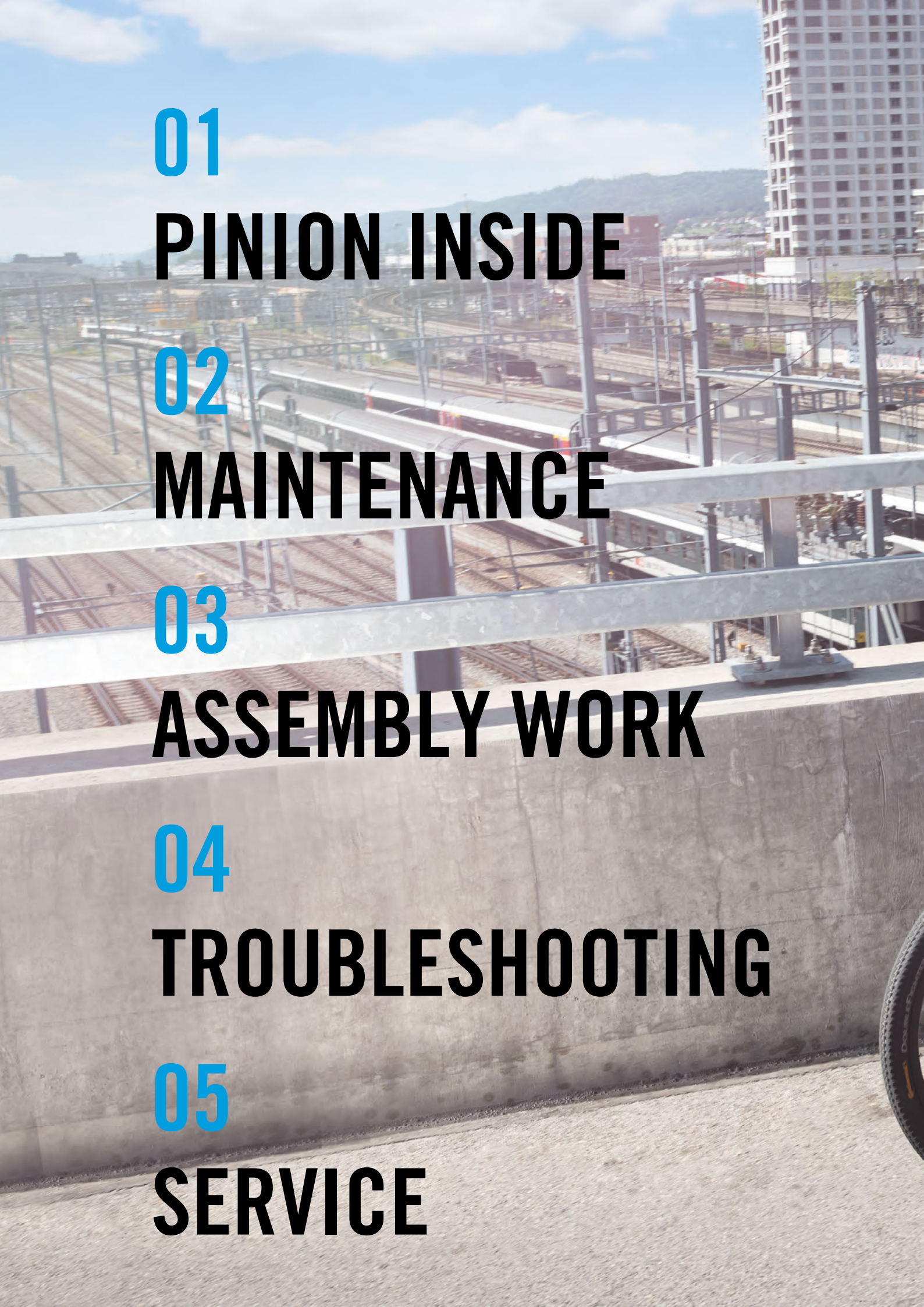
pinion

WORKSHOP MANUAL

TECHTALK GEARBOX TECHNOLOGY 2023.2

P-LINE
C-LINE
SMART.SHIFT
ACCESSORIES



01
PINION INSIDE
02
MAINTENANCE
03
ASSEMBLY WORK
04
TROUBLESHOOTING
05
SERVICE

SUPERIOR CENTRAL GEARBOX CONCEPT

✓ COMPLETELY RELIABLE

Efficient and tested spur gearing modelled after automotive technology.

✓ EXTREMELY LOW MAINTENANCE

An oil change is only due every 10,000 km*. Maintenance-free, the bottom bracket is located inside the gearbox.

✓ SILKY-SMOOTH RUNNING

Consistent efficiency at the highest level. In every gear. In any weather.

✓ 5 YEARS WARRANTY

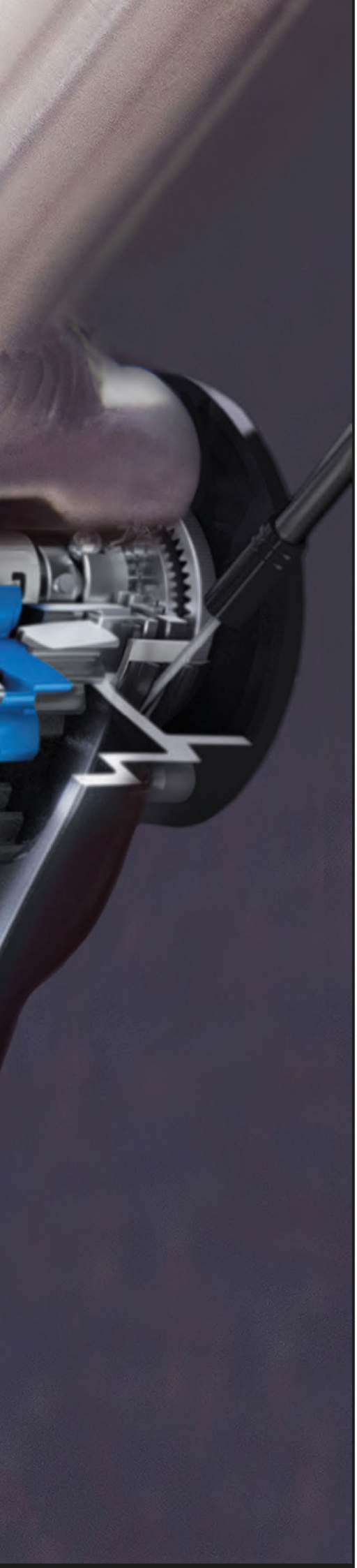
No other gear shift manufacturer can guarantee the function of its gear shifts for longer.

✓ CAREFREE ON THE ROAD

Highest material quality, precise construction and 100% functional testing of each gearbox guarantee long-lasting cycling pleasure.

✓ MADE IN GERMANY

Pinion gearbox technology is available in absolute premium bikes and high-quality everyday bikes. Starting at less than 2,000.00 euros.



GEARBOX TECHNOLOGY

The Pinion gearbox shifting is centrally integrated into the bicycle frame. Thanks to its optimal centre of gravity, it offers incomparably dynamic handling. Five gearbox types differ in number of gears, gear steps and gear range and are perfectly matched in their characteristics to the various areas of application.

Pinion gearbox technology works on the basis of spur gearing with two sub-units connected in sequence. The individual gears are derived by matching the two sub-units with various cog pairings. The steps between gears are evenly spaced and an ergonomically sensible gearbox type is built specific to the area of application.

There are no gear overlaps with Pinion. Poor efficiency or increased chain wear are foreign to Pinion gearbox technology. In addition, we achieve gear ratio ranges of more than 630 percent, so you can select the perfect gear for every situation.

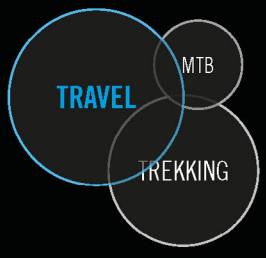
All gears can be shifted through in sequence, individually or in any desired gear jumps. It does not matter whether the bicycle is rolling or stationary. With conventional hub gears, a larger number of components are usually in force application. With Pinion, however, power is only transmitted via two gear pairs. This technical feature ensures a consistently direct and loss-free riding feel in every gear.

Every Pinion gearbox is developed and manufactured in Germany to the highest industry standards and is designed as a durable, wear-free assembly for a service life of well over 60,000 kilometres.

ONE TECHNOLOGY

P-LINIE

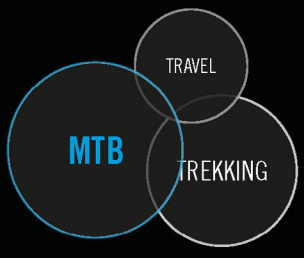
P1.18 P1.12



18 REAL GEARS

636% GEAR RANGE

11.5% EXTRA FINE GEAR STEPS



12 REAL GEARS

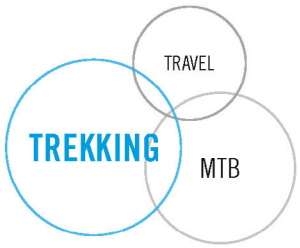
600% GEAR RANGE

17.7% GEAR STEPS

TWO PRODUCT LINES

C-LINIE

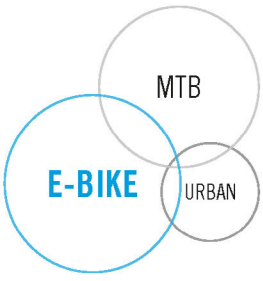
C1.12 C1.9 C1.6



12 REAL GEARS

600% GEAR RANGE

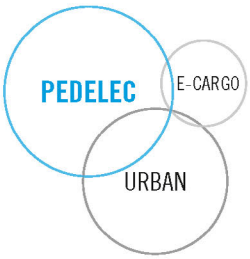
17.7% GEAR STEPS



9 REAL GEARS

568% GEAR RANGE

24.3% GEAR STEPS



6 REAL GEARS

295% GEAR RANGE

24.3% GEAR STEPS

THE PROVEN PINION GEARBOX NOW SHIFTS ELECTRICALLY!

Pinion Smart.Shift brings automotive driving dynamics to the e-bike. Shifting is done at the touch of a button – quickly and intuitively, and while under load! The proven and reliable shifting technology – now electrified, with Pinion Smart.Shift!

SMART.SHIFT GEARBOX

Pinion Smart.Shift gearboxes differ from the P-line and C-line gearboxes in their internal structure. The shifting mechanisms and sensor technology are the main differences. Smart.Shift gearboxes are based on the C-line and are marked with an “i”. (C1.12i, C1.9i, C1.6i).

E-TRIGGER TE1 SHIFT LEVER

The ergonomic TE1 shift lever was specially developed for electric shifting with Pinion Smart.Shift technology. The rubberised button surfaces provide ideal contact points for the thumb and the haptic button tuning ensures precise shifting. Button assignment is fully customizable.

SMART.SHIFT BOX

The Smart.Shift Box controls the electric shifting in the Smart.Shift gearbox. Here, the shifting impulse of the trigger is sent to the gearbox. Pinion Smart.Shift shifts in just 0.2 seconds whether at standstill or at full speed!

SHIFTING 2.0
WORKS AT THE PUSH OF A BUTTON

Electric shifting with Pinion Smart.Shift

PARTS & SERVICE

SERVICE FOR SPECIALIST DEALERS & BICYCLE REPAIR SHOPS

For any questions regarding service, adjustment, assembly and maintenance of Pinion gearboxes, you can find your direct contact person and all important documents in the dealer portal. Operating instructions, service videos and forms are available for download. In addition, Pinion offers attractive dealer training and effective sales support for your success.

YOUR CLIENT NUMBER: _____

YOUR B2B LOGIN E-MAIL: _____

YOUR B2B LOGIN PASSWORD: _____

TECHNICAL SUPPORT

If you have any technical questions about the gearbox, simply contact our Technical Service directly.

+49 (0)711 217491 590
support@pinion.com

INTERNAL SALES

If you would like to consult us about a product or place an order, please contact our sales department directly.

+49 (0)711 217491 500
sales@pinion.com

PINION WEBINAR SERIES

Take advantage of our free offering to get up to date on Pinion products and technical topics related to Pinion gearbox technology!

BASICS
bit.ly/3B4rw7L

MAINTENANCE & CARE
bit.ly/3VGgIVk

TROUBLESHOOTING
bit.ly/3EPYqKo

SPARE PARTS, ACCESSORIES & TOOLS

Genuine Pinion spare parts and tools that are essential for servicing in a bicycle repair shop.

OIL SERVICE KIT (60 ML)

Complete set consisting of 60 ml gear oil, oil syringe, hose, threaded connector for a clean oil change on all Pinion gearboxes.

P8903

ALL-SEASON GEARBOX OIL (1000 ML)

The workshop storage container. Please order the oil service kit with syringe and connector (P8903) separately.

P8901

SPARE PARTS KIT

High-quality plastic box with original screws and spare parts.
(Individual refill kits can be requested via sales@pinion.eu.)

P8903

LOCKRING TOOL SL

For changing chains and sprockets. Can be used with a 1/2" torque spanner, ensuring compatibility with a wide range of common tools.

P8903

TORQUE SPANNER

For shift cable clamps. Adjustable from 0.3 to 1.2 N.

P8903

FITTING SLEEVE PLIERS

For pushing back the fitting sleeves. For easier mounting of the gearbox in the frame.

P8903

ORIGINAL PINION ACCESSORIES
https://pinion.eu/en/accessories/

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WORKSHOP MANUAL

PINION GEARBOX TECHNOLOGY

PINION GEARBOX TECHNOLOGY

EXPLANATION OF SYMBOLS

WARNING

This note warns you about a hazardous situation which could result in death or serious injury if not avoided.

→ ... and also shows you how to avoid the hazardous situation.

CAUTION

This note warns you about a hazardous situation which could result in minor or moderate injury if not avoided.

→ ... and also shows you how to avoid the hazardous situation.

ATTENTION

This note warns you about imminent damage or harm to materials or the environment.

→ ... and also shows you how to avoid the hazardous situation.

IMPORTANT

This note identifies particularly important information and provides you with additional notes and tips.

Operating values

Operating values for bicycles and e-bikes of the trade associations (VDZ, VSF and ZIV) are given as “AW”.

Valid as of 2018

DATA SHEET (P-LINE)

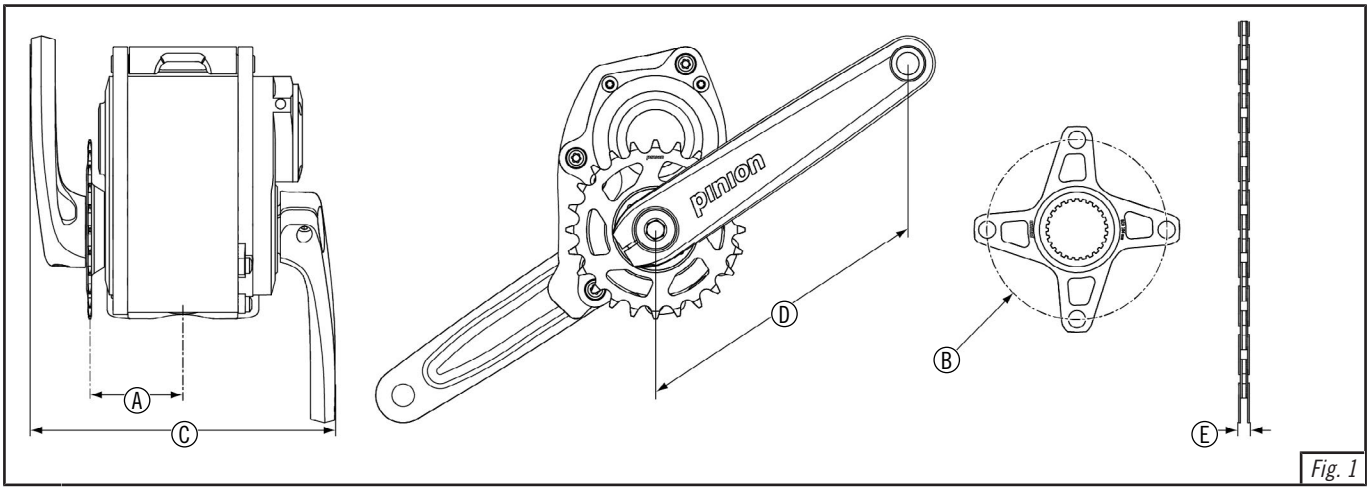

Fig. 1

Gearbox type		P1.18		P1.12	
Chain line (A) – with Pinion sprocket	mm	54*			
Pitch circle Ø (B), Pinion Spider		104			
Q-factor (C) with Forge crank (P8510)		174			
Crank length** (D)		180 / 175 / 170 / 165 / 160 / 155			
Crank axle		Pinion Standard			
Dimension, chain (E)	mm	6.6 – 6.8 (9-speed)			
Gears via rotary shifter		18	12	9	
Gear ratio, total	%	636	600	568	364
Gear steps, constant		~ 11.5	~ 17.7	~ 24.3	~ 17.5
Ratio in 1st gear		1.82			1.30
Ratio in the fastest gear		0.29	0.30	0.32	0.36
Oil volume / type	ml (oz)	60 (2.0) / Pinion			
Input torque max.	Nm (lbf·in)	250 (2213)			
Rider weight max.***	kg (lb)	110 (243)			

* When using the Pinion Spider, the chain or belt line results from the stop surface (56 mm) of the Spider and the dimension or geometry of the chain ring or belt sprocket used - e.g.: 56 mm + ½ t = 58 mm chain line (for symmetrical chain ring with thickness t = 4 mm).

** Optional

*** Rider + backpack or similar gear

DEVELOPMENT DIAGRAM P1.18.

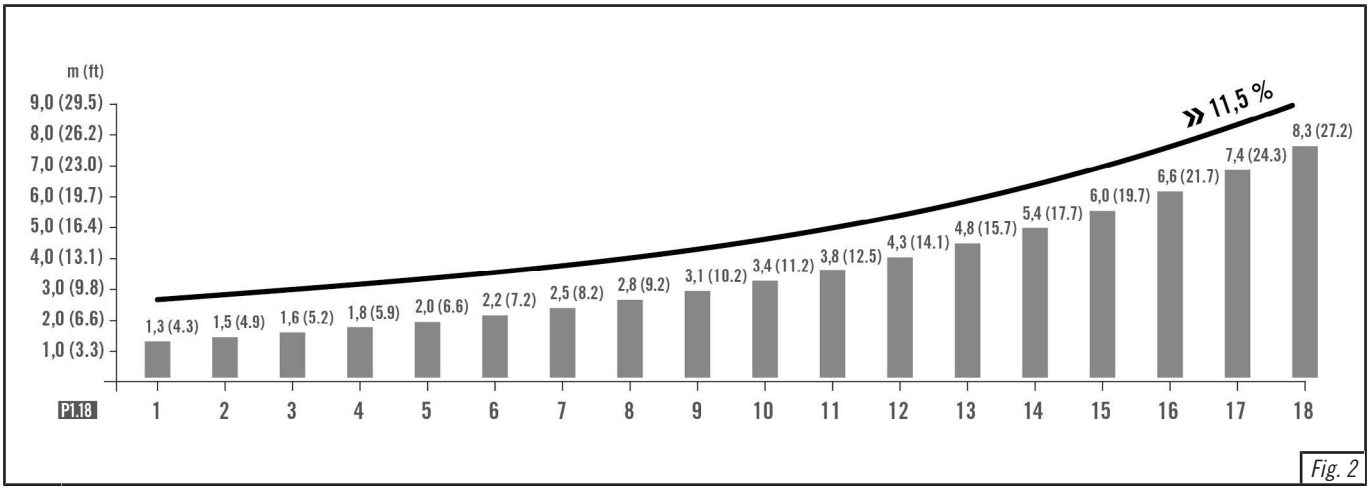

Fig. 2

TIGHTENING TORQUES (P-LINE)

	Tightening torque in Nm (lbf in) max.	
Gearbox retaining screws	10 (89)	with threadlocker, medium-strength
Central crank screws	10 (89)	dry
Crank clamp screws	10 (89)	with SCHNORR® lock washer, dry
Sprocket lockring	40 (354)	dry
Shift box cover housing screws	1.5 (13)	dry
Rotary shifter housing clamping screw	2 (18)	dry
Rotary shifter cover housing screw	0.4 (4)	dry
Shift cable clamping screws	0.4 (4)	dry
Oil drain plug	3 (27)	dry
Pinion chain tensioner retaining screws	4 (35)	dry
Pulley retaining screws	2 (18)	dry

IMPORTANT

Development

The specified values in m (ft) per crank revolution correspond to the recommended ratio for sprocket (rear): chain ring (front) 26: 30 = 0.866.
The calculation is based on the tyre size of 28×1.4 (37-622).

A convenient programme for calculating your individual ratio as well as the development values of other types of Pinion gearboxes can be found at https://pinion.eu.

DATA SHEET (P-LINE)

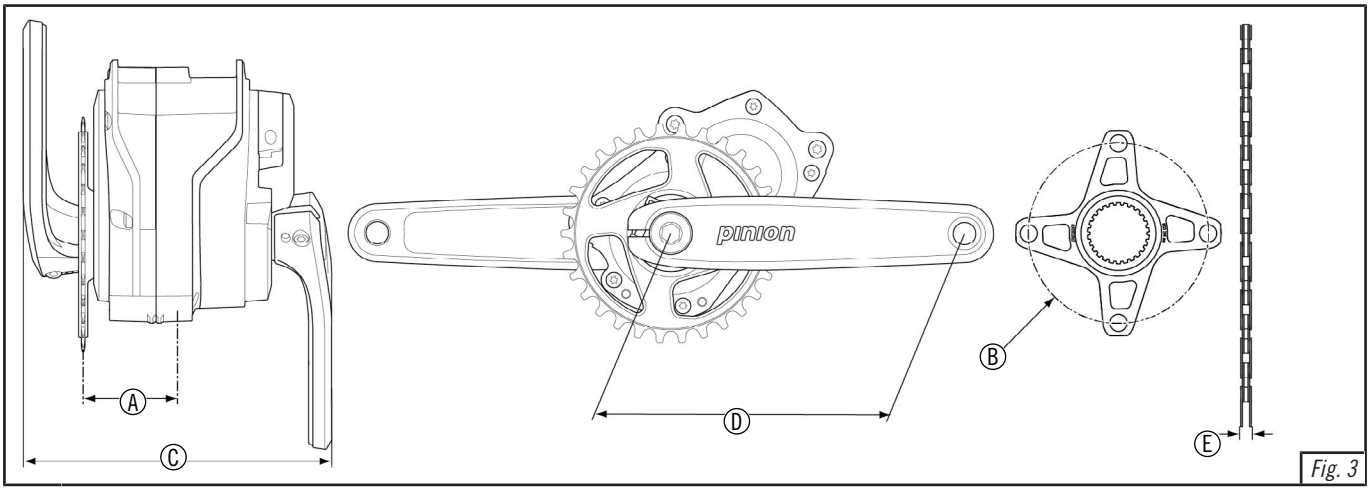

Fig. 3

Gearbox type		C1.12 / C^{i}1.12	C1.9 / C^{i}1.9	C1.6 / C^{i}1.6
Chain line (A) – with Pinion sprocket	mm	50*		
Pitch circle Ø (B), Pinion Spider		104		
Q-factor (C) with the Forge crank (P8510)		166		
Crank length** (D)		180 / 175 / 170 / 165 / 160 / 155		
Crank axle		Pinion Standard		
Dimension, chain (E)	mm	6.6 – 6.8 (9-speed)		
Gears via rotary shifter		12	9	6
Gear ratio, total	%	600	568	295
Gear steps, constant		~ 17.7	~ 24.3	
Ratio in 1st gear		1.82		0.95
Ratio in the fastest gear		0.30	0.32	
Oil volume / type	ml (oz)	60 (2.0) / Pinion		
Input torque max.	Nm (lbf·in)	250 (2213)		
Rider weight max.***	kg (lb)	110 (243)		

* When using the Pinion Spider, the chain or belt line results from the stop surface (52 mm) of the spider and the dimension or geometry of the chain ring or belt sprocket used - e.g.: 52 mm + ½ t = 54 mm chain line (for symmetrical chain ring with thickness t = 4 mm).

** Optional

*** Rider + backpack or similar gear

IMPORTANT

C^{i} Smart.Shift gearbox

C^{i} gearboxes are equipped with a modified shift mechanism and magnets for the sensor system of the Smart.Shift-Box.

C^{i} gearboxes can only be shifted with Smart.Shift and ‘standard’ C gearboxes can only be controlled with a mechanical rotary shifter.

DEVELOPMENT DIAGRAM C1.12

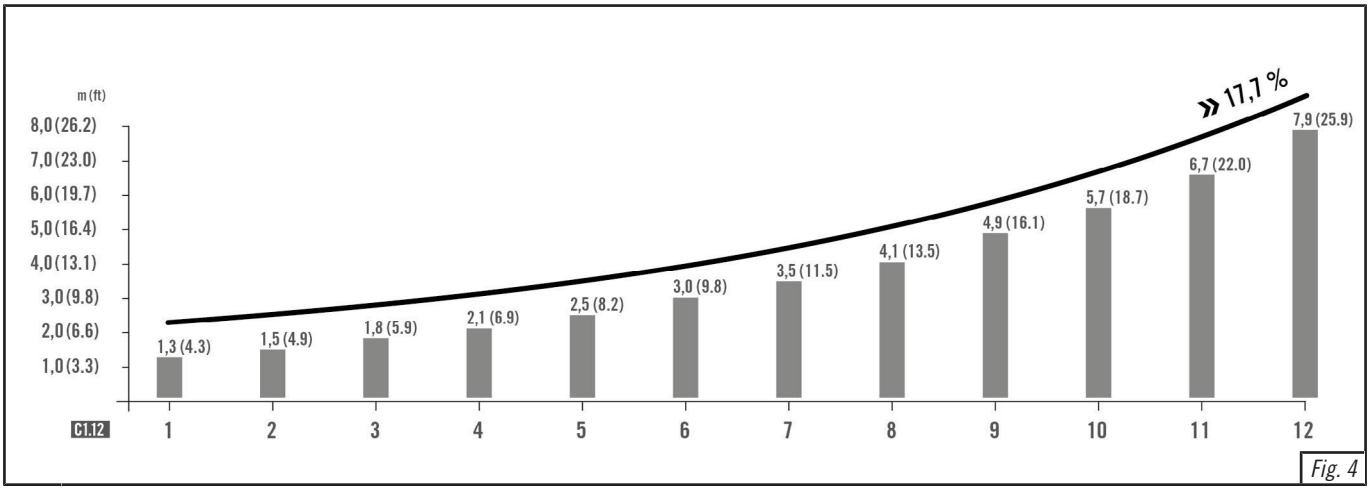

Fig. 4

TIGHTENING TORQUES (C-LINE)

	Tightening torque in Nm (lbf in) max.	
Gearbox retaining screws	10 (89)	with threadlocker, medium-strength
Central crank screws	10 (89)	dry
Crank clamp screws	10 (89)	with SCHNORR® lock washer, dry
Sprocket lockring	40 (354)	dry
Shift box retaining screws	1.5 (13)	dry
Rotary shifter housing clamping screw	2 (18)	dry
Rotary shifter cover housing screw	0.4 (4)	dry
Shift cable clamping screws	0.4 (4)	dry
Oil drain plugs	3 (27)	dry
Pinion chain tensioner retaining screws	4 (35)	dry
Pulley retaining screws	2 (18)	dry
Smart.Shift box for C^{i} gearboxes	2 (18)	with SCHNORR® lock washer, dry
Trigger TE1	3 (27)	dry

IMPORTANT

Development

The specified values in m (ft) per crank revolution correspond to the recommended ratio for sprocket (rear): chain ring (front) 26: 30 = 0.866.
The calculation is based on the tyre size of 28×1.4 (37-622).

A convenient programme for calculating your individual ratio as well as the development values of other types of Pinion gearboxes can be found at https://pinion.eu.

GEARBOX LINE FEATURES IN COMPARISON

	C-line	C^{i}-Line	P-line
Colours	Anthracite metallic		9 anodised colours
Underlying technology	Spur gearing technology		
Housing	Magnesium die casting		Milled aluminium
Frame connection	Pinion Standard		
Control	Rotary handle	E-trigger (Smart.Shift)	Rotary handle
Shift cable connection	3 angle/s	1 angle/s	
Mounting of chain rings - Spider	Pinion Standard		
Chain line	50 mm		54 mm
Max. input torque	250 Nm		
Max. rider weight[1]	110 kg		
Efficiency[2]	> 96%		
Crank axle	Pinion Standard		
Q-factor[3]	166 mm		174 mm
I-factor[4]	140 mm		148 mm
Oil volume	60 ml Pinion gearbox oil[5]		
Oil plugs	2		1
Temperature range	-20°C to +40° C		
Service	Every 10,000 km		

GEARBOX TYPES FEATURES IN COMPARISON

	C1.12(i)	C1.9(i)	C1.6(i)	P1.18	P1.12
Number of gears	12	9	6	18	12
Total gear ratio	600%	568%	295%	636%	600%
Gear steps	17.7%	24.3%	24.3%	11.5%	17.7%
Gear ratio in the lowest gear	1.82	1.82	0.95	1.82	1.82
Gear ratio in the fastest gear	0.30	0.32	0.32	0.29	0.30
Gear weight [6]	2100 g	2000 g	1800 g	2700 g	2350 g

[1] Maximum permissible rider weight including gear being worn.

[2] Efficiency with the gearbox run in. Measured at 60 rpm and 300 W input power.

[3] Distance between the outer sides of the crank arms (P8510) at the level of the crank eyelets.

[4] Distance between the inner sides of the crank arms (P8510) at the level of the crank eyelets.

[5] Fully synthetic oil.

[6] Weight incl. sprocket Z24.

PINION GEARBOX GEAR RANGES

Overview of all Pinion gearboxes. The blue bar shows the gear range of the respective gearbox type. The white lines in the blue bar show how large the gear jumps of the corresponding gearbox are.

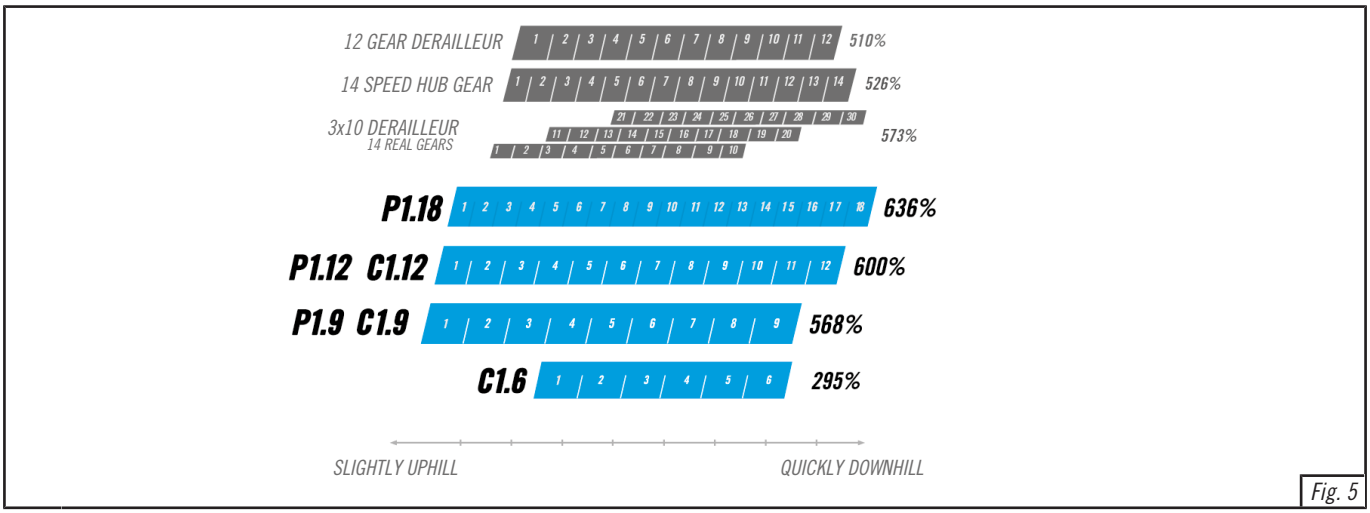

Fig. 5

ADJUSTING THE RATIO

The basic ratio, which the gearbox provides by selecting the gearbox type with 18, 12, 9 or 6 gears, can be individually adapted to the gear ratio range on the secondary drive. A selection of different chain rings or belt sprockets is available for this purpose. More information can be found at: https://pinion.eu/en/accessories/.

A ratio calculator is available at https://pinion.eu/en/p-line-calculator/.

Take a look at this example to see how the ratio can be adapted to individual factors.

The table shows the effect of changing the secondary ratio. This is based on the assumption of a touring bicycle with a 28 in wheel size and a total system weight of 150 kg (rider, bicycle and gear).

			
Number of teeth at front: rear	30:30	30:28	30:26
Fastest gear at 90 rpm.	41 km/h	44 km/h	48 km/h
Lowest gear at 90 rpm.	3.6 km/h	3.9 km/h	4.2 km/h
Required power at 20% incline / 120 kg (effort)	242 watt	262 watt	282 watt
EFFORT	**-8%**		**+8%**

PERIPHERAL COMPONENTS

PINION COMPONENTS

All Pinion components are tested for safety, function and durability and are also guaranteed to be compatible with the Pinion gearbox.

WARNING

Risk of accidents due to failing components.

→ Do not modify Pinion components under any circumstances.

→ Always mount and handle Pinion components according to the instructions.

→ Always observe and follow the regulations and instructions in the relevant Pinion user manual.

→ Always use only approved third-party components and observe their own installation instructions.

CRANKS

Only original Pinion cranks are approved for use on the Pinion gearbox.

WARNING

Accident hazard due to unsuitable components.

→ Ensure that there is no possibility of a collision between the crank and the bicycle frame.

→ Always use pedals that have an abutment surface diameter of 18 mm.

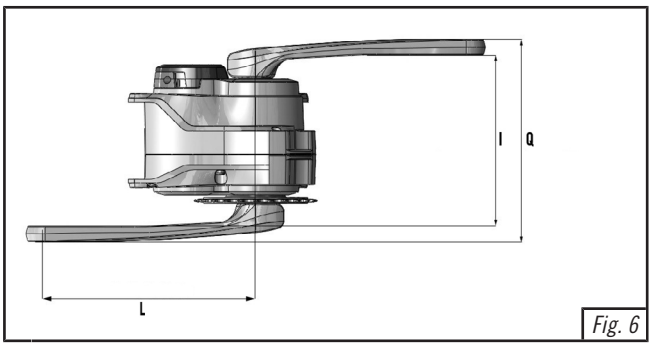

Fig. 6

Item no.	Designation	Crank length L	P-line Q-factor	P-line I-factor	C-line Q-factor	C-line I-factor
P8500–P8505	CNC crankset	155/160/165/170/175/180 mm	174 mm	148 mm	166 mm	140 mm
P8510/P8511	Forge crankset	165/170/175 mm	174 mm	146 mm	166 mm	140 mm
P8530	CNC Fatbike crankset	175 mm	214 mm	187 mm	206 mm	179 mm
P8531/P8532	CNC Boost	175/170 mm	194 mm	168 mm	186 mm	160 mm
P8535	CNC Boost	170 mm	182 mm	156 mm	174 mm	148 mm
P8534	Forged Boost	170 mm	182 mm	156 mm	174 mm	148 mm

SMART.SHIFT

System overview

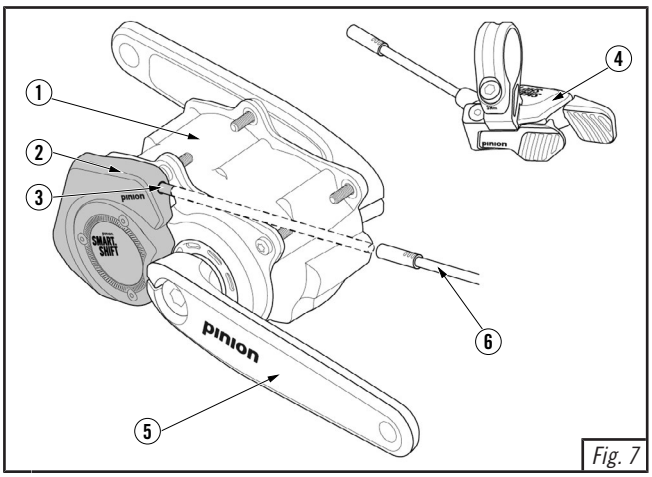

Fig. 7

(1) Smart.Shift gearbox (e.g. C1.12i)
(2) Smart.Shift box
(3) Cable outlet on the Smart.Shift box
(4) E-trigger TE1
(5) Pinion crank with sensor magnet
(6) Wiring harness

Smart.Shift box

For the use of Pinion Smart.Shift technology, special variants of Pinion gearboxes are required. Shifting mechanics and sensor technology are the main differences. All gearboxes compatible with Smart.Shift are marked with “i” on the series label (C1.12^{i}, C1.9^{i}, C1.6^{i}).

The shifting principle

→ Briefly pressing one of the two shift levers immediately triggers the gear shift.

→ Pressing several times in succession triggers the change of several gears in a row.

→ The gear shift is carried out when the cranks reach the vertical position in the pedalling motion.
This targeted shifting in the not so heavily loaded crank positions is only activated above a certain pedalling frequency.

→ At lower pedalling frequencies, the system switches immediately.

→ Safe and energy-saving starting is very important, especially with e-bikes. Pinion Smart.Shift START.SELECT can be activated via the settings on the e-bike. Here you can set the desired starting gear, which is automatically engaged when the bike stops.

Shifting under load

Pinion Smart.Shift is designed to shift in any situation. When shifting under load, for example when going uphill, riding with a higher pedalling frequency is advantageous.

→ The system shifts with a high pedalling frequency with the crank in a vertical position. The faster the cranks circulate, the faster the gear shift is performed.

→ Shifting under load may be associated with a popping noise. This is not a cause for concern. The system is designed for shifting under full load and is not damaged.

→ In certain situations, a gear shift may be cancelled due to excessive load (e.g. high pedal load when stationary) to protect the Smart.Shift system from damage. After selecting a new gear, the system will attempt to change gear for 2 seconds. While this is happening, noises from the shift motor may be heard. If sufficient relief is provided within this phase, the gear change is carried out successfully.

→ Due to the system, there is an idle travel of a few degrees after the gear shift in which the cranks offer no resistance. This is not noticeable during normal riding. When shifting under high load, this effect is slightly noticeable.

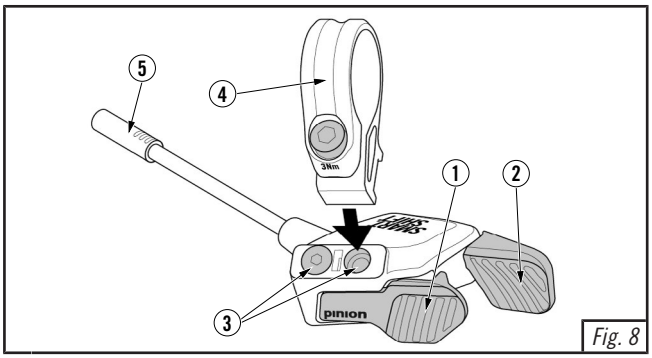

Fig. 8

(1) Front shift lever
(2) Rear shift lever
(3) Screw-on positions and blind screw
(4) Trigger clamp with screw
(5) Plug

E-trigger TE1

Item no.	Designation
P5580	Trigger TE1
P5581	Matchmaker clamp with screw
P6010	Trigger extension cable

The compact Pinion TE1 e-trigger shift lever has been specially developed for shifting with Pinion Smart.Shift shifting technology. The aim is to give you clear switching feedback. With a defined lever movement and sophisticated micro switch tuning, you can initiate every gear shift with noticeable precision. Maintenance-free and waterproof in accordance with IP66, the TE1 is the optimal control in every situation.

Ergonomics

The TE1's rubberised button surfaces offer ideal contact points for the thumb with their texture. The two buttons on the TE1 are designed to ensure a natural circular path for the thumb to reach the touch surfaces. With the clamp, the TE1 can be screwed in 2 positions for different space conditions on the handlebar and for different hand sizes. By rotating the trigger you can adjust the individual reach of the thumb, depending on the riding position and the resulting wrist angle. You can individually set the key assignment.

SPROCKETS AND SPIDER

With the Pinion sprockets with different numbers of teeth or the Pinion Spider with standard single chainring (from 32 T), the secondary gear ratio can be adapted to a variety of requirements.

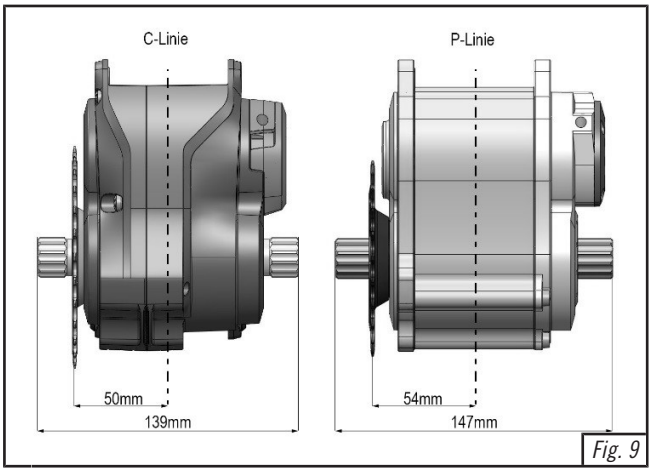

Fig. 9

Gearbox sprockets

Item no.	Designation	Teeth [T]	P-line chain line	C-line chain line	Diameter
P8124	Gearbox chainring [1]	24	54 mm	50 mm	105 mm
P8130		30	54 mm	50 mm	129 mm
P8130L	Longlife gearbox chainring [2]	30	54 mm	50 mm	129 mm
P8132	Gearbox belt pulley	32	56 mm	52 mm	110 mm

[1] Chain with outer width 6.6 to 6.8 mm (9-speed or single-speed)

[2] Chain with outer width max. 8 mm

Spider gearbox

Standard single chainrings can be mounted on the Pinion Spider.

IMPORTANT

The Pinion Spider cannot be used in conjunction with the Pinion chain tensioner.

Item no.	Designation	Pitch circle diameter	Chain line P-Linie	Chain line C-Linie
P8500	Spider gearbox	104 mm, 4-hole	54 mm +½ t [1]	52 mm +½ t [1]
P8105	Spider Fatbike gearbox	104 mm, 4-hole	64.5 mm -½ t [2] 69 mm +½ t [3]	60.5 mm -½ t [2] 65 mm +½ t [3]

[1] t = chainring thickness

[2] Chainring mounted inside

[3] Chainring mounted outside

Sprockets/rear wheel Spider

Standard single chainrings can be mounted on the Pinion Spider.

Item no.	Designation	Teeth [T]	Outer diameter	Pitch circle diameter	Universal spacer set
P8222	Rear wheel chainring [1]	22	98 mm	-	P7958
P8224		24	105 mm		
P8226		26	112 mm		
P8230		30	129 mm		
P8226L	Longlife rear wheel chainring [2]	26	112 mm		
P8230L		30	129 mm		
P8200	Rear wheel Spider			104 mm, 4-hole	P7954 [3] / P7955 [4]
-	Rear wheel belt pulley	See GATES Tech Manual [5]		-	P7956 [3] / P7957 [4]

[1] Chain with outer width 6.6 to 6.8 mm (9-speed or single-speed)

[2] Chain with outer width max. 8 mm

[3] 9-/10-speed freewheel

[4] Single-speed

[5] **Note**: Observe the GATES Guideline in regard to tolerances and installation requirements, for example.

CHAIN TENSIONER

IMPORTANT

Due to the limitation to no more than 30 teeth, the Pinion chain tensioner is not compatible with the Pinion Spider (gearbox).

We recommend mounting the Pinion chain tensioner on bicycles that are not equipped with sliding dropout ends:

→ The correct chain tension is guaranteed.

→ There is compensation for elongation of the chain due to wear.

Depending on the rear triangle, the Pinion chain tensioner is required for full-suspension bikes:

→ There is compensation for differences in length due to compression/decompression.

→ The chain is prevented from falling off during travel over rough surfaces.

Item no.	Designation	Max. chainring capacity	Max. chain elongation capacity	Compatibility
P8552	CT2 chain tensioner	30 teeth	68 mm	Pinion/KMC X1
P8552L	CT2 Longlife chain tensioner	30 teeth	68 mm	Pinion/KMC X101

WARNING

Accident hazard due to failure of chain tensioner resulting from improper use.

→ Equip Pinion gearboxes exclusively with a Pinion chain tensioner.

→ Fit the Pinion chain tensioner only to a Pinion gearbox.

→ Ensure that there is no possibility of collision between the chain tensioner and the bicycle frame or tyre.

→ Ensure that the chain tensioner can exhibit its full tensioning effect.

→ On full-suspension bicycles, always check the chain length, freedom of movement and mobility of the chain tensioner when the rear triangle is fully compressed.

ATTENTION

C-line Screws made of stainless steel cause the gearbox housing to corrode.

→ Use original Pinion screws only.

A special feature are the toothless chain rollers, which provide almost noiseless running of the chain and increase the efficiency of the drive train.

Depending on the installation position of the gearbox, the chain tensioner can be mounted in four different positions.

For assembly work, the chain tensioner can be fixed in place using a hexagonal spanner, for example (see**Fig. 10**).

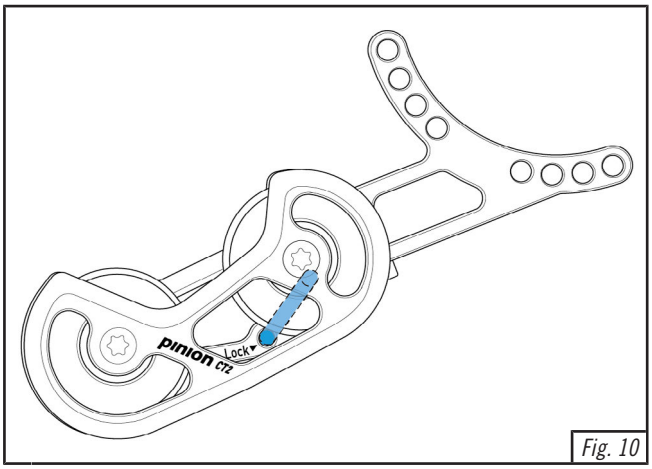

Fig. 10

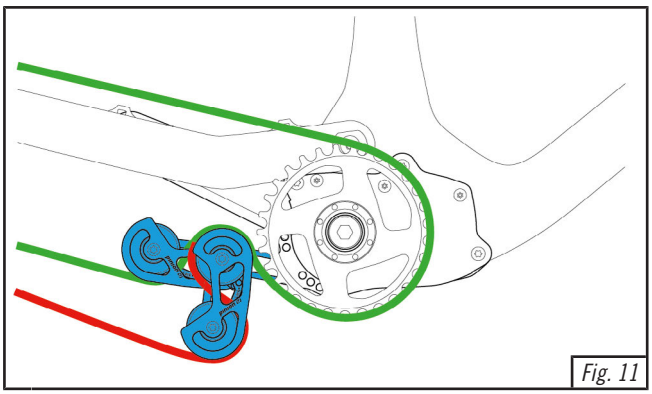

Fig. 11

The chain has the correct length when the tension mechanism of the chain tensioner is pretensioned, but you can still move it further within the scale (see **Fig. 12**). The chain should be chosen so that it is as short as possible.

The chain tensioner should already be pretensioned when the bicycle is extended. Do not overtighten the chain tensioner when the bicycle is fully compressed and keep it as close as possible to the maximum deflection mark.

IMPORTANT

→ Ideal angle 120°

→ Shorter chain better: more pretension, lower inertia

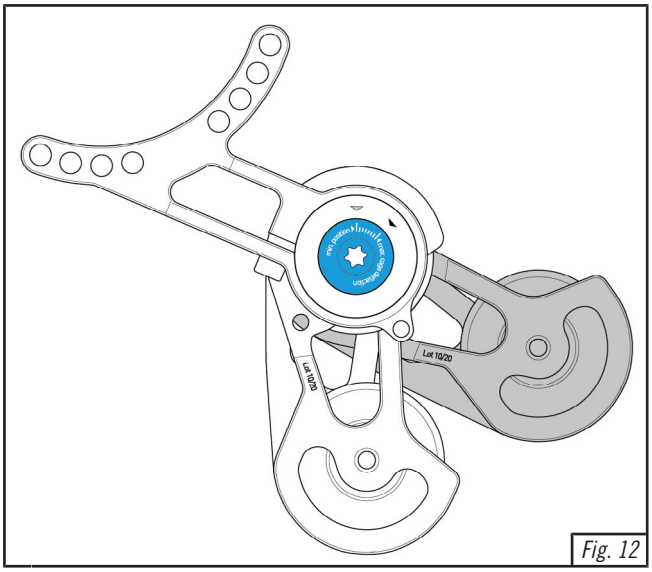

Fig. 12

A scale on the back shows the operating range of the chain tensioner.

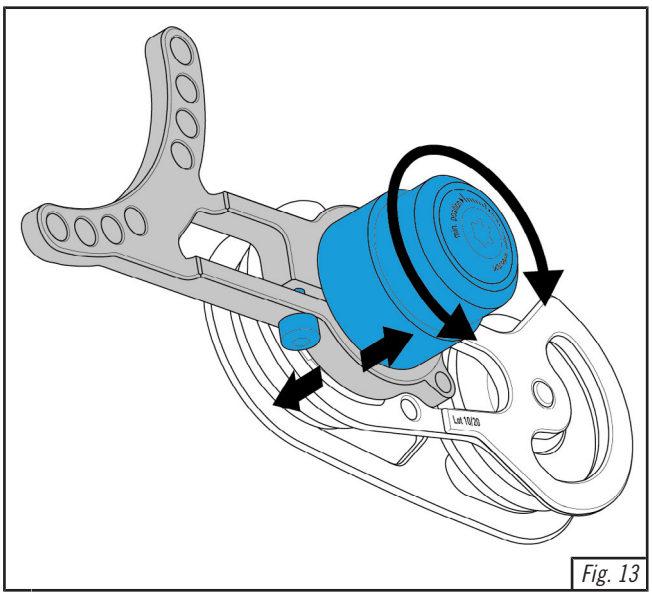

Fig. 13

Using the clamping of the chain tensioner, you can adjust the pretension by turning, and the chain line can be adjusted by shifting.

After adjustment, tighten the clamping screw with 3 Nm.

If you use the Longlife chain X101 (P8540L), you need to replace the chain rollers of the chain tensioner CT2 (classic version).

IMPORTANT

The mounting plate must be installed with the ridge facing inwards.

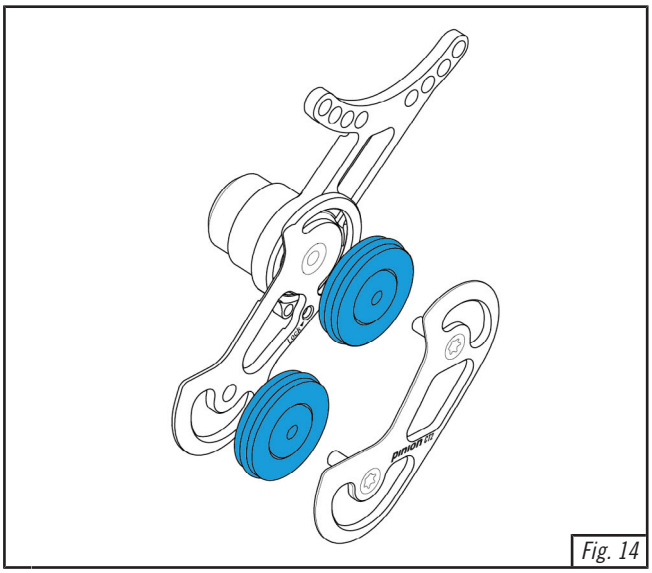

Fig. 14

IMPORTANT

If you want to use Longlife chains, you need to replace the chain rollers.

LongLife chain rollers are marked with 'L'.

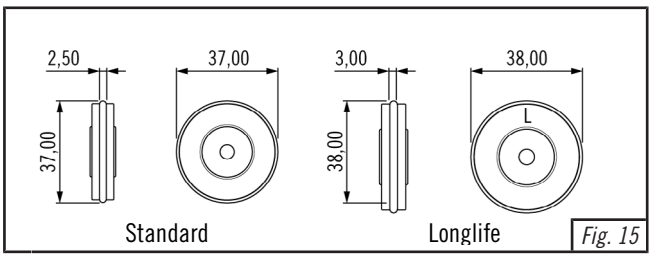

Fig. 15

BELT TENSIONER

Item no.	Designation	Max. belt pulley capacity	Max. belt length capacity	Application range
P8555	BT1 belt tensioner for P-/C-/T-line	39 teeth	23 mm	For rear triangles with suspension
P8558	BT1 belt tensioner for P-C-line	39 teeth	23 mm	For hardtails
P8559	BT1 belt tensioner for Stromer ST7			
P8548	BT1 belt tensioner for Stromer ST2			

WARNING

Accident hazard due to failure of belt tensioner resulting from improper use.

→ Equip Pinion gearboxes exclusively with an original belt tensioner.

→ Fit the Pinion belt tensioner only to a Pinion gearbox.

→ Ensure that there is no possibility of a collision between the belt tensioner and the bicycle frame or tyre.

→ Ensure that the belt tensioner can exhibit its full tensioning effect.

→ On full-suspension bicycles, always check the belt length, freedom of movement and mobility of the chain tensioner when the rear triangle is fully compressed.

ATTENTION

C-line Screws made of stainless steel cause the gearbox housing to corrode.

→ Use original Pinion screws only.

Screw-on positions and settings on the belt tensioner

The belt tensioner can be secured in place for assembly work.

Depending on the installation position of the Pinion gearbox, the belt tensioner can be mounted in five positions (positions 1 to 5). The individual positions rotate the belt tensioner around the belt pulley in 10° steps. For fine-tuning purposes, it is possible to change the belt roller between positions A and B, creating intermediate steps of 5°.

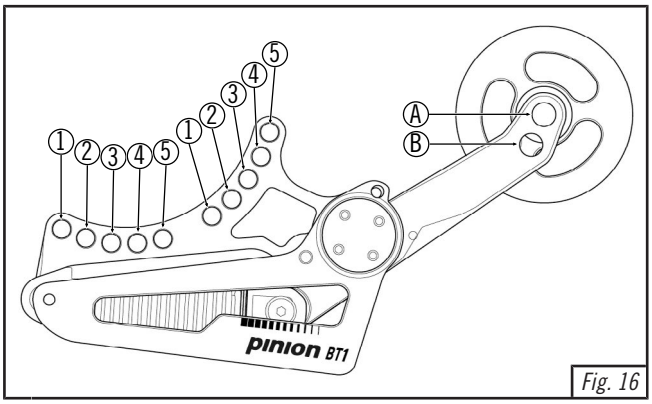

Fig. 16

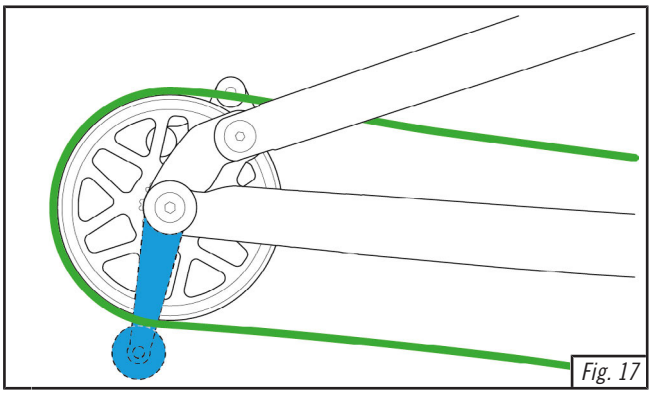

Fig. 17

WARNING

Belts that skip

→ Operate Pinion gearboxes in combination with belt drive only with snubbers.

→ Snubbers can be provided as rollers or fixed guides.

→ Due to impact loads, belts that skip can cause damage to the Pinion gearbox or other components.

IMPORTANT

Position the snubbers close to the running-in point of the belt on the pulley; otherwise, the belt might jam.

System design for rear suspension

Pinion recommends the following procedure for sizing a belt drive on a rear suspension:

Secondary gear transmission ratio

→ Selecting the rear belt pulley according to tyre size and application. The front belt pulley needs to have 39 teeth. Suitable secondary gear transmission ratios can be calculated with the Pinion Calculation Tool, which is available for download from the Pinion OEM portal.

Belt selection (length)

→ The maximum distance (spring-loaded condition) between the front and rear belt blade is crucial for selection of the belt length. The centre distance is used for calculation.

→ The belt length is calculated from (number of teeth rear + 39)/2 + 2/11 x chainstay length (in mm), with the result being the minimum number of teeth the belt needs. Select the next larger belt as required.

Positioning the belt tensioner

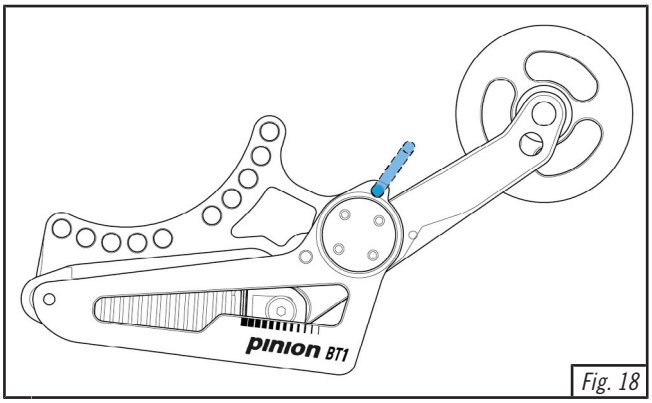

Fig. 18

IMPORTANT

The belt tensioner can be locked with a 3 mm bolt (hexagon socket spanner can also be used) for easier assembly (see **Fig. 18**).

→ Select the position in which the belt tensioner already has approx. 10% pretensioning at the minimum chainstay length (rear suspension uncompressed). Change the position of the belt pulley if necessary.

Checking the belt tensioner operating range

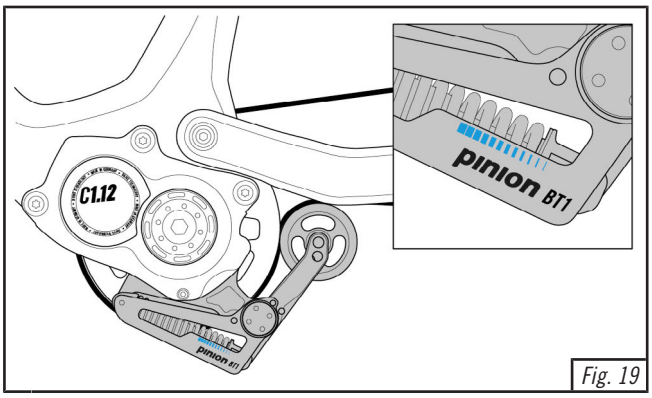

Fig. 19

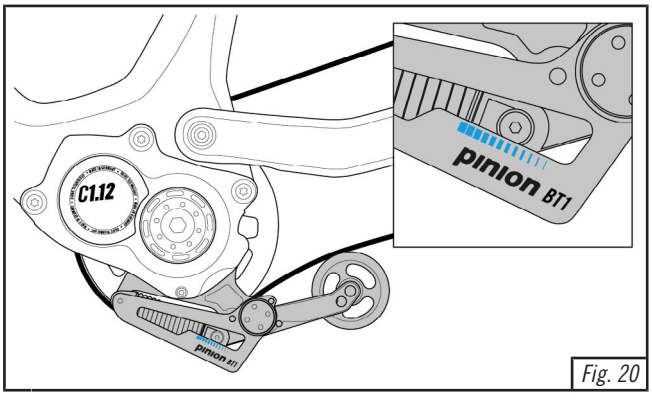

Fig. 20

According to the selection of components made, build a system with a complete rear triangle. The fully extended and compressed state should be checked. It may be necessary to check the condition with the max. and min. extension of the distance from the front to the rear belt pulley.

IMPORTANT

In the slackened state, the belt roller should not rest on the belt pulley.

Ensure that there are no collisions and check the tension state of the belt tensioner. To be in the optimal operating range, the belt tensioner should use the range between 10% (see **Fig. 19**) and 90% (see **Fig. 20**). Using the scale that has been engraved with a laser, you can check the tension state of the belt tensioner over the entire spring travel range. The scale is also included in the CAD data; the check should already be carried out in the CAD design. Adjust the position, belt wheel arrangement, component selection or rear triangle length if necessary.

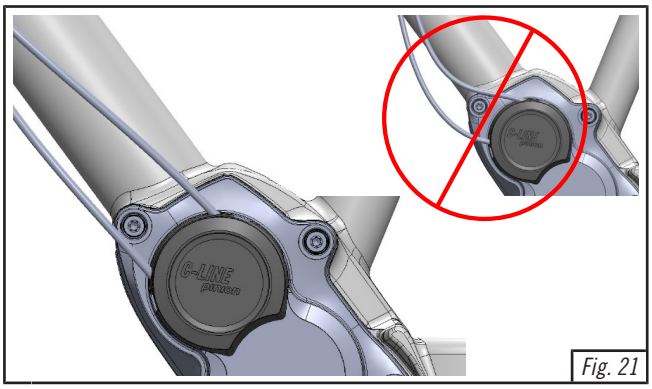

Fig. 21

SHIFTER CABLES AND OUTER SHEATHS

Approved shifter cables:

→ Diameter 1.1 to 1.25 mm, barrel nipple 4.4×4.4 mm.

Approved shifter cable outer sheaths:

→ Diameter 4 mm, outer sheath end caps diameter 5.8 mm, plastic.

ATTENTION

Outer sheath end caps made of metal tend to cause the shifter cables to splay/fan out.

→ Use plastic outer sheath end caps (diameter 5.8 mm).

The shifter cable guide must be designed as follows:

→ Pay attention to the minimum bend radii of the cables. The number of radii does not matter to the cable (see **Fig. 21**).

→ Radii can be laid harmoniously.

→ The steering angle is not affected.

→ Cables and lines cannot be affected or damaged by the steering angle.

→ Compression of the fork or rear triangle is not affected.

→ Cables and lines cannot be impaired or damaged by compression of the fork or rear triangle.

→ Cables and lines are not stuck.

→ Cables and lines do not rub against the gearbox or frame components.

Item no.	Designation	Length	Diameter	Nipples
P8957	Universal shifter cable set	1550 mm	1.1 mm	4.4x4.4 mm

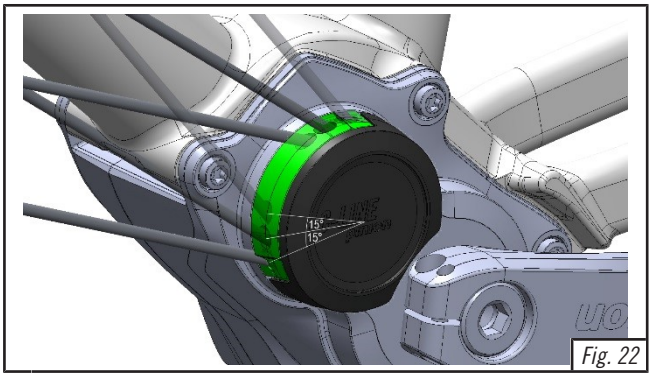

Fig. 22

C-line The shiftbox can be fixed in three different positions on the gearbox. Depending on the installation position and frame geometry, this makes it possible to almost directly control the shiftbox (see **Fig. 22**).

IMPORTANT

Cable gland between bridge and gearbox.

Depending on the positioning and connection of the bridge to the bicycle frame, cables and lines may be routed between the gearbox mount (bridge) and the gearbox.

The Pinion bridge may be modified on the inside of the frame tubes. For example, a hole in the down tube that extends to the inside of the weld seam has little effect on the stability and rigidity of the bicycle frame.

The larger the opening, the easier it is to lay larger cable diameters (such as a brake line or motor cable) between the bridge and gearbox.

C-line There are recesses on the housing that facilitate the feed-through on the non-drive side.

HUBS

IMPORTANT

With the Pinion gearbox, rear wheel hubs with commercially available single-speed 9-spline or 9/10-speed freewheel bodies can be used.

As the gearbox exerts elevated chain forces on the rear wheel hub, we recommend a freewheel body made of steel as well as a freewheel mechanism design that transmits sufficient power and that is sufficiently finely toothed.

For calculation of the applied chain force, the Pinion chain force calculator is available in the OEM CAD package on the OEM portal at https://pinion.eu/en/manufacturer-portal/.

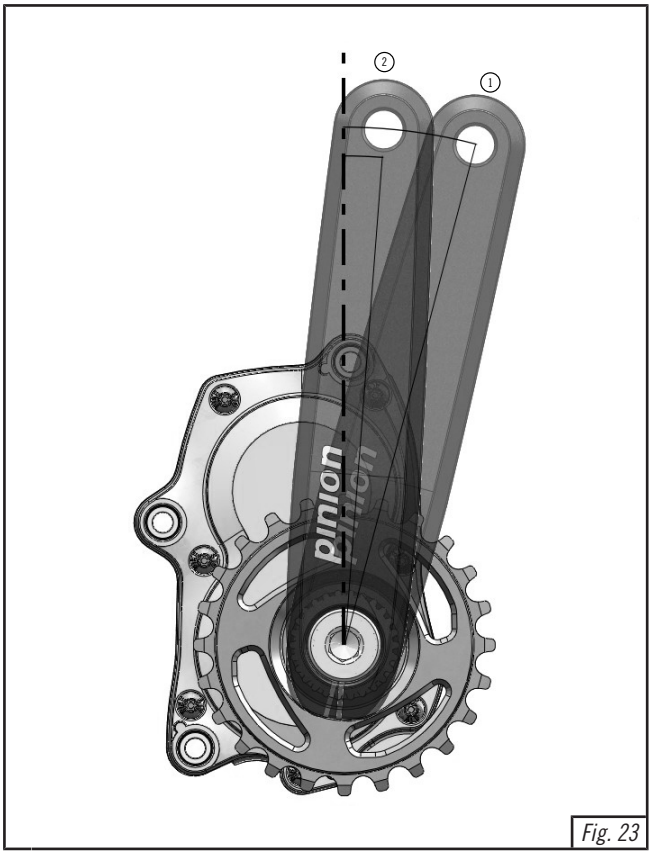

Fig. 23

Within the Pinion gearbox, the design of the pawls allows them to function as freewheels.

To prevent the chain or belt from continuing to turn during travel without movement of the crank (such as on downhill stretches), another freewheel is needed on the rear wheel.

Each freewheel has a certain idle travel until power is transmitted.

The idle travel of the gearbox and rear wheel freewheel add up, and this effect is apparent when starting off. It is also quite clearly noticeable with a coarse-toothed rear wheel freewheel (1).

We therefore strongly recommend the use of a Pinion H3R rear wheel hub (2) in combination with the Pinion gearbox.

WARNING

Accident hazard due to rear wheel slipping when the fixing mechanism fails.

→ Ensure that the quick release skewer in use has closing pressure of at least 4000 N.

→ Use only a thru axle.

Fig. 24

H3R rear wheel hubs

→ Single-speed hub.

→ Wide spoke flange spacing for symmetrically spoked wheels that are particularly robust.

→ Freewheel body made of steel.

→ Optimised for combination with the Pinion gearbox.

→ Approved for all application areas.

Item no.	Designation	Number of spoke holes	Axle system	Installation dimension
P7065	H3R	32	135 mm × 10 mm thru axle	135 mm
P7070	H3R	32	142 mm × 12 mm thru axle	142 mm
P7031	H3R Boost	32	148 mm × 12 mm thru axle	148 mm

Universal spacer set

The Pinion universal spacer set is used for adjusting the chain or belt line on the rear wheel hub.

Item no.	Designation	Freewheel body
P7958	Universal spacer set, Pinion sprocket from 2018, Gates Carbon Drive™	9-/10-speed, single-speed, Boost

THIRD-PARTY COMPONENTS

There are third-party components that are currently offered in combination with a Pinion gearbox. We do not classify all of them as suitable. You therefore need to pay attention to the following characteristics of approved and unapproved components.

Use of third-party peripheral components is always at the user's own risk.

We recommend that you discuss the use of peripheral components with us in advance.

Use of unapproved peripheral components jeopardises your claims in terms of liability for material defects.

APPROVED COMPONENTS

The peripheral components listed below have been tested by us for proper function and compatibility and approved for assembly in combination with a Pinion gearbox.

IMPORTANT

Guidelines and regulations of the providers must be observed and complied with.

Component	Manufacturer – product	Comment
Handlebar	Van Nicolas – Divisible Drop	Separable road bike handlebar. Makes it possible to use the Pinion shifter with a road bike handlebar.
Shift cable outer sheath	Jagwire – LEX	Use the shift cable outer sheath only with a diameter of 4 mm.
	Jagwire – GCX	Preferable to use a shift cable outer sheath for small radii, since inner contour is better supported.
Shift cables	Jagwire – SLS	Only use shift cables with a diameter of 1.1 to 1.25 mm and 4.4×4.4 mm barrel nipples.
Outer sheath end caps	Jagwire	Only use plastic outer sheath end caps (diameter of 5.8 mm).
Pipes / angle pieces	90° pipes – Jagwire	Only with PTFE liners.
Handlebar grips, grip components	GP series, GS series, GA2 – Ergon	Short grip components with or without internal clamping impair safety and ergonomics.
Chains	X1 – Pinion/KMC	Outer width 6.7 mm
Longlife chains	X101 – Pinion/KMC	Outer width 8.0 mm
Toothed belt	Carbon Drive CDX – Gates	
Belt pulleys	Carbon Drive CDX/CDX SL – Gates	
Chainring	-	Single-speed or 1-speed chainring with pitch circle diameter 104 mm, 4-hole
Chainring screws	-	4.5 mm + t (chainring thickness), outer diameter 10 mm
Belt tensioner	GPI – Nicolai	Can only be used on a suitable bicycle frame
	Belt tensioner – Mi-Tech	
Belt/chain guard	Chainbar Gates – Hebie	

Lubricants	Manufacturer – product	Comment
Gear oil	All-season gear oil – Pinion	
Assembly paste	Carbon assembly paste – Dynamic	
	Motorex Anti Seize	
	WEICON Anti-Seize	
Grease	-	Resin-free, soap-based grease (white).

INADMISSIBLE COMPONENTS

The peripheral components listed below are not approved by us for assembly in combination with a Pinion gearbox.

Components intended for mounting on the chain tensioner mount of the gearbox housing or on the screw-on points of the gearbox must be approved by us.

We recommend that you discuss the use of peripheral components with us in advance.

Use of unapproved peripheral components jeopardises your claims in terms of liability for material defects.

Component	Comment
Bashguard	The chain tensioner mount of the gearbox housing is suitable for mounting a bashguard or an underride guard only under certain circumstances. Any bashguard or underride guard to be used in this way must be designed so that forces incurred cannot act on the gearbox housing.
Attachment parts made of stainless steel	C-line attachments made of uncoated steels of any kind should not be installed, as there will otherwise be contact corrosion on the gearbox housing. The same applies to the stainless steel fitting sleeves of the P-line in use until 2017.
Screws	Only use original Pinion screws to attach the gearbox to the gearbox mount and for all other Pinion components (chain tensioner, shiftbox, shift lever, etc.).
Rear wheel hubs	Freewheels with disc freewheels or less than 60 engagement points per revolution are associated with extensive idle travel when used with a Pinion gearbox. Weakly designed freewheels cannot reliably transmit the increased chain forces and will quickly suffer from damage – see **Hubs [▶ 34]**.
Rigid hubs	It is not permitted to use rigid hubs in combination with a Pinion gearbox. To prevent the chain or belt from continuing to turn during travel without movement of the crank (such as on downhill stretches), another freewheel is needed on the rear wheel.
Quick release skewer	A rear wheel quick release skewer with a closing pressure less than 4000 N is not permitted.
Chain tensioner	Only the Pinion chain tensioner can be used on a Pinion gearbox.
Flexible pipes	Use of flexible shift cable outlets increases the required shifting forces and is not permitted.

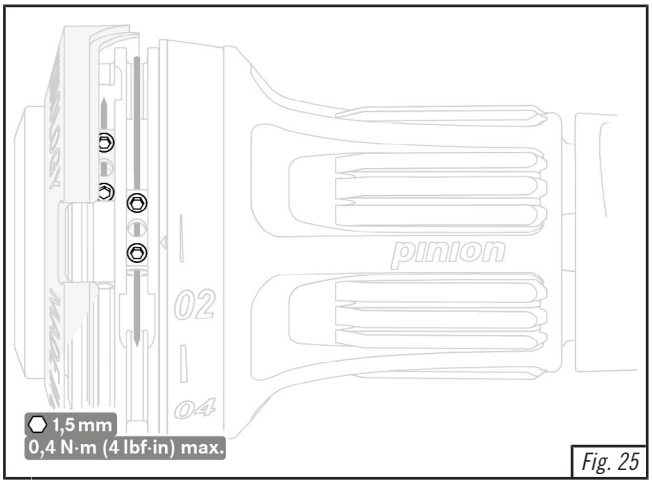

Fig. 25

CORRECT SHIFTING

IMPORTANT

The mark (1) on the fixed part of the rotary shifter shows the selected gear.

It is possible to shift several gears in one go (e.g., from 06 to 02).

It is possible to shift gears while stationary or with the crank at rest or turning backwards, and this contributes to less gearbox wear.

Downshifting (18-17-16- ... -01) under load is possible to a limited extent.

In order to protect the gearbox, shifting will not be carried out as long as the pressure on the crank or pedal is too strong.

A mechanism in the gearbox enables upshifting (01-02- ... -18) under load. This is possible with all gear changes, except when changing gears between the respective sub-units. In this case, the pressure must be taken off the pedal for a short time.

→ When downshifting (18-17-16- ... -01) always reduce the pressure on the pedal.

→ When shifting up in the 18-speed gearbox from 06 to 07 and from 12 to 13, always reduce the pressure on the pedal.

→ When shifting up in 12-speed gearboxes, from 04 to 05 and from 08 to 09, always reduce the pressure on the pedal.

→ When shifting up in 9-speed gearboxes, from 03 to 04 and from 06 to 07, always reduce the pressure on the pedal.

IMPORTANT

You might occasionally feel that your crank “falls through” by about 10° after a gear change; you feel a short jolt caused by a gear that is not engaged immediately. This phenomenon cannot be eliminated, but it does not cause damage to the gearbox.

IMPORTANT INFORMATION

RUNNING-IN

For optimal functioning and smooth shifting, a Pinion gearbox must be run in. The running-in time is around 1000 km, depending on the type of rider also considerably less. Surfaces smooth out on various parts and all components interact ideally with each other. Any roughness present in the drive or when shifting gears is normal when your Pinion gearbox is new and is nothing to be concerned about!

PLAY IN THE ROTARY SHIFTER

Due to the planetary gear installed on the gearbox, the rotary shifter always has about 2 mm of play. To ensure that the planetary gear always functions smoothly, it requires some play between the individual teeth. This play can also be felt in the rotary shifter on the handlebar.

The rotary shifter can be turned approx. 2 mm until resistance is felt from inside the gearbox.

SHIFTING UNDER LOAD

Shifting to slower gears under load can cause noise. This will not cause damage to the gearbox!

IDLE TRAVEL DURING AND AFTER SHIFTING

Due to the principle of the ratchet function, a short freewheel movement occurs under load when shifting into slower gears. This may repeat once after shifting if the pawl is not properly engaged.

DARK OIL COLOURING

The input and output shafts have a protective coating against corrosion. The coating colours the oil dark. This has no influence on the durability of the gearbox.

CLICKING IN HIGHEST GEAR

In the highest gear it is possible to hear a slight clicking noise, e.g., in the assembly stand. This is produced by a pawl that is not completely retracted. This is due to the design and cannot be eliminated.

LEAKAGE

→ At the start of use, the shaft seal ring and the sealing surface must adapt to each other. Initially, there may be oil leakage from the shafts. This should stop after approx. 1000 km.

→ In dusty environments, a light film of oil may be visible on the housing during use.

PLAY ON THE INPUT SHAFT

→ Unlike conventional inner bearings, it is possible for the input shaft of a Pinion gearbox to have slight play.

→ This cannot be ruled out due to the design and is also necessary as the ball bearings are not preloaded.

→ The bearings are very large and robust, they are also lubricated by the oil bath and are therefore very durable.

→ Slight play in the cranks is not an indication of a defect or worn bearing.

pinion

WORKSHOP MANUAL

MAINTENANCE

MAINTENANCE

REQUIRED TOOLS

Please ensure that high quality tools are used for the work to be carried out. Using the P article numbers, you can order special tools directly from Pinion.

	Hexagon socket 1.5 mm	Hexagon socket 2.5 mm	Hexagon socket 3.0 mm	Hexagon socket 4.0 mm	Hexagon socket 5.0 mm	Hexagon socket 10 mm	TORX TX 25	TORX TX 30	Flat-blade screwdriver	Open-end spanner 8 mm	Open-end spanner 10 mm	Open-end spanner 17 mm	Lockring tool P9511	1/2" toggle	Fitting sleeve pliers P9515	Side cutter P9516	Torque wrench P9517	Chain whip P9522	HG puller	Plastic hammer
Oil change P-line		X	X																	
Oil change C-line/C^{i} gearbox		X	X						X											
Maintenance rear wheel hub H2R			X		X	X					X[2]	X[1.2]						X	X	X
P-line gearbox assembly	X	X[1]						X							X					X
C-line/C^{i}-gearbox assembly		X						X	X						X					X
Crank assembly				X		X														
Sprocket assembly													X	X						
Chain tensioner assembly				X			X													
Rotary shifter DS1 assembly		X																		
Rotary shifter DS2 assembly	X	X	X							X[3]						X	X			
Smart.Shift box assembly		X																		
Trigger TE1 assembly				X																

[1] When using X-12 axles | [2] When using T-10 axles | [3] Only when using the **DS1** rotary shifter

CARE AND MAINTENANCE OVERVIEW (C-LINE)

The following maintenance and care work should be carried out on a C-line gearbox at the specified intervals:

	after each trip[1]	every 250 km	every 500 km	every 10,000 km[2]
Clean the gearbox with water, mild detergent and a brush.	X			
Clean the chain/belt, chain ring and sprocket or belt sprockets and, if necessary, the pulleys of the chain tensioner.		X[3]		
Oil the chain lightly.		X[3]		
Check shift cables for tension and ease of movement, adjust or replace if necessary.		X		
Check chain or belt tension, correct if necessary.			X	
Check shift cables, shift cable outer sleeves, chain/belt, chain ring and sprocket or belt sprocket for wear, replace if necessary.			X	
Remove the shift box. Thoroughly clean, preserve and generously grease the universal cable pulley, sliding surface and seat of the shift box on the shift box housing, planetary gears etc.			X	
Check all bolted connections – except the gearbox housing bolts – for tight fit with correct, required tightening torque or tighten them.			X	
Check the pulleys of the chain tensioner for easy running and wear (excessive play, loud running noises) – replace pulleys if necessary.				X
Change the oil.				X

[1] Especially in wet conditions and with road salt | [2] Or 1× a year | [3] Or after each journey in wet conditions and with road salt

CARE AND MAINTENANCE OVERVIEW (P-LINE)

The following maintenance and care work should be carried out on a P-line gearbox at the specified intervals:

	after each trip[1]	every 250 km	every 500 km	every 10,000 km[2]
Clean the gearbox with water, mild detergent and a brush.	X			
Clean the chain/belt, chain ring and sprocket or belt sprockets and, if necessary, the pulleys of the chain tensioner.		X[3]		
Oil the chain lightly.		X[3]		
Check chain or belt tension, correct if necessary.			X	
Check shift cables, shift cable outer sleeves, chain/belt, chain ring and sprocket or belt sprocket for wear, replace if necessary.			X	
Check shift cables for tension and ease of movement, adjust or replace if necessary.			X	
Open the shift box. Thoroughly clean and generously grease the universal cable pulley, sliding surface and the inside of the shift box, the planetary gears etc.			X	
Check all bolted connections – except the gearbox housing bolts – for tight fit with correct, required tightening torque or tighten them.			X	
Check the pulleys of the chain tensioner for easy running and wear (excessive play, loud running noises) – replace pulleys if necessary.				X
Change the oil.				X

[1] Especially in wet conditions and with road salt | [2] Or 1× a year | [3] Or after each journey in wet conditions and with road salt

ANNUAL INSPECTION (11 AW)

The annual inspection should be carried out as part of the annual oil service. Defects are prevented by checking the following points and rectifying possible faults. A recently serviced bicycle can offer just as good a riding experience as a new purchase. Only the specific points concerning Pinion gear shift systems are listed in this description. Further maintenance/inspection work may be necessary, e.g., due to an installed suspension fork. These can be found in the instructions for the corresponding products.

TEST RIDE (1.0 AW)

It is advisable to take a thorough test ride in a quiet environment to get an impression of the shifting behaviour and running of the Pinion gearbox and the bicycle. Pay particular attention to:

→ Possible cracking and creaking noises.

→ Is the rotary shifter easy or hard to move?

→ Does the drive also function under heavy load?

In the event of cracking or creaking noises and faults in the switching behaviour, please refer to chapter 04 Troubleshooting.

VISUAL INSPECTION (1.0 AW)

During the visual inspection, the entire bicycle and its care/maintenance condition should be considered first. Check the following:

→ Is there obvious damage, e.g., damage to the housing or cranks?

→ Are the shift cables kinked?

→ Is the belt sprocket/sprocket loose?

→ Is the belt/chain correctly tensioned?

CHECKING THE SHIFT CABLES (1.0 AW)

Check the shift cables for damage, e.g., broken strands. Shift once from first to last gear to inspect as much as possible of the shift cable on both the rotary shifter and the gear cable pulley. If a strand of the shift cable is torn (see **Fig. 28**), the shifter cable sleeves should also be replaced. Avoid metal switching sleeve end caps, these can lead to premature wear.

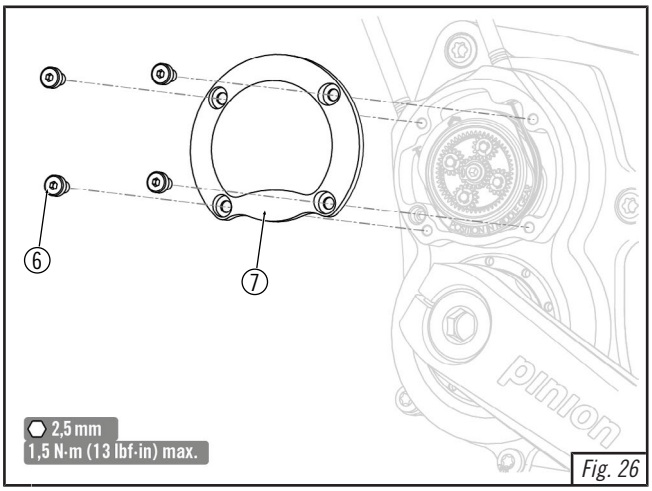

Fig. 26

→ Unscrew the housing screws (6) of the shift box cover (7).

→ Remove the shift box cover.

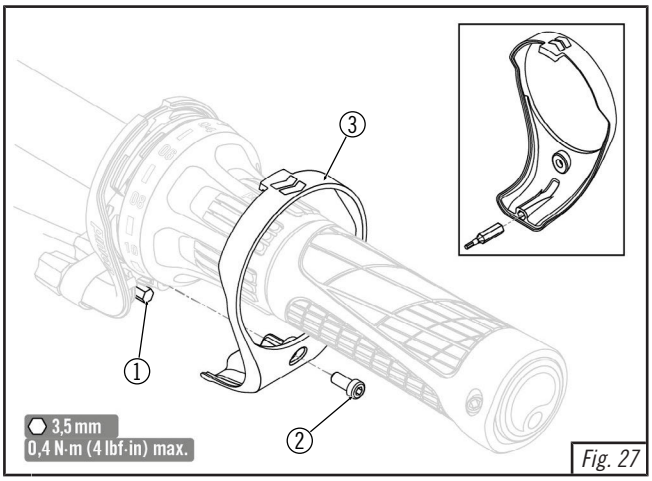

Fig. 27

→ Unscrew the housing screw (2) of the rotary shifter cover (3).

→ Unhook the rotary shifter cover at the top and remove it.

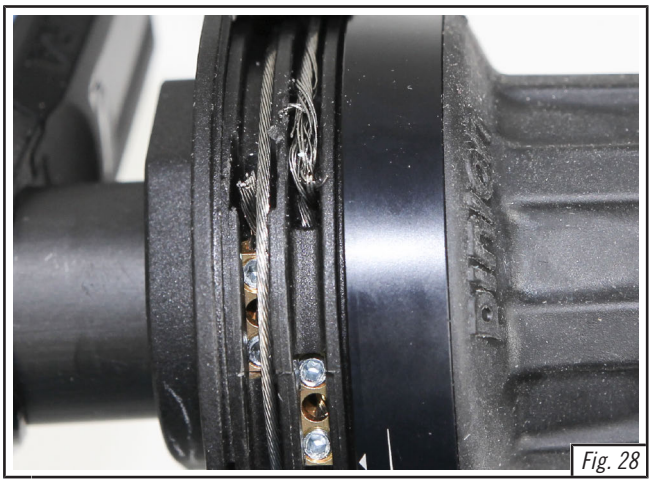
Fig. 28

Defective shift cable.

CHECKING THE TIGHTENING TORQUES (2.5 AW)

Check all components for tight fit and check all fastening screws for correct tightening torque. For the tightening torques, refer to the table in the data sheet of the gearbox. Dismantle the cranks and mount them on the shaft at a 90° angle compared to before. Please observe the assembly instructions on p. 47. With the right crank removed, it is a good idea to check the tightening torque of the lock ring.

CHECKING THE SECONDARY DRIVE (1.0 AW)

The secondary drive can be a chain and chain rings or a belt with belt sprocket on a bicycle equipped with a Pinion gearbox. If the secondary drive is worn, an interrupted frictional connection can occur under high load. Likewise, insufficient pretension can cause the chain or belt to skip under high load.

CHAIN DRIVE

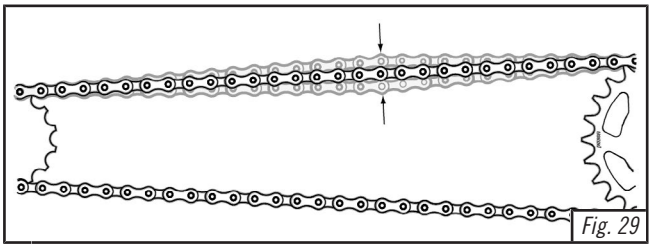
Fig. 29

Checking the chain rings for wear:

Are the chain rings in a so-called 'shark tooth' shape? The sprocket and chain always wear each other out during operation. If only one of these components is replaced, it is possible that the drive will no longer function faultlessly.

We recommend replacing front/rear chain rings and chain together at the same time, as soon as the first component requires it.

Checking the chain tension and chain line:

The correct length of the bicycle chain or toothed belt depends on various factors:

→ Number of teeth of sprocket and chain ring or belt sprocket – after a replacement, it may be necessary to determine the correct length of the bicycle chain or toothed belt again.

→ Suspension travel and design of the rear suspension of your bicycle frame – follow the manufacturer's instructions.

→ Type of chain tensioner or tensioning system used (horizontal dropouts with tensioning bolts) – observe the manufacturer's instructions.

As a general rule, the following applies to the length of a bicycle chain or toothed belt: As short as possible, as long as necessary! The function and adjustment range of your tensioning system as well as the complete compression of the rear suspension must not be impaired under any circumstances.

ATTENTION

Accelerated wear of the entire drive due to excessive tension.

For direct tensioning (horizontal dropouts with adjusting screws) make sure that the bicycle chain or toothed belt has approx. 10-15 mm play.

Observe the manufacturer's exact specifications!

ATTENTION

Accelerated wear of the entire drive due to skewed running.

Make sure that the clearances between your rear wheel hub and the chain or belt line of your Pinion gearbox.

BELT DRIVE

The belt drive is a product of the Gates company.
Detailed product information and descriptions can be found at:
https://de.gatescarbondrive.com/resources/manuals-and-tech

CHECKING THE BELT SPROCKETS FOR WEAR

Detailed product information and descriptions can be found at:
https://de.gatescarbondrive.com/resources/manuals-and-tech

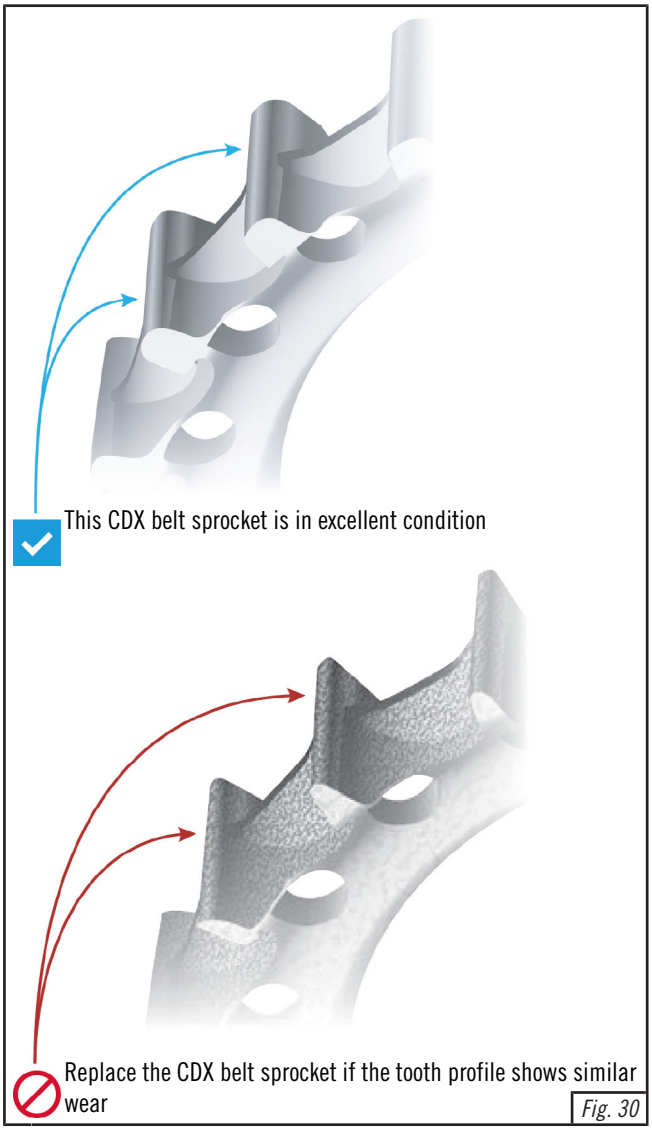

Fig. 30

CHECKING THE BELT TENSION (1.0 AW)

If the pretension is too low, the belt may slip. The required preload depends strongly on the rider's weight. Due to the reduction between the crank and the sprocket, higher tractive forces act on the belt in low gears compared to a hub gear system with a Pinion gearbox.

As a general rule: the smaller the belt sprockets, the higher the pretension should be, as fewer teeth absorb the force here. It might be necessary to set a slightly higher tension with a heavier rider or high load. (Note: this can sometimes be higher than indicated or recommended by a tension measuring device).

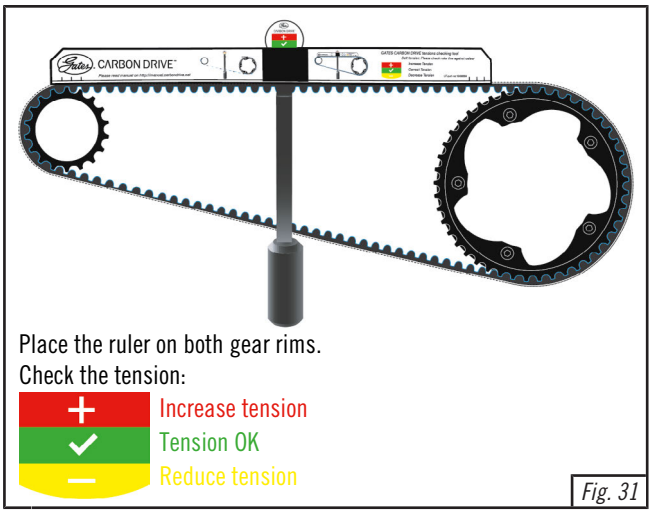

Fig. 31

BELT LINE (1.0 AW)

When moving at an angle, disturbing noises or vibrations may occur.

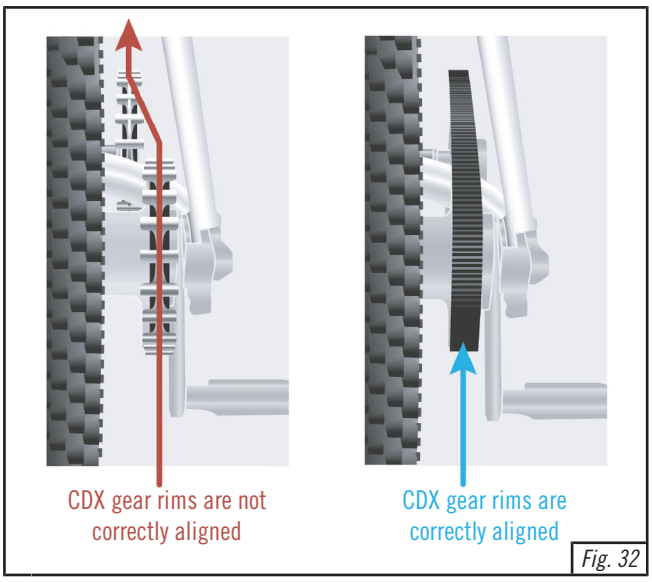

Fig. 32


Fig. 33

Checking the belt line

→ Make sure that the rear wheel is correctly aligned and centred.

→ Place a ruler / straightedge on the belt and align it parallel to the belt edge.

→ Measure the distance to the rim at both points of the radius.

→ Measure the distance between the rim and the belt in the bottom bracket area.

→ Note down this value.

→ Measure the distance between the rim and the belt at the rearmost point of the bicycle.

→ Note down this value as well.


Fig. 34

→ When the belt is correctly adjusted, these distance values should not differ from each other.

→ If the values differ, subtract the second value from the first.

→ If the result is positive, place the belt sprocket on the free wheel of the hub further out (using spacer arrangement).

→ If the result is negative, place the belt sprocket on the free wheel of the hub further in (using spacer arrangement).

CLEANING THE BELT

→ If necessary, clean the belt with water and a brush.

→ Squeaking noises when the belt is clean can be eliminated with silicone spray.

LUBRICATING THE PLANETARY GEAR (2.0 AW)

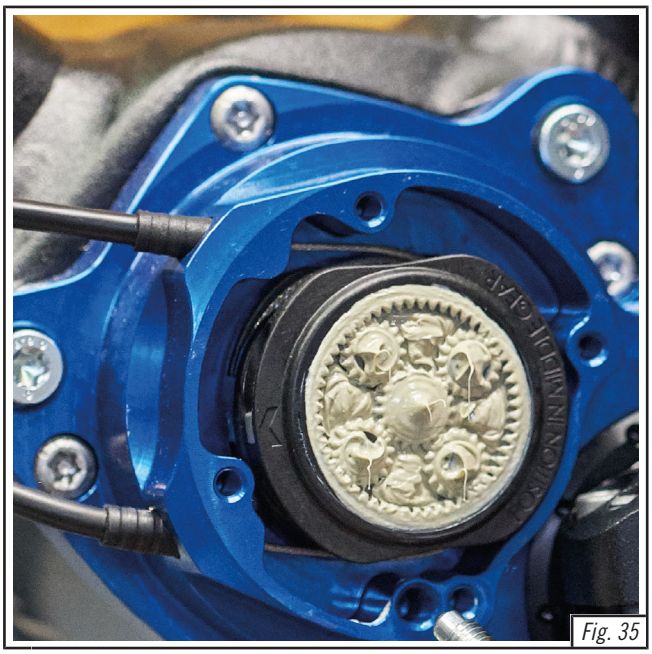
Fig. 35

The planetary gear transmits the rotation of the universal cable pulley to the camshaft. It transmits the gearshift command from the rotary shifter to the gearbox. The planetary gear should be cleaned and re-greased as part of the annual inspection.

→ Using a cloth, remove old grease and dirt roughly.

→ A small brush can be used for thorough cleaning.

→ Apply new grease. You can use commercially available, non-resinous and acid-free ball bearing greases.

CHANGING THE OIL

To maintain the warranty, the oil must be changed once a year or every 10 000 km. When changing the oil for the first time, it is not unusual for a small amount of oil to leak from the gearbox. This is due to the large surface area of the components inside the gearbox, on which a large part of the oil adheres. The input and output shafts have a protective coating against corrosion. The coating colours the oil dark. This has no influence on the durability of the gearbox.

CHANGING THE OIL (C-LINE) (1.0 AW)

To change the oil, it is advisable to store the bicycle at room temperature for a while beforehand.

IMPORTANT

The oil in your Pinion gearbox must be changed every 10 000 km (6 200 miles) or once a year.

Use only original Pinion gear oil. Oil filling capacity: 60 ml (2.0 oz).

When changing the oil of your Pinion gearbox for the first time, the volume of the drained oil is less than 60 ml (2.0 oz) – nevertheless, keep to the oil filling quantity prescribed by us!

→ Position the bicycle or fix it in the assembly stand such that the drain hole is at the lowest point of your Pinion gearbox.

→ Place a collection container underneath.

With mechanical control

→ Remove the shift box cover – use a flat screwdriver to lever carefully in the area of the tabs.

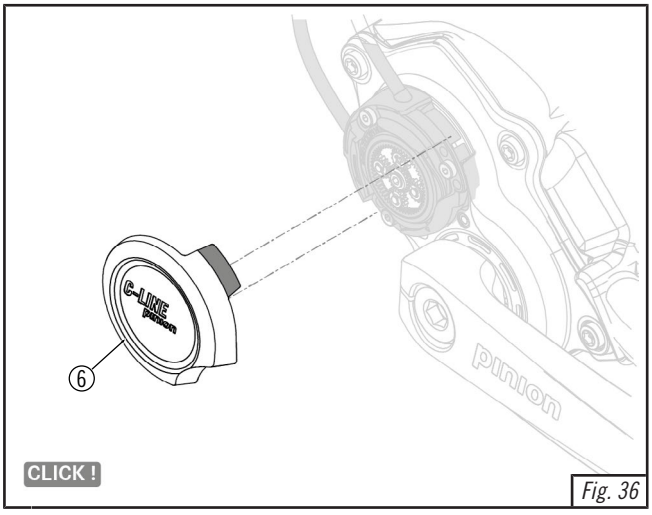

Fig. 36

with Smart.Shift

→ Loosen three screws on the Smart.Shift box

→ Pull off the Smart.Shift box.

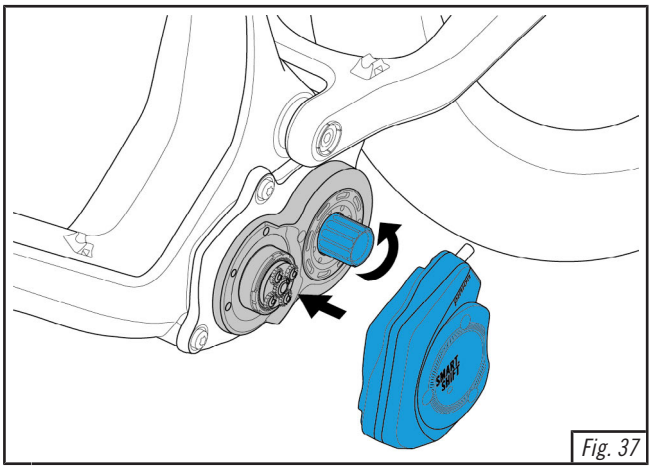
Fig. 37

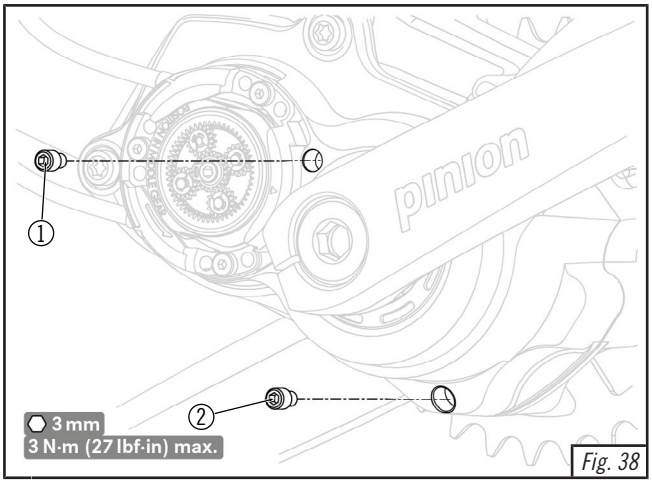

Fig. 38

Changing the oil

→ Unscrew the screw plug (1) from the filling opening.

→ Unscrew the screw plug (2) from the drain opening.

→ Allow used oil to drain completely from the drain hole into the collection container.

→ Screw the screw plug (2) into the drain opening and tighten with a tightening torque of 3 Nm (27 lb in).

→ Fill with fresh oil – oil filling capacity: 60 ml (2.0 oz).

→ Screw the screw plug (1) into the filling opening and tighten with a tightening torque of 3 Nm (27 lbf in).

With mechanical control

→ Put on the shift box cover.

with Smart.Shift

→ Check the seal of the Smart.Shift box. It must be undamaged and free of grease.

→ Push the Smart.Shift box onto the gearbox and turn the shaft in the direction of travel so that the gears mesh.

→ Dry tighten the 3 screws to 2 Nm, while continuing to turn the shaft.

→ The SCHNORR® lock washers can be reused.

After the oil change

→ Note the date of the oil change.

⇨ The oil change is complete.

ATTENTION

Dispose of used greases and oils in an environmentally friendly manner and as prescribed by law – never allow them to enter the sewage system or groundwater.

IMPORTANT

The Pinion oil service kit (P8903) allows you to suck used gear oil out of the gearbox in a clean and quick manner.

CHANGING THE OIL (P-LINE) (1.5 AW)

To change the oil, it is advisable to store the bicycle at room temperature for a while beforehand.

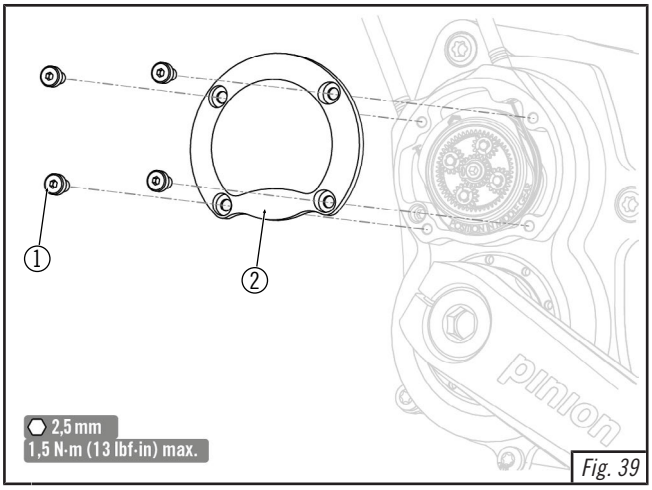

Fig. 39

→ Unscrew the housing screws (1) of the shift box cover (2).

→ Remove the shift box cover.

→ Unscrew the screw plug (3) from the filling opening.

→ Screw the connector with hose (P8903) into the thread of the screw plug.

→ Place the bicycle on its left side so that the screw plug is the lowest point of the gear.

→ Suck the old oil out of the gearbox using the syringe.

→ Then set the bicycle upright again and remove the syringe and hose.

→ Empty and clean the syringe. Draw up fresh oil with the syringe.

→ Screw the hose into the thread of the screw plug and fill in the oil.

→ Equalise the pressure by pulling back the syringe. The connecting nozzle can now be removed.

IMPORTANT

The oil in your Pinion gearbox must be changed every 10 000 km (6 200 miles) or once a year.

Use only original Pinion gear oil. Oil filling capacity: 60 ml (2.0 oz).

When changing the oil of your Pinion gearbox for the first time, the volume of the drained oil is less than 60 ml (2.0 oz) – nevertheless, keep to the oil filling quantity prescribed by us!

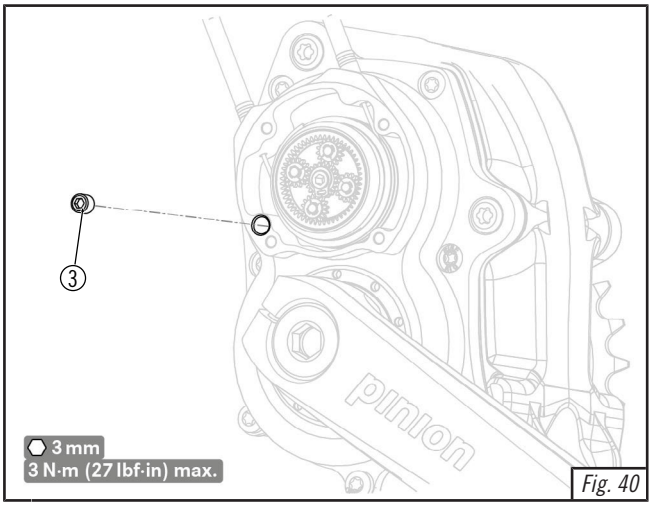

Fig. 40

→ Screw the screw plug (3) into the filling opening and tighten with a tightening torque of 3 Nm (27 lbf in).

→ Use medium-strength threadlocker for oil drain plugs with fine threads (year 2012).

→ Put on the shift box cover (2).

→ Tighten the housing screws (1) with a tightening torque of 1.5 Nm (13 lbf in).

→ Note the date of the oil change.

⇨ The oil change is complete.

ATTENTION

Dispose of used greases and oils in an environmentally friendly manner and as prescribed by law – never allow them to enter the sewage system or groundwater.

IMPORTANT

The Pinion oil service kit (P8903) allows you to suck used gear oil out of the gearbox in a clean and quick manner.

MAINTAINING THE REAR WHEEL HUB H2R (3.0 AW)

Removal

→ Note the order of the spacers used.

→ Remove the sprocket/spider/belt sprocket and brake disc.

IMPORTANT

Note the spacer sequence! Otherwise, noises and malfunctions may occur.

Fig. 41

→ Pull off the left end cap.

→ Pull the right end cap with axle, spacer sleeve and freewheel body out of the hub; if necessary, tap lightly with a soft-head hammer.

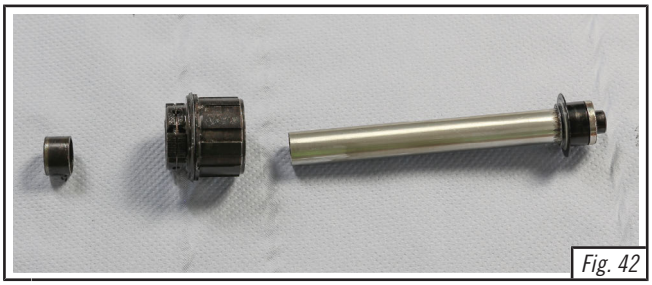

Fig. 42

→ Pull the spacer sleeve and freewheel body from the axle; if necessary, tap lightly with a soft-head hammer.

→ Clean and degrease the teeth in the hub body and the axle. Use a soft cloth and a gentle degreaser (isopropanol) for this purpose.

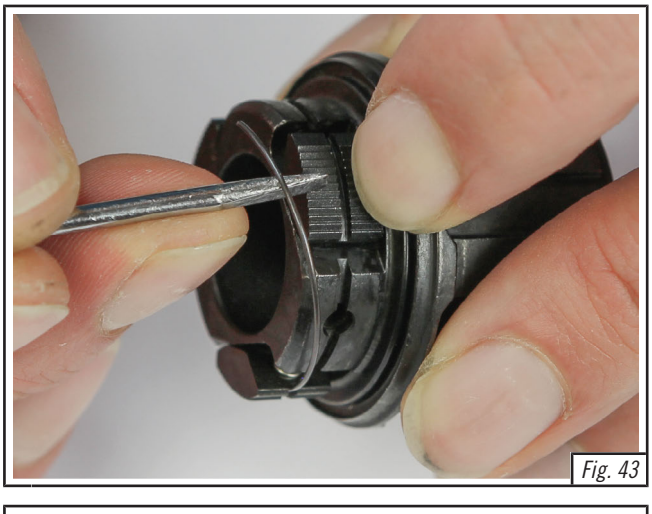

Fig. 43

→ Remove the circlip.

ATTENTION

Be careful not to bend or damage the circlip.

→ Handle the circlip with care.

→ Hold pawls and springs securely during disassembly and assembly.

→ Dismantle the circlip.

Fig. 44

→ Remove the pawls and springs from the freewheel body.

→ Thoroughly clean all components and the toothed ring in the hub housing.

→ Check all components for wear.

→ Replace worn components. Have defective bearings replaced at a specialist bicycle workshop.

→ Insert the pawls and springs into the freewheel body in the correct position.

→ Fit the circlip in the correct position. The hook is in the hole of the freewheel body.

→ Check the pawls for correct functioning.

→ Do they revert to the original position on their own?
If this is not the case, replace the freewheel.

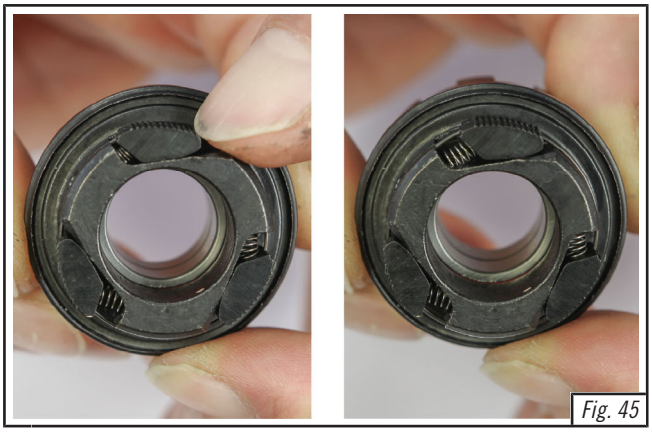
Fig. 45

Assembly

→ Tighten the right end cap and axle against each other with a tightening torque of 5 Nm (44 lbf-in).

→ Place the freewheel body and spacer sleeve on the greased axle.

→ Remove the retaining ring.


Fig. 46

→ Carefully grease all components, toothed ring in hub housing, seals and surface of bearings with fluid grease – especially between pawls and their sliding surfaces on the freewheel body.


Fig. 47

→ Carefully insert the axle into the hub; slowly turn the freewheel body anticlockwise. If necessary, gently press in the pawls with a screwdriver.

⇨ Pawls engage in the toothed ring.

→ Put on the left end cap.

→ Check freewheel for correct function (freewheel and frictional connection).

→ Assemble the sprocket/spider/belt sprocket and brake disc.

→ Tighten the end ring using an HG puller (40 Nm).

TEST RIDE (1.0 AW)

Check the following points during a final test ride:

→ The shifting process is smooth and direct.

→ There are no disturbing cracking and creaking noises.

→ Gear skipping can be ruled out even under high load.

pinion

WORKSHOP MANUAL

ASSEMBLY WORK

ASSEMBLY WORK

REMOVAL

REMOVING THE CRANK

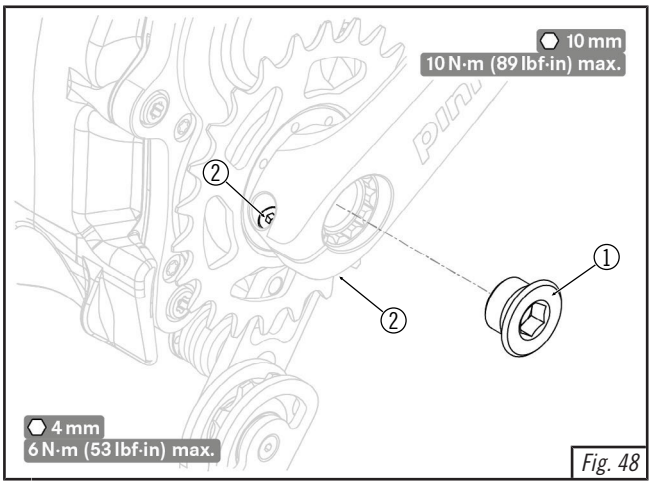

Fig. 48

→ Unscrew the central crank screw (1).

→ Loosen both crank clamp screws (2).

→ Pull the crank off the input shaft.

REMOVING THE CHAIN RING (0.5 AW)

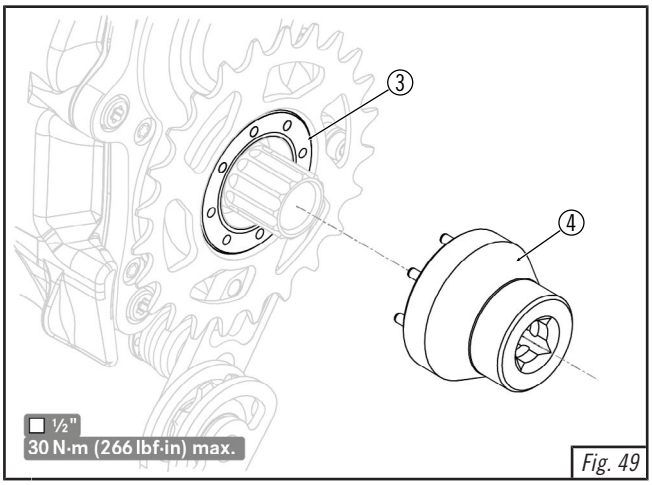

Fig. 49

→ Unscrew the central crank screw (1).

→ Loosen both crank clamp screws (2).

→ Pull the crank off the input shaft.

→ Hold the sprocket with the rear wheel mounted and the chain against it.

→ Unscrew the lockring (3) clockwise (left-hand thread!) using the Pinion lockring tool (4).

→ Pull the sprocket off the output shaft.

IMPORTANT

The output shaft may have axial play when the sprocket or spider is removed – this is normal and nothing to be concerned about!

→ Make sure that the toothing (5) and contact surfaces on the gearbox side and on the sprocket (6) or Spider (7), disc (8) and lockring (3) are free of dirt and old grease.

→

→ Lightly grease the toothing (5).

ATTENTION

Incorrect removal may damage the sprocket by distorting it.

→ Preferably hold the sprocket by the chain on the rear wheel.

→ If necessary, use the chain whip carefully, do not tilt it.

REMOVING THE GEARBOX (C-LINE) (0.5 AW)

Remove cranks and chain ring first (previous chapters).

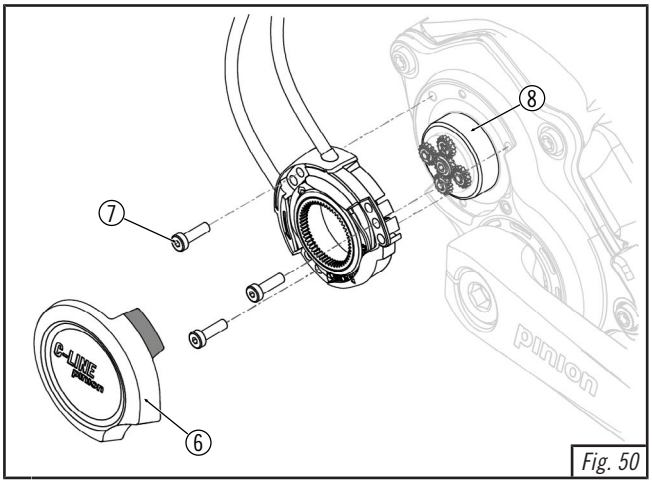

Fig. 50

→ Remove the shift box cover (6) – use a flat screwdriver to lever carefully in the area of the tabs.

→ Unscrew the retaining screws (7) of the shift box; mark the holes used (position of the cable box ring) with a waterproof pencil or similar.

→ Remove the shift box ring with the universal cable pulley.

→ Thoroughly clean the shift box seat on the shift box housing and apply corrosion protection (e.g. protective wax).

→ Clean the planetary wheels and sun wheel thoroughly and grease them generously.

→ Lightly grease the sliding surface (8) of the universal cable pulley.

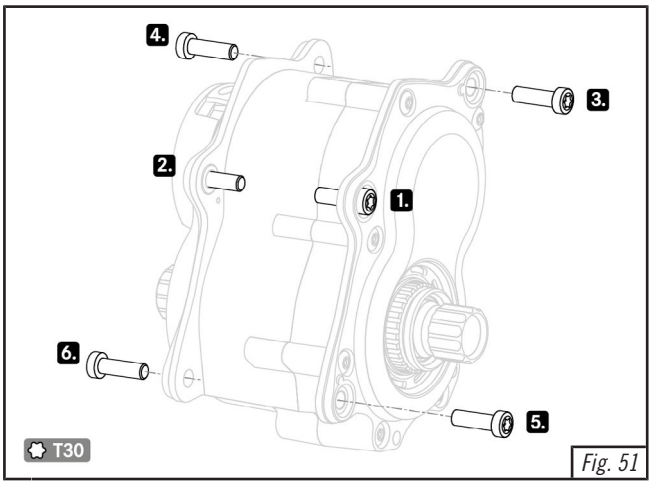

Fig. 51

Dismounting the gearbox

→ Remove the shift box, do not disassemble the shift cables.

→ First just loosen the 2 middle retaining screws.

→ Unscrew the 4 upper and lower retaining screws.

→ Have someone secure the gearbox.

→ Unscrew the 2 middle retaining screws.

→ If necessary, tap the input shaft radially alternately on the right and left with a rubber hammer and remove the gearbox by pulling it downwards out of the gearbox mount of the bicycle frame.

IMPORTANT

The gearbox retaining screws may be reused if cleaned and provided with fresh (medium-strength) threadlocker.

CAUTION

Risk of injury due to the gearbox falling down

Weight approx. 2.1 kg (5 lb).

→ Have someone secure the gearbox when removing it.

REMOVING THE GEARBOX (P-LINE) (0.5 AW)

Remove cranks and chain ring first (previous chapters).

→ Unscrew the housing screw (2) of the rotary shifter cover (3).

→ Unhook the rotary shifter cover at the top and remove it

IMPORTANT

The clamping screws are easily accessible in the rotary shifter positions 01 and 18 or 01 and 12 or 01 and 09, depending on the type of your Pinion gearbox.

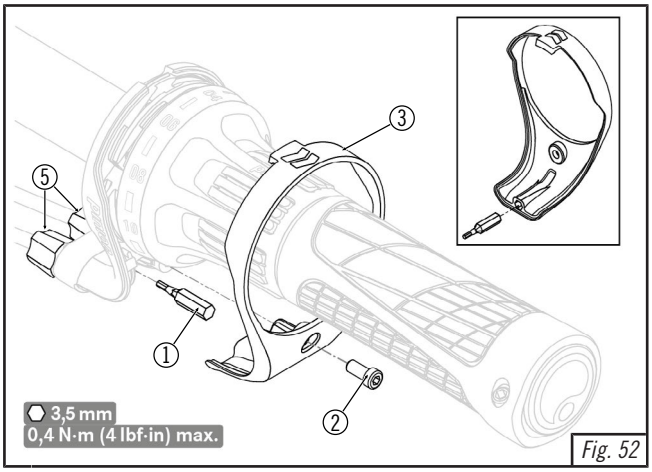

Fig. 52

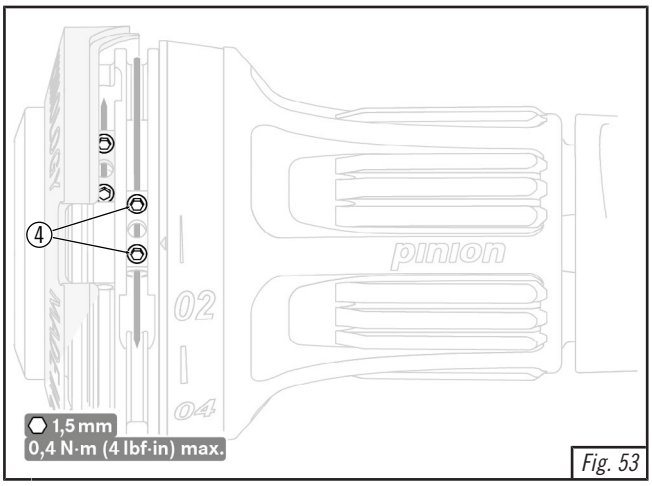

Fig. 53

→ Loosen the clamping screws (4) – 2× per shift cable end.

→ Pull the shift cables out of the rotary shifter.

→ Cut off any spliced shift cable ends with a sharp side cutter.

→ First screw in the adjusting screws (5) completely, then unscrew them by 3 turns.

→ This guarantees a sufficient adjustment range for the later adjustment of the gear shift.

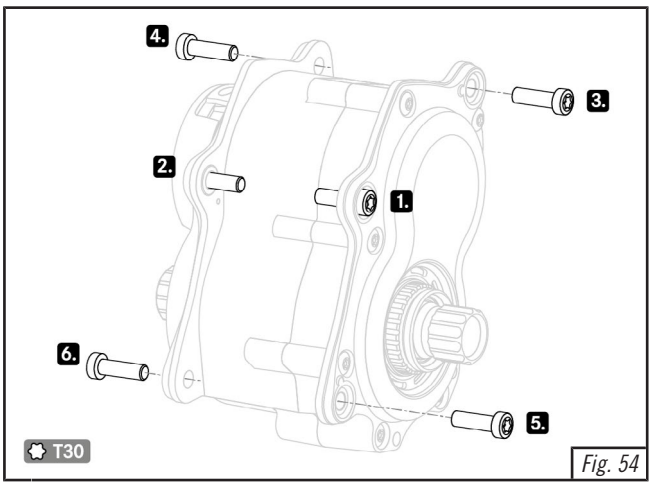

Fig. 54

→ Loosening the shift cable on the rotary shifter

→ First just loosen the 2 middle retaining screws.

→ Unscrew the 4 upper and lower retaining screws.

→ Have someone secure the gearbox.

→ Unscrew the 2 middle retaining screws.

→ If necessary, tap the input shaft radially alternately on the right and left with a rubber hammer and remove the gearbox by pulling it downwards out of the gearbox mount of the bicycle frame.

IMPORTANT

The gearbox retaining screws may be reused if cleaned and provided with fresh (medium-strength) threadlocker.

CAUTION

Risk of injury due to the gearbox falling down

Weight approx. 2.1 kg (5 lb).

→ Have someone secure the gearbox when removing it.

ASSEMBLY

GEARBOX (C-LINE) (1.0 AW)

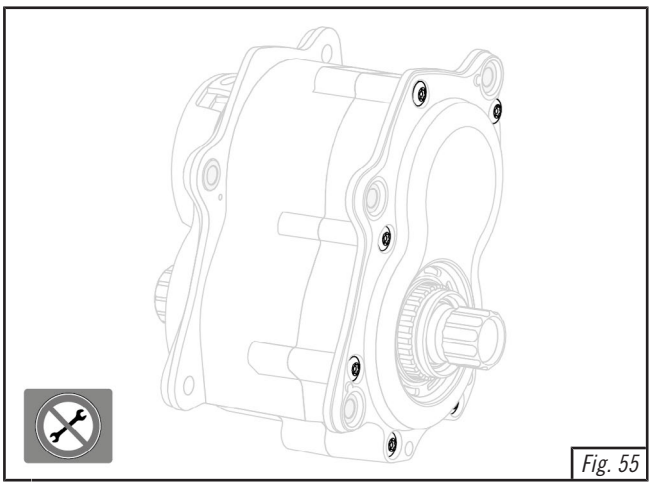

Fig. 55

→ Do not tighten or loosen the gearbox housing screws under any circumstances.

→ The gearbox housing screws may only be adjusted in a specialist workshop authorised by Pinion or by Pinion itself.

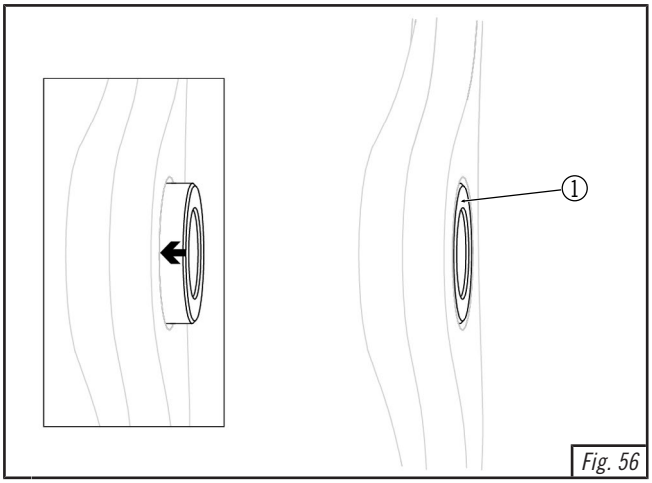

Fig. 56

→ Make sure that all 4 fitting sleeves (1) have been fitted perfectly flat in their seats in the gearbox housing; if necessary, press them in flat with a parallel pressing tool (e.g. screw clamp, suitable pliers or similar).

→ Observe the correct sequence and tightening torque.

IMPORTANT

The gearbox retaining screws may be reused if cleaned and provided with fresh (medium-strength) threadlocker.

ATTENTION

Damage to the gearbox due to deformation caused by incorrect assembly

Irreparable damage to the gearbox housing or leakage.

Stainless steel screws cause corrosion on the gearbox housing.

→ Use original Pinion screws only.

IMPORTANT

Together with the mounting of the Smart.Shift-Box (Smart.Shift gearbox), it is recommended to route the required cables with sufficient overhang through the recess on the top of the gearbox before mounting the gearbox.

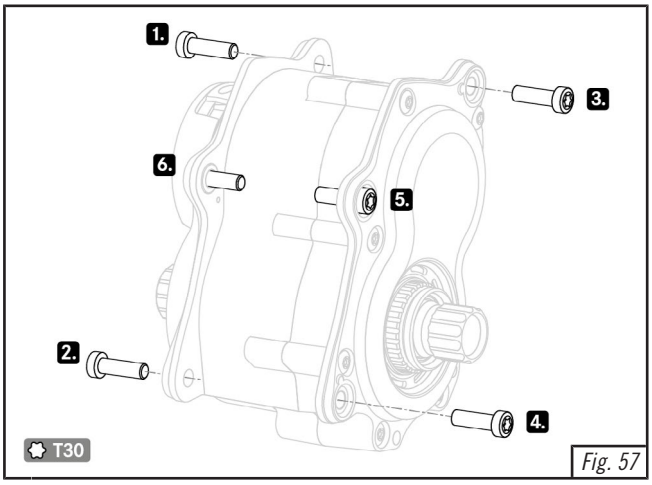

Fig. 57

→ Make sure that all contact points on the gearbox and the gearbox mount of the bicycle frame are free of dirt and covered with carbon assembly paste (e.g., DYNAMIC).

→ Insert the gearbox into the gearbox mount of the bicycle frame.

→ Fit all 6 retaining screws.

→ Tighten the retaining screws in the specified sequence with a tightening torque of 10 Nm (89 lbf in).

⇨ The mounting of the gearbox is completed.

SMART.SHIFT (1.0 AW)

For the use of Pinion Smart.Shift technology, special variants of Pinion gearboxes are required. Shifting mechanics and sensor technology are the main differences. All gearboxes compatible with Smart.Shift are marked with “i” on the series label (C1.12^{i}, C1.9^{i}, C1.6^{i}).

IMPORTANT

Do not grease the inside of the Smart.Shift box

→ When re-greasing, only grease the planetary gear and the sliding surface on the gearbox.

MOUNTING THE SMART.SHIFT BOX

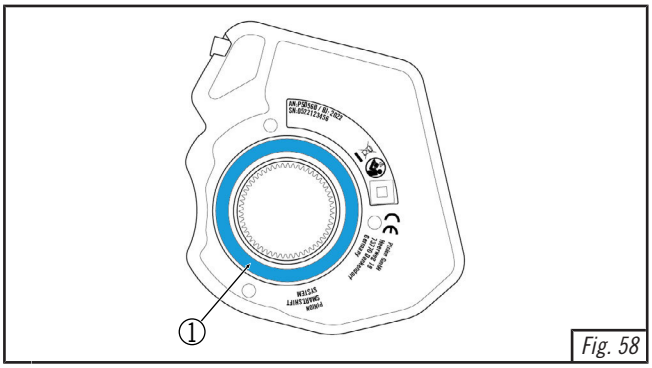

Fig. 58

→ Check the seal (1). The seal must be undamaged and free of grease. If damaged, the seal must be removed and a new original seal (P8961 Smart.Shift Adhesive Seal) glued on.

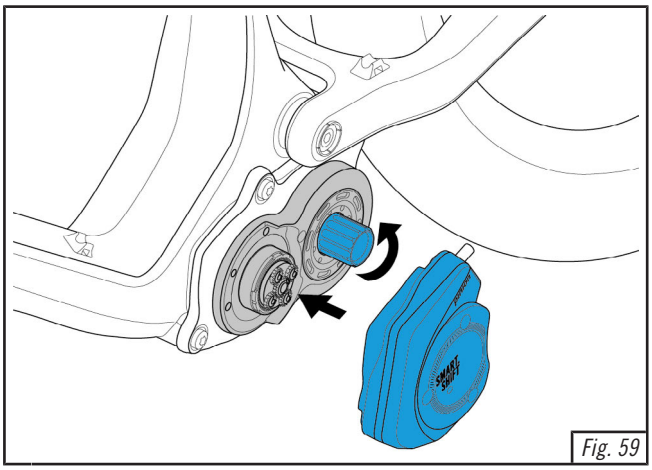
Fig. 59

→ If there are cables laid inside, lay the cables for peripherals in the frame before mounting the gearbox. Then insert the Smart.Shift box and guide the cable through the opening provided in the frame when mounting the gearbox. Do not bend or crush the cable.

→ Push the Smart.Shift box onto the gearbox and, while doing it, turn the shaft in the direction of travel so that the gears mesh.

→ Connect the cable.
Green: CAN connector
Blue: E-trigger
Violet: Battery
Orange: Speed sensor
Black: Smart.Shift box

IMPORTANT

Not all connections are needed for all purposes. Place caps on unused connections. The caps must be purchased from Higo.

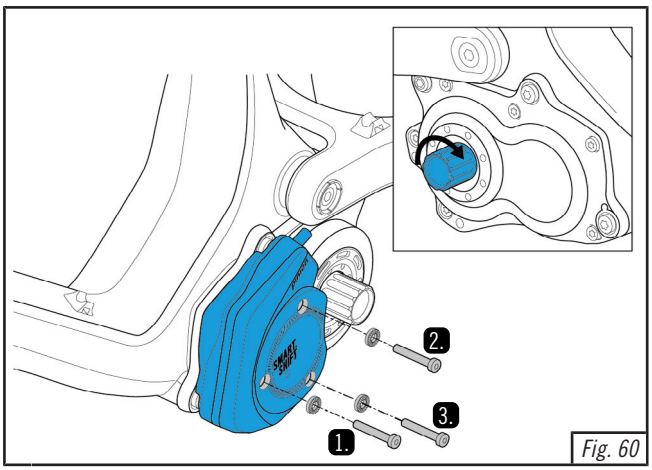

Fig. 60

→ Tighten the screws in the order shown in **Fig. 60**. This is the best way to align the box, and the screws will grip faster in the threaded holes.

→ Dry tighten the 3 screws with lock washers to 2 Nm, while continuing to turn the shaft forwards.

ATTENTION

If the input shaft is not rotated while mounting, this can lead to malfunctions.

Failure to observe the proper tightening torque will also lead to malfunctions.

PAIRING THE SMART.SHIFT WITH THE PINION SMART.SHIFT APP

The Smart.Shift system can be paired with the Pinion Smart.Shift app in order to change settings and view the battery charge level, for example.

→ Open the Pinion Smart.Shift app and enable Bluetooth® on your mobile device.

→ Hold the bottom shift lever pressed for 3–10 seconds.

⇨ When you let go, the Smart.Shift will make a sound to signal that it is ready to pair. The LED flashes blue and the Smart.Shift can be paired wirelessly.

→ In the app, select **Add Device**.

→ Follow the instructions in the app.

B2B SETTINGS IN THE SMART.SHIFT APP

Function-relevant values are defined in the B2B Settings. If you are unsure about any of these values, contact Pinion customer service.

Enabling access to B2B Settings in the app

→ Pair with a Smart.Shift box.

→ Tap **Settings** on the Device screen.

→ On the Settings screen, tap the **Settings** heading 8 times.

⇨ The **B2B Settings** selection field will appear.

→ Tap **B2B Settings**.

→ Enter "07737" as the B2B code. This code only needs to be entered once.

Required input

The following parameters must be input before performing any calibration:

1. Installation angle
2. Number of teeth, front sprocket
3. Number of teeth, rear sprocket
4. Wheel size
5. Power supply

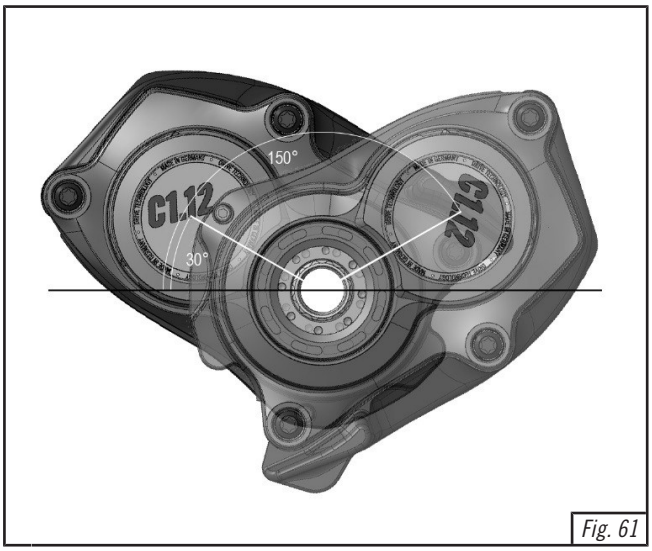

Fig. 61

Installation position (**Fig. 61**): The reference line for the installation position is the imaginary straight line that runs between the gear shafts. The gearbox is pivoted around the input shaft at an angle relative to the horizontal line. The illustration shows the two installation positions 30° and 150°.

Additional input

1. CAN communication
2. Display
3. Speed sensor
4. Number of speed sensor magnets

In the event of a reproduction or replacement, it makes sense to archive the B2B settings of the first Smart.Shift in the app so that they can be loaded again for the new Smart.Shift. This is done using the buttons below the settings in the app.

CALIBRATING THE SMART.SHIFT BOX

IMPORTANT

With a brand-new Smart.Shift box, all the important settings first have to be made via the app. See **B2B Settings in the Smart.Shift app [▶ 65]**

IMPORTANT

Either both cranks may be fitted or no crank fitted at all. Fitting only one crank would lead to movement during the calibration!

→ Before calibration, fit other components such as chain tensioner/belt tensioner, cranks and E-trigger.

→ Hold both the Up and Down shift buttons on the Smart.Shift for 5–10 seconds.

→ Let them go, and within 3 seconds press and hold both buttons again for 5–10 seconds.

⇨ The LED flashes yellow while calibrating.

→ After calibration, make sure that the LED is green.

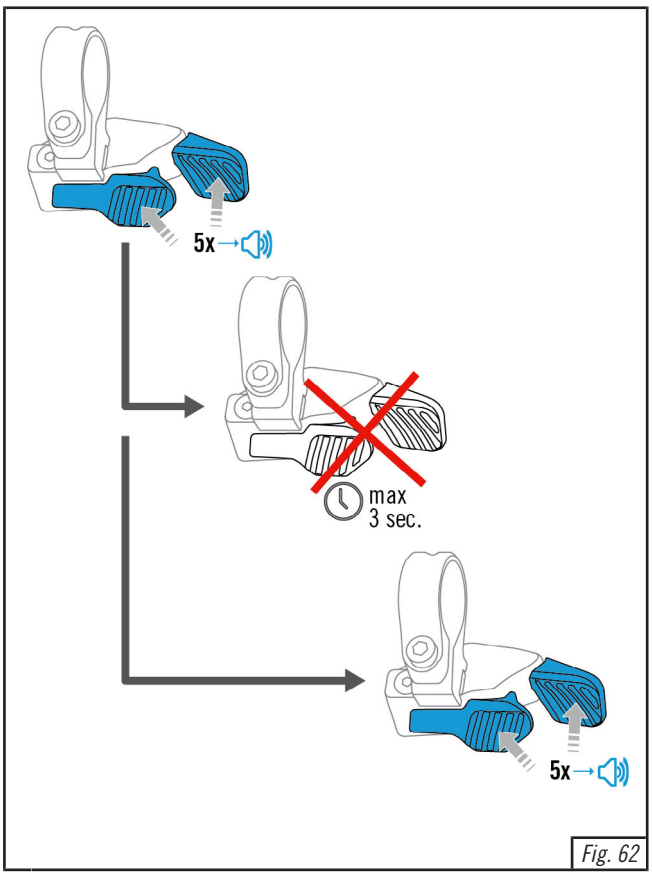

Fig. 62

IMPORTANT

For e-bikes with a CAN interface, it may be possible to perform the calibration via the display while in service mode.

Calibration can also be activated from the Pinion Smart.Shift app.

→ For this, observe the documentation of the respective manufacturer.

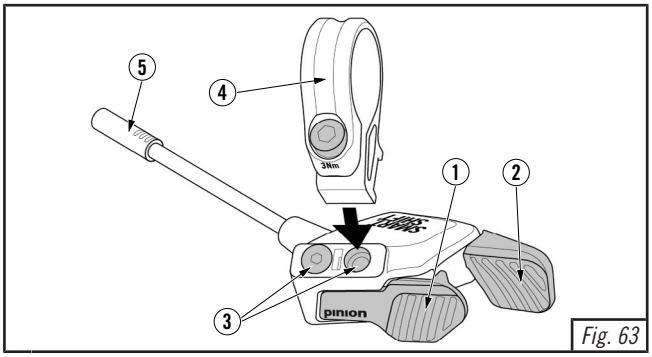

Fig. 63

(1) Front shift lever
(2) Rear shift lever
(3) Screw-on positions and blind screw
(4) Trigger clamp with screw
(5) Plug

E-TRIGGER TE1

Mounting options

The TE1 shift lever is designed for mounting on the right-hand side of the handlebar.

→ Instead of the Pinion clamp, the TE1 can also be connected with combination clamps from other manufacturers. (e.g. Magura ShiftMix 3, SRAM MMX)

→ The cable must be fixed to the underside of the handlebar in such a way that the adjustability of the shift levers is guaranteed without sharply bending or crushing the cable or putting it under tension.

→ Make sure that there is no collision with the shift levers and other components (especially the brake) also when operating them.

IMPORTANT

→ During assembly, maintain a torque of 3 Nm.

Adjustability

To ensure optimal accessibility of the shift levers, for all hand sizes and preferences, a wide range of adjustment options can be selected.

→ The TE1 should be positioned on the handlebar in such a way that you do not have to remove your right hand from the grip to reach both shift levers with your thumb.

→ For optimum accessibility, the clamp can be positioned to the left or right of the brake lever. Fine adjustments can be made via the two screw-on points on the TE1.

→ You can also change the button assignment of the TE1 in the settings of your e-bike.

Wiring

The trigger is equipped with a 50 mm long connection cable. The minimum permissible bending radius is 18 mm. The Higo Micro A 3-pin plug has a diameter of 5.5 mm. The extension cable is 1450 mm long and has a Higo Mini F 4-pin plug in addition to the Higo Micro A 3-pin plug.

IMPORTANT

The extension cable is to be attached to the handlebar. This prevents any impact from free-swinging cables. We generally recommend that you secure the cables every 30 cm.

IMPORTANT

Bending radius and sharp edges

→ Cable diameter: 3.7 mm

→ Min. bending radius (static): 20 mm

→ Min. bending radius (dynamic): 40 mm

GEARBOX (P-LINE) (1.0 AW)

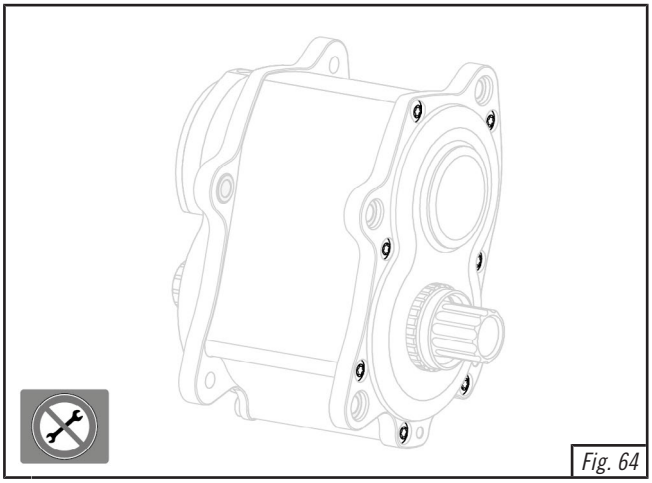

Fig. 64

→ Do not tighten or loosen the gearbox housing screws under any circumstances.

→ The gearbox housing screws may only be adjusted in a specialist workshop authorised by Pinion or by Pinion itself.

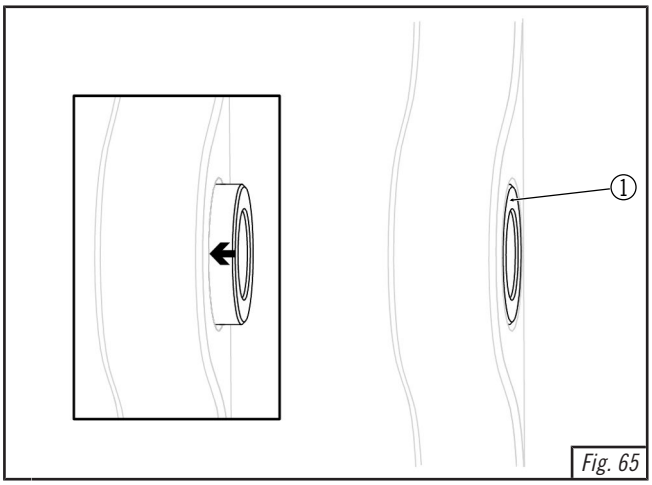

Fig. 65

→ Make sure that all 4 fitting sleeves (1) have been fitted perfectly flat in their seats in the gearbox housing; if necessary, press them in flat with a parallel pressing tool (e.g. screw clamp, suitable pliers or similar).

→ Observe the correct sequence and tightening torque.

IMPORTANT

The gearbox retaining screws may be reused if cleaned and provided with fresh (medium-strength) threadlocker.

ATTENTION

Damage to the gearbox due to deformation caused by incorrect assembly

Irreparable damage to the gearbox housing or leakage.

Stainless steel screws cause corrosion on the gearbox housing.

→ Use original Pinion screws only.

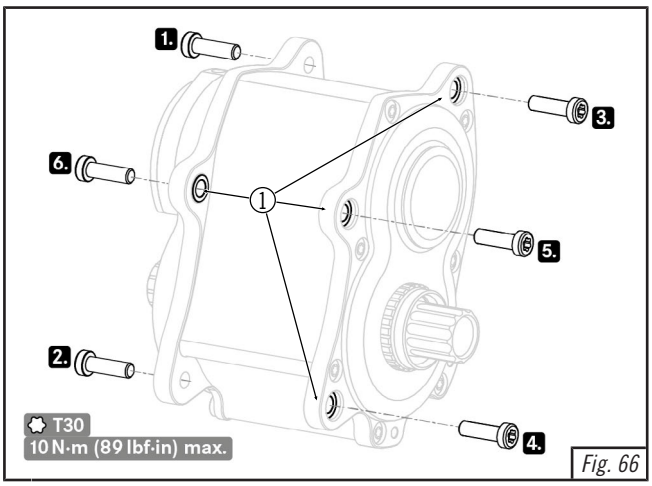

Fig. 66

→ Make sure that all contact points on the gearbox and the gearbox mount of the bicycle frame are free of dirt and covered with carbon assembly paste (e.g., DYNAMIC).

→ Insert the gearbox into the gearbox mount of the bicycle frame.

→ Fit all 6 retaining screws.

→ Tighten the retaining screws in the specified sequence with a tightening torque of 10 Nm (89 lbf in).

⇨ The mounting of the gearbox is completed.

CHAIN TENSIONER (KS1.2)

MOUNTING THE CHAIN TENSIONER (0.5 AW)

The Pinion chain tensioner is designed and intended exclusively for use with a Pinion gearbox.

→ Only ever fit the Pinion chain tensioner to the chain tensioner mount provided for this purpose on your Pinion gearbox.

→ Use only original Pinion screws.

IMPORTANT

Depending on the installation position of your Pinion gearbox, the Pinion chain tensioner can be installed in position A, B or C.

→ When your Pinion chain tensioner is in the position you have chosen, make sure that it can fully develop its tensioning effect, but that it cannot under any circumstances come into contact with the chain stay or tyres of your bicycle.

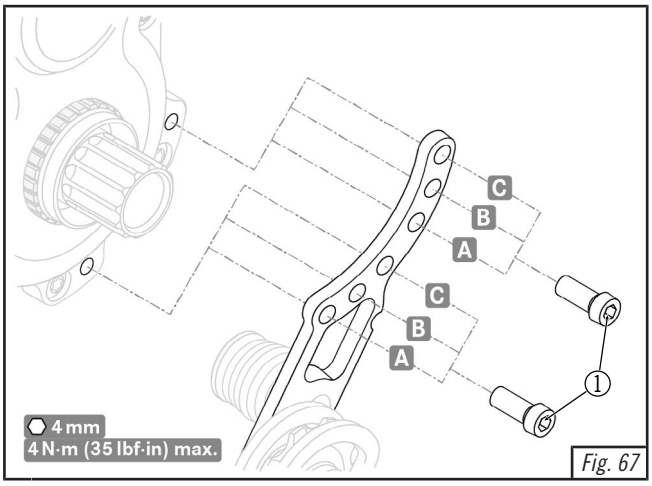

Fig. 67

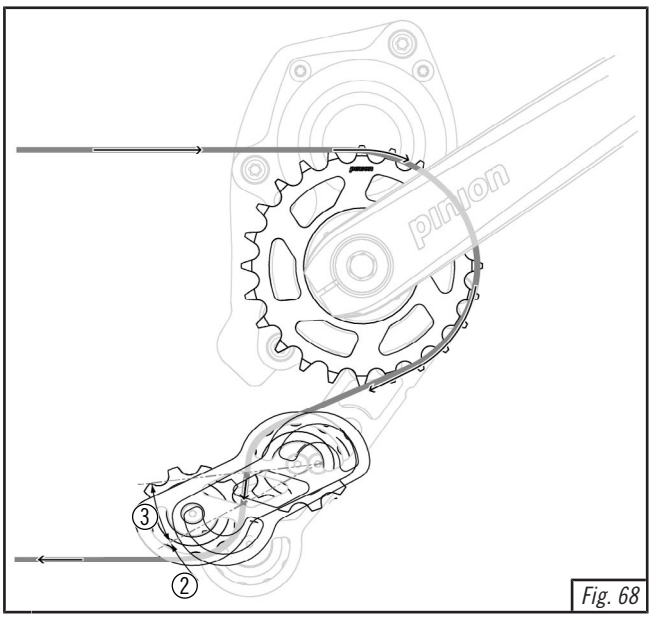

Fig. 68

→ Remove the chain.

→ Remove the crank and the sprocket.

→ Tighten the retaining screws (1) with a tightening torque of 4 Nm (35 lbf in).

→ Mount the crank and the sprocket.

→ Position chain and guide it through the tension mechanism.

→ Connect chain.

IMPORTANT

Your chain has the correct length if the tension mechanism of the chain tensioner is pretensioned (2) but can still be moved upwards (3).

⇨ Mounting of the Pinion chain tensioner is complete.

WARNING

Accident hazard due to failure of chain tensioner resulting from improper use.

ADJUSTING THE CHAIN TENSIONER (0.5 AW)

IMPORTANT

If your chain frequently hits the chain stay of your bicycle frame while riding, it may be necessary to increase the chain tension.

If the chain or cranks continue to rotate when you are pushing, even though the rear freewheel is functioning correctly, or if your chain tensioner rattles, it may be necessary to reduce the chain tension.

→ Make sure that your chain is the correct length before proceeding with the follow actions – see **Mounting the chain tensioner (0.5 AW) [▸ 69]**.

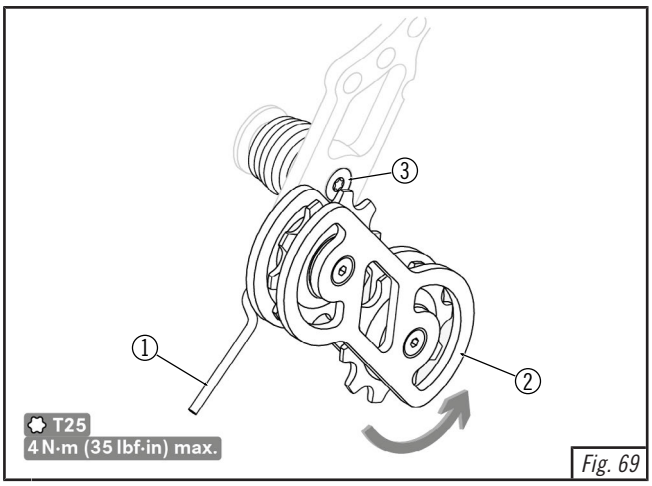

Fig. 69

→ Remove the chain take it off the chain ring and sprocket.

→ Disconnect the spring leg (1) from the tension mechanism (2).

→ Turn the tension mechanism forwards.

→ The screw (3) of the spring shaft is accessible.

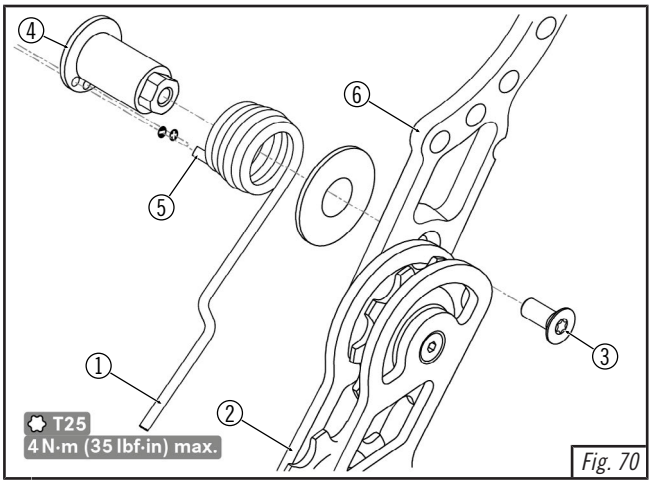

Fig. 70

→ Unscrew the screw (3) of the spring shaft (4).

→ Pull the spring shaft out of the base plate (6).

→ Reposition the spring end pin (5) anticlockwise (+). > Chain tension increases. or:

→ Reposition the spring end pin (5) clockwise (-). > Chain tension decreases.

→ Insert the spring shaft into the base plate (6).

→ Screw in the screw (3) of the spring shaft (4) and tighten it with a tightening torque of 4 Nm (35 lbf in).

→ Mount/position the chain on the chain ring and sprocket.

→ Attach the spring leg (1) to the tension mechanism (2).

→ Check the adjustment.

CONVERTING THE “LONG LIFE” CHAIN TENSIONER (0.5 AW)

When using the Longlife chain (P8540L) in conjunction with a chain tensioner (P8551), the chain tensioner must be widened with the bearing washers supplied with the chain. The bearing washers installed in the chain tensioner are replaced by wider bearing washers.

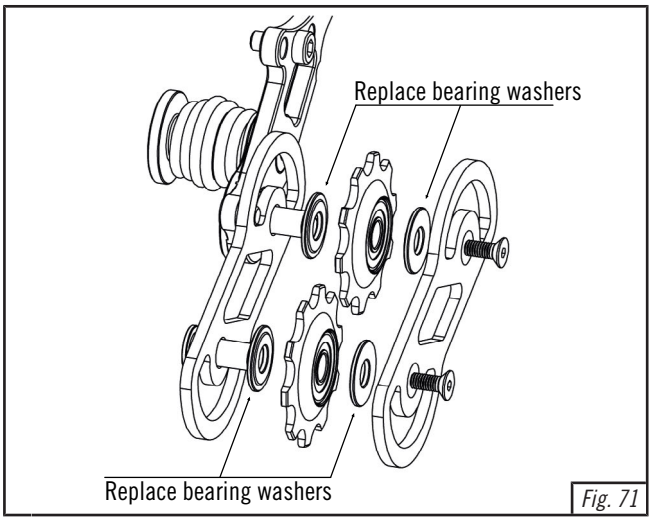

Fig. 71

→ Remove the chain rollers’ screws.

→ Remove the outer guide plate.

→ Dismantle the chain rollers with cover discs (bearing discs).

→ Fit new, wide bearing washers with a large continuous bore.

→ Attach the chain rollers.

→ Fit new, wide bearing washer with offset bore.

→ Mount the outer guide plate with countersunk screws (2 Nm).

IMPORTANT

To prevent the chain from rubbing against the inner guide plate, the chain roller is positioned off-centre to the chain.

CHAIN TENSIONER (CT2) (1,0 AW)

MOUNTING THE CHAIN TENSIONER

WARNING

Accident hazard due to failure of chain tensioner resulting from improper use.

→ Equip Pinion gearboxes exclusively with a Pinion chain tensioner.

→ Fit the Pinion chain tensioner only to a Pinion gearbox.

→ Ensure that there is no possibility of collision between the chain tensioner and the bicycle frame or tyre.

→ Ensure that the chain tensioner can exhibit its full tensioning effect.

→ On full-suspension bicycles, always check the chain length, freedom of movement and mobility of the chain tensioner when the rear triangle is fully compressed.

ATTENTION

C-line Screws made of stainless steel cause the gearbox housing to corrode.

→ Use original Pinion screws only.

IMPORTANT

The chain tensioner is available in 2 versions for MGU and Classic. These differ in the base plate, which can be replaced, see chapter Peripheral components.

IMPORTANT

Only Longlife chain drives are permitted for the MGU (1/8" x 1/2" chains, max. width 8 mm).

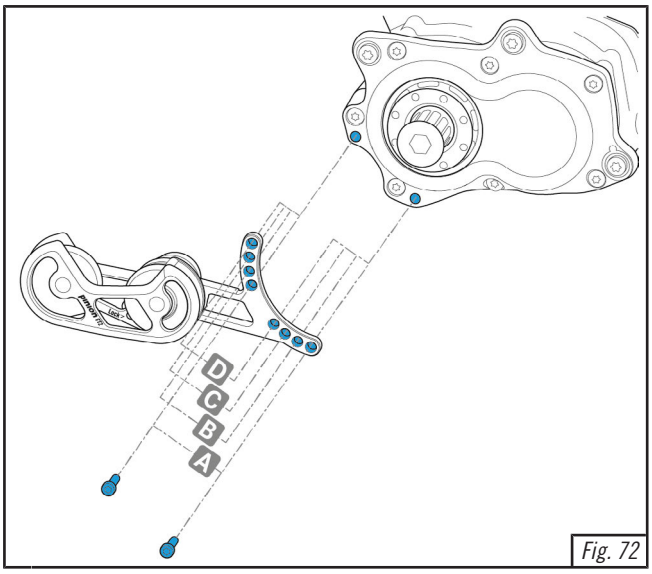

Fig. 72

→ Depending on the installation position of the gearbox, mount the chain tensioner in one of the 5 or 4 possible positions.

→ Tighten the chain tensioner using 2 screws with washers (3 Nm).

→ Ensure that the tyre does not touch the chain tensioner.

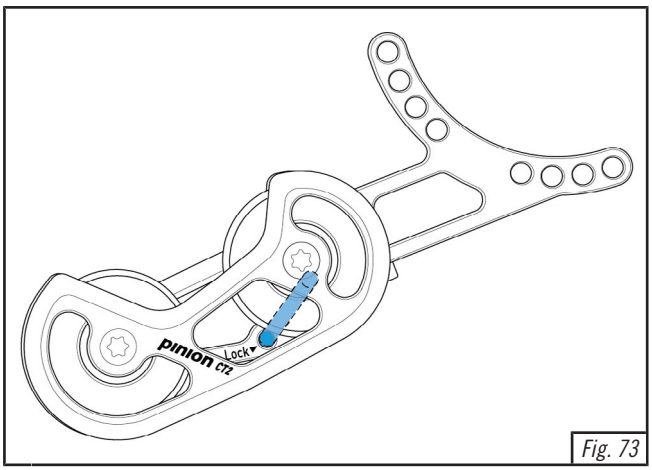

Fig. 73

→ For assembly work, fix the chain tensioner using, for example, a hexagonal spanner.

→ Put the chain on, guide it through the chain tensioner and lock it.

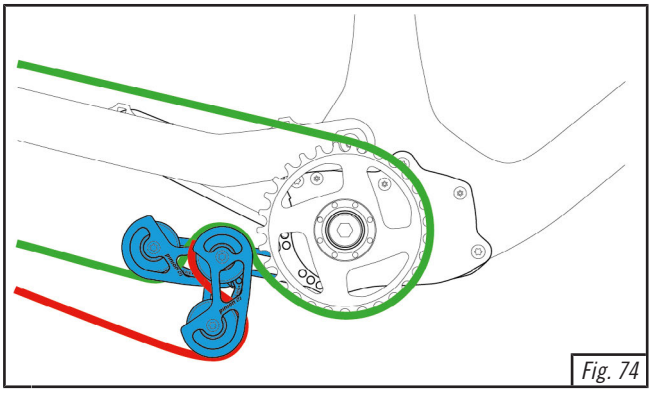

Fig. 74

The chain has the correct length when the tension mechanism of the chain tensioner is pretensioned, but you can still move it further within the scale (see **Fig. 75**). The chain should be chosen so that it is as short as possible.

The chain tensioner should already be pretensioned when the bicycle is extended. Do not overtighten the chain tensioner when the bicycle is fully compressed and keep it as close as possible to the maximum deflection mark.

ADJUSTING THE CHAIN TENSIONER

→ Test the entire spring travel by loading. For full-suspension bikes, depressurise the absorber beforehand.

⇨ A scale on the back shows the operating range of the chain tensioner.

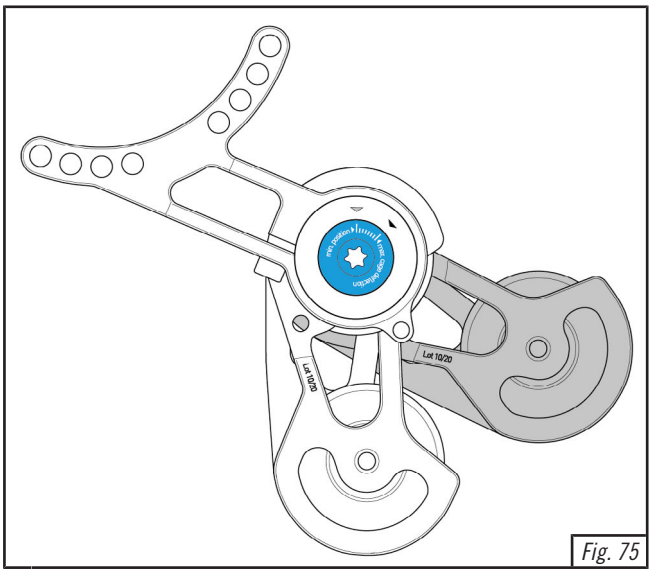

Fig. 75

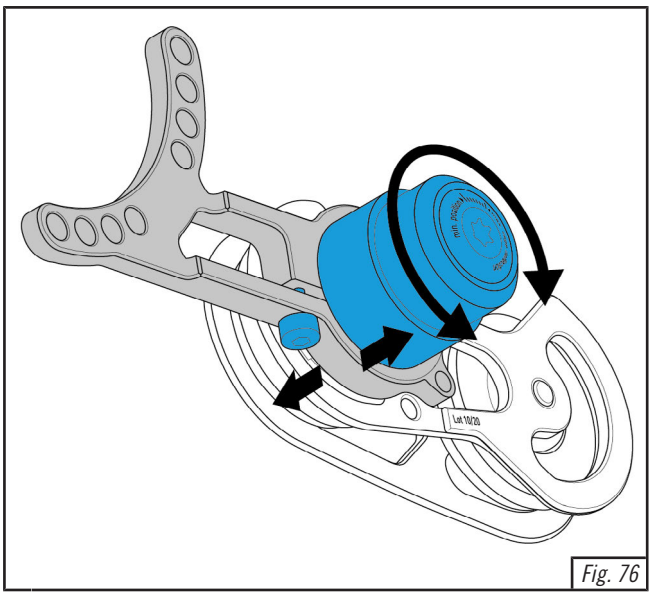

Fig. 76

→ Using the clamping of the chain tensioner, adjust the pretension by turning and the chain line by shifting.

→ After adjustment, tighten the clamping screw with 3 Nm.

CONVERTING THE “LONG LIFE” CHAIN TENSIONER

If you use Longlife chain X101 (P8540L), you need to replace the chain rollers of chain tensioner CT2.

IMPORTANT

The mounting plate must be installed with the ridge facing inwards.

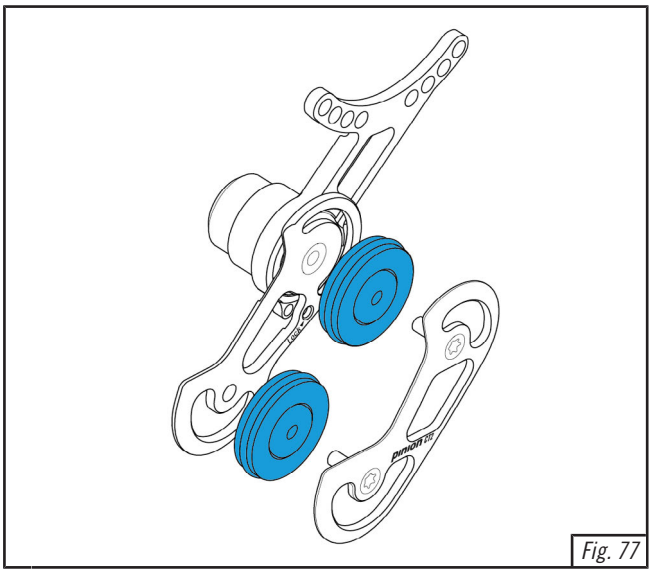

Fig. 77

IMPORTANT

If you want to use Longlife chains, you need to replace the chain rollers.

LongLife chain rollers are marked with ‘L’.

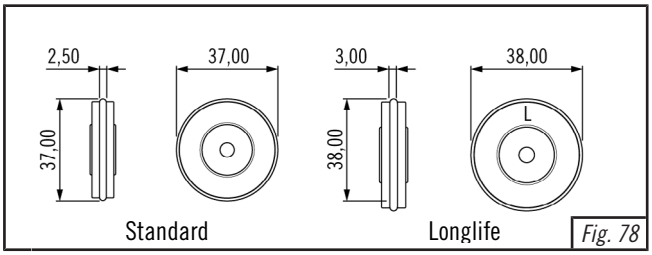

Fig. 78

BELT TENSIONER (BT1)

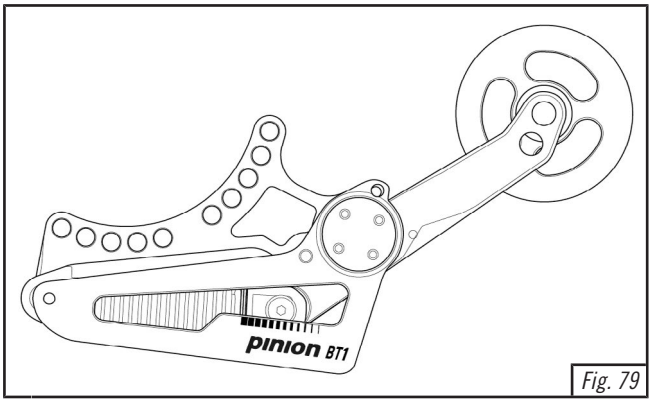

Fig. 79

WARNING

Accident hazard due to failure of belt tensioner resulting from improper use.

→ Equip Pinion gearboxes exclusively with an original belt tensioner.

→ Fit the Pinion belt tensioner only to a Pinion gearbox.

→ Ensure that there is no possibility of a collision between the belt tensioner and the bicycle frame or tyre.

→ Ensure that the belt tensioner can exhibit its full tensioning effect.

→ On full-suspension bicycles, always check the belt length, freedom of movement and mobility of the chain tensioner when the rear triangle is fully compressed.

ATTENTION

C-line Screws made of stainless steel cause the gearbox housing to corrode.

→ Use original Pinion screws only.

IMPORTANT

The belt tensioner is available in 2 versions for MGU (4 mounting positions) and Classic (5 mounting positions). These differ in the base plate, see chapter Peripheral components.

SYSTEM DESIGN FOR REAR SUSPENSION

Pinion recommends the following procedure for sizing a belt drive on a rear suspension:

Secondary gear transmission ratio

→ Selecting the rear belt sprocket according to tyre size and application. The front belt sprocket needs to have 39 teeth. Suitable secondary gear transmission ratios can be calculated using the Pinion Calculation Tool.
It is available for download from the Pinion OEM portal.

Belt selection (length)

→ The maximum distance (spring-loaded condition) between the front and rear belt blade is crucial for selection of the belt length. The centre distance is used for calculation.

→ The belt length depends on the frame manufacturer.

MOUNTING THE BELT TENSIONER

The belt tensioner can be secured in place for assembly work.

Depending on the installation position of the Pinion gearbox, the belt tensioner can be mounted in 4 or 5 positions. The individual positions rotate the belt tensioner around the belt pulley in 10° steps. For fine-tuning purposes, it is possible to change the belt roller between positions A and B, creating intermediate steps of 5°.

Changing the position of the belt tensioner causes a change of approx. 30% pre-tension, changing the position of the belt pulley causes a change of approx. 50% pretension.

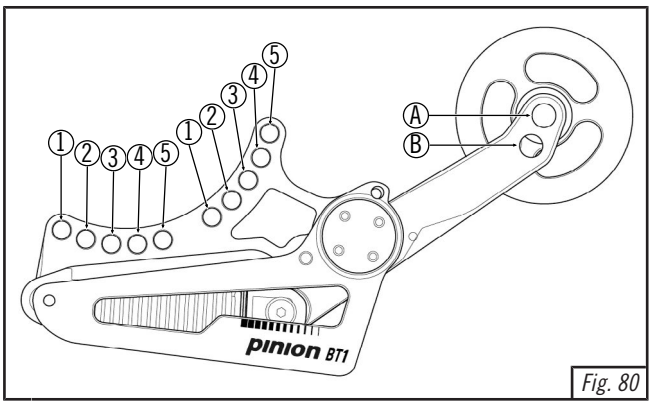

Fig. 80

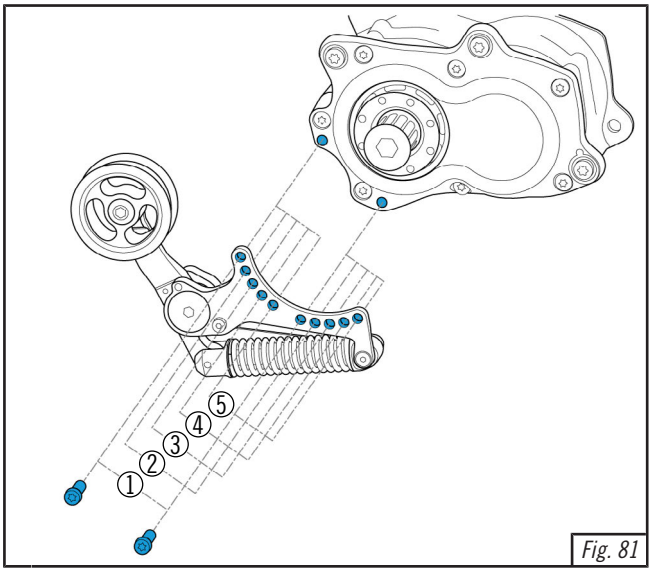

Fig. 81

→ Depending on the installation position of the gearbox, mount the belt tensioner in one of the 4 different positions.
Select the position in which the belt tensioner already has approx. 10% pre-tensioning at the minimum chainstay length (extended rear suspension).
Change the position of the belt pulley if necessary.

→ Tighten the belt tensioner using 2 screws with washers (4 Nm).

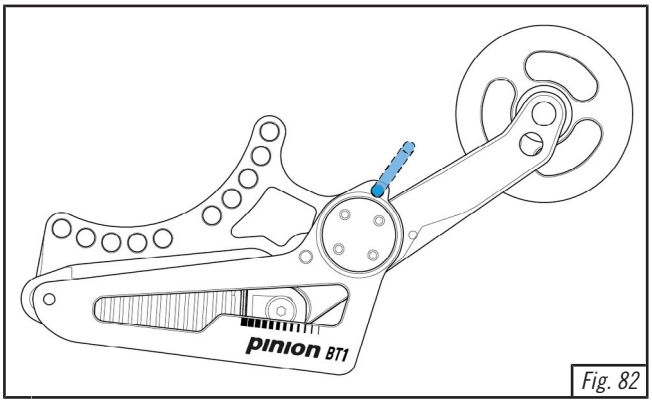

Fig. 82

CAUTION

Danger of crushing

→ When fixing the belt tensioner, take care not to pinch your fingers.

→ For assembly work, fix the belt tensioner using, for example, a hexagonal spanner.

→ Put on the belt.

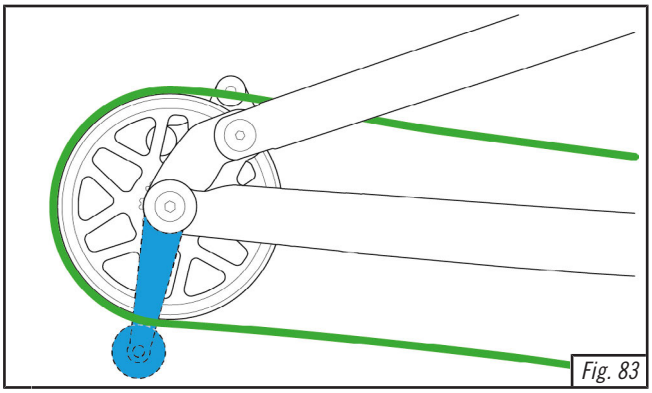
Fig. 83

WARNING

Belts that skip

→ Operate Pinion gearboxes in combination with belt drive only with snubbers.

→ Snubbers can be provided as rollers or fixed guides.

→ Due to impact loads, belts that skip can cause damage to the Pinion gearbox or other components.

IMPORTANT

Position the snubbers close to the running-in point of the belt on the pulley; otherwise, the belt might jam.

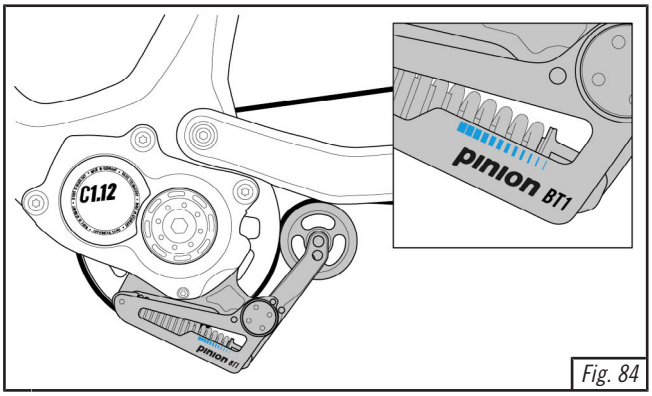

Fig. 84

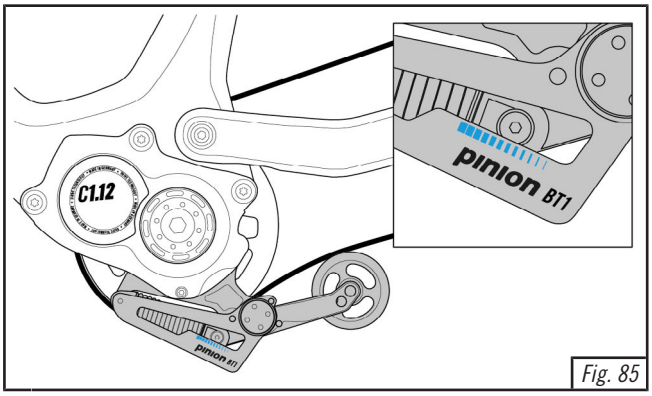

Fig. 85

CHECKING THE BELT TENSIONER OPERATING RANGE

→ Check it in the fully extended and compressed state. It may be necessary to check the condition with the max. and min. extension of the distance from the front to the rear belt pulley.

IMPORTANT

In the slackened state, the belt roller should not rest on the belt pulley.

→ Ensure that there are no collisions and check the tension state of the belt tensioner. To be in the optimal operating range, the belt tensioner should use the range between 10% (see **Fig. 84**) and 90% (see **Fig. 85**). The tension of the belt tensioner can be checked over the entire spring travel range using the scale on the rear. The scale is also included in the CAD data so that you can also conduct the check in the kinematic model in CAD.

→ Adjust the position, belt wheel arrangement, component selection or rear triangle length if necessary.

CHAIN RING (0.5 AW)

IMPORTANT

Only chain rings with 30 teeth and belt pulleys with 39 teeth are permitted

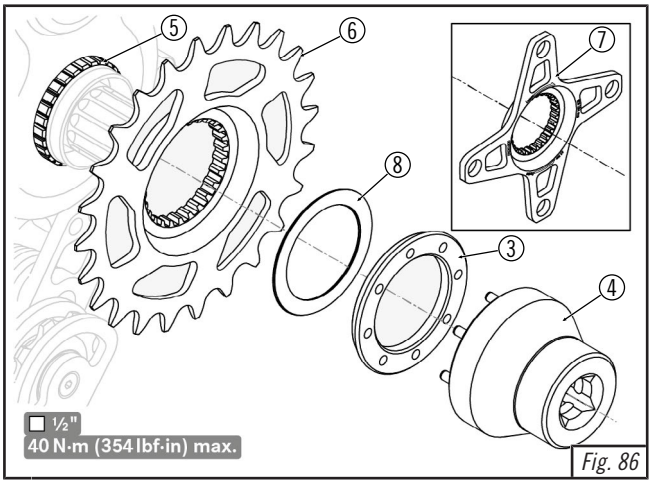

Fig. 86

→ Make sure that the gearing (5) and contact surfaces on the gearbox side and on the sprocket (6) or Spider (7), disc (8) and lockring (3) are free of dirt and old grease.

→ Lightly grease the gearing (5).

→ Fit the sprocket or Spider (with chainring mounted).

→ Lightly grease the contact surfaces of the disc (8).

→ Insert the disc (8) into the sprocket or Spider.

→ Lightly grease the contact surface and thread of the lockring (3).

→ Unscrew the lockring anticlockwise (left-hand thread!) using the Pinion lockring tool (4).

→ Hold the sprocket with the left crank.

→ Tighten the lockring (3) with a tightening torque of 40 Nm (354 lbf in).

→ If necessary, replace the chain; see chain/toothed belt length & tension.

⇨ The replacement of the sprocket is completed.

CRANK (0.5 AW)

IMPORTANT

To protect the teeth (3) on the input shaft and cranks from one-sided stress and wear, it is advisable to dismantle both cranks regularly (once a year) and remount them offset by 1-2 teeth each, and apply fresh carbon assembly paste (e.g., DYNAMIC).

IMPORTANT

The Smart.Shift-Box may only be used in combination with cranks produced in 2021 or later.

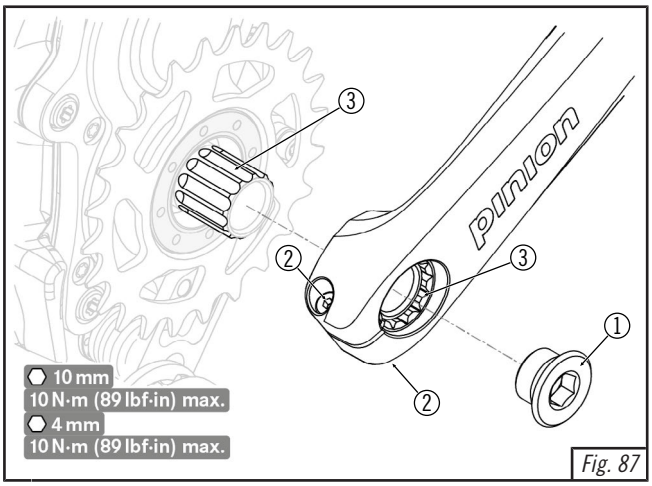

Fig. 87

→ Ensure that the gearing (3) on the input shaft and crank is free of dirt and old lubricants.

→ Verify that both crank clamp screws (2) are each fitted with a SCHNORR® lock washer.

→ Shift the gearbox to 1st gear.

→ Lightly coat the gearing with carbon assembly paste.

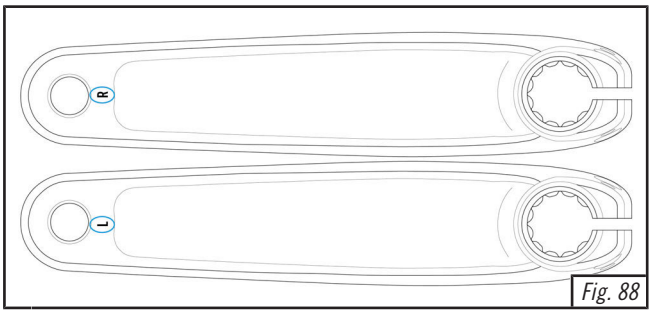
Fig. 88

→ Fit the crank and push it by hand as far as it will go onto the input shaft. If necessary, use a wide screwdriver to carefully expand it; do not use a striking tool (hammer or similar).

→ Screw the central crank screw (1) and tighten it with a tightening torque of 10 Nm (89 lbf in).

WARNING

Danger of accident due to pedals coming loose.

The cranks are marked R(ight) and L(eft). The cranks can also be swapped.

WARNING

Danger of accident due to blocked drive caused by incorrect mounting.

→ Always pull the crank outwards as far as it will go before tightening the crank clamp screws.

IMPORTANT

If a crank is difficult to put on, it can be spread open as follows: Unscrew the crank clamp screw. Hold a metal plate (e.g., a washer) in the crank gap. Turn the screw from the threaded side into the crank , until it rests on the metal plate and the crank is slightly spread open. Slide on the crank, unscrew the screw and proceed with the assembly of the crank in the proper manner.

IMPORTANT

The crank can now be moved by 1-2 mm on the input shaft – this is normal and designed to do so!

→ Pull the crank outwards as far as it will go.

→ Tighten the crank clamp screws (2) gradually and alternately until a tightening torque of 10 Nm (89 lbf in) is reached on both crank clamp screws.

→ Mount the second crank 180° offset.

SCHALTGRIFF DS2.0

With the DS2 we have perfected the proven and intuitive way of shifting a Pinion gearbox. In cooperation with *Ergon*, we have succeeded in ensuring that shifting is possible at all times in wet, cold and hot conditions as well as under high loads.

MOUNTING (0.5 AW)

IMPORTANT

When the Pinion rotary shifter housing is in the correct position, the adjusting screws (1) for the shift cable tension should point downwards and slightly forwards—i.e., approximately in the direction of 4-5 o'clock.

In this position you can optimally read the set gear; the shift cables do not interfere with the brake lever.

In the event of a fall, it is advantageous if the brake lever can twist. The risk of irreparable damage – also to the handlebar – is thus reduced. Only tighten the clamping screws of the brake lever so that it can barely be twisted by hand.

You only need the spacer ring (2) if you use a handlebar grip that tends to touch the rotary shifter.

WARNING

Danger of accident due to restricted braking/steering manoeuvres caused by incorrect mounting.

Danger of accident due to handlebar failure caused by incorrect assembly.

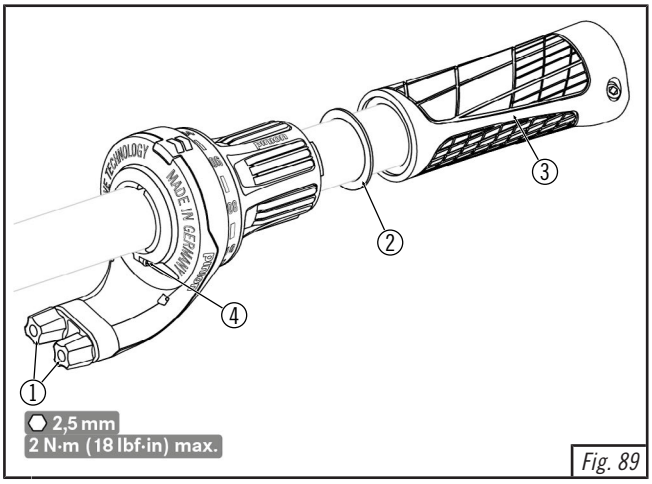

Fig. 89

→ Ensure that the position of the rotary shifter housing does not interfere with the full function of the brake lever in any way.

→ Make sure that the shift cables do not interfere with the steering angle in any way.

→ Always follow the manufacturer's instructions for carbon handlebars.

→ For carbon handlebars, apply carbon assembly paste to the clamping area.

→ Place the rotary shifter housing on the handlebar.

→ Place the handlebar grip (3) and, if necessary, the bar ends on the handlebar.

→ Push the rotary shifter housing against the handlebar grip as far as it will go and turn it into the correct position.

→ Tighten the clamping screw (4) with a tightening torque of 2 Nm (18 lbf in).

→ Ensure that the rotary shifter can be turned freely; if necessary, fit a spacer ring (2).

⇨ The installation of the rotary shifter is completed.

REPLACING THE SHIFT CABLES (C-LINE) (2.5 AW)

IMPORTANT

Your Pinion gearbox is operated with 2 shift cables.

The clamps of the shift cable ends are located in the rotary shifter.

It is imperative that you use commercially available shift cables with the following dimensions: Ø 1.1–1.25 mm, nipples 4.4 × 4.4 mm. Genuine Pinion shift cables guarantee optimum shifting performance and can be obtained from one of the Pinion bicycle dealers.

As a breakdown tool for on the road, you will find an inserted bit (AF 1.5 mm/4 mm) (1) inside your rotary shifter – it fits the clamping screws of the shift cable clamps. You can use the rotary shifter cover as a tool holder if necessary.

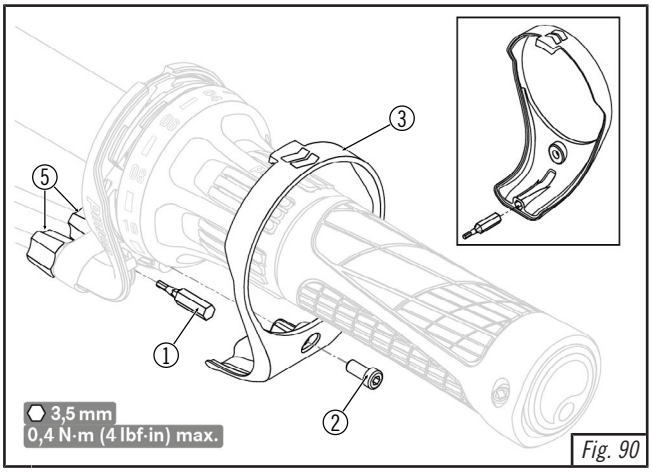

Fig. 90

→ Unscrew the housing screw (2) of the rotary shifter cover (3).

→ Unhook the rotary shifter cover at the top and remove it.

IMPORTANT

Since you will have to move the sun gear of your Pinion gearbox in the course of the shift cable assembly, it is advisable to have the right crank and chain ring mounted. This will make it much easier for you to hold the shift shaft in place.

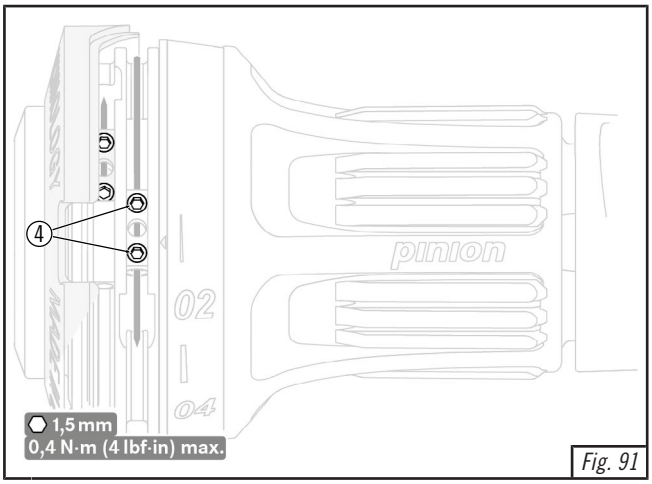

Fig. 91

→ Loosen the clamping screws (4) – 2× per shift cable end.

→ Pull the shift cables out of the rotary shifter.

→ Cut off any spliced shift cable ends with a sharp side cutter.

→ First screw in the adjusting screws (5) completely, then unscrew them by 3 turns.

⇨ This guarantees a sufficient adjustment range for the later adjustment of the gear shift.

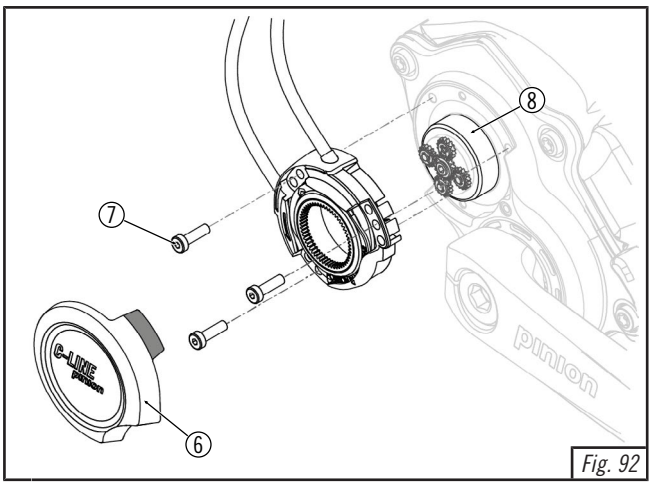

Fig. 92

→ Remove the shift box cover (6) – use a flat screwdriver to lever carefully in the area of the tabs.

→ Unscrew the retaining screws (7) of the shift box

→ Mark the holes used (position of the shift box ring) with a waterproof pencil or similar.

→ Remove the shift box ring with the universal cable pulley.

→ Thoroughly clean the shift box seat on the shift box housing and apply corrosion protection (e.g. protective wax).

→ Clean the planetary wheels and sun wheel thoroughly and grease them generously.

→ Lightly grease the sliding surface (8) of the universal cable pulley.

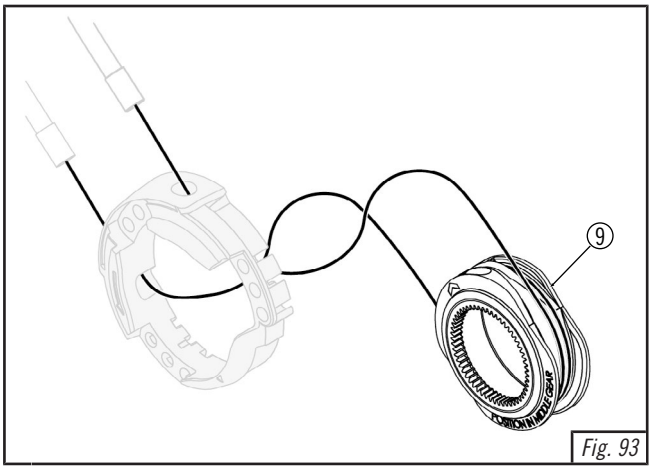

Fig. 93

→ Remove the universal cable pulley (9) together with the shift cables from the shift box ring.

→ Remove the shift cables from the universal cable pulley.

→ Thoroughly clean the universal cable pulley.

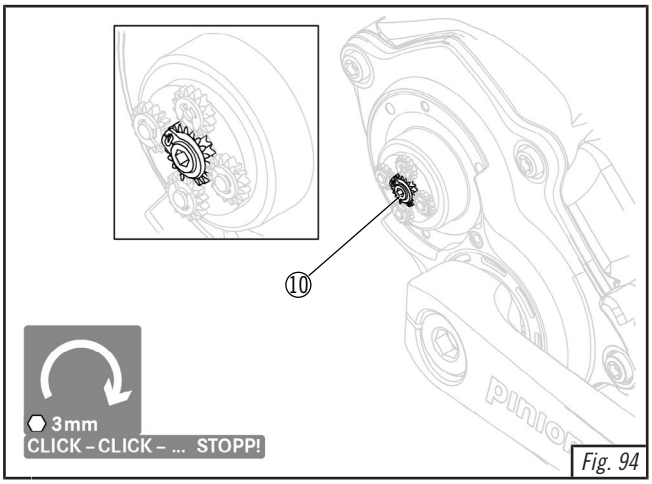

Fig. 94

→ Hold the crank and chain ring.

→ Turn the sun gear (10) clockwise as far as it will go with a 3 mm Allen key.

⇨ 1st gear is engaged.

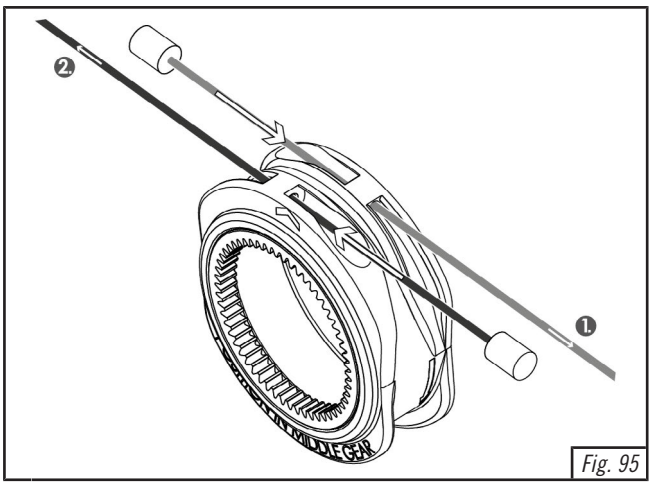

Fig. 95

→ Guide the new shift cables through the insertion holes of the universal cable pulley.

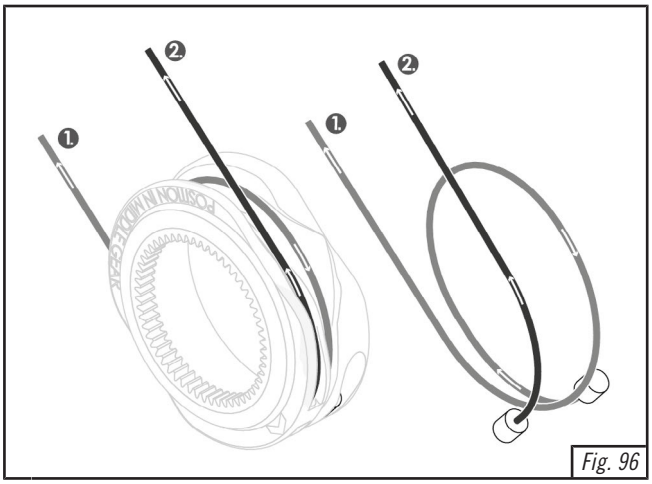

Fig. 96

→ Wind the left shift cable (output 1st) onto the universal cable pulley—1 ¼ turns.

→ Wind the right shift cable (output 2nd) onto the universal cable pulley—¼ turns.

→ Hold the shift cables with the universal cable pulley with one hand so that the shift cables cannot unwind.

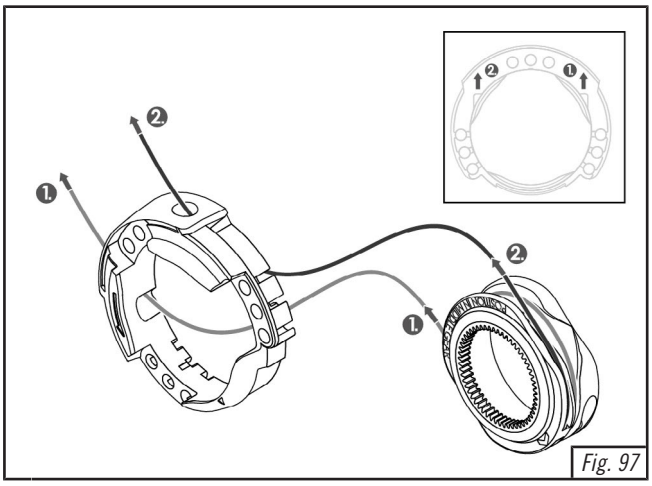

Fig. 97

→ Guide the shift cables through the outputs on the 1st and 2nd of the shift box ring.

→ Keep the shift cables tensioned.

→ Insert the universal cable pulley into the shift box ring.

ATTENTION

When properly wound, the shift cables do not cross each other at any point!

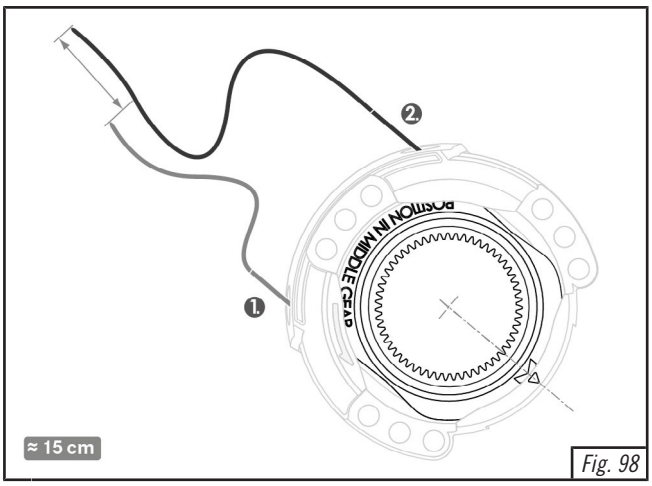

Fig. 98

→ Ensure that the markings (11) on the universal cable pulley and the shift box ring match.

⇨ The universal cable pulley is in the 1st gear position.

→ The right shift cable (output 2nd) protrudes approx. 15 cm further from the shift box ring.

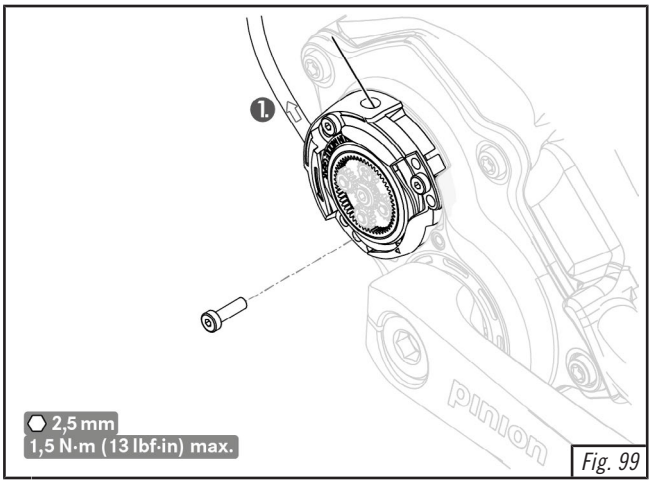

Fig. 99

→ Check whether both shift cables are in the correct position in the guides of the universal cable pulley.

→ Fit the shift box ring with the universal cable pulley in the marked position.

→ Tighten the retaining screws (7) with a tightening torque of 1.5 Nm (13 lbf in).

→ Use plastic outer sheath end caps (diameter 5.8 mm).

→ Guide the left shift cable (output 1st) through the outer casing of the shift cable.

→ Guide the right shift cable (output 2nd) through the outer casing of the shift cable.

→ Check whether both shift cables are in the correct position in the guides of the universal cable pulley.

ATTENTION

Outer sheath end caps made of metal tend to cause the shift cables to splay/ fan out.

Damage to the shift cable liner.

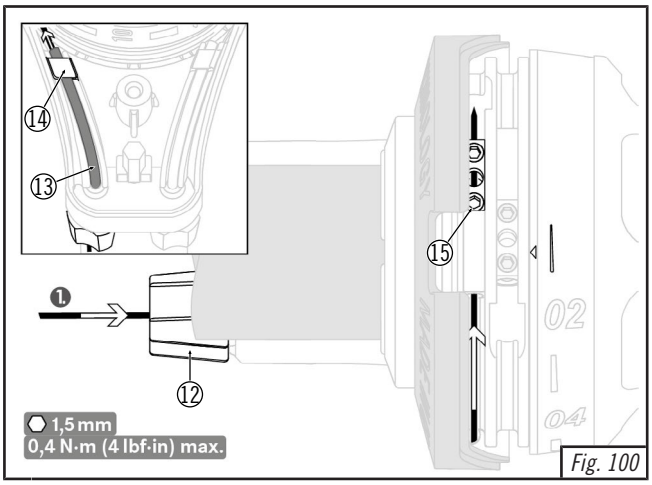

Fig. 100

→ Carefully guide the shift cables through the shift cable liner.

→ If necessary, first remove the shift cable liner and reinsert it together with the shift cable.

→ Shift the rotary shifter to position 01.

→ Guide the left end of the shift cable (output 1st) through the adjusting screw (12), shift cable liner (13), shift cable guide (14) and shift cable clamp (15) located at the rear in the direction of motion.

→ Keep the left end of the shift cable taut.

→ Ensure that the ends of the shift cable outer sleeve are firmly seated in their stops on the adjusting screw and shift box.

→ Tighten both clamping screws, in alternation, with a tightening torque of 0.4 Nm (4 lbf in).

→ Cut off the left end of the shift cable as close as possible behind the shift cable clamp with small sharp side cutters.

IMPORTANT

→ Pull the shift cable clamp slightly out of its seat. It is then easier to cut off the end of the shift cable.

→ Afterwards, make sure that the shift cable clamp is back in its seat as far as it will go.

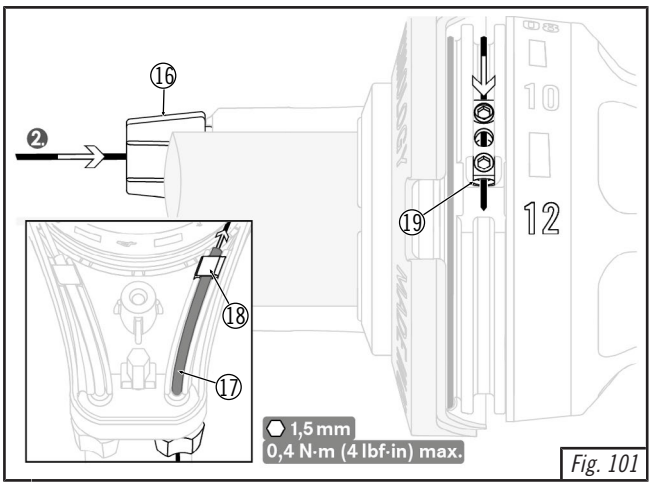

Fig. 101

→ Unscrew the housing screw (2) of the rotary shifter cover (3).

→ Unhook the rotary shifter cover at the top and remove it.

→ Loosen the clamping screws (4) – 2× per shift cable end.

→ Pull the shift cables out of the rotary shifter.

→ Cut off any spliced shift cable ends with a sharp side cutter.

→ First screw in the adjusting screws (5) completely, then unscrew them by 3 turns.

⇨ This guarantees a sufficient adjustment range for the later adjustment of the gear shift.

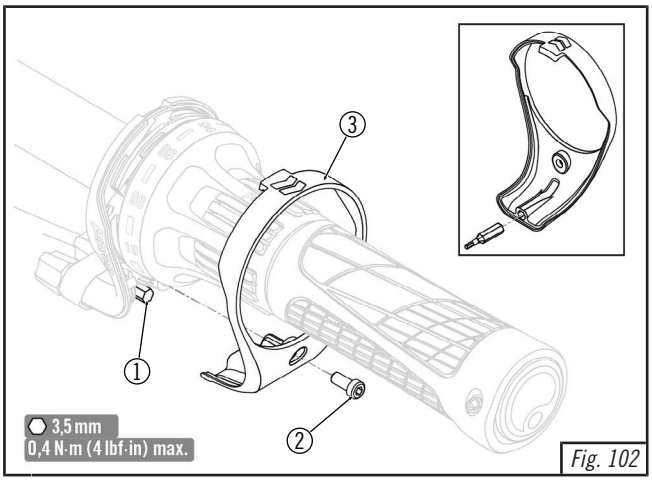

Fig. 102

→ For 12-speed gearboxes: Shift the rotary shifter clockwise (01-02-03- ... -12) to position 12; or:
For 9-speed gearboxes: Shift the rotary shifter clockwise (01-02-03-… -09) to position 09; or:
For 6-speed gearboxes: Shift the rotary shifter clockwise (01-02-03-… -06) to position 06.

→ Guide the right end of the shift cable (output 2nd) through the adjusting screw (16), shift cable liner (17), shift cable guide (18) and shift cable clamp (19) located in front in the direction of motion.

→ Keep the right end of the shift cable taut.

→ Ensure that the ends of the shift cable outer sleeve are firmly seated in their stops on the adjusting screw and shift box.

→ Tighten both clamping screws, in alternation, with a tightening torque of 0.4 Nm (4 lbf in).

→ Cut off the right end of the shift cable as close as possible behind the shift cable clamp with small sharp side cutters.

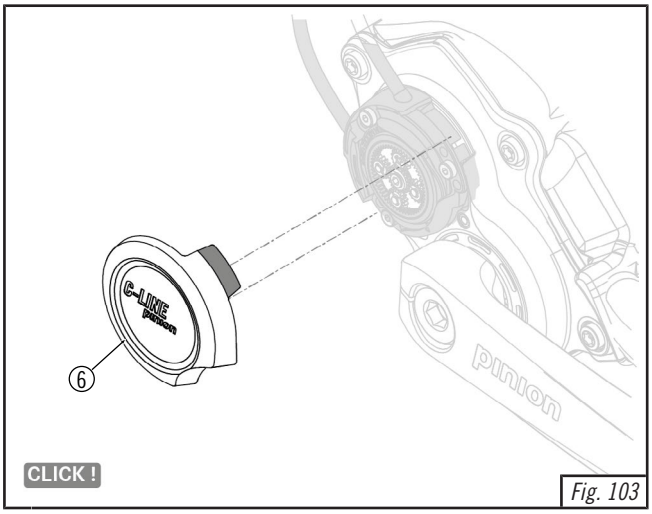

Fig. 103

→ If necessary, pull the bit (1) out of the rotary shifter cover and insert it into its seat inside the rotary shifter.

→ Hook the rotary shifter cover (3) on the top and put it on.

→ Tighten the housing screw (2) with a tightening torque of 0.4 Nm (4 lbf in).

→ Check the shifting function; if necessary, correct the tension at the adjusting screws – see Adjusting the shifting.

→ Put on the shift box cover (6).

⇨ The replacement of the shift cables is completed.

REPLACING THE SHIFT CABLES (P-LINE) (2.5 AW)

IMPORTANT

Your Pinion gearbox is operated with 2 shift cables.

The clamps of the shift cable ends are located in the rotary shifter.

It is imperative that you use commercially available shift cables with the following dimensions: Ø 1.1–1.25 mm, nipples 4.4 × 4.4 mm. Genuine Pinion shift cables guarantee optimum shifting performance and can be obtained from one of the Pinion bicycle dealers.

As a breakdown tool for on the road, you will find an inserted bit (AF 1.5 mm/4 mm) (1) inside your rotary shifter – it fits the clamping screws of the shift cable clamps. You can use the rotary shifter cover as a tool holder if necessary.

Since you will have to move the sun gear of your Pinion gearbox in the course of the shift cable assembly, it is advisable to have the right crank and chain ring mounted. This will make it much easier for you to hold the shift shaft in place.

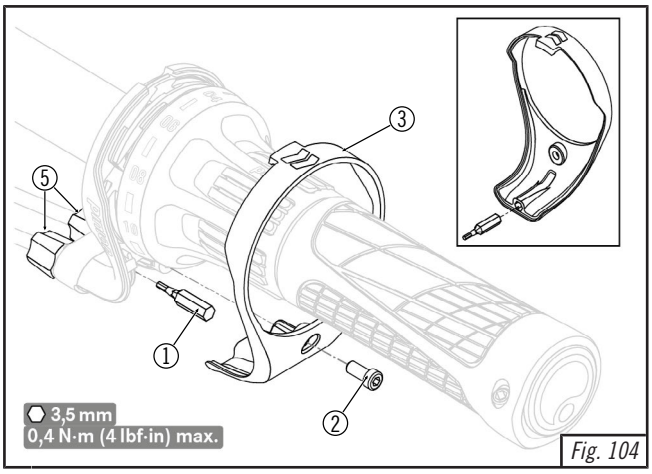

Fig. 104

→ Unscrew the housing screw (2) of the rotary shifter cover (3).

→ Unhook the rotary shifter cover at the top and remove it.

IMPORTANT

Since you will have to move the sun gear of your Pinion gearbox in the course of the shift cable assembly, it is advisable to have the right crank and chain ring mounted. This will make it much easier for you to hold the shift shaft in place.

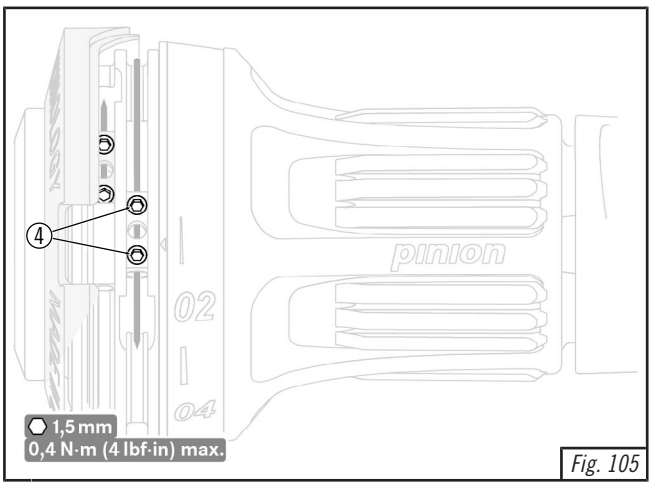

Fig. 105

→ 01 and 18 or 01 and 12 or 01 and 09 depending on the type of your Pinion gearbox.

→ Loosen the clamping screws (4) – 2× per shift cable end.

→ Pull the shift cables out of the rotary shifter.

→ Cut off any spliced shift cable ends with a sharp side cutter.

→ First screw in the adjusting screws (5) completely, then unscrew them by 3 turns.

⇨ This guarantees a sufficient adjustment range for the later adjustment of the gear shift.

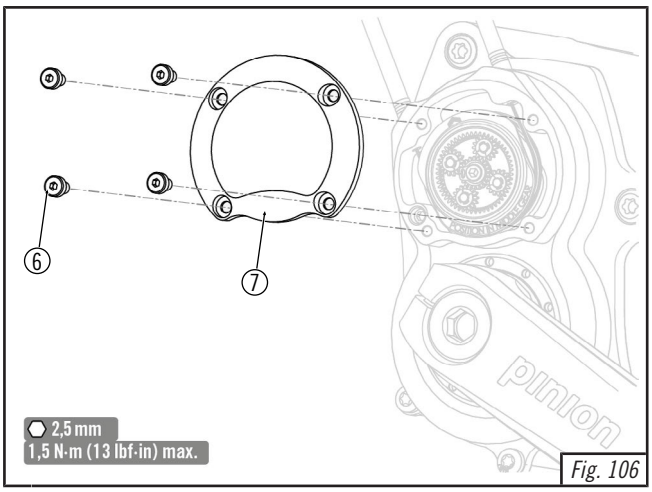

Fig. 106

→ The clamping screws are easily accessible in the rotary shifter positions.

→ Unscrew the housing screws (6) of the shift box cover (7).

→ Remove the shift box cover.

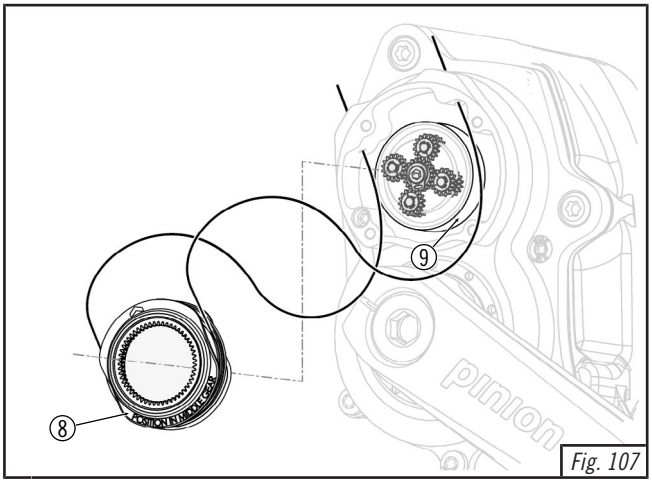

Fig. 107

→ Remove the universal cable pulley (8) together with the shift cables from the shift box.

→ Remove the shift cables from the universal cable pulley.

→ Thoroughly clean the universal cable pulley.

→ Thoroughly clean the inside of the shift box.

→ Clean the planetary wheels and sun wheel thoroughly and grease them generously.

→ Lightly grease the sliding surface (9) of the universal cable pulley.

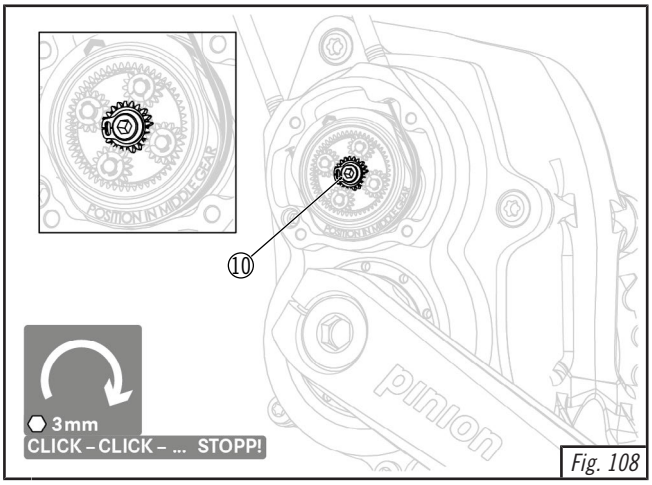

Fig. 108

→ Hold the crank and chain ring.

→ Turn the sun gear (10) clockwise as far as it will go with a 3 mm Allen key.

⇨ 1st gear is engaged.

ATTENTION

When properly wound, the shift cables do not cross each other at any point!

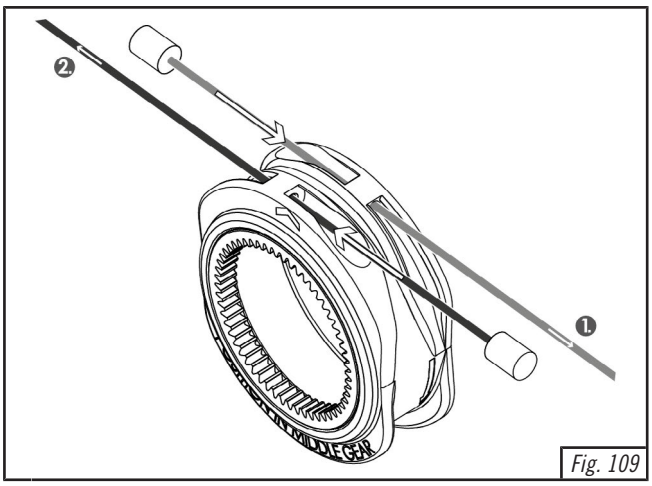

Fig. 109

→ Guide the new shift cables through the insertion holes of the universal cable pulley.

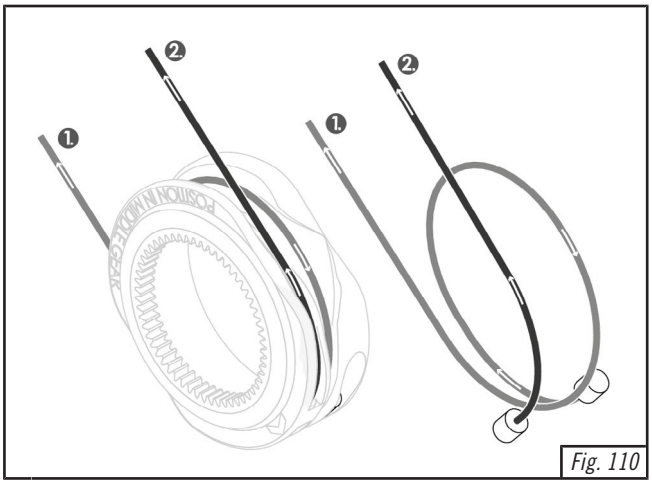

Fig. 110

→ Wind the left shift cable (output 1st) onto the universal cable pulley—1 ¼ turns.

→ Wind the right shift cable (output 2nd) onto the universal cable pulley—¼ turns.

→ Hold the shift cables with the universal cable pulley with one hand so that the shift cables cannot unwind.

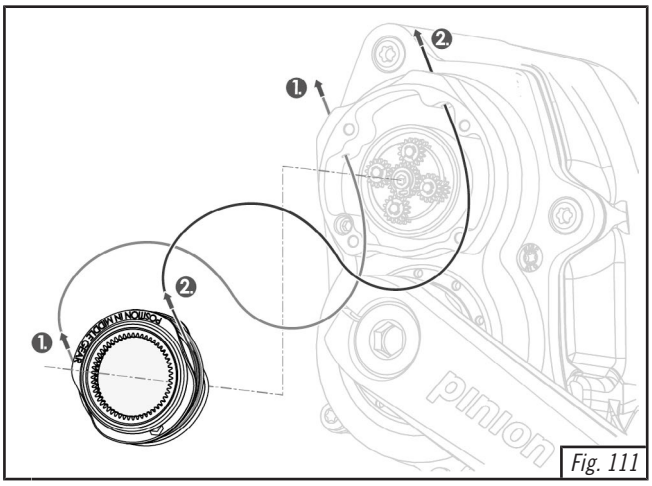

Fig. 111

→ Guide the shift cables through the shift box.

→ Keep the shift cables tensioned.

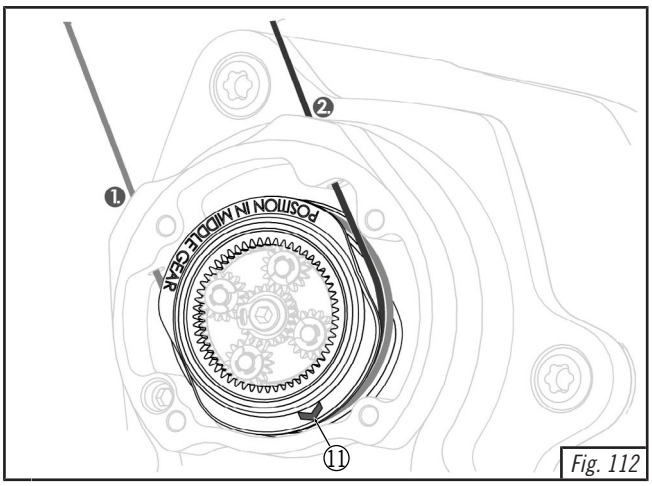

Fig. 112

→ Insert the universal cable pulley into the shift box.

→ Ensure that the mark (11) on the universal cable pulley is centred on the apex of the shift cables.

⇨ The universal cable pulley is in the 1st gear position.

⇨ The right shift cable (output 2nd) protrudes approx. 15 cm further from the shift box ring.

→ Check whether both shift cables are in the correct position in the guides of the universal cable pulley

→ Keep the shift cables tensioned.

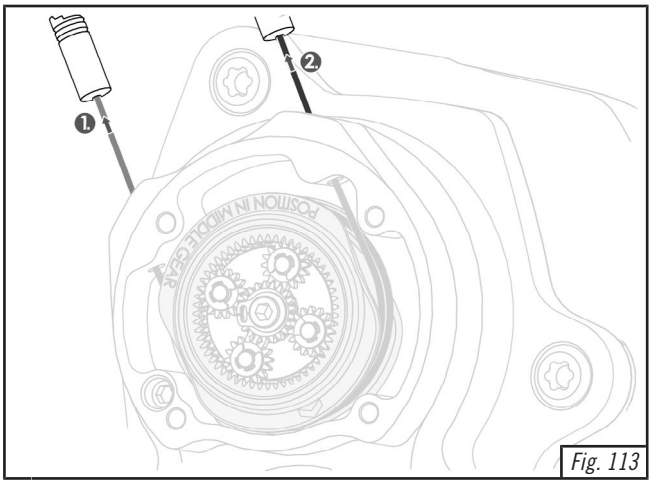

Fig. 113

→ Use plastic outer sheath end caps (diameter 5.8 mm).

→ Guide the left shift cable (output 1st) through the outer casing of the shift cable.

→ Guide the right shift cable (output 2nd) through the outer casing of the shift cable.

→ Check whether both shift cables are in the correct position in the guides of the universal cable pulley.

→ Carefully guide the shift cables through the shift cable liner.

→ If necessary, first remove the shift cable liner and reinsert it together with the shift cable.

→ Shift the rotary shifter to position 01.

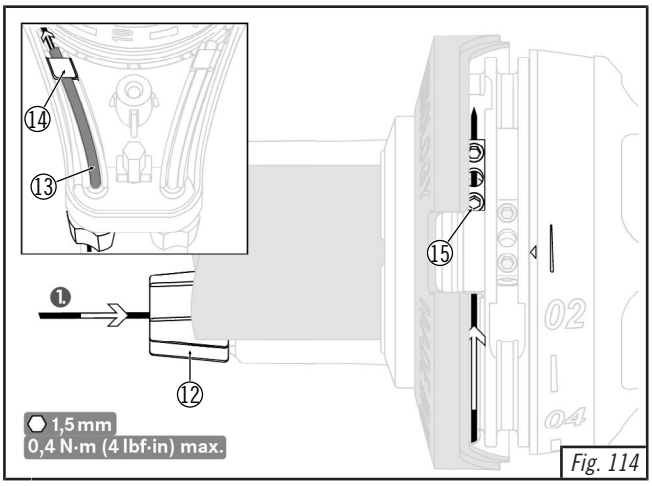

Fig. 114

→ Guide the left end of the shift cable (output 1st) through the adjusting screw (12), shift cable liner (13), shift cable guide (14) and shift cable clamp (15) located at the rear in the direction of motion.

→ Keep the left end of the shift cable taut.

→ Ensure that the ends of the shift cable outer sleeve are firmly seated in their stops on the adjusting screw and shift box.

→ Tighten both clamping screws, in alternation, with a tightening torque of 0.4 Nm (4 lbf in).

→ Cut off the left end of the shift cable as close as possible behind the shift cable clamp with small sharp side cutters.

ATTENTION

Outer sheath end caps made of metal tend to cause the shift cables to splay/ fan out.

Damage to the shift cable liner.

IMPORTANT

→ Pull the shift cable clamp slightly out of its seat. It is then easier to cut off the end of the shift cable.

→ Afterwards, make sure that the shift cable clamp is back in its seat as far as it will go.

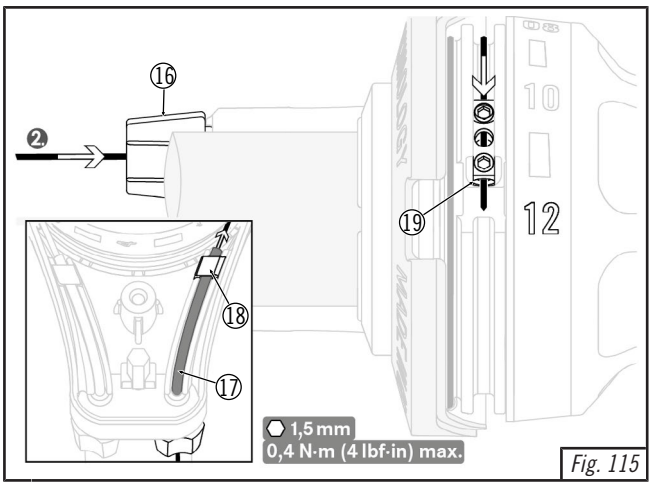

Fig. 115

→ For 18-speed gearboxes: Shift the rotary shifter clockwise (01-02-03-… -18) to position 18; or:

→ For 12-speed gearboxes: Shift the rotary shifter clockwise (01-02-03-… -12) to position 12; or:

→ For 9-speed gearboxes: Shift the rotary shifter clockwise (01-02-03-… -09) to position 09.

→ Guide the right end of the shift cable (output 2nd) through the adjusting screw (16), shift cable liner (17), shift cable guide (18) and shift cable clamp (19) located in front in the direction of motion.

→ Keep the right end of the shift cable taut.

→ Ensure that the ends of the shift cable outer sleeve are firmly seated in their stops on the adjusting screw and shift box.

→ Tighten both clamping screws, in alternation, with a tightening torque of 0.4 Nm (4 lbf in).

→ Cut off the right end of the shift cable as close as possible behind the shift cable clamp with small sharp side cutters.

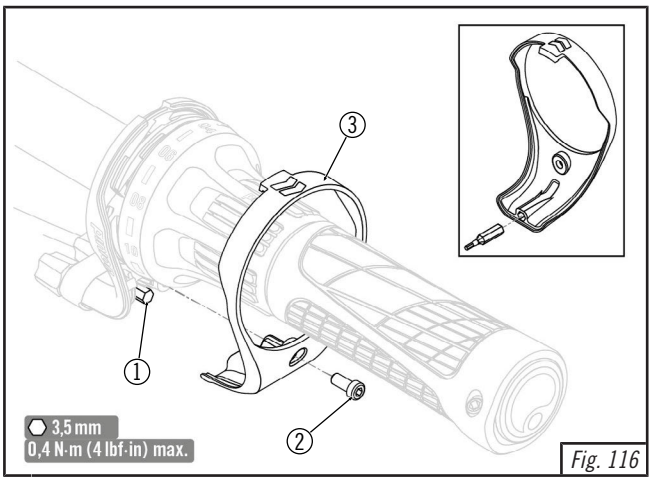

Fig. 116

→ If necessary, pull the bit (1) out of the rotary shifter cover and insert it into its seat inside the rotary shifter.

→ Hook the rotary shifter cover (3) on the top and put it on.

→ Tighten the housing screw (2) with a tightening torque of 0.4 Nm (4 lbf in).

→ Check the switching function; if necessary, correct the tension at the adjusting screws.

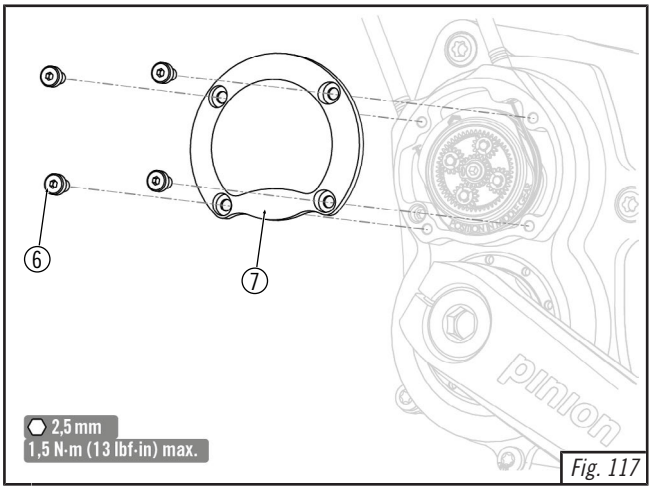

Fig. 117

→ Put on the shift box cover (7).

→ Tighten the housing screws (6) with a tightening torque of 1.5 Nm (13 lbf in).

⇨ The replacement of the shift cables is completed.

ADJUSTING THE ROTARY SHIFTER

IMPORTANT

Your Pinion gearbox is correctly adjusted when the desired shifting process takes place immediately (tension), all gears can be shifted with little effort (tension) and the display on the rotary shifter corresponds to the selected gear (synchronisation).

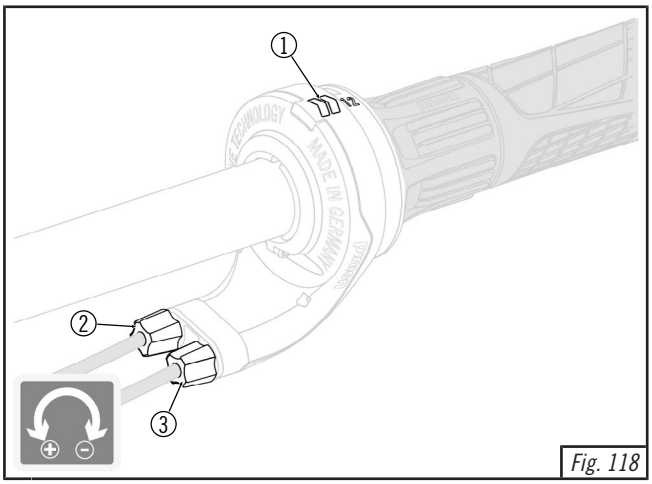

Fig. 118

Adjusting the tension

→ Unscrew both adjusting screws ¼ turn anticlockwise (+).

→ The tension is increased.

→ The force required is increased; or:

→ Unscrew both adjusting screws ¼ turn clockwise (-).

→ The tension is reduced.

⇨ There is more play on the rotary shifter, shifting is less direct.

IMPORTANT

The tension is always within the correct range when the ends of the shift cable outer sheaths lie free of play but without pressure in their stops on the gearbox and the rotary shifter housing and the latter has approx. 2 mm of rotational play.

Synchronising the rotary shifter position

→ Turn the rotary shifter clockwise (01-02-03- ...) as far as it will go in the direction of the last position (12 or 09 or 06).

→ Check whether the symbol of the last position (12 or 09 or 06) is centred next to the mark (1).

→ Screw in the adjusting screw (2) ¼ turn clockwise (-).

→ Unscrew the adjusting screw (3) ¼ turn anticlockwise (+).

→ Number ring moves towards position 11 or 08 or 05;
or:

→ Unscrew the adjusting screw (2) ¼ turn anticlockwise (+).

→ Screw in the adjusting screw (3) ¼ turn clockwise (-).

→ Number ring moves towards position or 01.

→ Check the adjustment, repeat procedures if necessary

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MOUNTING (0.5 AW)

IMPORTANT

When the Pinion rotary shifter housing is in the correct position, the adjusting screws (1) for the shift cable tension should point downwards and slightly forwards—i.e., approximately in the direction of 4-5 o'clock.

In this position you can optimally read the set gear; the shift cables do not interfere with the brake lever.

In the event of a fall, it is advantageous if the brake lever can twist. The risk of irreparable damage – also to the handlebar – is thus reduced. Only tighten the clamping screws of the brake lever so that it can barely be twisted by hand.

WARNING

Danger of accident due to restricted braking/steering manoeuvres caused by incorrect mounting.

Danger of accident due to handlebar failure caused by incorrect assembly.

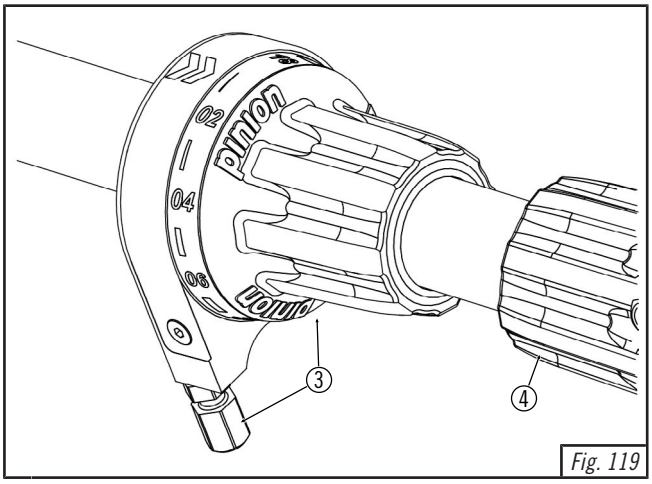

Fig. 119

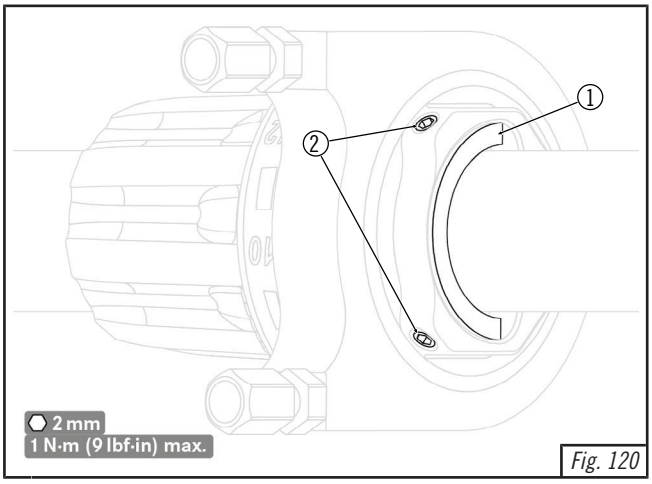

Fig. 120

→ Ensure that the position of the rotary shifter housing does not interfere with the full function of the brake lever in any way.

→ Make sure that the shift cables do not interfere with the steering angle in any way.

→ Check whether the clamping ring (1) is in place, so that the clamping screws (2) do not act directly on the handlebar surface.

→ Always follow the manufacturer's instructions for carbon handlebars.

→ For carbon handlebars, apply carbon assembly paste to the clamping area.

→ Place the rotary shifter on the handlebar.

→ Place the handlebar grip (4) and, if necessary, the bar ends on the handlebar.

→ Push the rotary shifter against the handlebar grip as far as it will go and turn it into the correct position.

→ Tighten both clamping screws (2) gradually and alternately—do not exceed a maximum tightening torque of 1 Nm (9 lbf in).

⇨ The installation of the rotary shifter is completed.

REPLACING THE SHIFT CABLES (C-LINE) (2.5 AW)

IMPORTANT

Your Pinion gearbox is operated with 2 shift cables.

The clamps of the shift cable ends are located in the rotary shifter.

It is imperative that you use commercially available shift cables with the following dimensions: Ø 1.1–1.25 mm, nipples 4.4 × 4.4 mm. Genuine Pinion shift cables guarantee optimum shifting performance and can be obtained from one of the Pinion bicycle dealers.

As a breakdown tool for on the road, you will find an inserted bit (AF 1.5 mm/4 mm) (1) inside your rotary shifter – it fits the clamping screws of the shift cable clamps. You can use the rotary shifter cover as a tool holder if necessary.

Since you will have to move the sun gear of your Pinion gearbox in the course of the shift cable assembly, it is advisable to have the right crank and chain ring mounted. This will make it much easier for you to hold the shift shaft in place.

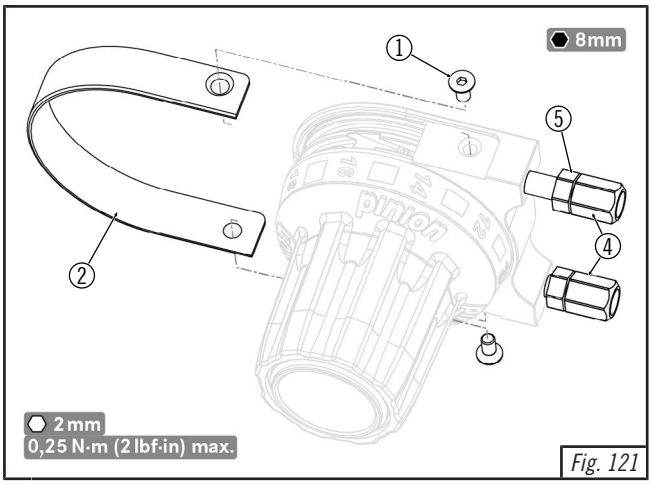

Fig. 121

→ Unscrew the housing screws (1) of the rotary shifter cover (2).

→ Remove the rotary shifter cover.

IMPORTANT

The clamping screws are easily accessible in the rotary shifter positions 01 and 18 or 01 and 12 or 01 and 09, depending on the type of your Pinion gearbox.

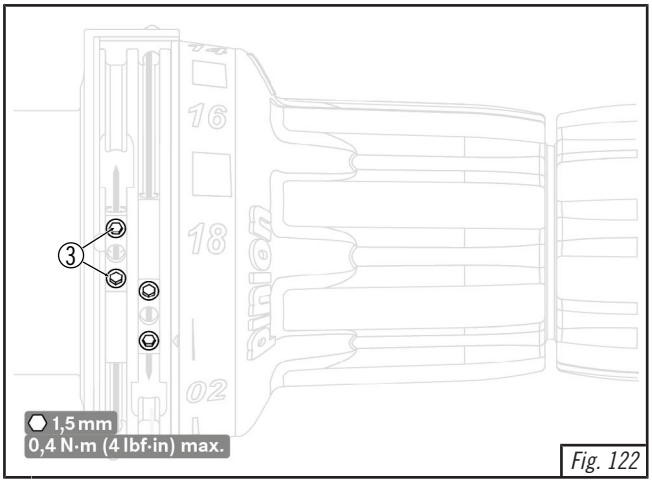

Fig. 122

→ Loosen the clamping screws (3) – 2× per shift cable end.

→ Pull the shift cables out of the rotary shifter.

→ Cut off any spliced shift cable ends with a sharp side cutter.

→ Hold the adjusting screws (4) and loosen the lock nuts (5).

→ Screw the lock nuts onto the adjusting screw heads as far as they will go.

→ First screw in the adjusting screws completely, then unscrew them by 3 turns.

→ This guarantees a sufficient adjustment range for the later adjustment of the gear shift.

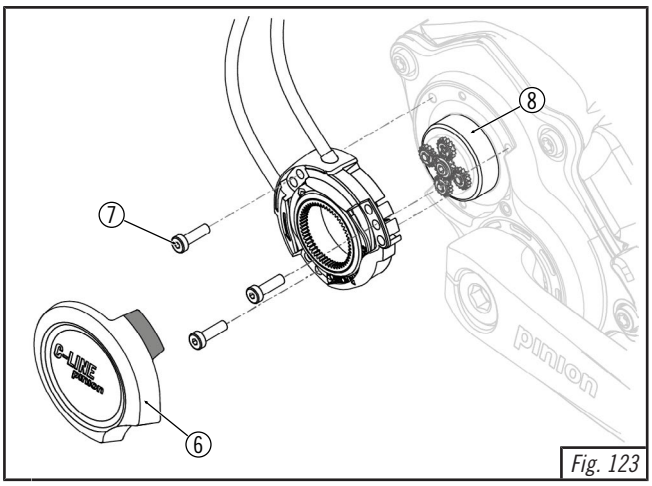

Fig. 123

→ Remove the shift box cover (6) – use a flat screwdriver to lever carefully in the area of the tabs.

→ Unscrew the retaining screws (7) of the shift box

→ Mark the holes used (position of the shift box ring) with a waterproof pencil or similar.

→ Remove the shift box ring with the universal cable pulley.

→ Thoroughly clean the shift box seat on the shift box housing and apply corrosion protection (e.g. protective wax).

→ Clean the planetary wheels and sun wheel thoroughly and grease them generously.

→ Lightly grease the sliding surface (8) of the universal cable pulley.

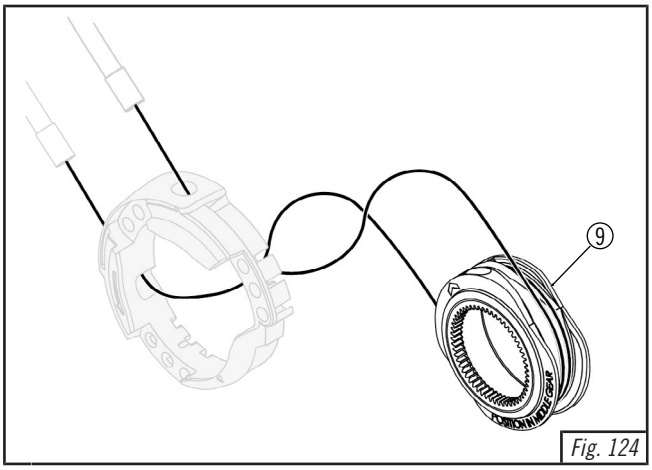

Fig. 124

→ Remove the universal cable pulley (9) together with the shift cables from the shift box ring.

→ Remove the shift cables from the universal cable pulley.

→ Thoroughly clean the universal cable pulley.

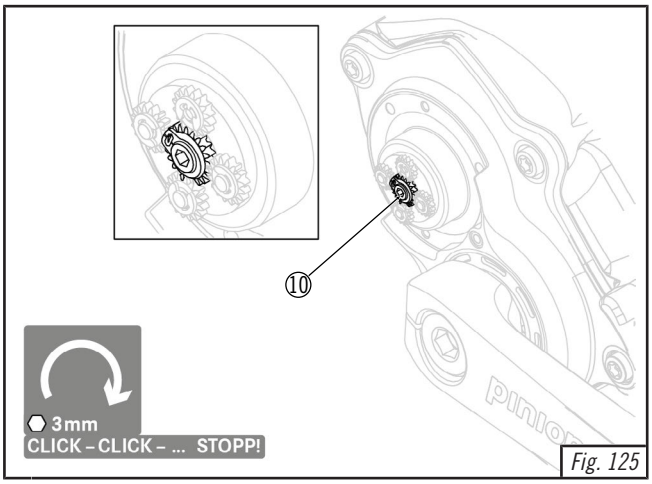

Fig. 125

→ Hold the crank and chain ring.

→ Turn the sun gear (10) clockwise as far as it will go with a 3 mm Allen key.

⇨ 1st gear is engaged.

ATTENTION

When properly wound, the shift cables do not cross each other at any point!

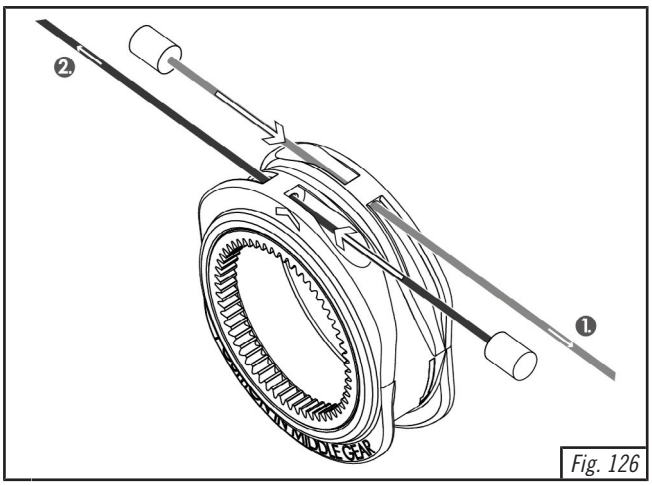

Fig. 126

→ Guide the new shift cables through the insertion holes of the universal cable pulley.

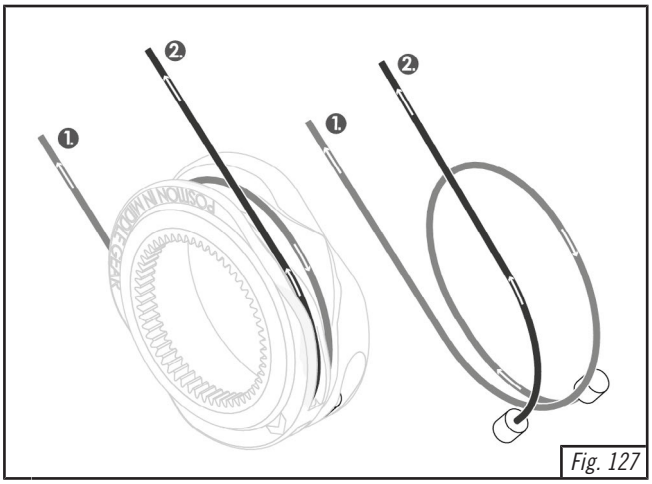

Fig. 127

→ Wind the left shift cable (output 1st) onto the universal cable pulley—1 ¼ turns.

→ Wind the right shift cable (output 2nd) onto the universal cable pulley—¼ turns.

→

→ Hold the shift cables with the universal cable pulley with one hand so that the shift cables cannot unwind.

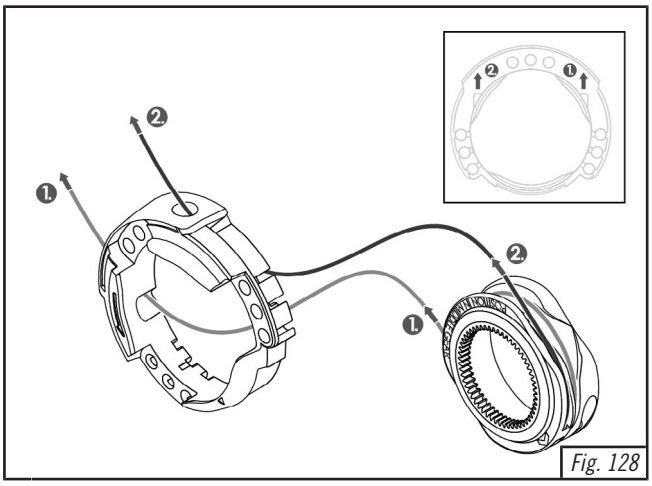

Fig. 128

→ Guide the shift cables through the outputs on the 1st and 2nd of the shift box ring.

→ Keep the shift cables tensioned.

→ Insert the universal cable pulley into the shift box ring.

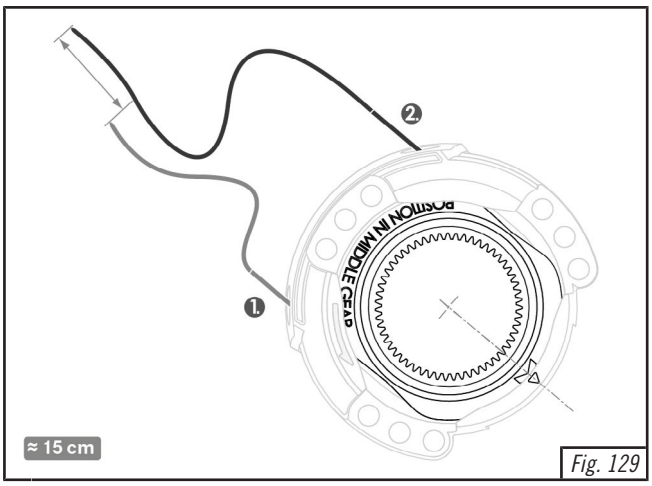

Fig. 129

→ Ensure that the markings (11) on the universal cable pulley and the shift box ring match.

→ The universal cable pulley is in the 1st gear position.

⇨ The right shift cable (output 2nd) protrudes approx. 15 cm further from the shift box ring.

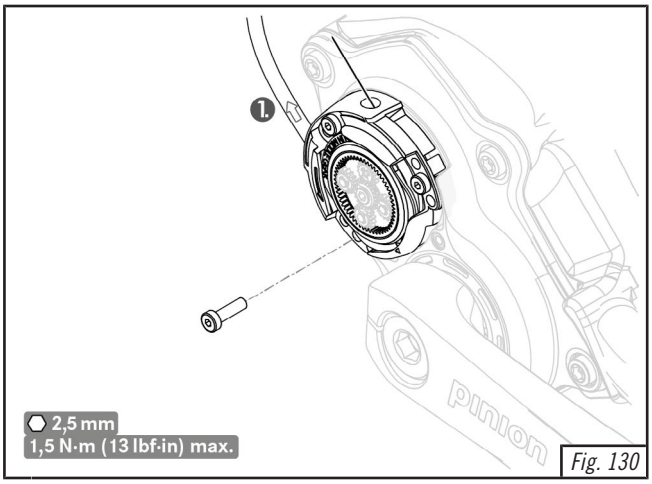

Fig. 130

→ Check whether both shift cables are in the correct position in the guides of the universal cable pulley.

→ Fit the shift box ring with the universal cable pulley in the marked position.

→ Tighten the retaining screws (7) with a tightening torque of 1.5 Nm (13 lbf in).

→ Use plastic outer sheath end caps (diameter 5.8 mm).

→ Guide the left shift cable (output 1st) through the outer casing of the shift cable.

→ Guide the right shift cable (output 2nd) through the outer casing of the shift cable.

→ Check whether both shift cables are in the correct position in the guides of the universal cable pulley.

ATTENTION

Outer sheath end caps made of metal tend to cause the shift cables to splay/ fan out.

Damage to the shift cable liner.

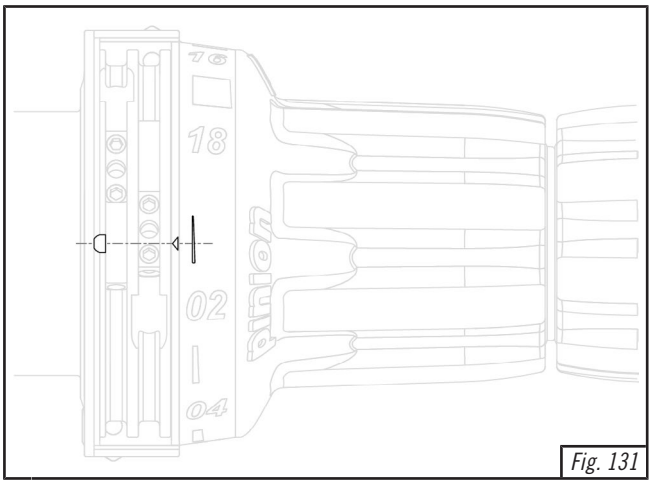

Fig. 131

→ Use plastic outer sheath end caps (diameter 5.8 mm).

→ Guide the left shift cable (output 1st) through the outer casing of the shift cable.

→ Guide the right shift cable (output 2nd) through the outer casing of the shift cable.

→ Check whether both shift cables are in the correct position in the guides of the universal cable pulley.

→ Shift the rotary shifter to position 01.

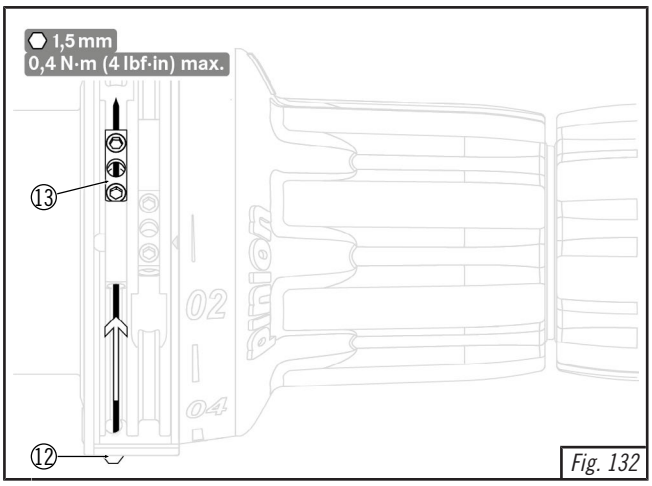

Fig. 132

→ Guide the left-hand end of the shift cable through the adjusting screw (12), which is located further inwards towards the centre of the handlebar, then through the rotary shifter housing and the shift cable clamp (13).

→ Keep the left end of the shift cable taut.

→ Ensure that the ends of the shift cable outer sleeve are firmly seated in their stops on the adjusting screw and shift box.

→ Tighten both clamping screws, in alternation, with a tightening torque of 0.4 Nm (4 lbf in).

→ Cut off the left end of the shift cable as close as possible behind the shift cable clamp with small sharp side cutters.

IMPORTANT

→ Pull the shift cable clamp slightly out of its seat. It is then easier to cut off the end of the shift cable.

→ Afterwards, make sure that the shift cable clamp is back in its seat as far as it will go.

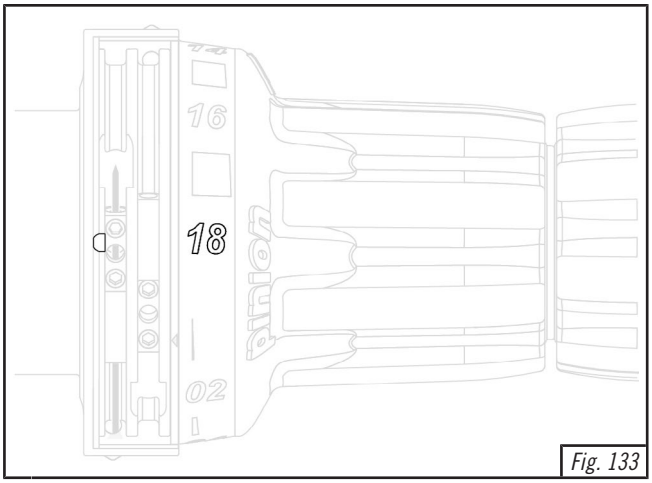

Fig. 133

→ For 12-speed gearboxes: Shift the rotary shifter clockwise (01-02-03-… -18) to position 12; or:

→ For 9-speed gearboxes: Shift the rotary shifter clockwise (01-02-03-… -12) to position 09; or:

→ For 6-speed gearboxes: Shift the rotary shifter clockwise (01-02-03-… -09) to position 06.

→ Guide the right shift cable through the outer casing of the shift cable.

→ Check whether both shift cables are in the correct position in the guides of the universal cable pulley.

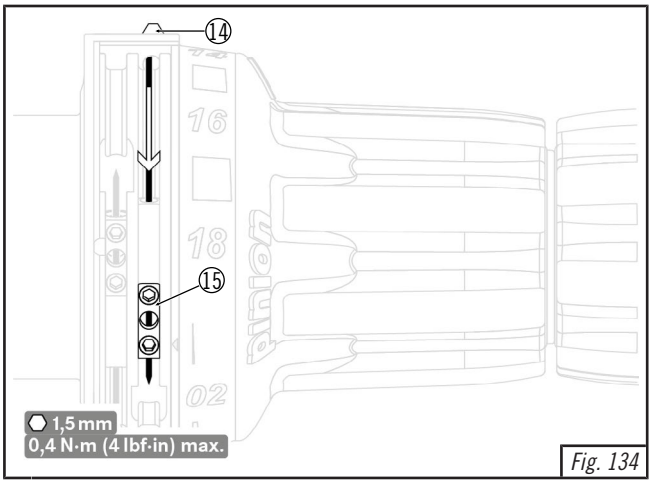

Fig. 134

→ Guide the right-hand end of the shift cable through the adjusting screw (14), which is located further out towards the end of the handlebar, then through the rotary shifter housing and the shift cable clamp (15).

→ Keep the right end of the shift cable taut.

→ Ensure that the ends of the shift cable outer sleeve are firmly seated in their stops on the adjusting screw and shift box.

→ Tighten both clamping screws, in alternation, with a tightening torque of 0.4 Nm (4 lbf in).

→ Cut off the right end of the shift cable as close as possible behind the shift cable clamp with small sharp side cutters.

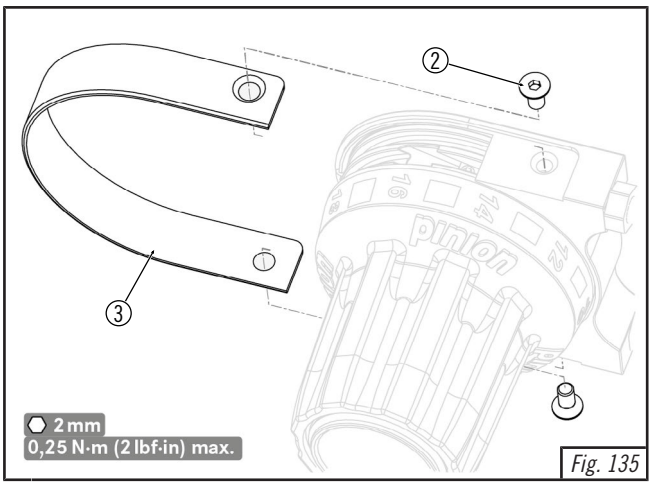

Fig. 135

→ Put on the rotary shifter cover (2).

→ Tighten the housing screws (1) with a tightening torque of 0.25 Nm (2 lbf in).

→ Check the switching function; if necessary, correct the tension at the adjusting screws.

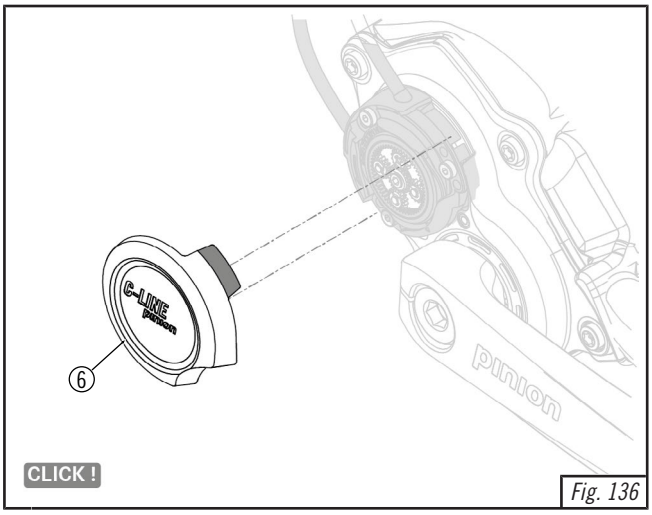

Fig. 136

→ Put on the shift box cover (5).

⇨ The replacement of the shift cables is completed.

REPLACING THE SHIFT CABLES (P-LINE) (2.5 AW)

IMPORTANT

Your Pinion gearbox is operated with 2 shift cables.

The clamps of the shift cable ends are located in the rotary shifter.

It is imperative that you use commercially available shift cables with the following dimensions: Ø 1.1–1.25 mm, nipples 4.4 × 4.4 mm. Genuine Pinion shift cables guarantee optimum shifting performance and can be obtained from one of the Pinion bicycle dealers.

As a breakdown tool for on the road, you will find an inserted bit (AF 1.5 mm/4 mm) (1) inside your rotary shifter – it fits the clamping screws of the shift cable clamps. You can use the rotary shifter cover as a tool holder if necessary.

Since you will have to move the sun gear of your Pinion gearbox in the course of the shift cable assembly, it is advisable to have the right crank and chain ring mounted. This will make it much easier for you to hold the shift shaft in place.

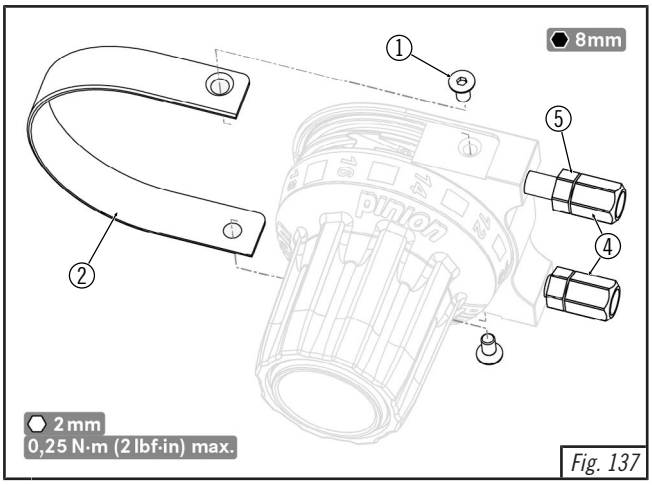

Fig. 137

→ Unscrew the housing screws (1) of the rotary shifter cover (2).

→ Remove the rotary shifter cover.

IMPORTANT

The clamping screws are easily accessible in the rotary shifter positions 01 and 18 or 01 and 12 or 01 and 09, depending on the type of your Pinion gearbox.

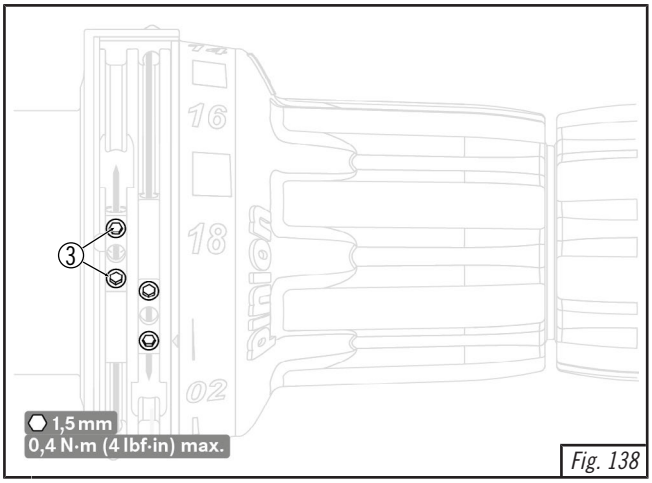

Fig. 138

→ Loosen the clamping screws (3) – 2× per shift cable end.

→ Pull the shift cables out of the rotary shifter.

→ Cut off any spliced shift cable ends with a sharp side cutter.

→ Hold the adjusting screws (4) and loosen the lock nuts (5).

→ Screw the lock nuts onto the adjusting screw heads as far as they will go.

→ First screw in the adjusting screws completely, then unscrew them by 3 turns.

→ This guarantees a sufficient adjustment range for the later adjustment of the gear shift.

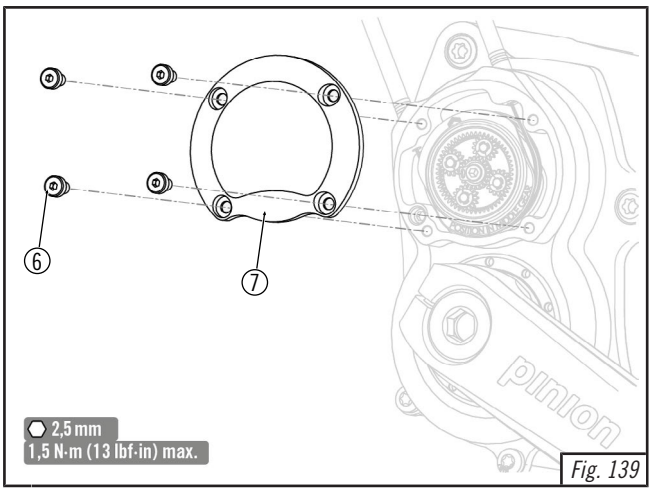

Fig. 139

→ Unscrew the housing screws (6) of the shift box cover (7).

→ Remove the shift box cover.

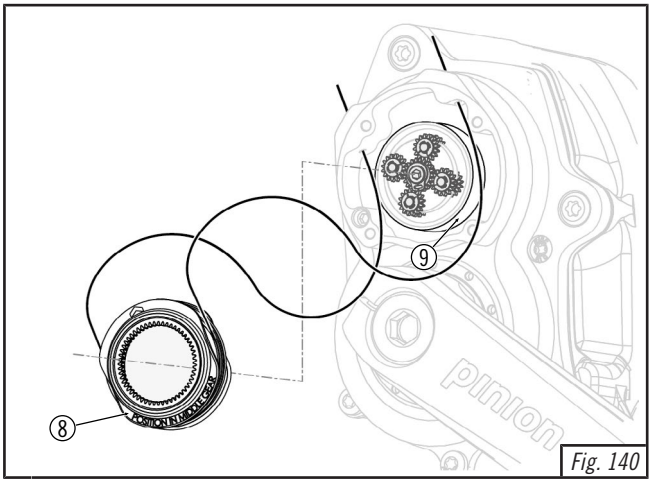

Fig. 140

→ Remove the universal cable pulley (8) together with the shift cables from the shift box.

→ Remove the shift cables from the universal cable pulley.

→ Thoroughly clean the universal cable pulley.

→ Thoroughly clean the inside of the shift box.

→ Clean the planetary wheels and sun wheel thoroughly and grease them generously.

→ Lightly grease the sliding surface (9) of the universal cable pulley.

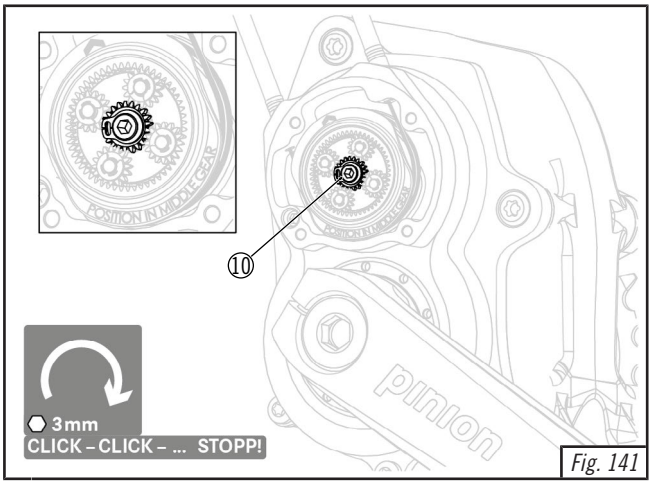

Fig. 141

→ Hold the crank and chain ring.

→ Turn the sun gear (10) clockwise as far as it will go with a 3 mm Allen key.

⇨ 1st gear is engaged.

ATTENTION

When properly wound, the shift cables do not cross each other at any point!

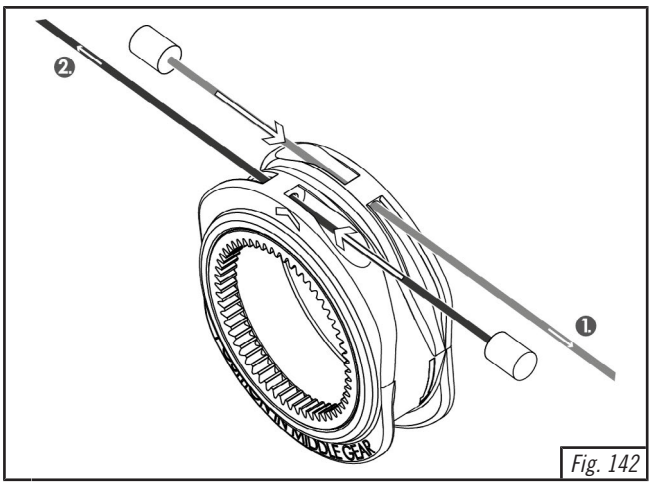

Fig. 142

→ Guide the new shift cables through the insertion holes of the universal cable pulley.

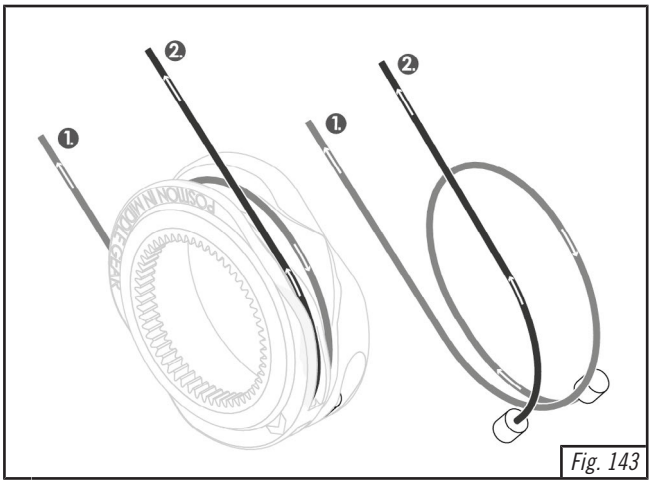

Fig. 143

→ Wind the left shift cable (output 1st) onto the universal cable pulley—1 ¼ turns.

→ Wind the right shift cable (output 2nd) onto the universal cable pulley—¼ turns.

→ Hold the shift cables with the universal cable pulley with one hand so that the shift cables cannot unwind.

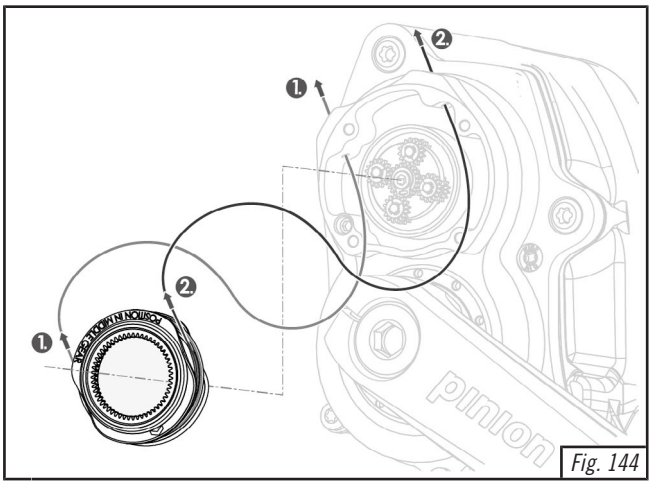

Fig. 144

→ Guide the shift cables through the shift box.

→ Keep the shift cables tensioned.

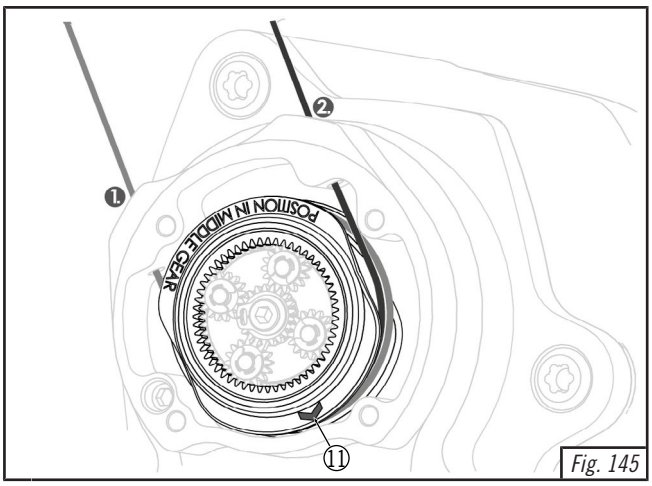

Fig. 145

→ Insert the universal cable pulley into the shift box.

→ Ensure that the mark (11) on the universal cable pulley is centred on the apex of the shift cables.

→ The universal cable pulley is in the 1st gear position.

→ The right shift cable (output 2nd) protrudes approx. 15 cm further from the shift box ring.

→ Check whether both shift cables are in the correct position in the guides of the universal cable pulley.

→

→ Keep the shift cables tensioned.

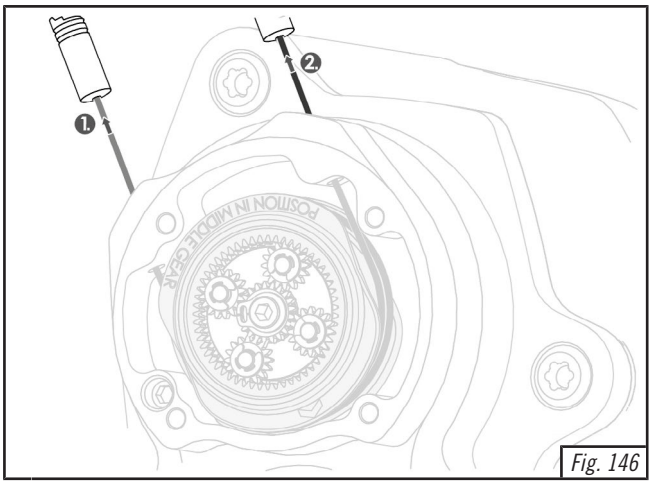

Fig. 146

ATTENTION

Outer sheath end caps made of metal tend to cause the shift cables to splay/ fan out.

Damage to the shift cable liner.

→ Use plastic outer sheath end caps (diameter 5.8 mm).

→ Guide the left shift cable (output 1st) through the outer casing of the shift cable.

→ Guide the right shift cable (output 2nd) through the outer casing of the shift cable.

→ Check whether both shift cables are in the correct position in the guides of the universal cable pulley.

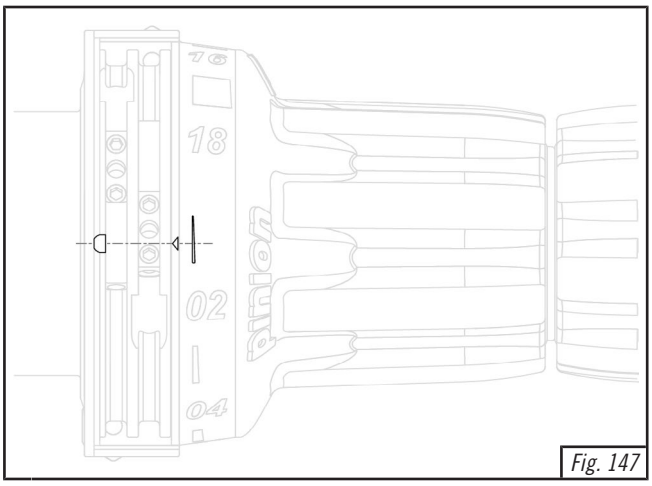

Fig. 147

→ Shift the rotary shifter to position 01.

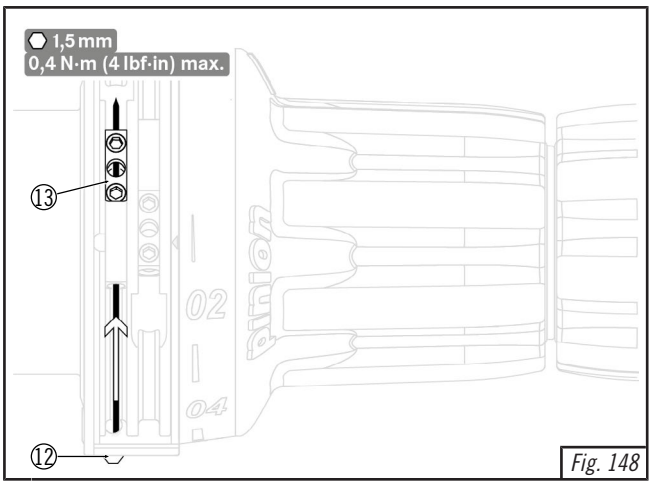

Fig. 148

→ Guide the left-hand end of the shift cable through the adjusting screw (12), which is located further inwards towards the centre of the handlebar, then through the rotary shifter housing and the shift cable clamp (13).

→ Keep the left end of the shift cable taut.

→ Ensure that the ends of the shift cable outer sleeve are firmly seated in their stops on the adjusting screw and shift box.

→ Tighten both clamping screws, in alternation, with a tightening torque of 0.4 Nm (4 lbf in).

→ Cut off the left end of the shift cable as close as possible behind the shift cable clamp with small sharp side cutters.

IMPORTANT

→ Pull the shift cable clamp slightly out of its seat. It is then easier to cut off the end of the shift cable.

→ Afterwards, make sure that the shift cable clamp is back in its seat as far as it will go.

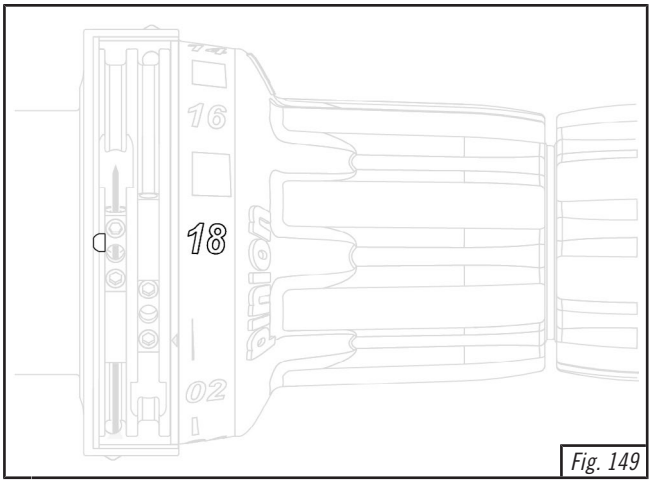

Fig. 149

→ For 18-speed gearboxes: Shift the rotary shifter clockwise (01-02-03-… -18) to position 18; or:

→ For 12-speed gearboxes: Shift the rotary shifter clockwise (01-02-03-… -12) to position 12; or:

→ For 9-speed gearboxes: Shift the rotary shifter clockwise (01-02-03-… -09) to position 09.

→ Guide the right shift cable through the outer casing of the shift cable.

→ Check whether both shift cables are in the correct position in the guides of the universal cable pulley.

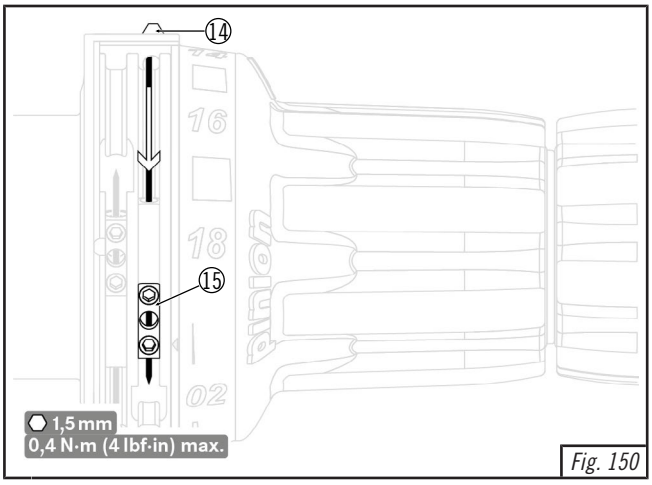

Fig. 150

→ Guide the right-hand end of the shift cable through the adjusting screw (14), which is located further out towards the end of the handlebar, then through the rotary shifter housing and the shift cable clamp (15).

→ Keep the right end of the shift cable taut.

→ Ensure that the ends of the shift cable outer sleeve are firmly seated in their stops on the adjusting screw and shift box.

→ Tighten both clamping screws, in alternation, with a tightening torque of 0.4 Nm (4 lbf in).

→ Cut off the right end of the shift cable as close as possible behind the shift cable clamp with small sharp side cutters.

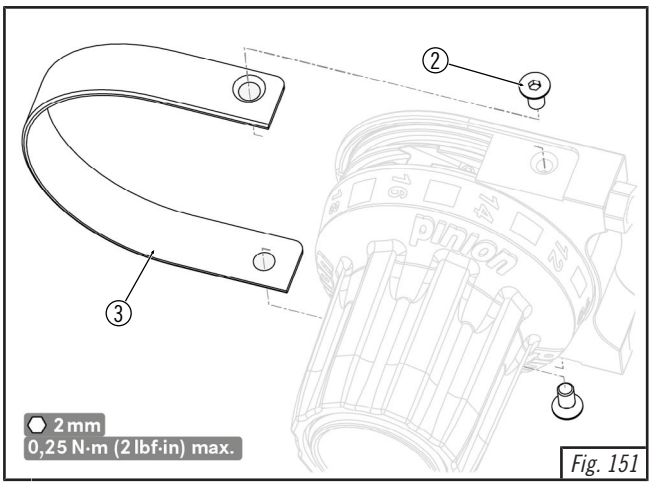

Fig. 151

→ Put on the rotary shifter cover (2).

→ Tighten the housing screws (1) with a tightening torque of 0.25 Nm (2 lbf in).

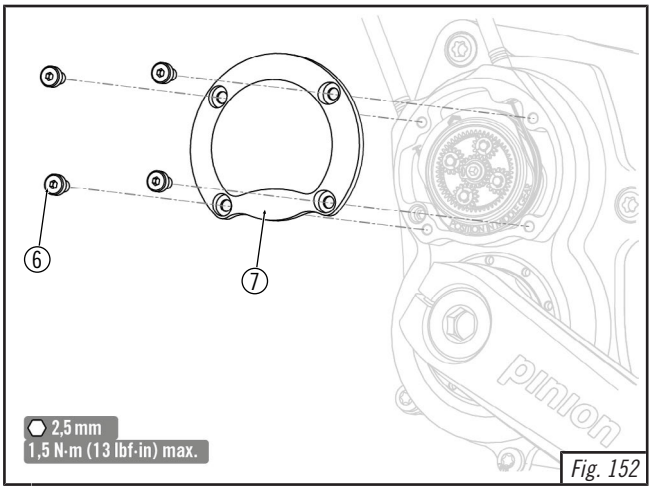

Fig. 152

→ Check the switching function; if necessary, correct the tension at the adjusting screws.

→ Put on the shift box cover (7).

→ Tighten the housing screws (6) with a tightening torque of 1.5 Nm (13 lbf in).

⇨ The replacement of the shift cables is completed.

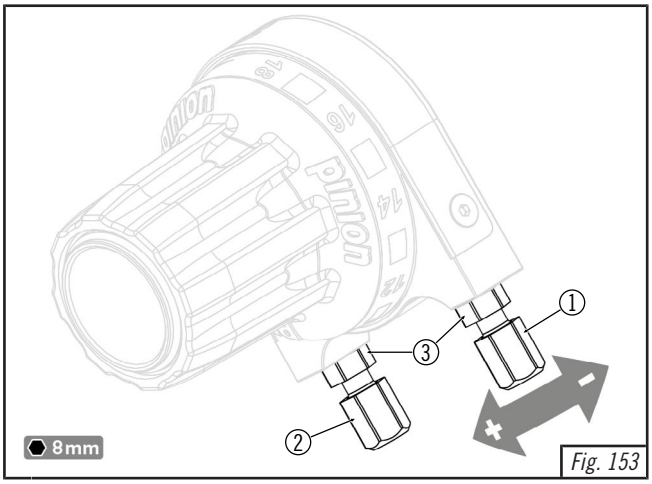

Fig. 153

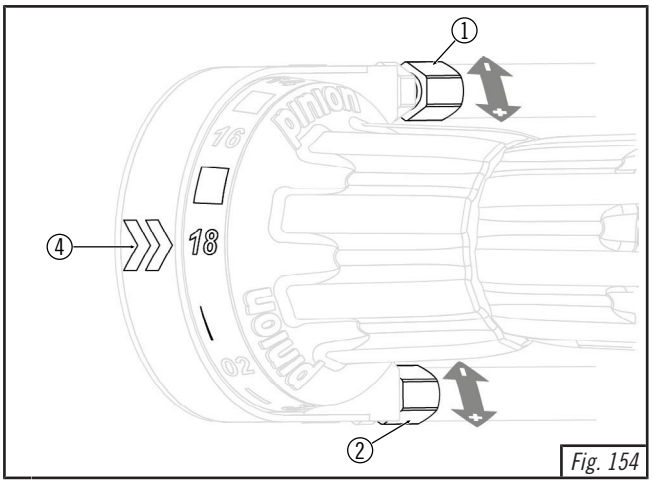

Fig. 154

ADJUSTING THE ROTARY SHIFTER

→ Hold the adjusting screws (1) and (2) and loosen the lock nuts (3).

Adjusting the tension

→ Unscrew both adjusting screws ¼ turn anticlockwise (+).

→ The tension is increased.

→ The force required is increased; or:

→ Unscrew both adjusting screws ¼ turn clockwise (-).

→ The tension is reduced.

→ There is more play on the rotary shifter, shifting is less direct.

Synchronising the rotary shifter position

→ Turn the rotary shifter clockwise (01-02-03- ...) as far as it will go in the direction of the last position (18 or 12 or 09).

→ Check whether the symbol of the last position (18 or 12 or 09) is centred next to the mark (4).

→ Screw in the adjusting screw (1) ¼ turn clockwise (-).

→ Unscrew the adjusting screw (2) ¼ turn anticlockwise (+).

→ Number ring moves towards position 17 or 11 or 08;
or:

→ Unscrew the adjusting screw (1) ¼ turn anticlockwise (+).

→ Screw in the adjusting screw (2) ¼ turn clockwise (-).

→ Number ring moves towards position or 01.

→ Check the adjustment, repeat procedures if necessary. Hold adjusting screws (1) and (2) and tighten lock nuts (3) with a tightening torque of 2-3 Nm (18-27 lbf in).

IMPORTANT

Your Pinion gearbox is correctly adjusted when the desired shifting process takes place immediately (tension), all gears can be shifted with little effort (tension) and the display on the rotary shifter corresponds to the selected gear (synchronisation).

IMPORTANT

The tension is always within the correct range when the ends of the shift cable outer sheaths lie free of play but without pressure in their stops on the gearbox and the rotary shifter housing and the latter has approx. 2 mm of rotational play.

pinion

WORKSHOP MANUAL

TROUBLESHOOTING

TROUBLESHOOTING

NOISES

CRACKING AND CREAKING

Pinion gearboxes run quietly and without disturbing noises. The cause is not in the gearbox, but in the peripheral components. It has been proven that in most cases the causes of noise are connection points such as crank-pedal, saddle-seatpost, handlebar-stem. Note: At https://pinion.eu/en/account/ you will find checklists for quick fault analysis.

The most common Pinion-specific causes are shown here.

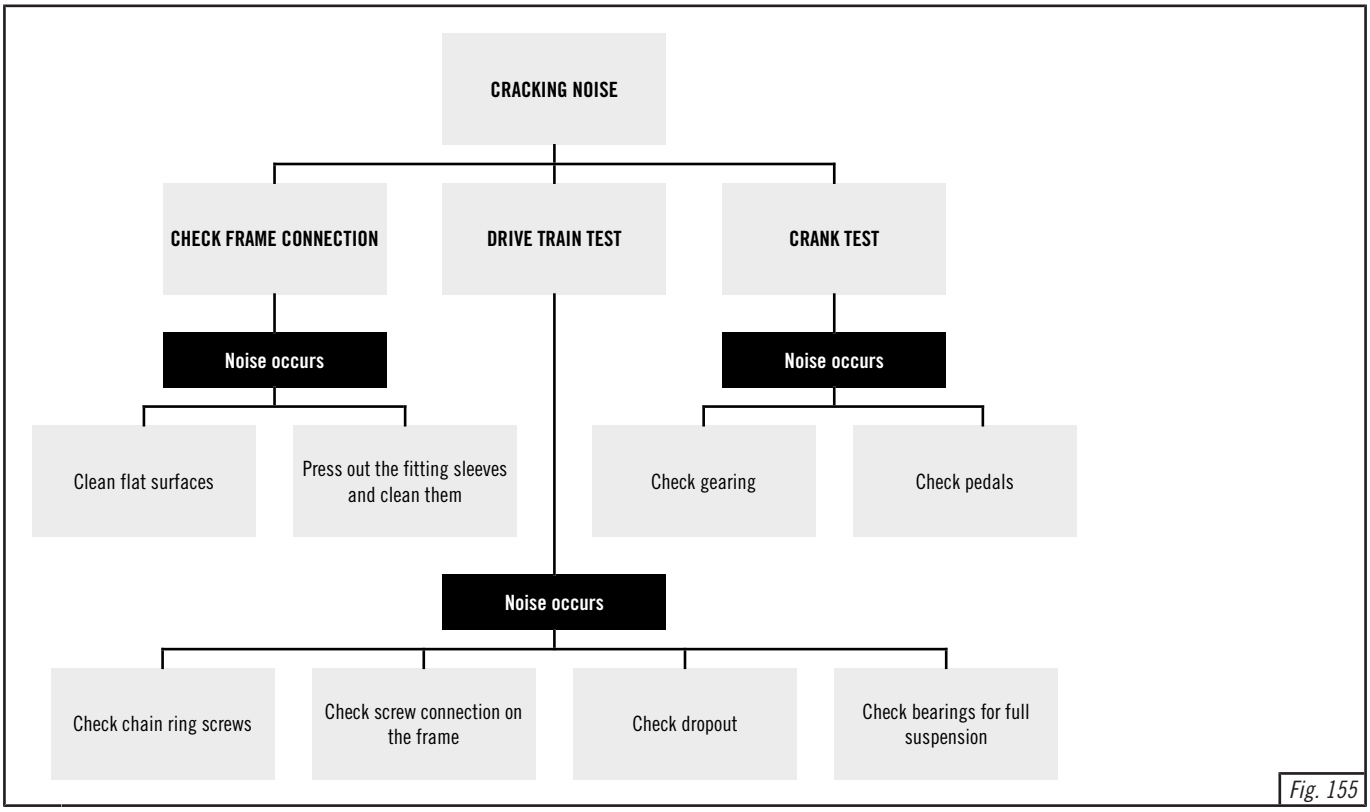

Fig. 155

CHECKING THE FRAME CONNECTION

One cause of disturbing noises can be the mounting arrangement of the gearbox. Use the following test to identify the type:

If a cracking noise is heard, the gearbox should be dismantled and reassembled according to the assembly instructions.

Fig. 156

→ LEFT: Hold the bicycle by the main frame. Press the input shaft with your foot.

Fig. 157

→ RIGHT: Turn the bicycle and press it against the input shaft from the other side.

REMEDY FOR CRACKING AT THE FRAME CONNECTION (2.0 AW)

To eliminate a cracking noise coming from the frame connection, the gearbox should be completely dismantled once.

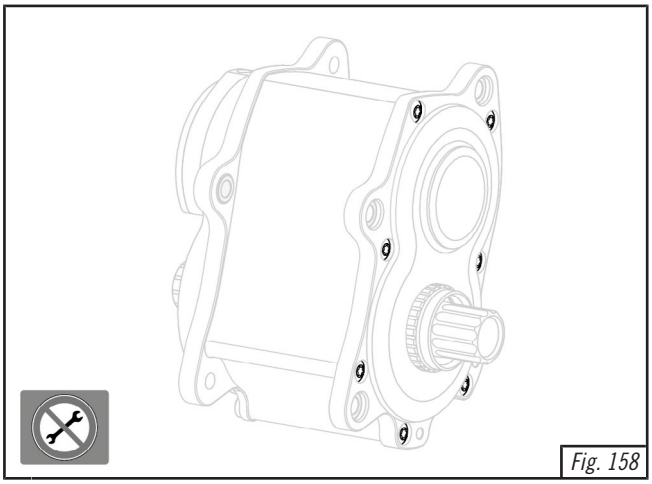

Fig. 158

→ Clean the gearbox

→ Clean any paint residues or burrs from the plane surfaces on the bridge.

→ Do not tighten or loosen the gearbox housing screws under any circumstances.

→ The gearbox housing screws may only be adjusted in a specialist workshop authorised by Pinion or by Pinion itself.

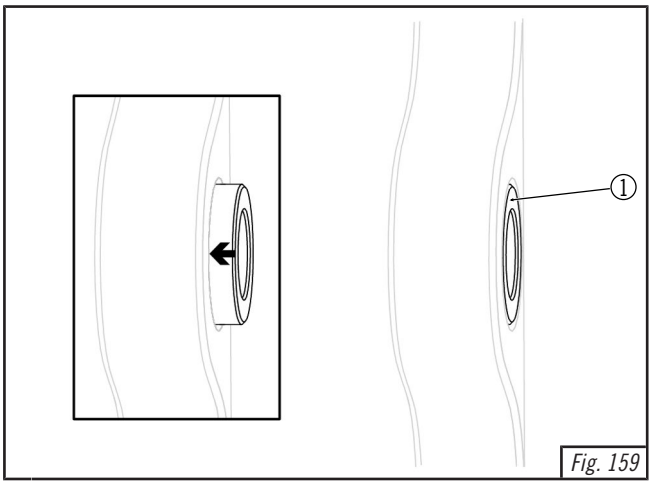

Fig. 159

→ Press out the fitting sleeves and clean them. Then press them back in greased. Insert the fitting sleeves from the outside and press them in with the fitting sleeve pliers.

→ Make sure that all 4 fitting sleeves (1) have been fitted perfectly flat in their seats in the gearbox housing; if necessary, press them in flat with a parallel pressing tool.

→ Observe the correct sequence and tightening torque.

IMPORTANT

The gearbox retaining screws may be reused if cleaned and provided with fresh (medium-strength) threadlocker.

ATTENTION

Irreparable damage to the gearbox housing or leakage.

Damage to the gearbox due to deformation caused by incorrect assembly.

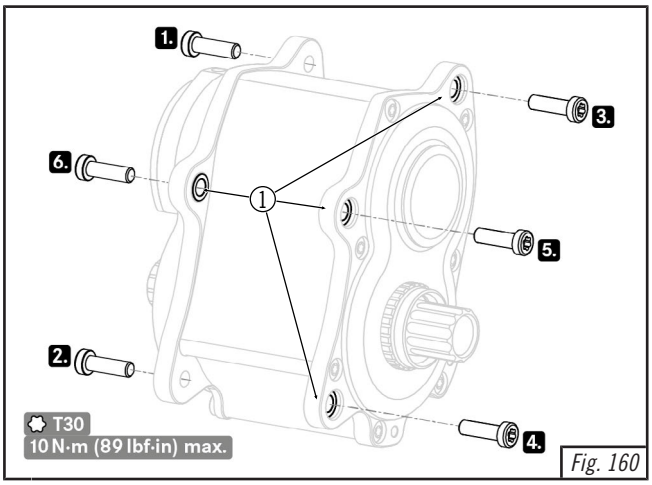

Fig. 160

→ Make sure that all contact points on the gearbox and the gearbox mount of the bicycle frame are free of dirt and covered with carbon assembly paste (e.g., DYNAMIC).

→ Insert the gearbox into the gearbox mount of the bicycle frame.

→ Fit all 6 retaining screws.

→ Tighten the retaining screws in the specified sequence with a tightening torque of 10 Nm (89 lbf in).

⇨ The mounting of the gearbox is completed.

CHECKING THE CRANKS

A loose connection between the crank and the shaft can also be the cause of disturbing noises. You should carry out the following test which is a clear indication of a bad crank/shaft connection. A visual inspection of the gearing is equally helpful and should be carried out when troubleshooting. Check the crank/shaft connection using the following description.

→ Visual inspection of the gearing

→ Check pedals for tight fit and ensure axle thread is greased.

Fig. 161


Fig. 162

If a cracking sound is heard during this test, it is very likely that the connection of the crank to the input shaft is not correct.

Fig. 163

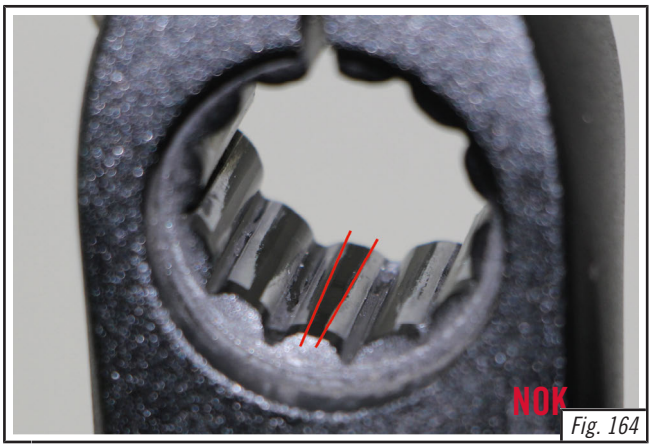

Fig. 164

Even if the test doesn't indicate an issue, the cranks should be dismantled once to visually inspect the gearing. If the cranks sit very loosely on the shaft after loosening the clamping screws, this can be an indication that this is the source of the cracking noise. Compare the wear pattern with the adjacent illustration.

→ Load the cranks in a horizontal position. Bounce from the knees WITHOUT pedalling!

→ Turn the cranks by 180°. Bounce again WITHOUT pedalling.

ATTENTION

Image below: If the wear pattern is wedge-shaped, please contact Pinion.

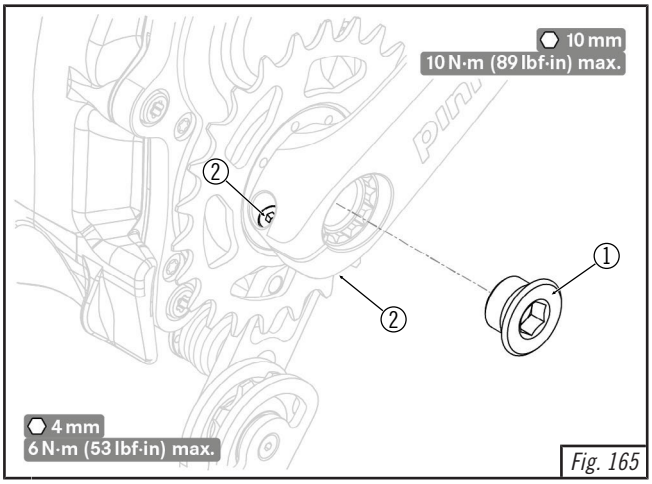

Fig. 165

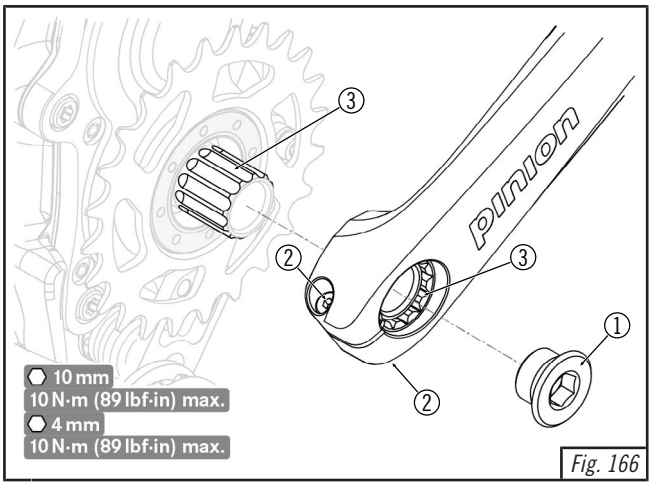

Fig. 166

CORRECTIVE ACTION FOR CRACKING CRANKS (1.5 AW)

→ Tighten or replace the pedals

→ Unscrew the central crank screw (1).

→ Loosen both crank clamp screws (2).

→ Pull the crank off the input shaft.

→ Ensure that the gearing (3) on the input shaft and crank is free of dirt and old lubricants.

→ Verify that both crank clamp screws (2) are fitted with a SCHNORR® lock washer.

→ Lightly coat the teeth with carbon assembly paste.

→ Fit the crank and push it by hand as far as it will go onto the input shaft. If necessary, use a wide screwdriver to carefully expand it; do not use a striking tool (hammer or similar).

→ Screw the central crank screw (1) and tighten it with a tightening torque of 10 Nm (89 lbf in).

IMPORTANT

The crank can now be moved by 1-2 mm on the input shaft – this is normal and designed to do so!

IMPORTANT

Protecting the gearing from wear

To protect the teeth (3) on the input shaft and cranks from one-sided stress and wear, it is advisable to dismantle both cranks regularly (once a year) and remount them offset by 1-2 teeth each, and apply fresh carbon assembly paste (e.g., DYNAMIC).

WARNING

Danger of accident due to blocked drive caused by incorrect mounting.

→ Always pull the crank outwards as far as it will go before tightening the crank clamp screws.

→ Tighten the crank clamp screws (2) gradually and alternately until a tightening torque of 10 Nm (89 lbf in) is reached on both crank clamp screws.

→ Repeat the test.

CHECKING THE DRIVE TRAIN

→ Dismantle the chain pulley or belt sprocket. If using a spider, remove attachments from the spider.

→ Clean and then grease all contact surfaces, mount attachments on the spider without play (sleeves must sit snugly in the spider).

→ Grease the lockring screw connection and tighten with 40 Nm (left-hand thread!).

→ Remove the sprocket or belt sprocket on the rear wheel hub. Clean, grease and reassemble.

→ Check rear wheel fastening and dropout adjusting screws.

→ Check frame lock for openable rear triangle

→ Check the bearings of the rear triangle on full-suspension frames.

→ Check freewheel body toothing and rear wheel hub bearing.

→ Check toothed belt line according to manufacturer's instructions.

→ Check toothed belt or chain for wear.

→ Engage gear, pull rear brake. Place your foot on the horizontal pedal and press.

Fig. 167

→ Turn the drive (only the chain/belt wheel, not the cranks) 90° further and press again. Repeat the process 4 times.

Fig. 168

BELT NOISES

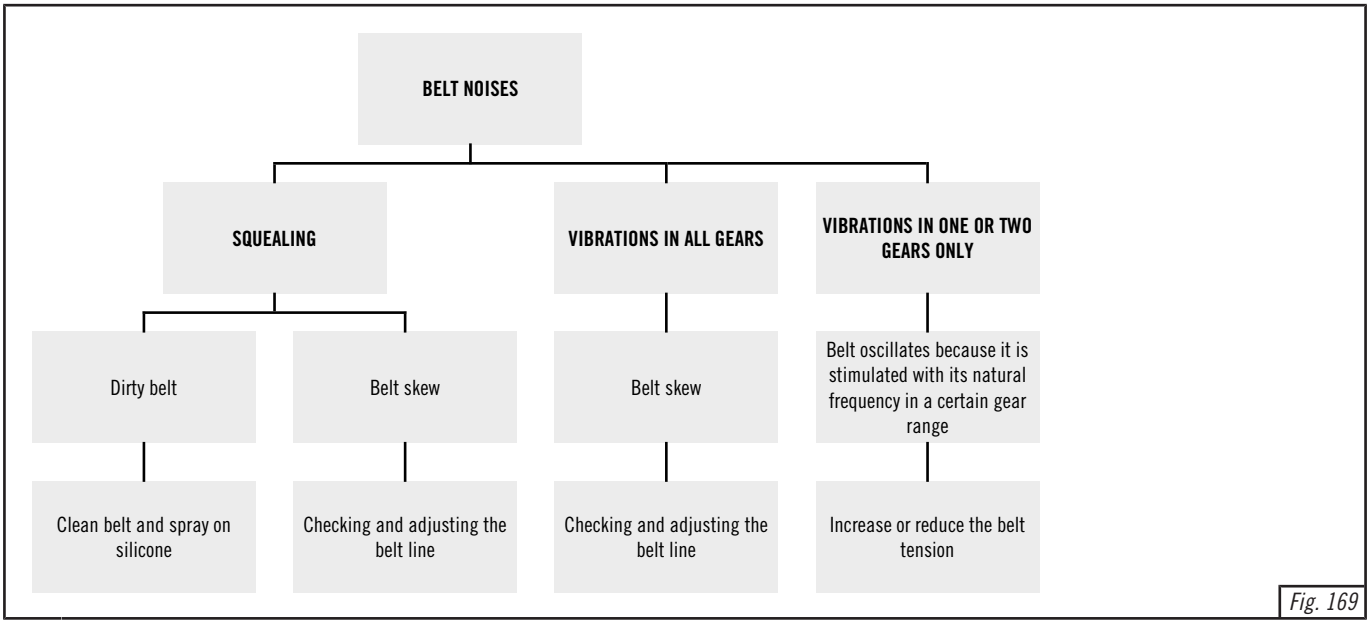

Fig. 169

CORRECTIVE ACTION FOR SQUEAKING

Dirty belt/dry chain

→ Clean the belt with water and a brush and spray on some silicone spray if necessary. Clean and oil a dry chain.

Skewed running of belt or chain

→ Adjust the chain or belt line as accurately as possible.

Dry seals or bearings on e.g., rear wheel hub or chain tensioner

→ Oil the corresponding areas.

CORRECTIVE ACTION FOR HUMMING/VIBRATIONS IN ALL GEARS

The chain or belt line is not correct. If the chain/belt is skewed, noises occur as if they were coming from the gearbox. Adjust the chain or belt line as accurately as possible. Follow the belt manufacturer's instructions.

→ Make sure that the rear wheel is correctly aligned and centred.

→ Place a ruler/straightedge on the belt.

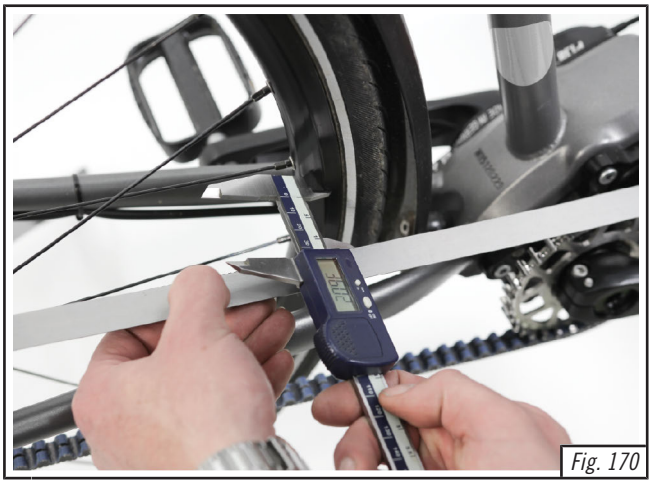

Fig. 170

→ Measure the distance to the rim at both points of the wheel diameter.

→ If the two values differ, the belt line is not correctly aligned.

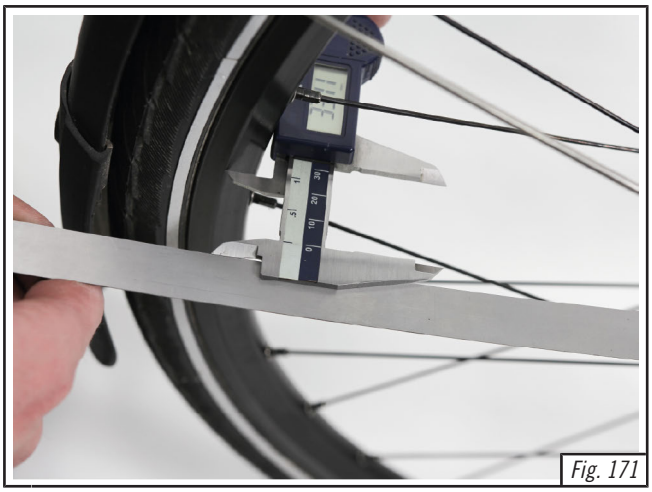

Fig. 171

CORRECTIVE ACTION FOR HUMMING/VIBRATIONS IN GEARS 1-3

In rare cases, at a certain speed, the belt may oscillate. This creates clearly noticeable vibrations.

→ Gradually increase or reduce the belt tension.

→ Carry out a test ride to check.

CLICKING

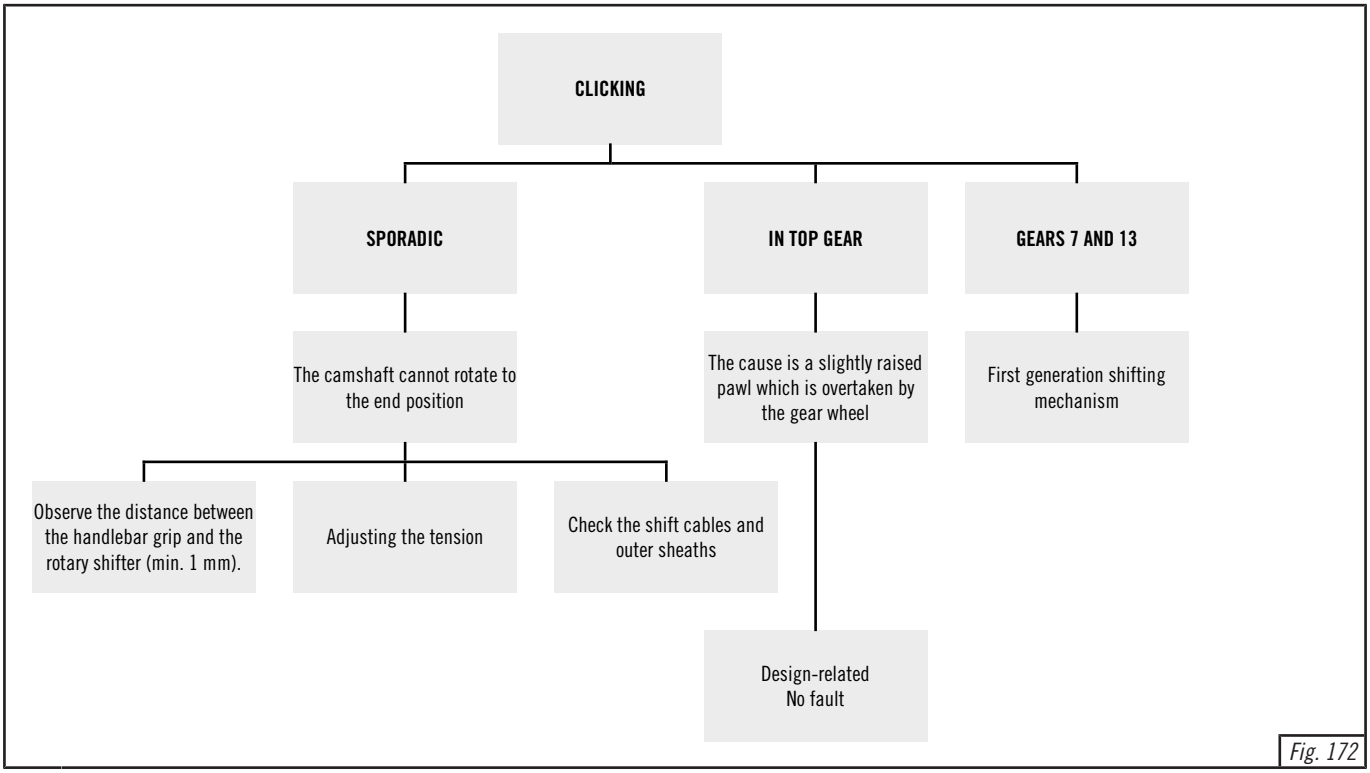

Fig. 172

SPORADIC QUIET 'CLICKING' SOUND

Under certain circumstances, a soft click may be heard sporadically. The camshaft cannot rotate to the end position. This is usually due to excessive friction in the shift cables or the rotary shifter. Another cause can be an unconscious twisting of the grip when grasping the handlebars.

→ Keep a minimum distance of 1 mm from rotary shifter to handlebar grip

→ Adjust the tension on the rotary shifter with 2-3 mm backlash without making it harder to turn.

→ Check the shift cables and outer sheaths.

→ Be careful not to pre-tension the rotary shifter with your hand when riding. If necessary, grip next to the rotary shifter.

'CLICKING' IN TOP GEAR

This is not a fault, but is inherent to the design and is no cause for concern. The cause of this is a slightly raised pawl in the freewheel condition.

'CLICKING' IN THE 7TH AND 13TH GEARS

→ In gearboxes up to model year 2014, there is a pawl in the freewheel state in these two shift stages. This is what causes the noise. In this case, this is due to the design.

→ There is the possibility of a fee-based update to the latest gearshift generation.

INTERRUPTED FRICTIONAL CONNECTION

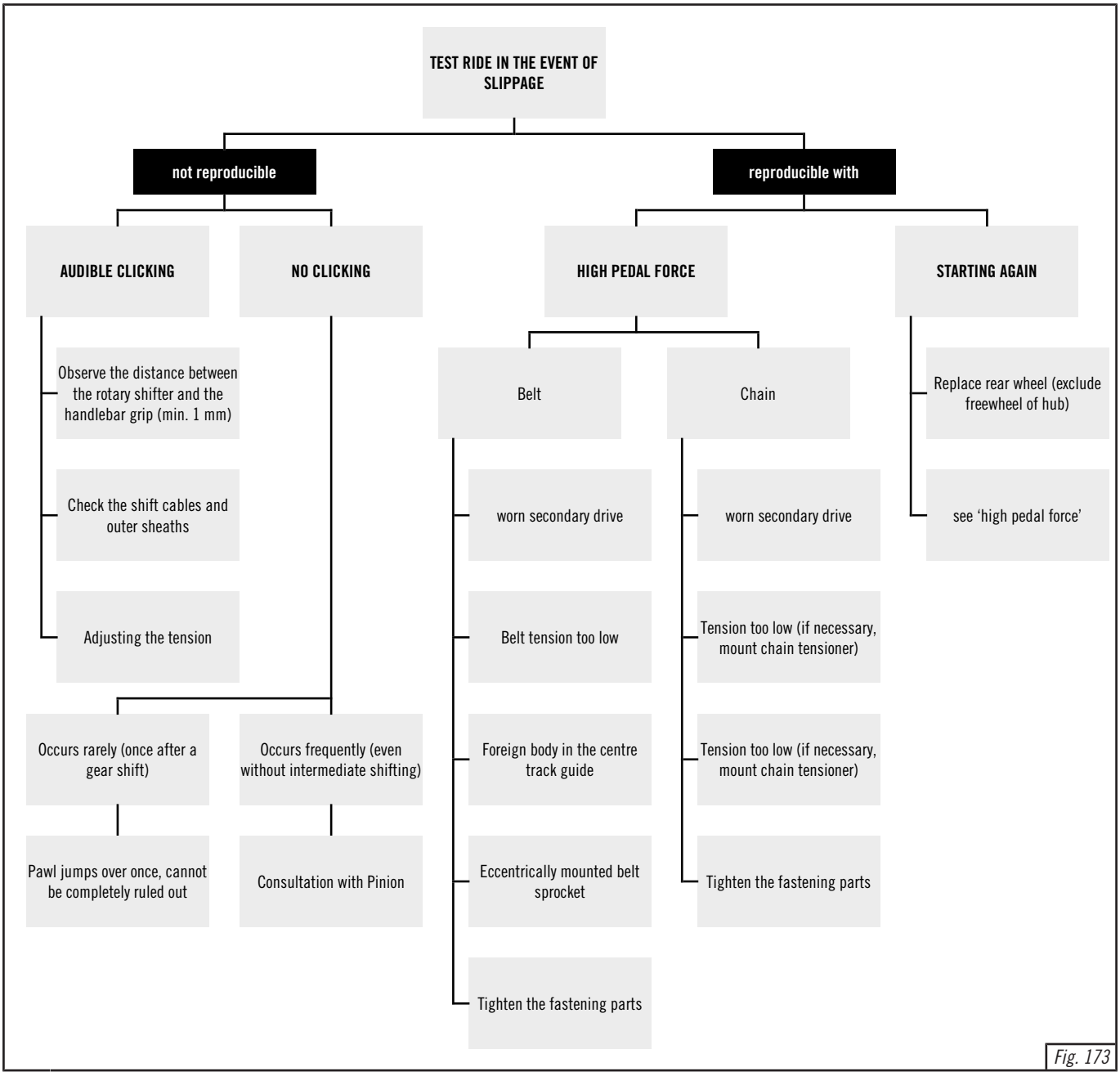

Fig. 173

The described effect is often difficult to characterise, or even to narrow down. Theoretically, all components involved in the bicycle's drive system are possible triggers. These are typically the gear shift – in this case your gearbox, the secondary drive – most often a chain or toothed belt, and the freewheel hub installed in the rear wheel.

In principle, the effect is noticeable through a perceived and usually audible small idle angle of rotation at the crank while riding. It is usually difficult to differentiate which component of the drive has caused this interrupted frictional connection.

As the manufacturer of the gearbox, we have placed particular emphasis on ensuring that the gearbox excludes or avoids interruption of the frictional connection while riding as much as possible.

Pinion and many thousands of cyclists have gained important experience in using the gearboxes. We would like to share these experiences in the following chapters to ensure seamless customer satisfaction.

NON-REPRODUCIBLE, RARELY OCCURRING SLIPPAGE

The effect of ‘sporadic slippage’ described first cannot be completely ruled out in any system with pawl freewheels.

Gearboxes, but also non-shiftable rear wheel hubs, which in most cases are based on pawl or claw freewheels, or also hub gears, can slip once shortly or some time after the intervention.

It is likely that this effect will occur and it depends on the relative position of the components involved at the moment of engagement.

AUDIBLE CLICKING

There are factors that can favour sporadic slippage. This is often accompanied by clicking. Clicking occurs when the friction in/on the rotary shifter or in the shift cables is too high. In this case, the camshaft cannot rotate to the end position.

Fig. 174

→ The rotary shifter starts at the handlebar grip. The friction of the two rubber parts makes for a tough and heavy shift feel.

→ There should be 1-2 mm between the rotary shifter and the handlebar grip.

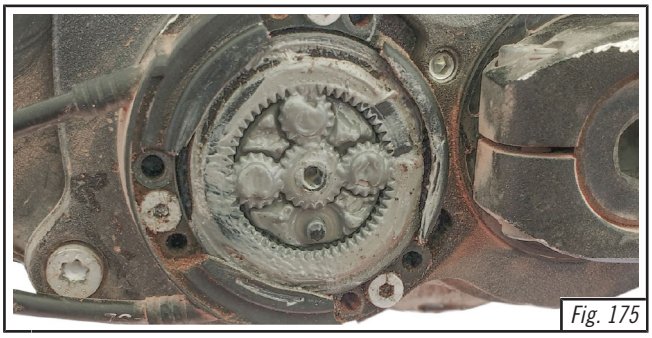
Fig. 175

→ The shift box is dirty. Water and sand ingress causes increased friction, increases the required switching forces and may damage the powder coating.

→ Clean the shift box and the planetary gear.

Fig. 176

→ Metal end caps or caps with a seal increase friction.

→ Metal end caps can cause premature wear of the cables.

→ Only use plastic caps and shifter sleeves.

→ Check and adjust the tension. If the shift cables are pre-tensioned too much, this causes increased friction and sluggishness of the cables.

→ The tension is always within the correct range when the ends of the shift cable outer sheaths lie free of play but without pressure in their stops on the gearbox and the rotary shifter housing and the latter has approx. 2 mm of rotational play.

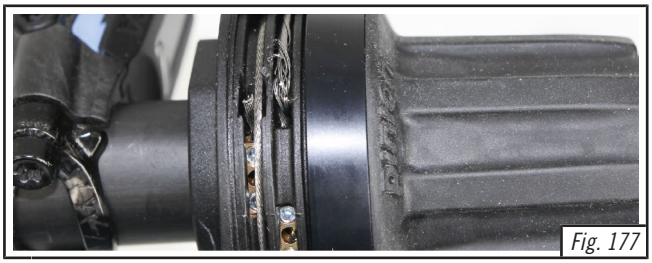
Fig. 177

→ Worn or split shift cables also cause poor shifting performance.

→ Check the shift cables and shift cable sleeves.

→ Replace spliced shift cables, cables and shift cable sleeves.

NO AUDIBLE CLICKING, RARELY OCCURRING SLIPPAGE

After a shifting operation, a shift pawl is not fully seated in your gearing and then slips from this position completely into the gearing. There is a certain likelihood of this effect occurring. The probability of this happening depends on the relative position of the components involved at the moment of engagement. This phenomenon cannot be 100% excluded due to the design.

Tip: Do not shift a Pinion gearbox too hesitantly. Shift quickly and directly into the desired gear.

NO AUDIBLE CLICK, REGULAR SLIPPAGE

Repeated 'slippage' when riding in the same gear:

The effect occurs repeatedly when riding in the same gear after several revolutions of the crank; i.e., without shifting in between or unloading the drive train.

Contact Pinion: support@pinion.eu

REPRODUCIBLE SLIPPAGE UNDER HIGH LOAD

If the slippage is reproducible under high load, i.e., in low gears or with high pedal force, the cause is not the Pinion gearbox. The possible causes are outlined in the following sections.

WITH A BELT DRIVE

Check and adjust the belt tension (tend to adjust with high tension in the permissible range): If the pretension is too low, the belt may slip. The required preload depends strongly on the rider's weight. Due to the reduction between the crank and the sprocket, a Pinion gearbox has higher tractive forces on the belt in the lower gears compared to a hub gear system. The following is also true: the smaller the belt sprocket, the higher the pretension should be, as fewer teeth absorb the force here. It might be necessary to set a slightly higher tension with a heavier rider or high load. In some cases even higher than a tension meter indicates or recommends.

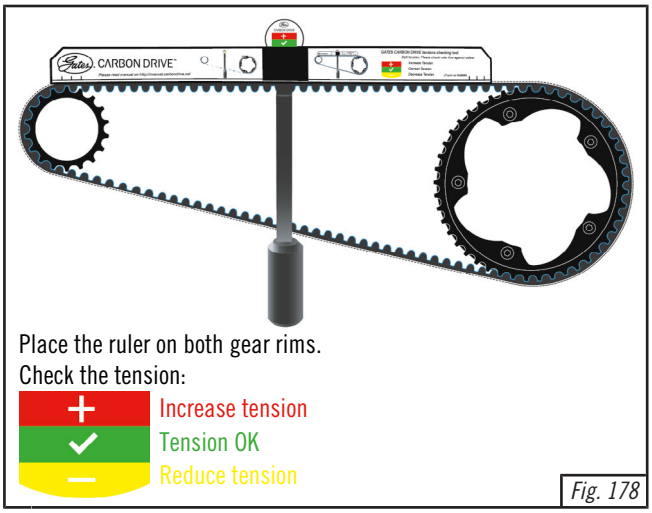

Fig. 178

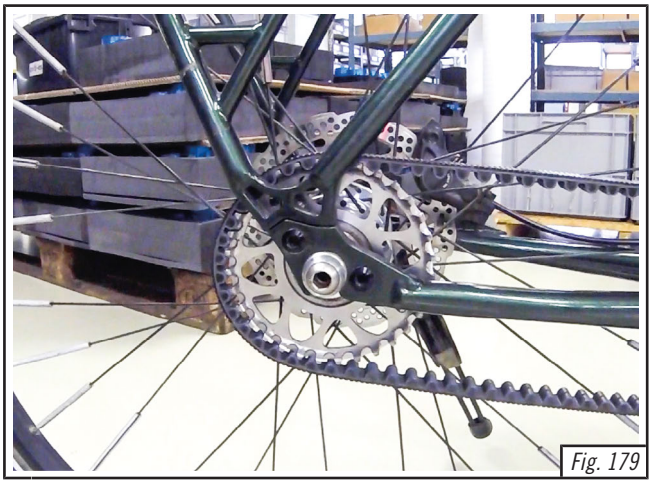
Fig. 179

→ Check wear of the drive components

→ Tighten fasteners such as adjustable dropouts or a Tout Terrain TBA system.

→ Check the centre track guide of the Gate belt for foreign body deposits.

→ Check the belt sprockets for correct seating. Eccentrically mounted belt sprockets can cause the belt tension to vary.

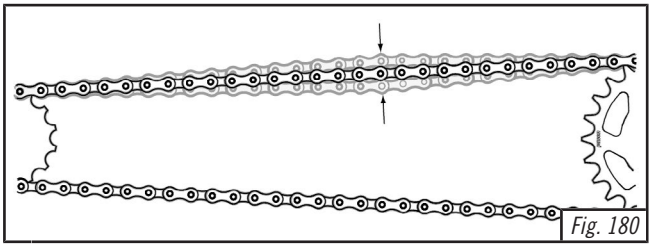
Fig. 180


Fig. 181

WITH A CHAIN DRIVE

→ Check wear of the drive components.

→ Replace all drive components at once.

→ Checking the chain tension and chain line:

→ For direct tensioning (horizontal dropouts with tensioning bolts) make sure that the bicycle chain or the toothed belt has approx. 10-15 mm play.

→ When using the Pinion chain tensioner KS1.2 or CT2, check the function and chain length.

→ Tighten fasteners such as adjustable dropouts or a Tout Terrain TBA system.

SLIPPING THROUGH ON RE-ENTRY

Accidental slipping when starting again from rolling, or when starting from a standing position. This fault is not due to the Pinion gearbox. The cause is often the freewheel of a rear wheel hub.

→ Replace the rear wheel to isolate the source of the fault.

→ Check the freewheel, especially the pawls/clamp bodies, for wear.

→ Check pawls and springs for ease of movement.

→ Clean and re-grease the freewheel.

→ Examine issues such as slippage under heavy load.

SHIFTING BEHAVIOUR

ROTARY SHIFTER ROTATES WITH DIFFICULTY

Every Pinion gearbox is subjected to a test run at the factory after it has been assembled, during which the shifting forces are checked. If the rotary shifter rotates with difficulty or sluggishness, this may be due to the following causes:

Fig. 182

→ The rotary shifter starts at the handlebar grip. The friction of the two rubber parts makes for a tough and heavy shift feel.

→ There should be 1-2 mm between the rotary shifter and the handlebar grip.

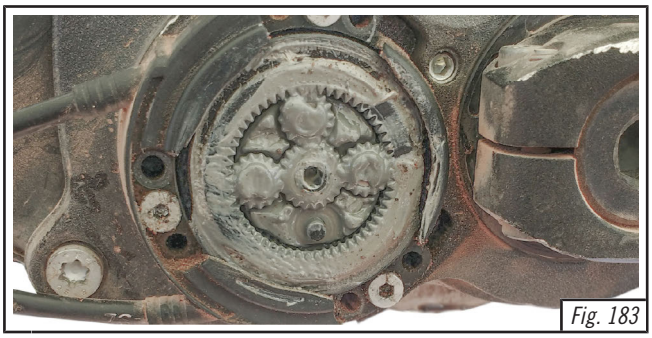
Fig. 183

→ The shift box is dirty. Water and sand ingress causes increased friction and may damage the powder coating.

→ Clean the shift box and the planetary gear.

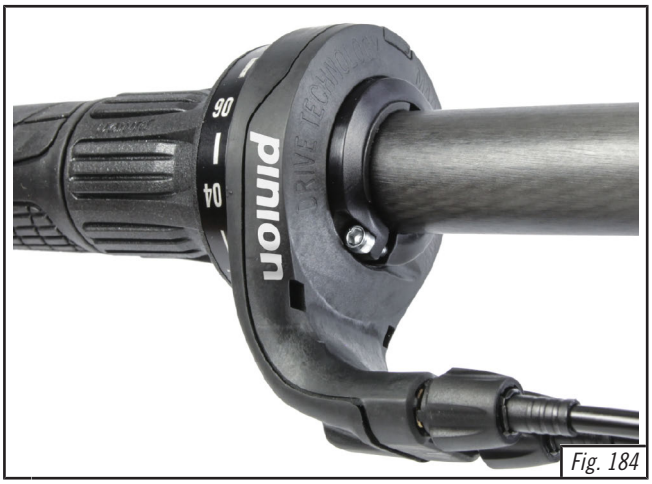

Fig. 184

→ Metal end caps or caps with a seal increase friction.

→ Metal end caps can cause premature wear of the cables.

→ Only use plastic caps and shifter sleeves.

→ Check and adjust the tension. If the shift cables are pre-tensioned too much, this causes increased friction and sluggishness of the cables.

→ The tension is always within the correct range when the ends of the shift cable outer sheaths lie free of play but without pressure in their stops on the gearbox and the rotary shifter housing and the latter has approx. 2 mm of rotational play.

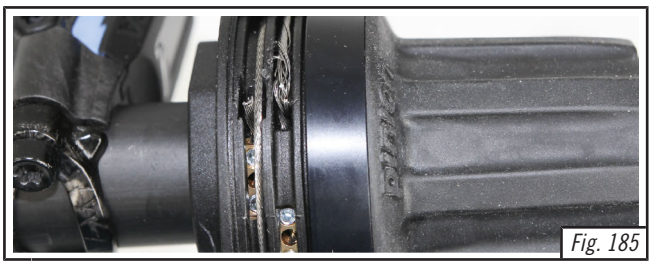
Fig. 185

→ Worn or split shift cables also cause poor shifting performance.

→ Check the shift cables and shift cable sleeves.

→ Replace spliced shift cables, cables and shift cable sleeves.

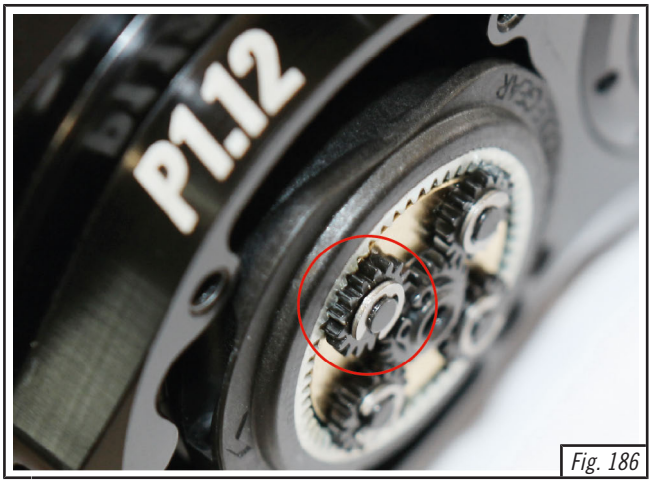

Fig. 186

INCORRECT WIRING DIAGRAM OR NO END STOPS

If the gearbox can be shifted through the end of the scale on the rotary shifter, this can have two causes:

→ On the one hand, the fault may be due to the fact that the planetary gear is not flush with the cable pulley

→ on the other, the positioning bearing could have slipped out.
This is a clear indication of a fault in the gearbox **> Return to Pinion is necessary!**

→ However, it is possible that the gearbox does not have end stops even without this visual feature.

→ In both cases **> Contact Pinion!**

ROUGH RUNNING

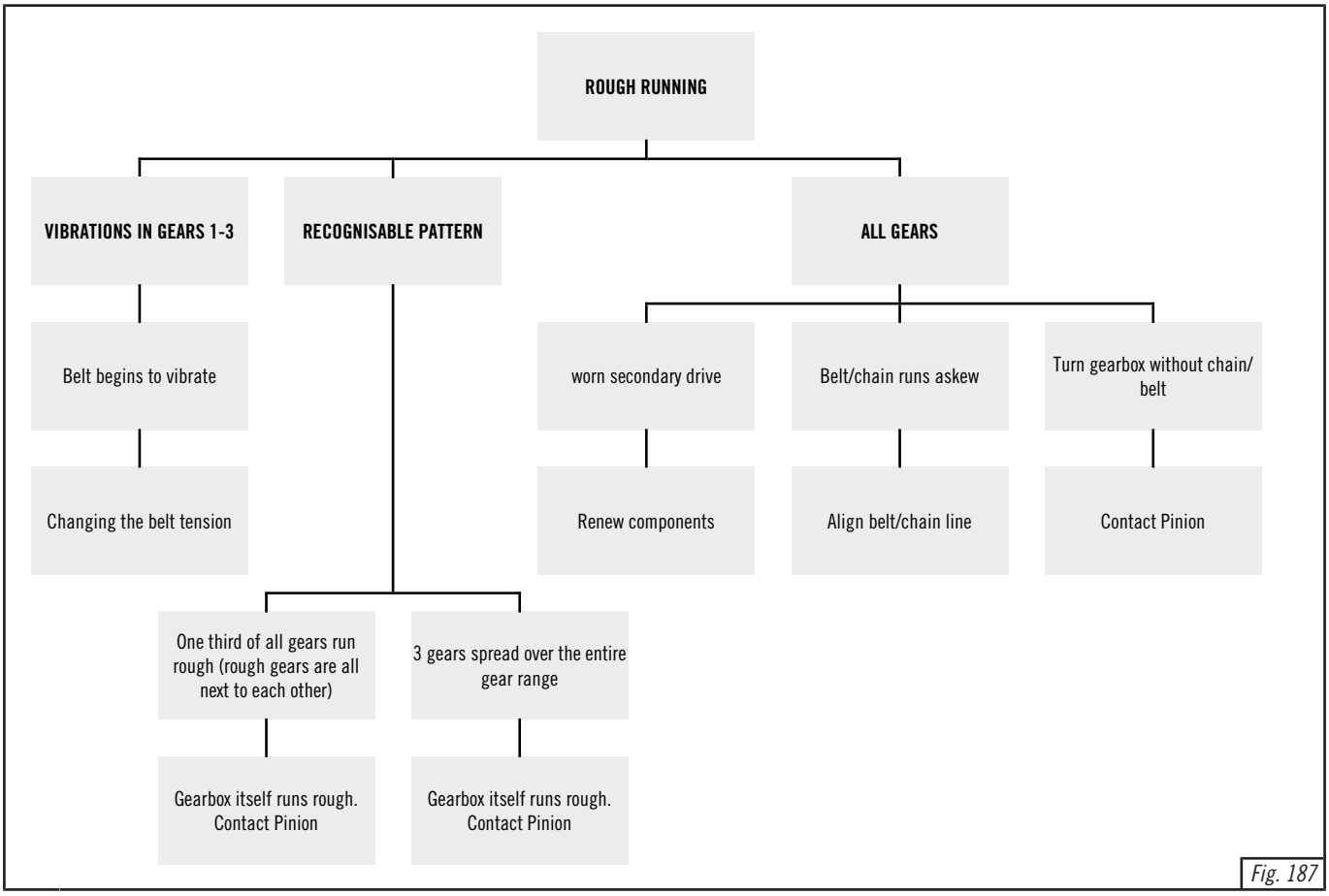

Fig. 187

HUMMING/VIBRATIONS IN GEARS 1-3

In some cases, at a certain speed, the belt could oscillate. This creates vibrations that you can clearly feel.

→ Gradually increase or reduce the belt tension.

→ Following each adjustment, perform a test ride.

ROUGH RUNNING – RECOGNISABLE PATTERN

Every Pinion gearbox has a two-stage design. If the rough running is due to the gearbox itself, there is usually a pattern.

→ One third of the gears run rough and all the gears are next to each other.

→ 3 gears spread over the entire gear range.

→ There is probably a defect in a gear wheel.

Contact Pinion: support@pinion.eu

ROUGH RUNNING IN ALL GEARS

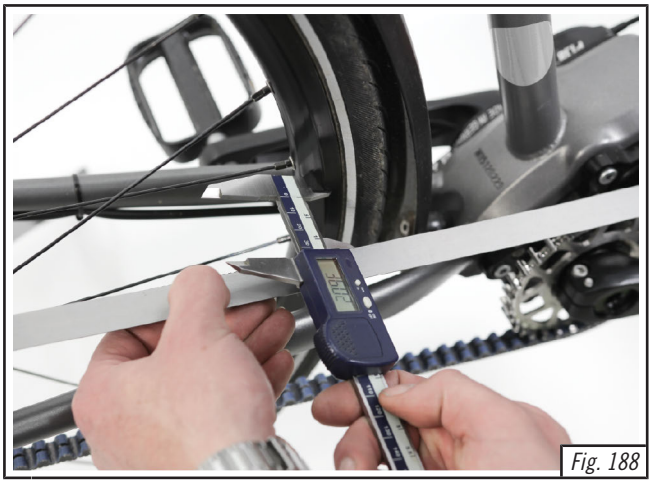

Fig. 188

→ Check wear of the drive components.

⇨ With a chain drive, replace all drive components at once.

⇨ The chain or belt line is not correct. If the movement is skewed, noises occur as if they were coming from the gearbox. Adjust the chain or belt line as accurately as possible.

→ Make sure that the rear wheel is correctly aligned and centred.

→ Place a ruler/straightedge on the belt.

→ Measure the distance to the rim at both points of the radius.

→ If the two values differ, the belt line is not correctly aligned.

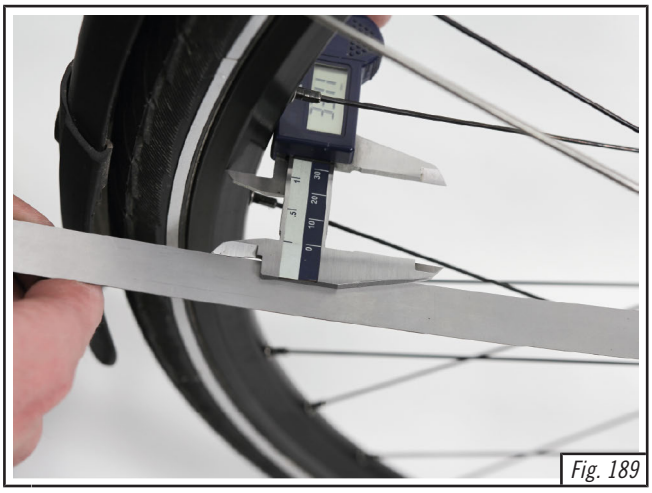

Fig. 189

→ Remove the secondary drive and turn the gearbox individually. If the gearbox feels rough even without the secondary drive.

→ The gearbox feels rough even without the secondary drive.

Contact Pinion: support@pinion.eu

GEARBOX BLOCKAGE

If the gearbox jams and is difficult or impossible to pedal, please check the following components:

→ Lockring loosened. When the lockring is loosened, it runs against the crank and blocks the rotation.

→ Dismantle the right crank, the gearbox should be able to move again.

→ Tighten the lockring with 40 Nm. Installing the crank handle Caution: Pull the crank handle outwards during installation.

→ Gearbox continues to lock: **Contact Pinion:** support@pinion.eu

→ Check all remaining relevant components.

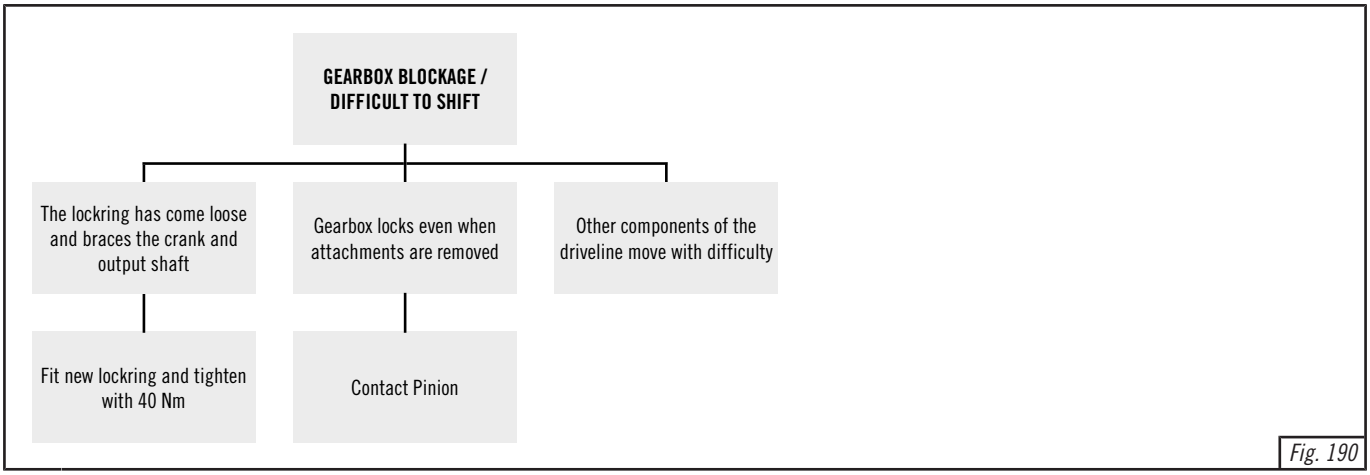

Fig. 190

LEAKAGE

If a gearbox leaks and loses oil, this is not particularly worrying from a technical point of view. The gearbox has very good emergency running properties. There is always a sufficient amount of oil remaining in the gearbox even in the case of a supposedly clear leakage

OIL LEAKAGE AT THE OUTPUT SHAFT

If the oil leakage is on the right side of the output shaft, the lockring may have loosened.

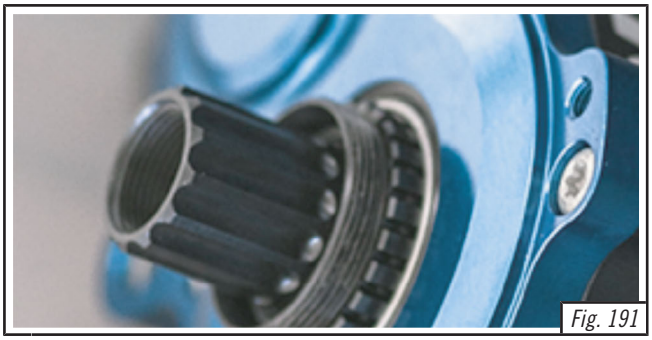
Fig. 191

→ Chain ring/belt sprocket not fitted/loose.

→ Output shaft shifted into gearbox.

→ Seal no longer runs in the sealing track.

Remedy:

→ mount or tighten sprocket/belt sprocket 40 Nm.

SWEATING

Fig. 192

Slight sweating may occur; it is particularly visible in dusty conditions. There is no need for action.

INITIAL LEAKAGE

At the start of use, the shaft seal ring and the sealing surface must adapt to each other. Initially, there may be oil leakage from the shafts. This should stop after approx. 1000 km.

In dusty environments, a light film of oil may be visible on the housing during use.

SMART.SHIFT

The Smart.Shift system is available in different versions for e-bikes. This means that the procedure for service cases varies as well.

For example, there are e-bikes (e.g., the Stromer ST7) in which Smart.Shift is strongly integrated. There, the bicycle is connected to individual components via CAN communication. This allows errors to be shown on the display of the drive system. Below is a table showing what faults are present and how to repair them.

It is also possible that the trigger does not send gearshift commands directly to the Smart.Shift-Box, but that communication takes place via the CAN interface. In these cases, long presses and pressing two keys at the same time may not be possible.

On bicycles without CAN communication, however, it is not possible to show error codes on a display.

pinion

WORKSHOP MANUAL

SERVICE

SERVICE

PINION SERVICE OFFERS

We actively involve the specialised traders in all our services. This overview shows in detail how our services are structured.

FREE REGISTRATION

The 6-digit gearbox serial number is required for registration. In addition to quick assignment in the event of service, it includes theft monitoring in the event of loss of the gearbox. Gearboxes registered within the first 12 months of purchase benefit from an extended warranty.

This service is free of charge and is only available online.

GEARBOX WARRANTY

Gearboxes of the P-Line are covered by a 5-year warranty when registered online. C-line gearboxes have a 2-year warranty. If registered online within the first 12 months, the warranty can be extended to 3 years. This service is free of charge and is only available online.

All details can be found online at: https://pinion.eu/en/warranty-terms-and-conditions/

PINION CARE

With Pinion Care, we offer Pinion customers the security of being carefree on the road at all times, even after the warranty has expired. Pinion Care includes the factory inspection of a gearbox and, if necessary, its repair. Optionally, a housing change can also be selected. Always with a 2-year follow-up guarantee.

PINION CARE P2110

Pinion recommends that the factory inspection be carried out regularly after the warranty has expired.

Ideally, the processing for Pinion Care is done via a specialist shop. Professional removal and installation of the components as well as the correctly completed service form are prerequisites.

PINION CARE P2110

Damage and defects not covered by warranty are a Pinion Care service. Defects such as leaks and repairs to the shifting mechanism are included in the Pinion Care scope of services.

Overload damage will be assessed separately by Pinion. An individual offer will be made. In individual cases, the Pinion crash replacement takes effect.

OPTIONAL WITH PINION CARE P2110

It is recommended to replace the gearbox housing if the surface is damaged or dented.

There are many different anodised colours to choose from for gearboxes in the P-line.

Housing replacement is always carried out in conjunction with Pinion Care.

COMPLAINT PROCEDURE (EU)

Individual error analysis

→ Service videos
→ Troubleshooting
→ Checklists
→ Customer information
→ PHONE: 0711 217 491 590
→ support@pinion.eu
→ Important: Have the serial number ready
→ Download the service form
→ Complete the form in full
→ Remove the gearbox
→ Clean the gearbox

ATTENTION

Service cases outside the EU must be coordinated with Pinion before sending in. Otherwise, there is a risk of increased costs and time delays due to customs clearance.

→ Package safely
→ Enclose the service form
→ Do not enclose any further accessories
→ Send the gearbox to Pinion

Where can I find the serial number?

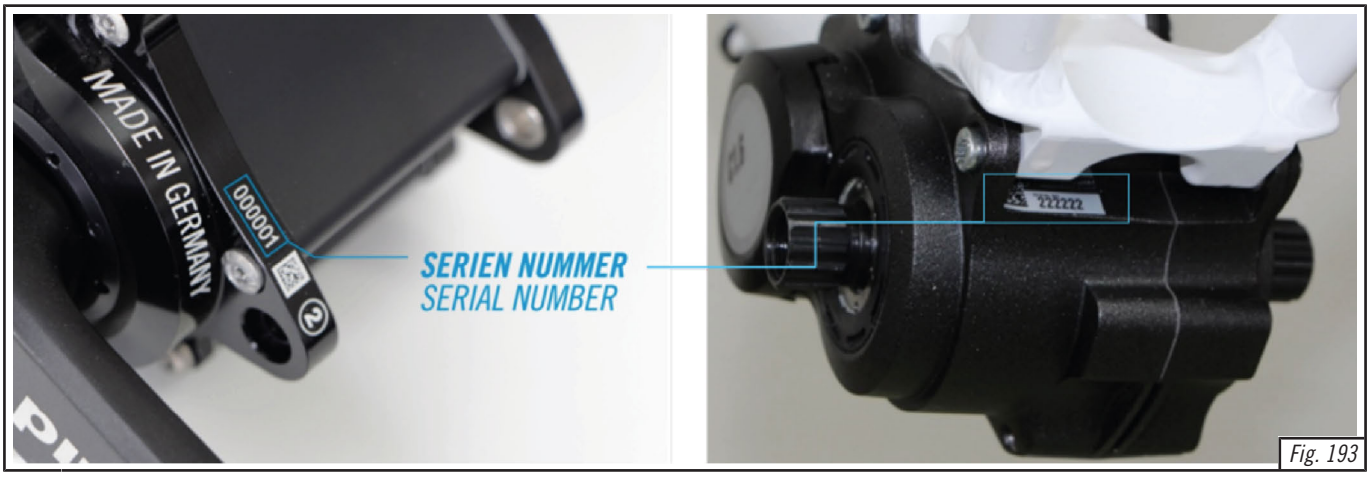

Fig. 193

COMPLAINT PROCEDURE (NON-EU)

The procedure is similar to the procedure for the EU.

However, Pinion must be contacted in order to prepare the corresponding import papers. Otherwise, there is a risk of increased costs and time delays due to customs clearance.

WARRANTY TERMS

Liability for material defects

The statutory liability for material defects shall apply to damage to materials and workmanship. The liability period applies from the date of initial purchase.

Components that are subject to normal wear and tear (e.g. shift cable with outer casing) are excluded from this.

Damage caused by improper handling, improper use or improper installation or maintenance work (e.g. opening the gearbox, modifications, etc.) is also excluded.

Furthermore, we shall not be liable for indirect or consequential damages resulting from the actions stated above.

In the event of damage, first contact the dealer from whom you purchased your Pinion product.

If necessary, the dealer will contact the relevant bicycle manufacturer, distributor or us directly to discuss further action. Do not return a defective Pinion product directly to us without prior agreement.

Warranty

You can find everything about the Pinion warranty conditions at https://pinion.eu/en/service/ or by scanning the QR code:

SUPPORT

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