5 Wear Parts

The following components are subject to constant wear:

- > sprocket
- > chain / belt
- > chain ring / pulley
- > tension rollers of the chain tensioner
- > shift cables
- > shifter grip rubber
- > brake disc

The wear of these components is strongly dependent on the conditions of use (load, dirt, weather, care). To guarantee functional reliability, the parts must be replaced when they reach their permissible wear limit. Have the drive components of your bike checked regularly by a specialist workshop.

1.6 Disclaimer

The tasks described in this manual must be performed by individuals with sufficient expertise.

We are not liable for damages as a result of:

- > Use other than as intended (see “2.5 Intended Use”)
- > Exceeding the maximum system weight (see “2.3 Maximum system weight”)
- > Failure to comply with safety-related regulations
- > Improper installation, repair, and maintenance
- > Use of unauthorized replacement parts and accessories

The user is liable for the aforementioned damages. In case of uncertainties or occurrence of problems, the 3X3 service team (service@3x3.bike) or a trained bicycle mechanic must always be consulted!

1.7 Retrofitting

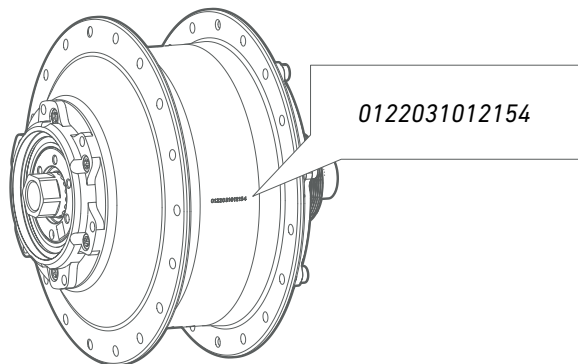
The 3X3 gear hub can only be retrofitted under the following circumstances:

- > The bicycle manufacturer must give its approval for the conversion.
- > There must be sufficient installation space available on the rear triangle, especially on the brake rotor side in the area of the brake caliper mount and the axle plate.

1.8 List of abbreviations

Abbreviation	Meaning
AP	axle plate
TA	Thru Axle 142/148
QR	quick release 135 mm
PM	postmount
BS	belt sprocket
CS	chain sprocket
R	rotary
E	electronic
SB	shift box
XP	actuator
TR	Trigger
RS	rotary shift
CBL	cables
SP	complete gear hub
GR	gearbox assembly
BRK	brake rotor
ADPTR	adapter

1.9 Serial number



Each 3X3 gear hub is marked with a unique serial number and an additional QR code. These are used to identify the product and are required for warranty and guarantee claims and as proof of ownership.

The use of a separate QR code app is recommended for reading the QR code, as integrated QR scanners on mobile devices may not reliably recognize the code.

2. Safety

2.1 Explanation signs and symbols used



DANGER

...indicates an immediate hazard that will result in death or serious injury if not avoided.



CAUTION

...indicates a potential hazard that may result in minor injury if not avoided.



NOTE! ... indicates further notes or tips.

2.2 General Safety



CAUTION

Risk of accident due to incorrect or impermissible assembly!

Before mounting, make sure that your bike frame is compatible with the 3X3 gear hub and the selected components. All works and modifications carried out improperly can cause malfunctions and, as a result, accidents. It is therefore essential to ensure proper installation of the gear hub and accessories. The first step must therefore be to read this manual and follow the instructions.

- We recommend that all assembly work be carried out by a qualified specialist workshop.
- The specified torques of the screw connections must be observed.
- The smallest permissible belt or chain transmission ratio must not be undercut (see „6.7 Permissible primary ratio“ on page 27).
- In the case of rear suspensions, a minimum length of the belt or chain must be maintained so that the full compression of the rear end is not restricted. More information on this can be obtained from the bicycle manufacturer.



CAUTION

Risk of accident due to incorrect handling and use of the gear hub!

Compliance with the following provisions is essential for accident-free operation and proper functioning.

- The gear hub is to be used exclusively for the intended use (see “2.5 Intended Use”) . The user is liable for any improper use.
- The maximum system weight (see “2.3 Maximum system weight”) must not be exceeded.
- The hub must be compatible with all relevant parts of the bike.
- Only use original spare parts.
- The hub must not be altered or modified.
- If there is any damage or signs of damage, the hub must not be used. If in doubt, contact the 3X3 service team (service@3x3.bike).



CAUTION

Danger of accident due to incorrectly mounted rotary shift!

Incorrect installation of the rotary shift can result in restricted braking and steering maneuvers and poses a risk of accidents.

- The position of the shifter grip must under no circumstances affect the functionality of the brake lever.
- The shift cables must not interfere with the steering.



CAUTION

Danger of accident due to contaminated brake rotor!

If the brake rotor becomes contaminated with oil, grease (including skin grease) or with other lubricating substances, the brake rotor cannot achieve its desired braking force.

- Be careful not to contaminate the brake rotor during installation.
- Clean the brake rotor after assembly with a strongly degreasing, residue-free and flash-off cleaner.



CAUTION

Risk of injury due to accidental activation of the e-bike system!

- Before carrying out any work on the e-bike (e.g. inspection, repair, assembly, maintenance, work on the chain, etc.), before transportation (in a car, aircraft, etc.) and before storage, it must be ensured that the system is deactivated and secured against being switched on.

If your bike is approved for use with a child seat, the weight of the seat and additional passenger will also be added to the maximum system weight.

2.4 Maximum input torque

The 3X3 gear hub is designed for high performance. The maximum input/output torque must not exceed 160 Nm. See also „6.7 Permissible primary ratio“ on page 27.

2.3 Maximum system weight

The maximum system weight of your bike in conjunction with a 3x3 gear hub is 250 kg.

The system weight is the sum of the rider, bicycle, clothing, luggage and a trailer and its contents.

2.5 Intended Use

The 3X3 gear hub is approved exclusively for use on bicycles that are not considered motor vehicles according to § 1 Para. 3 StVG (German Road Traffic Act) and comply with the generally applicable safety standards. Other installation methods must be reviewed and approved in advance.

The gear hub may only be used with a torque support.

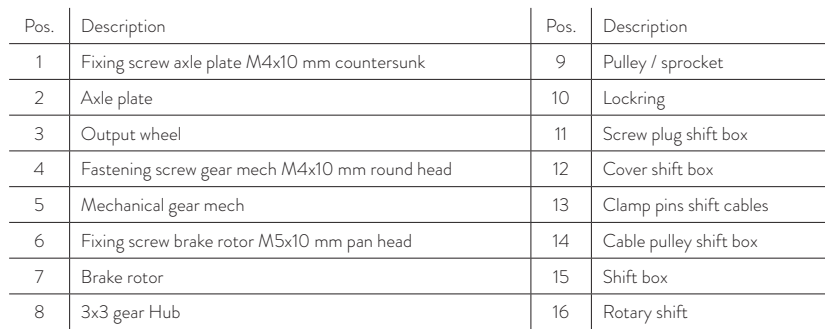
If the gear hub is used with a belt, only a Gates Carbon Drive belt may be used.

The 3X3 gear hub may only be laced in 18" to 29" rims.

The 3X3 gear hub is not compatible with coaster brakes.

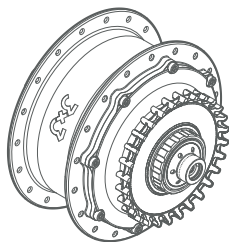
The 3X3 gear hub must not be used under water.

Schematic representation of the individual parts

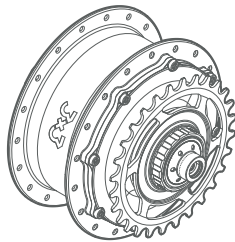


We offer the following configurations:

3.1 Drive unit

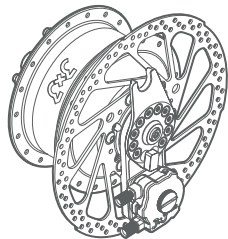


Pulley 3X3 BS32



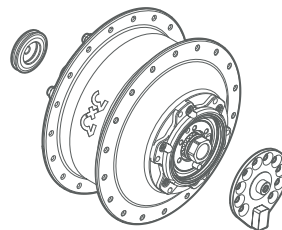
Sprocket 3X3 CS.28

3.2 Gear mech

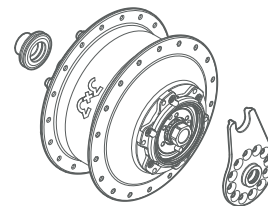


3X3 R.SB

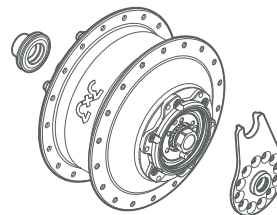
3.3 Frame width



3X3 SP.36.135

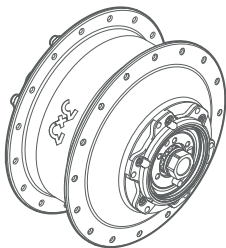


3X3 SP.36.142

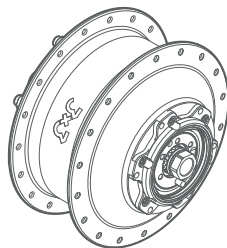


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3.4 Spoke holes

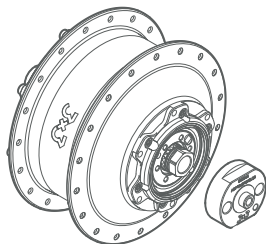


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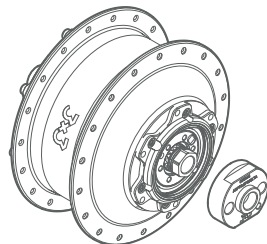


3X3 SP.36.135

3.5 Lacing adapter



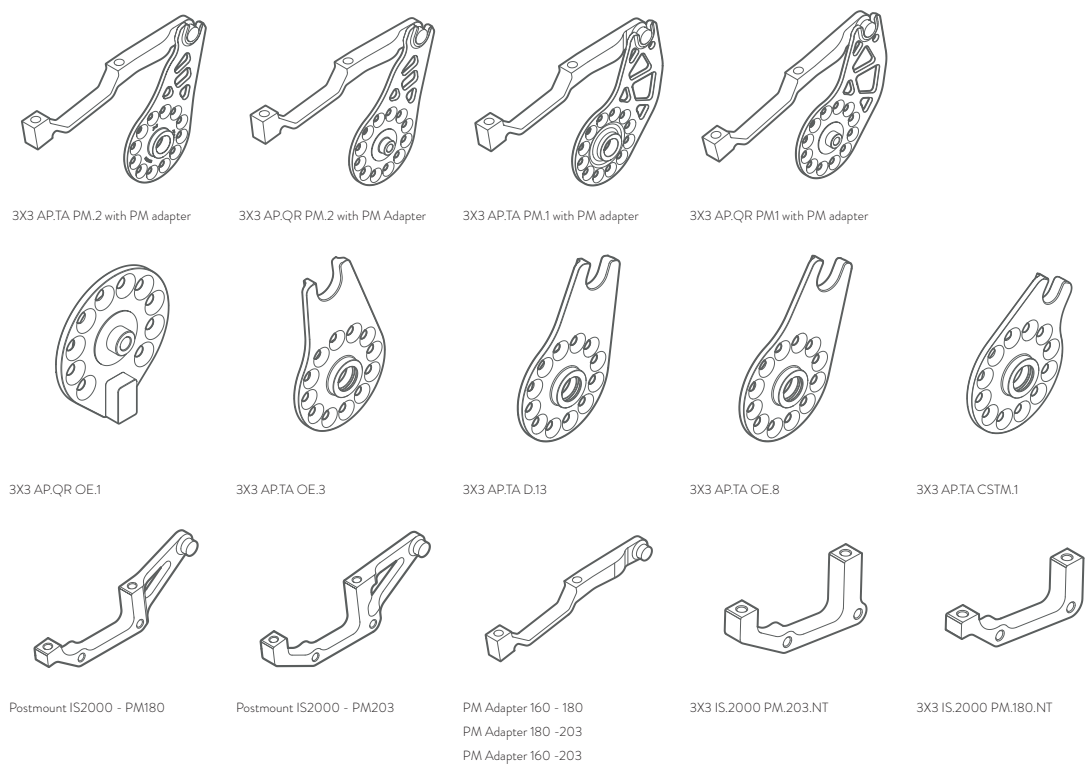
000345 3X3 ADAPTER.SPOKE.QR



000346 3X3 ADAPTER.SPOKE.TA

For more information on the lacing adapters, see „7.5 Mounting the lacing adapter“ on page 30.

3.6 Torque support



In addition to the standard torque supports shown here, individual supports are available to suit specific requirements of some frames.

4. Operation

4.1 Shifting gears

All gears of the 3X3 gear hub can be changed via the rotary shift. The gears can be shifted up and down in single steps or in larger steps as desired.

1. Shift to a higher or lower gear by turning the rotary shift.
 - = The marking on the housing of the rotary shift indicates the engaged gear.
 - = Fast gears are achieved by shifting the shifter up in the direction of 6.
 - = Slow gears are achieved by downshifting in direction 1.
2. Ease up on pedal force while initiating a shift - this can occur at any crank position. Over time the reduction in pedal force and simultaneous shifting becomes second nature and quite intuitive.
 - = The degree of relief determines the smoothness of the shifting process.
 - = The gear change is performed simultaneously by operating the shift lever and is completed by the tactile detent in the shifter.
 - = This enables fast and error-free shifting both when stationary and in all riding situations.

Unlike other shifting systems, the gear change in the 3X3 gear hub is not delayed to the operation of the shifter, but simultaneously.

When shifting gears, clutch components in the transmission are moved; these components are under load when the pedals are pressed. When stationary and under low pedal load, the shifter can be easily rotated from detent to detent. As the pedal load increases, the hand force required to turn the shifter increases.

With a high load on the pedals and possibly a high level of assistance from the e-bike motor, slightly louder shifting noises may occur when shifting gears

4.2 Riding noise

When riding, different types of riding noise can be heard in certain gears.

Depending on the frame type, these transmission noises are amplified or transmitted differently (the tubes of the frame / frame material act as a resonating body).

4.3 Running-in time

All gears and clutch elements of the 3X3 gear hub are made of hardened special steel and are manufactured with high precision.

Within the first 500 km, the 3X3 gear hub receives its final polish.

This makes riding noises quieter and gearshifts smoother. The run-in period is not associated with any restrictions.

4.4 Pushing the bike

When pushing the bicycle, the crank may rotate with it. This does not represent an error. Pushing the bike backwards is not a problem, here the crank inevitably turns with it.

4.5 Removing and installing the wheel

When removing and installing the rear wheel, a certain sequence of steps must be followed. For „5.8 Installing and removing the wheel“ on page 24 also observe the information provided by the frame or bicycle manufacturer.

5. Installation and initial operation

You can also find all the assembly steps as a video at <https://www.3x3.bike/tutorials/>

5.1 Mounting the brake rotor

Required tools and materials	Specifications
Torx key	TX25
torque wrench	Effective range 6 Nm
threadlocker	medium strength
degreaser / brake cleaner	completely flashing off, e.g. Disc Brake Cleaner from Muc-Off

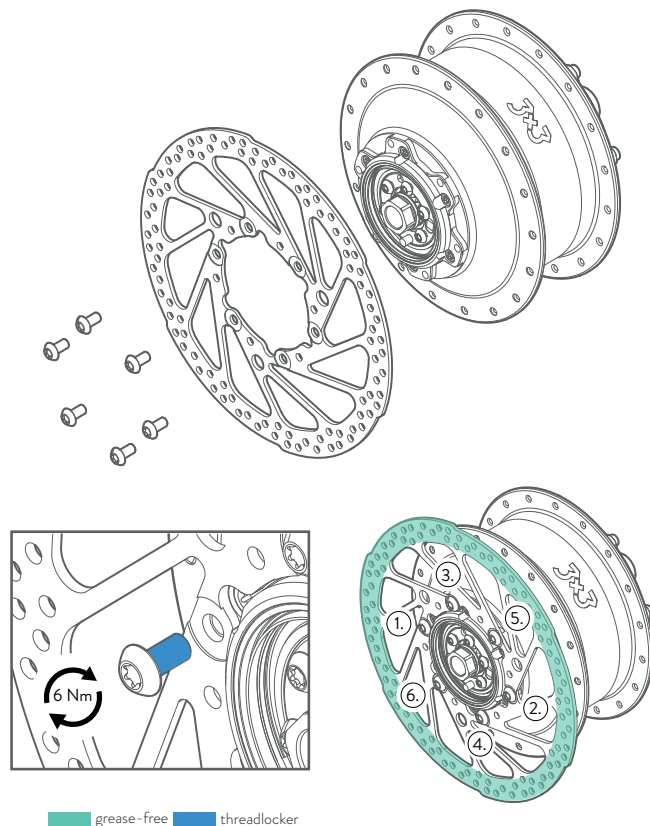
Brake rotors from Fahrwerker, Magura and Tektro are currently available.

The supplied screws (M5x10 flat head TX15) must be used with Magura brake rotor.

To mount the brake rotor, the gear housing must already be spoked. The gear mech or the actuator must not yet be mounted.

Before mounting the brake rotor, make sure that the contact surface of the brake rotor on the hub is clean and that the threads and screws are free of grease.

1. When using a brake rotor speed magnet:
Place the magnet in the hole provided in the brake rotor.
2. Clean the contact surfaces of the brake rotor and hub.
3. Place the brake rotor on the hub.
= Pay attention to the direction of rotation (see arrow marking on the brake rotor).
4. Degrease the threads of the screws and apply a medium-strength threadlocker.
= Some screws are already pre-treated with an encapsulated threadlocker. The threads do not need to be degreased and no additional threadlocker needs to be applied.
5. Screw in all six screws, but do not tighten them yet.
= Only screws with a maximum head height of 2.7 mm may be used! A taller head bolt will interfere with the shift box.
6. Tighten the screws crosswise (see numbering diagram) first hand-tight and then with a torque of 6 Nm.
7. Check that the brake rotor lies flat on the hub.

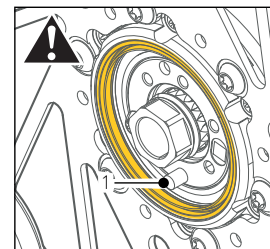
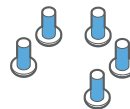
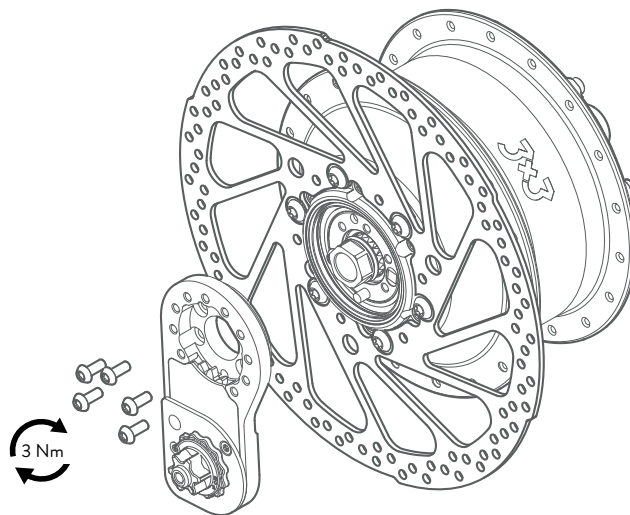


5.2 Mounting and adjusting the gear mech

Required tools and materials	Specifications
Torx key	T20
socket/ open-end wrench	17 mm
torque wrench	Effective range 3 Nm
Grease	3X3 Gear Grease
threadlocker	medium strength

The brake rotor must already be mounted in order to install the gear mech.

1. Clean the contact surfaces of the gear mech and the hub.
2. Grease the sealing ring in the hub with 3X3 Gear Grease.
If you plan to reuse the screws, degrease the threads and apply a medium-strength threadlocker.
3. Place the gear mech on the hub and screw in three of the five screws so that one hole remains free between each screw. The pin (1) on the main shaft must be inserted into the designated hole in the gear mech.
4. Lightly cross-tighten the three screws and check that the gear mech is sitting straight on the hub.
5. Place the two missing screws and tighten all screws crosswise with a torque of 3 Nm.
6. Check the clearance of the gear mech. The gear mech must not collide with any other component during a 360° rotation.
7. Check that the minimum distance between the brake rotor screws and the gear mech is 3 mm.

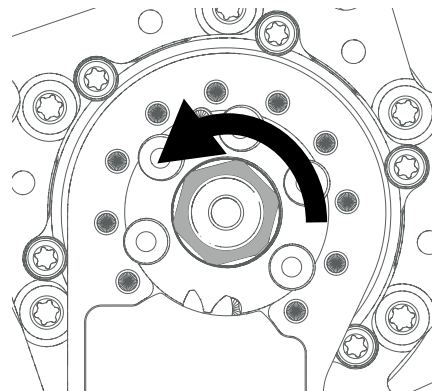
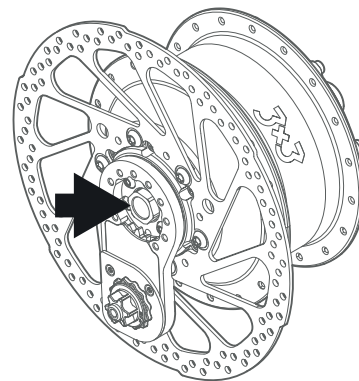


Shift hub to first gear

To ensure that the hub is in the starting position for the following assembly steps, the hub must be manually shifted into first gear via the shift drum.

The hub is normally supplied in gear 1.

1. Turn the hexagon of the shift drum counterclockwise with a 17 mm socket until it stops.
 - > The hexagon of the shift drum must not be clamped in the vise!
 - > Do not use an open-end wrench, ratchet, or similar tool, as this could cause the shift drum to be turned too forcefully into the lock position, potentially damaging other components.
 - > The hub is now in the first gear.



Turn the input wheel to the initial position

Depending on the design of the rear triangle, there are different mounting orientations.

Exemplary alignments:

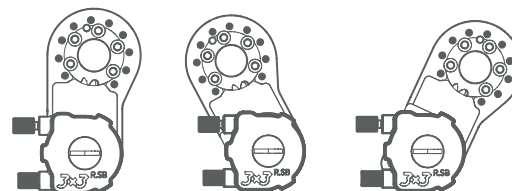
- > Alignment I: Gear mech in 6 o'clock position
- > Alignment II: Gear mech in 5 o'clock position
- > Alignment III: Gear mech in 7 o'clock position

Before mounting, check in which position the gear mech must be mounted.

Depending on the orientation (I, II or III), the shown marks must match.

Mounting the output wheel

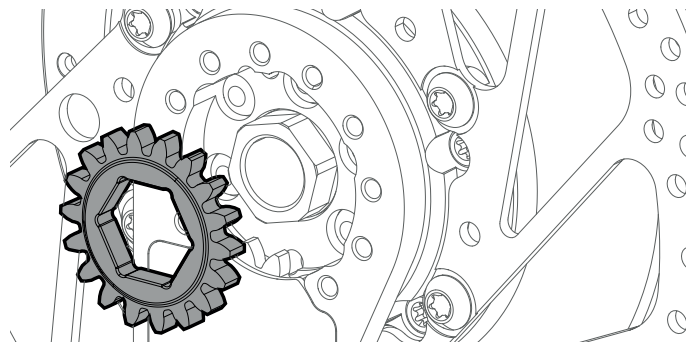
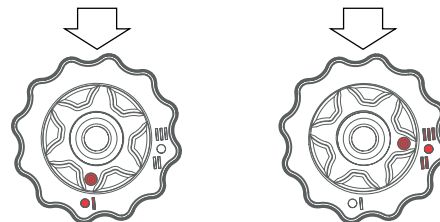
1. Clean the output wheel and the mounting surface.
2. After aligning the input gear, place the output gear onto the hexagon of the shift drum. The output wheel has no specified direction of rotation.
3. After installing the output gear, apply a small amount of grease to the gear teeth.



ALIGNMENT I

ALIGNMENT II

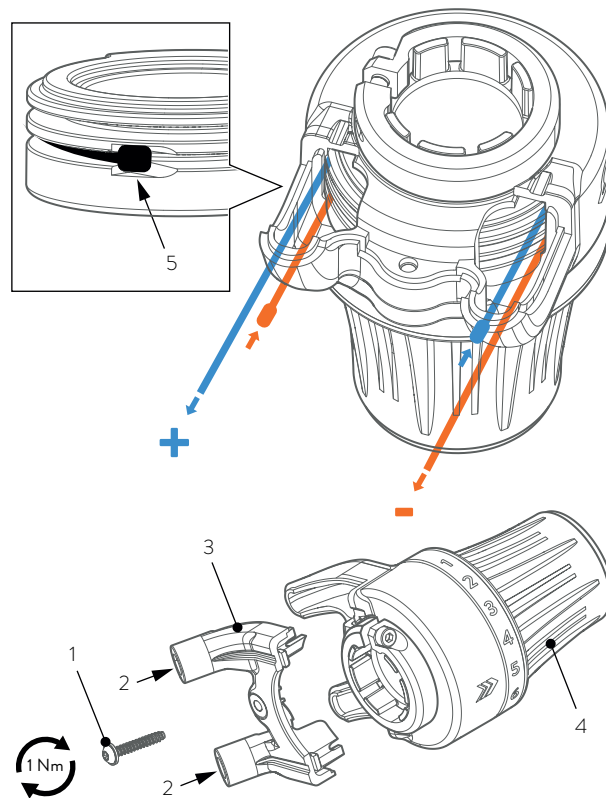
ALIGNMENT III



5.3 Installing shift cables in the rotary shift

Required tools and materials	Specifications
hex key	2.5 mm
screwdriver small	blade width 2 mm

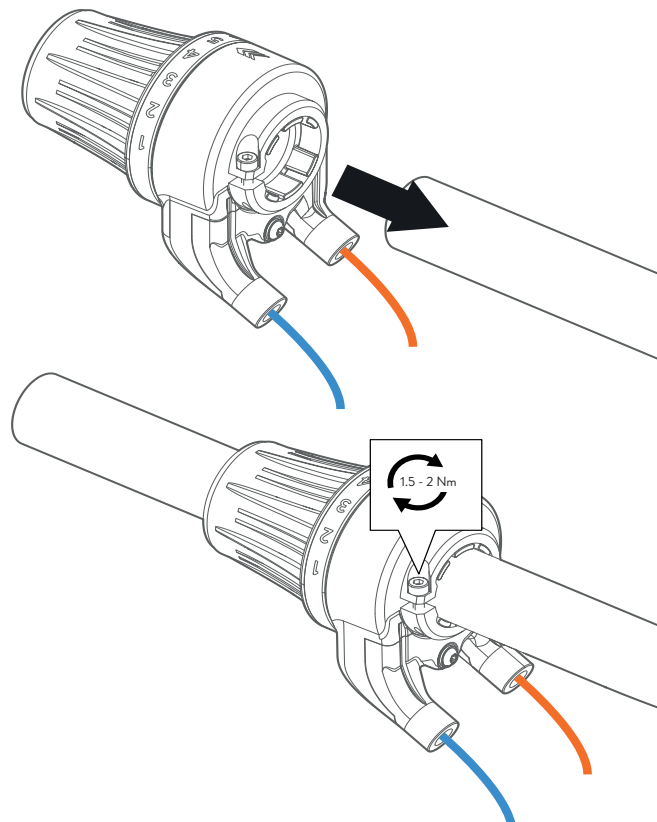
- Loosen the housing screw (1) and remove the housing cover (3).
- Turn the twist grip (4) until the slot for the shift lever knob on the left side becomes visible.
- Push the shift cable "-" into the left cable track until it emerges from the handle housing. For assistance, the shifter grip can be turned in the gears.
- Use a screwdriver to push the end of the shift cable into the indentation (5) until it has completely disappeared.
- Rotate the shifter grip to the second gear.
- Push the shift cable "+" into the right cable track until it emerges from the handle housing. For assistance, the shifter grip can be turned in the gears.
- Use a screwdriver to push the end of the shift cable into the indentation (5) until it has completely disappeared.
- Shift the shifter grip to first gear.
- Slide the shift cables into the openings (2) of the housing cover (left cable into the left opening, right cable into the right opening).
- Attach the housing cover and the housing screw and tighten them hand-tight to 1 Nm.
- Pull the shift cables to check the functionality of all gears.
 - = It must be possible to turn the shifter grip when pulling on the shift cables beyond first and ninth gear.
- Shift the shifter grip to first gear.



5.4 Mounting the rotary shift on the handlebar

Required tools and materials	Specifications
hex key / hex bit	2.5 mm
torque wrench	Effective range 1.5 to 2 Nm
Mounting paste (only required for carbon handlebars)	According to the handlebar manufacturer instructions)

1. Refer to the handlebar manufacturer's instruction manual and check for specific provisions regarding handlebar clamp tightening torques.
2. First slide the brake lever and then the rotary shift onto the handlebar.
 - > With the rotary shift, make sure that the "lugs" of the grip end cap also slip over the handlebar tube.
3. Mount the grip suitable for mounting with the rotary shift according to the manufacturer's instructions.
4. Adjust the position of the brake lever and fix it.
5. Adjust the position of the rotary shift and tighten the clamp with a 2.5 mm hex key to 1.5 Nm to 2 Nm.
 - > The correct position is usually so that the shift cables point straight down.
 - > The rotary shift must not be restricted in its function and must not restrict other operating elements (brake lever, etc.).
 - > The shift cables must not be kinked and the steering angle must not be affected.
6. Verify the tight fit of the rotary shift.
 - > It should not be possible to turn the rotary shift with normal force.
If the rotary shift can be turned on the handlebar, disassemble it, thoroughly clean and degrease the mounting surfaces and apply a suitable mounting paste. If the clamping force is still too low, the bicycle must not be put into operation. If you have any questions, please contact the 3X3 service team.



5.5 Mounting the axle plate

Required tools and materials	Specifications
Torx wrench / Torx bit	T20
torque wrench	Effective range 4 Nm
threadlocker	medium strength
degreaser / brake cleaner	completely flashing off, e.g. Disc Brake Cleaner from Muc-Off

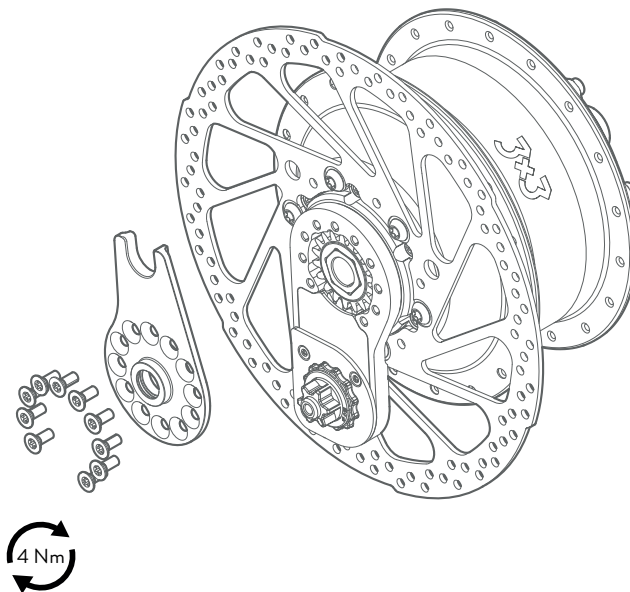


CAUTION

Risk of injury from the sharp edges of the brake rotor!

The axle plate is supported by the torque support of the bike frame. Different versions of the axle plate are available. The position of the axle plate must be aligned with the position of the torque support on the bike.

1. Place the matching axle plate on the shift box at the angle that matches the bike.
2. Degrease the threads of the screws and apply a medium-strength threadlocker.
 - > New screws have already been pre-treated with a threadlocker. No additional threadlocker needs to be applied here.
3. Secure the shift box against rotation and tighten the screws crosswise with a torque of 4 Nm.

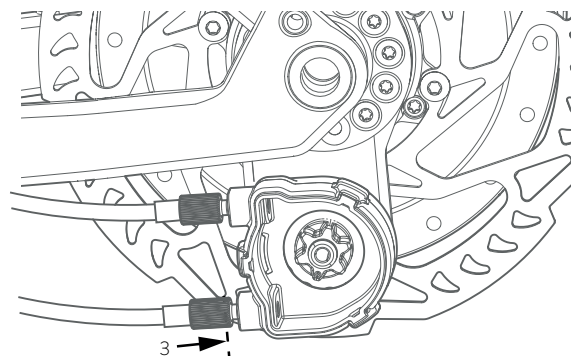
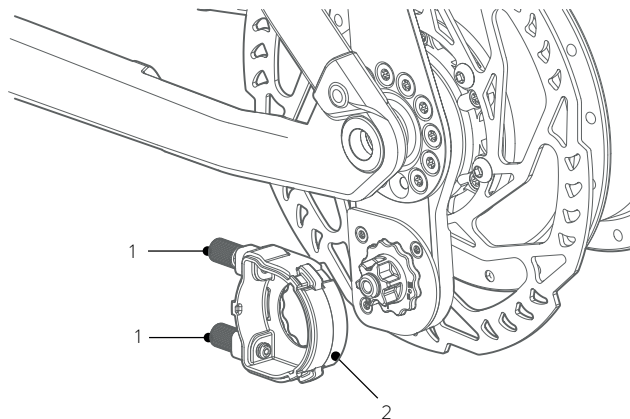


5.6 Mounting the shift box

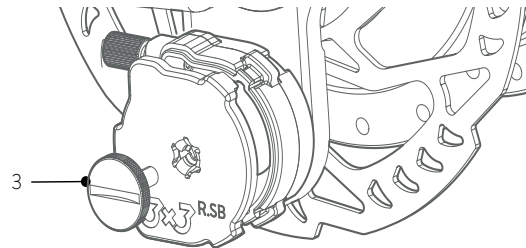
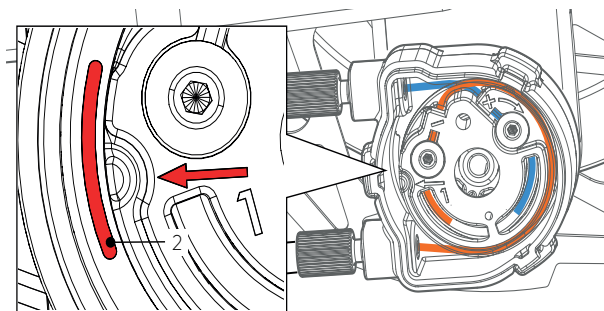
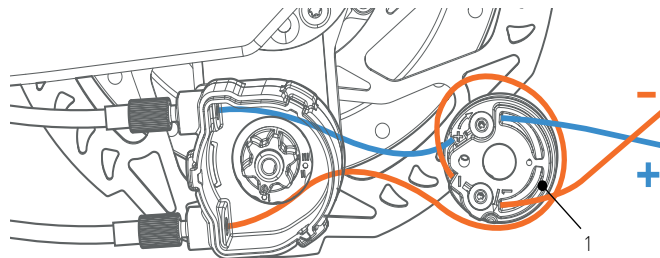
Required tools and materials	Specifications
hex key / hex bit	2 mm
torque wrench	Effective range 2 - 3 Nm
cable stretcher	commercial
Side cutter	commercial

Use brake cable housings to ensure that the shift cables move smoothly. The cables must be laid so that there are as few bends as possible.

1. Adjust the gear mech to the angle required when the unit is installed (see „Turn the input wheel to the initial position“ on page 17).
2. Screw the adjustment screws (1) for the shift cable into the lower part of the shift box as far as they will go and then screw them out again by 1 to 2 turns.
3. Take the cable pulley out of the shift box.
4. Place the lower part of the shift box housing (2) on the gear mech.
5. Shorten the shift cable housings to fit exactly and attach the end caps.
 - > Before shortening the cables, make sure that any changes in length caused by retightening the dropout or by the rear triangle flexing do not put the cables under tension.
 - > The end of the respective adjusting screw (3) serves as a reference for the length.
6. Push the upper shift cable into the outer casing until it comes out the other side. Then thread it through the adjustment screw into the upper opening of the gear box base.



7. Repeat the same with the lower shift cable and thread it into the lower opening of the shift box base.
8. Push the upper cable into the upper hole and the lower shift cable into the lower hole of the cable pulley (1).
9. Wrap the lower shift cable around the cable pulley (1).
10. Place the cable pulley on the teeth of the gear mech so that the arrow marking of the pulley coincides with the marking (2) of the shift box.
11. Check that the rotary shift is still in first gear and that the shift cable housings are properly guided.
12. Check that the shift cables are taut and tighten the cables if necessary.
13. Clamp both shift cables on the cable pulley with a 2 mm hex key.
 - > To prevent the cable pulley from twisting when tightening, hand-tighten the bolts alternately and gradually.
14. Check the function of all gears by turning the rotary shift.
 - > All gears must shift clean and easily.
 - > The cable pulley should move with each shift.
The gear indicator on the rotary shift and tension on the shift cables is adjusted via the shift cable adjustment screws.
15. Shorten the shift cables so that no ends are sticking out of the cable pulley.
16. Put on the cover of the shift box, screw in the knurled screw (3) and tighten it hand-tight.



NOTE! Shift cables may only be clamped once. Do not use already mounted shift cables!

5.7 Mounting the sprocket/ pulley

Required tools and materials	Specifications
strap wrench (pulley)	e.g. Gates GCD241236 / Strap Wrench
chain whip (chain sprocket)	e. g. BBB Cycling BTL 12 S
locking tool	BSA Hollowtech II tool
torque wrench	Effective range 40 Nm
Cleaner	Solvent-free cleaner, e.g. Muc Off
Grease	3X3 Gear Grease

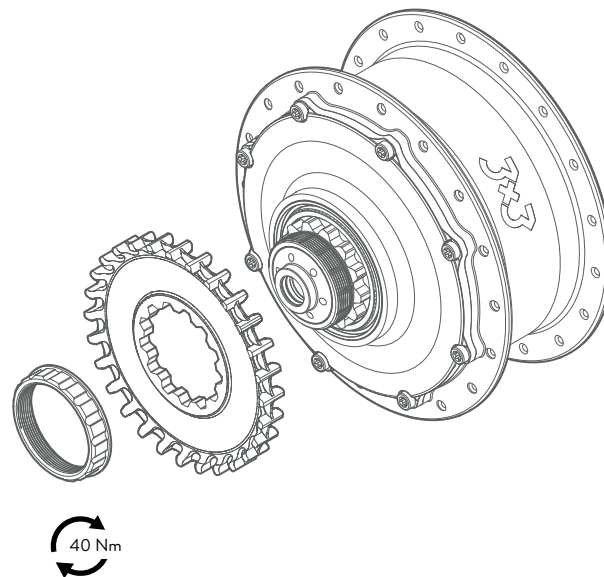
The 3X3 gear hub can be fitted with either a chain sprocket or a belt pulley. The chain/belt line is determined by the hub. The front chainring or pulley must be adjusted to the appropriate position.

1. Clean the driver on the hub and the sprocket or pulley.
2. Make sure that the seal carrier is fully inserted in the housing cover.
3. Slide the sprocket or pulley onto the hub driver.



NOTE! The labeling on the sprocket/pulley must point in the direction of the viewer.

4. Turn the locking onto the driver.
5. Hold the sprocket with a chain whip or the pulley with a strap wrench and tighten the locking with a bottom bracket tool to 40 Nm.



5.8 Installing and removing the wheel

Installing the wheel

In addition to the bike manufacturer's specifications, the following points must be observed:

1. Grease the thru axle and the axle plate with 3X3 Gear Grease.
2. Bring the rear wheel into position and place the chain / belt on the sprocket / pulley.
3. Thread the rear wheel into the dropout.
 - = Make sure that the brake rotor is threaded between the brake pads and that the fork of the axle plate engages with the pin of the torque support on the frame.
4. Insert the thru axle through the dropout and tighten it according to the manufacturer's instructions, whereby a torque of 16 Nm must not be exceeded.
 - = Make sure that the rubber seals in the axle plate and in the adapter are not damaged.
5. Place the cable pulley shift box on the gear mech and tighten it securely with the central fixing screw.
6. Check that the rear wheel turns freely.

Removing the wheel



NOTE!

Before removing the rear wheel, the hub should be shifted into first gear.

1. Turn off the e-bike system and remove the shift box from the gear mech. It remains on the wheel.
2. Open or loosen the rear wheel attachment according to the bike manufacturer's instructions.
3. Remove the rear wheel from the bike.
 - = Take care not to jam the torque support.
 - = Take care not to damage the rubber seals in the axle plate and in the adapter.
4. Remove the chain / belt from the sprocket / pulley.

6. Technical Specifications

6.1 Interfaces with the bicycle

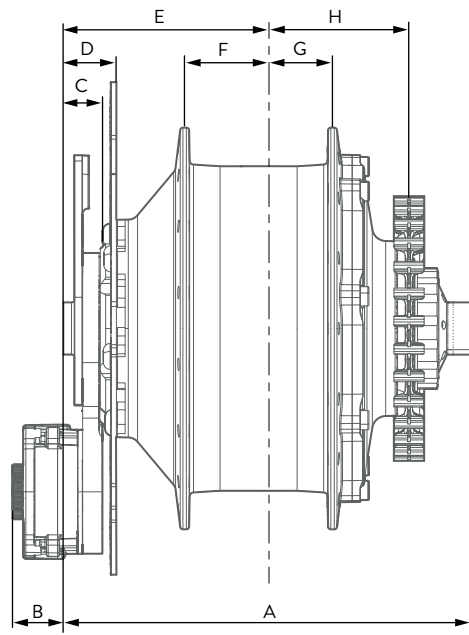
Maximum input torque	160 Nm
Axle diameter	5 mm (for 135 mm installation width, only as quick release version) 12 mm (for 142/148 mm installation width)
Total axle width with 135 mm installation width	145 mm
Axle bore diameter	for 135 mm installation width 5.2 mm for thru axle 12.2 mm
Installation widths in the frame	135 mm, 142 mm, 148 mm
Brake rotor diameter	180 mm, 203 mm

6.2 General technical data

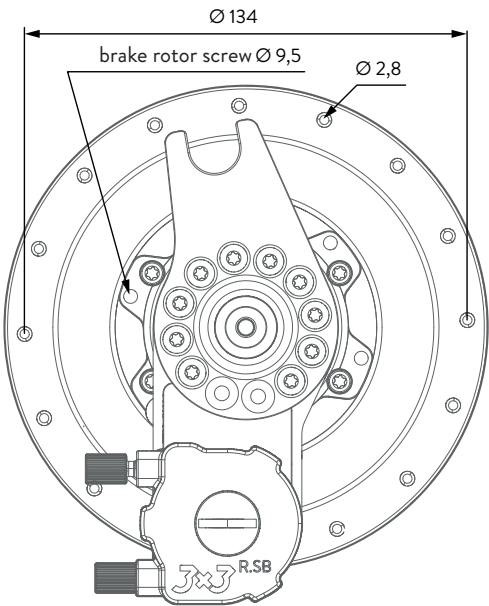
Number of gears	6
Gear steps	approx. 24 %
Total transmission	292 %
Weight	2 kg
Brake rotor centering diameter	Ø61.5 mm +0.2/0
Bolt circle diameter of the brake disc mount	Ø72.25 mm ±0.1
Brake rotor fixing screws	6 x M5 x 10 (TX25) Head height must not exceed 2.7 mm! Always use the screws supplied!
Distance dropout to brake rotor flange	15.3 mm +- 0.1 (IS 2000)
sprocket toothing	For bicycle chains 1/2 x 11/128" (ISO No. 082); corresponds to 10-speed chains

sprocket number of teeth	Chain: 24, 26, 28
	Belt: 22, 24, 28, 30 22T and 24T are available only with a 3 mm offset
Belt/chain line	135/ 142 mm installation width: 54.7 mm
	148 mm installation width: 51.7 mm
Shift operation	Rotary shift (can be set to the right or left)
Rotary shift rotation angle	Rotation angle per gear 22.2° / total: 177.6°
Gear mech	Rotary shift: via two Bowden cables (pull-pull system)
Rotary shift cable reel	Feed per gear 6.95 mm / total: 55.6 mm
Support moment	Gear 1: 117 Nm clockwise
	6th gear: 56 Nm counterclockwise

6.3 Dimensions



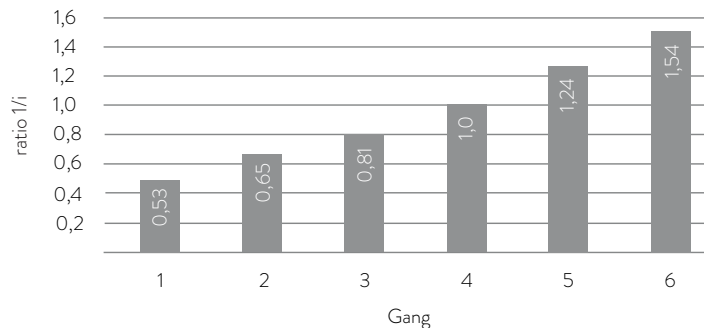
	135 mm installation width	142 mm installation width	148 mm installation width
A	135	142	148
B	22.1	18.6	18.6
C	10.6	14.1	14.1
D	15.3	18.8	18.8



	135 mm installation width	142 mm installation width	148 mm installation width
E	67.5	71	74
F	26.9	26.9	29.9
G	26.9	26.9	23.9
H	54.7	54.7	51.7

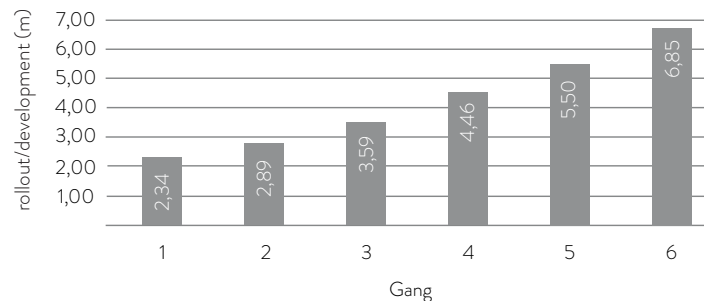
6.4 Gear ratio

The internal ratio refers to the ratio or reduced ratio of only the gearbox. From this and from the primary ratio, the desired gear inches can be calculated.



6.5 Gear inches

The values are based on a 50-622 tire, a 55T pulley, and a 28T sprocket.



6.6 Torques

Quick release	Observe the manufacturer's specifications
Thru axle	Observe the manufacturer's specifications
Torque support/axle plate	4 Nm
adapter	35 – 40 Nm
Pulley / sprocket	40 Nm
Brake rotor bolt	6 Nm
Rotary shift on the handlebar	1.5 - 2 Nm
Gear mech/ Switch actuator	3 Nm
Shift cable cover rotary shift	<1 Nm
Housing - Cover	2 Nm
axle plate	4 Nm
cable pulley shift box	1 – 2 Nm
Bowden cable housing cover	hand-tight

6.7 Permissible primary ratio

To protect the 3X3 SIX gear hub from overload, the primary gear ratio must be selected so that the maximum input torque of 160 Nm is not exceeded.



NOTE!

Contact our service department for primary ratio recommendations (service@3x3.bike).

6.8 Wheel building

Wheels should always be assembled by a specialist in compliance with all technical specifications.

Number of spokes	32 or 36 hole
Preferred lacing pattern	24-29": two-cross with 12 mm nipples 12-18"; one-cross with 12 mm nipples
Recommended spokes/nipples/rims	Spokes: > Sapim Strong ED 2.34-2.0 > DT Swiss DT Alpine II Spoke nipples: > Sapim Polyax Secure Lock > DT Swiss DT PRO HEAD Rims: > Ryde Andra 40 > Ryde Andra 29 > DT Swiss U 623 > DT Swiss U 663
Hub flange distance	Distance flange left: > 135 mm installation width: 26.9 mm > 142 mm installation width: 26.9 mm > 148 mm installation width: 29.9 mm Distance flange right: > 135 mm installation width: 26.9 mm > 142 mm installation width: 26.9 mm > 148 mm installation width: 23.9 mm
Hub flange diameter	134 mm (left and right)
Spoke hole diameter	2.8 mm
Hub flange width	In the center of a spoke hole: 4 mm
Maximum spoke tension	1500 N

All hub dimensions for calculating the spokes can be found under "6.3 Dimensions" on page 26.

We recommend using the lacing adapters for lacing the wheel (see "3.6 Lacing adapter" on page 12).

Spoke lengths can be calculated using the following tools:

- > <https://www.sapim.be/spoke-calculator>
- > <https://whizz-wheels.de/speichenrechner>
- > <https://spokes-calculator.dtswiss.com>

We recommend the following specialist companies for wheel building:

SES Sandmann Spare Parts Service e.K.

<https://ses-sandmann.de/>

Rehbecke 1

58091 Hagen/Germany

WHIZZ-WHEELS

<https://whizz-wheels.de/>

Hegnerweg 17

71101 Schönaich/Germany

Roland Werk GmbH

<https://roland-werk.de/>

Industriestr. 16

49681 Garrel/Germany

Ginkgo Veloteile, Leupold and Söhnchen GbR

<https://shop.ginkgo-veloteile.de/>

Creidlitzer Straße 47

96450 Coburg/Germany

Atasoy GmbH

<https://www.laufradtechnik.de/>

Werner-von-Siemens-Str.22

76694 Forst/Germany

Ralf Schneider Production and assembly

<https://www.produktion-montage.de/>

Breitscheidstr. 4

02625 Bautzen/Germany

VPL Vapor Propulsion Labs LLC

www.vpl.bike

397 Clark Ave, Unit C

Paonia, CO 81428/United States

7. Activities before the ride and care

The 3X3 gear hub is protected from dirt and water by a special sealing concept and is low maintenance. Care and maintenance work is therefore mainly limited to the chain / belt and the associated tensioner, the gear mech, brake disk and shift cables.

The intervals at which care and maintenance work becomes necessary on the 3X3 gear hub itself depend greatly on the frequency of use and the effects of the weather. The more extreme the conditions under which the gear hub is used (water, dirt, kilometers driven, etc.), the more frequently care and maintenance work is also required here.

7.1 Activities before the ride

The following table shows the specific activities that must be performed before the first ride or before each ride. In addition, please note the activities that affect your bike.

Activity	Before your first ride	Before each ride
Check all screws for tightness and tighten to specific torque if necessary.	X	
Clean the hub (see "7.2 Cleaning").	X	
Check that the brake rotor is free of oil and dirt.	X	X
Check the proper function of the brake.	X	X
Check the tight fit of the quick release / thru axle.	X	X
Verify the tight fit of the shift box.	X	X
Check if all gears can be shifted.	X	
Check the attachment of the shift cables and cable housings.	X	
Check the chain / belt for wear.		X

7.2 Cleaning

The 3X3 gear hub is protected against moisture penetration according to the latest standards. However, it is strongly discouraged to clean the bike with a pressure washer. Aggressive cleaners can also cause damage to the hub. Use qualified bicycle cleaners for cleaning and follow the cleaner's application instructions.

Be careful with the disc brake! Contaminants on the brake system, including cleaning agents, can massively impair braking behavior.

7.3 Lubrication

The 3X3 gear hub is factory filled with a high performance grease.

The sealing surfaces must be regreased when servicing the sprocket/pulley and gear mech.

7.4 Regular checks

The following checks should be performed at regular intervals:

Activity	Interval
Check all screws for tightness and tighten to specific torque if necessary.	monthly
Check the housing screws for tightness. If they have loosened, tighten them crosswise with 2 Nm.	monthly
Clean the hub (see "7.2 Cleaning").	as needed
Check the fastening of the shift cables and shift sleeves.	monthly
Check the brake disc for wear. The wear limit is indicated on the brake rotor. Replace the brake rotor if necessary (see „8.3 Replacing brake rotor“ on page 32).	3 months
Check the brake pads for wear. The brake pad specifies the wear limit.	monthly
Check the chain / belt for wear. Refer to the chain or belt manufacturer's specifications.	monthly
Check the pulley for wear. Refer to the chain or belt manufacturer's specifications.	3 months
Check the sprocket for wear. The sprocket is at its wear limit when the teeth show severe wear and are deformed. Replace the sprocket if necessary (see „8.1 Changing the sprocket / pulley“ on page 31).	3 months

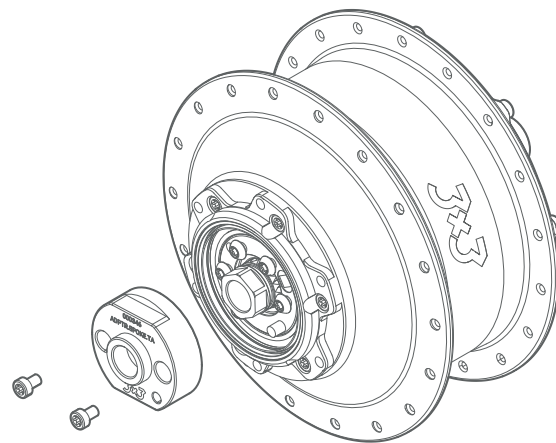
If in doubt, contact the 3X3 service team.

7.5 Mounting the lacing adapter

Required tools and materials	Specifications
lacing adapter	000345 3X3 ADAPTER.SPOKE.QR 000346 3X3 ADAPTER.SPOKE.TA
torque wrench	Effective range 2 Nm

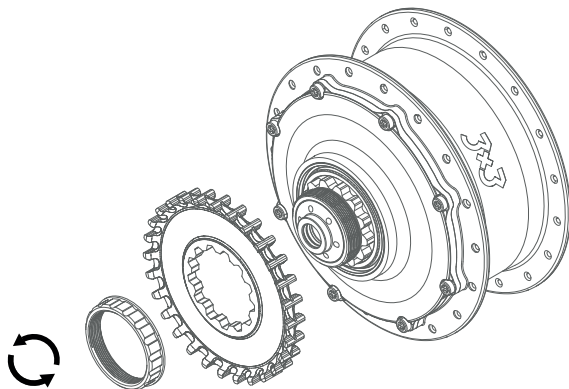
The lacing adapter can be used for various purposes, e.g. for lacing or replacing the adapters.

1. Place the lacing adapter on the main axle and make sure that the torque pin is threaded into the hole provided.
2. Turn the two screws into the main axle and tighten them with a torque of 2 Nm.



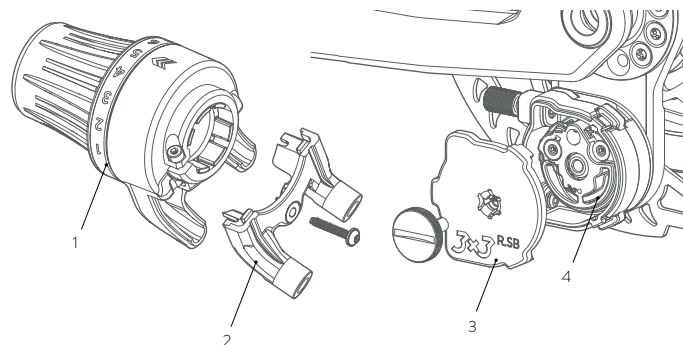
8. Exchanging components

8.1 Changing the sprocket / pulley



1. Clean the sprocket / pulley and the hub shell in the area of the sprocket / pulley.
2. Hold the sprocket in place with a chain whip or the pulley with a belt wrench, and loosen the locking counterclockwise using a BSA bottom bracket wrench.
3. Remove the locking and pull the sprocket or pulley off the toothing.
4. Clean the teeth and thread and check both for damage.
5. Clean and lubricate the sealing on the housing cover.
6. Install the sprocket or pulley (see 5.7 on page 23).

8.2 Replacing the shift cables



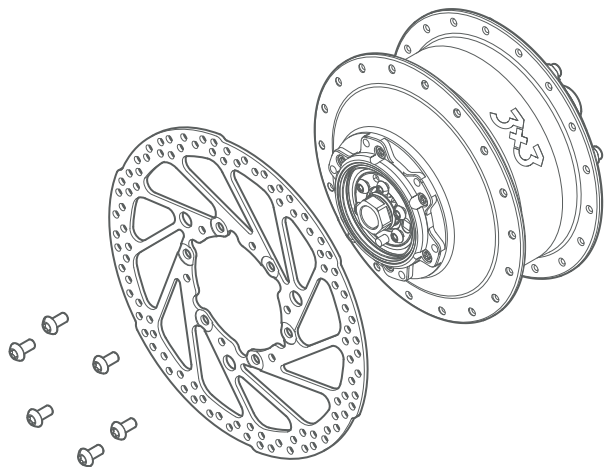
1. Disassemble the cover of the shift box (3), loosen the shift cables in the cable box (4) and remove them.
2. Pull a shift cable out of the cable housing and mark the housing on the rotary shift and the cable box so that the installation of the new shift cables is easier.
3. Unscrew the screw of the housing cover on the rotary shift (1) and remove the housing cover (2).
4. Turn the rotary shift to the second gear. Slide out the head of the shift cable on the right side and remove the gear cable from the rotary shift.



NOTE! Carefully pry the shift cable ends out of their housings using a suitable tool so that you can remove them more easily.

5. Continue turning the twist grip until the shift cable sleeve on the left side becomes visible, and slide the lower shift cable on the left side out of the cable pulley.
6. Install new shift cables on the rotary shift (see 5.3 on page 18) and cable box (see 5.6 on page 21).

8.3 Replacing brake rotor



1. Shift the hub to the first gear.
2. Mark the positioning of the axle plate and, if necessary, the gear mech and the input wheel.
This facilitates the reassembly.
3. Remove the axle plate and the gear mech. See the respective assembly instructions (reverse order for assembly of the respective components).
4. Loosen the fixing screws and disassemble the brake rotor.
5. Mount the brake rotor („5.1 Mounting the brake rotor“ on page 14).
6. Mount the gear mech (see „5.2 Mounting and adjusting the gear mech“ on page 15) and the axle plate (see „5.5 Mounting the axle plate“ on page 20).

8.4 Replacing the gearbox assembly

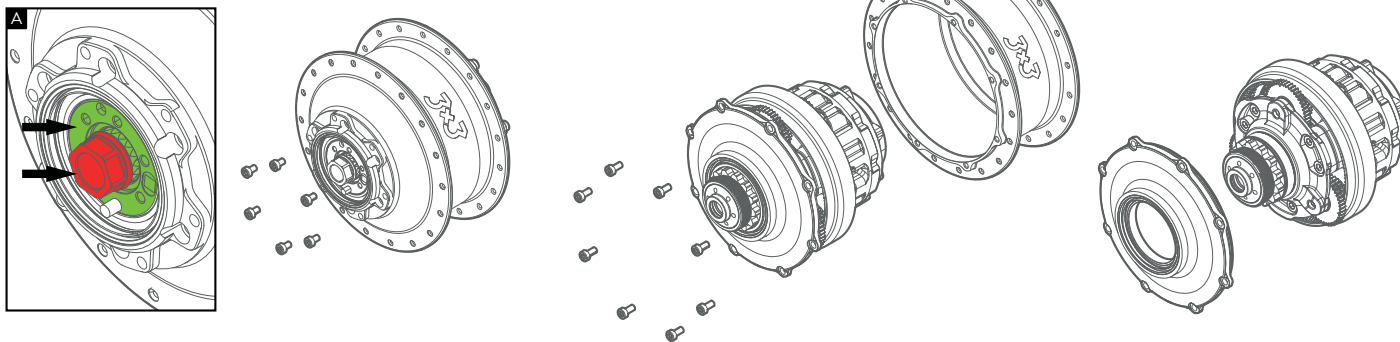
Required tools and materials	Specifications
torque wrench	Effective range 2 Nm
Cleaner	Solvent-free cleaner, e.g. Muc Off
threadlocker medium strength	Loctite 243

Preparations

1. Dismount the sprocket/pulley, see „8.1 Changing the sprocket / pulley“ on page 31.
2. Dismount the gear mech, see „5.2 Mounting and adjusting the gear mech“ on page 15.
3. If necessary Dismount the brake rotor, see „8.3 Replacing brake rotor“ on page 32.
4. Mark the axle plate position, then remove the axle plate.
5. The wheel can remain spoked.

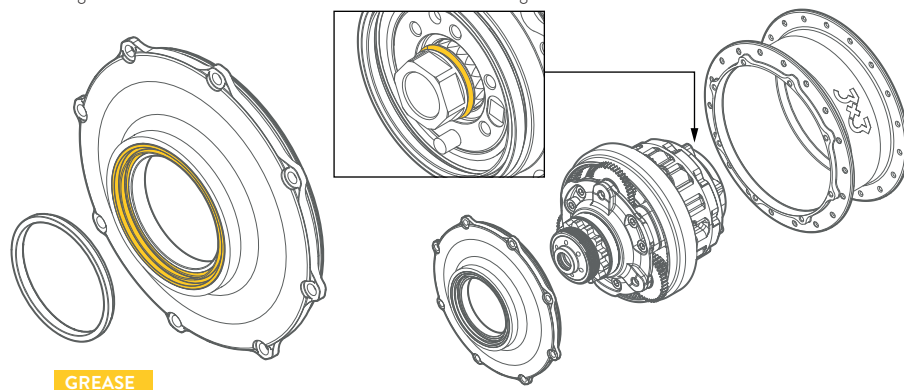
Dismounting the gearbox assembly

1. Loosen and remove the six screws on the housing on the non drive side.
2. Loosen and remove the eight screws from the housing cover.
3. Remove the gearbox assembly from the hub shell by pressing lightly on the main axle (A/ green) in the direction of the cover.
 - = Do not use a hammer or similar.
 - = Do not exert any pressure on the hexagon of the shift drum (A/red).
4. Remove the housing cover from the driver by hand. Avoid tilting the fit in the bearing seat.
5. Remove the rubber ring from the driver. This is reused in the new gearbox.
6. Pack the removed gearbox assembly to protect it from dirt.
7. Check the inside of the housing for dirt and clean it if necessary.
8. Check the sealing rings in the cover and housing for damage.



Fitting the gearbox assembly

1. Take the new gearbox assembly out of the packaging.
2. Scan the QR code on the gearbox assembly and on the hub shell and send the number to service@3x3.bike.
 - = The new combination of hub shell and gearbox assembly is saved in the 3X3 service database.
3. Remove the aluminum ring from the housing cover and clean and grease the seal.
4. Slide the housing cover onto the driver. Push the bearing as far as it will go onto the fit.
5. Grease the O-ring and insert it into the groove of the driver of the new gearbox assembly.
6. Clean the aluminum ring and insert it into the housing cover. The chamfer of the aluminum ring points towards the hub.
7. Insert the gearbox assembly into the housing.
 - = Turn the housing cover so that the holes and threads are on top of each other.
 - = Make sure that the toothing of the output matches the toothing of the housing and that the six threaded holes of the output match the six holes in the housing.
8. Coat the eight M4x8 mm TX20 screws on the cover with medium-strength threadlocker



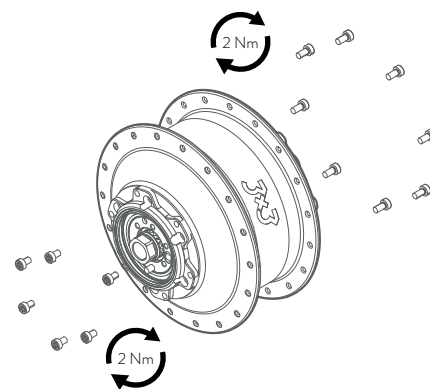
and screw them into the threads on the side of the housing cover.

Check that there is no gap between the bearing and the housing. Tighten the screws crosswise to 2 Nm.

9. Apply medium-strength threadlocker to the six M4x6 mm TX20 screws on the actuator and tighten them in a crisscross pattern on the brake rotor side. Check that the housing cover is fully inserted into the housing. Tighten the screws crosswise with a torque of 2 Nm.

Final steps

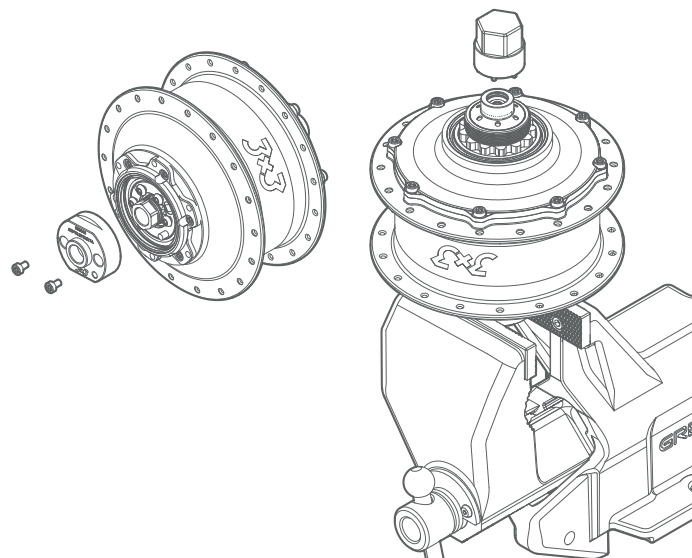
1. Install the sprocket/pulley, see „8.1 Changing the sprocket / pulley“ on page 31.
2. Install the gear mech, see „5.2 Mounting and adjusting the gear mech“ on page 15.
3. Align the axle plate using the previously set markings, then fit the axle plate.
4. If servicing is required, pack the old/defective gearbox assembly, contact the service and return it, quoting the service case number.



8.5 Replacing the adapter

Required tools and materials	Specifications
lacing adapter	000345 3X3 ADAPTER.SPOKE.QR 000346 3X3 ADAPTER.SPOKE.TA
Adapter tool	000358 3X3 ADPTR.TOOL
torque wrench	Effective range 2 Nm / 40 Nm
Grease	3X3 Gear Grease

1. Dismount the actuator, see „5.2 Mounting and adjusting the gear mech“ on page 15.
2. Mark the axle plate position and remove the axle plate.
If you convert from quick release to thru axle, a new axle plate is required.



Dismounting the adapter

1. Place the lacing adapter on the main axle and make sure that the torque pin is threaded into the hole provided.
2. Turn the two screws into the main axle and tighten them with a torque of 2 Nm.
3. Clamp the gearbox/wheel in a vise over the two flattened points so that the drive side is facing upwards.
4. Place the adapter tool on the adapter and unscrew the adapter counterclockwise using a 24 mm socket.

Mounting the adapter

1. Apply some grease to the sealing ring of the new adapter and screw the adapter into the driver by hand using the adapter tool until the sealing ring has completely disappeared into the adapter. Keep turning the driver slightly counterclockwise to prevent the sealing ring from tilting.
2. Tighten the adapter with 40 Nm.
3. Dismount the lacing adapter.

Final steps

1. Install the sprocket/pulley, see „5.7 Mounting the sprocket/ pulley“ on page 23.
 2. Install the gear mech, see „5.2 Mounting and adjusting the gear mech“ on page 15.
- NOTE: Note the position of the gear mech and axle plate.
- NOTE: If you have converted from quick release to thru axle, a new axle plate is required.



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