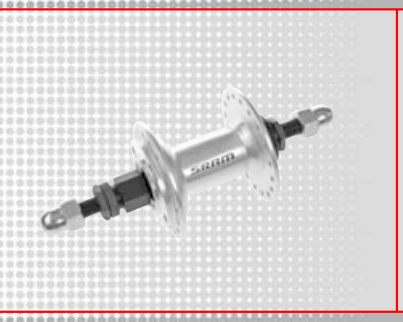
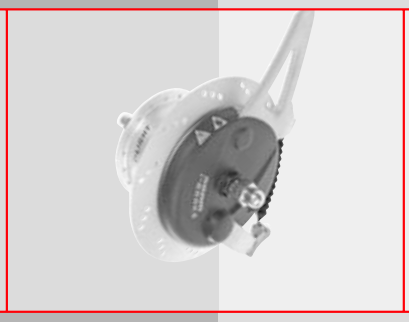
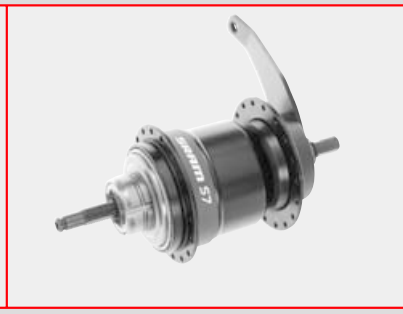
2006

TECHNICAL MANUAL
GEAR HUB SYSTEMS

ENGLISH



SRAM®

This Technical Manual is intended for bicycle factories and qualified bicycles dealers only!

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Information may be enhanced without prior notice.

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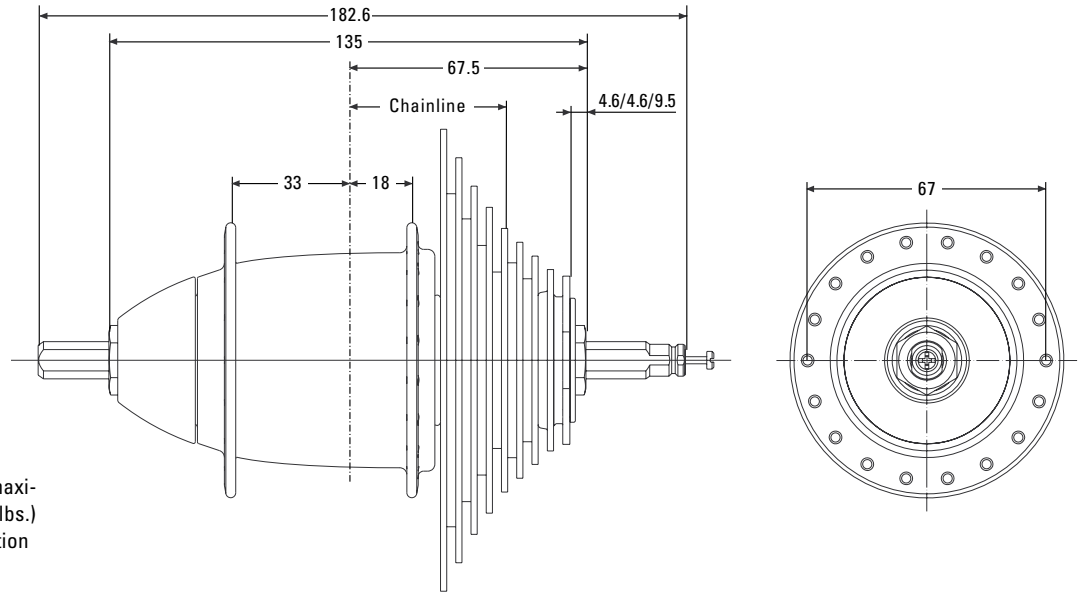


i-BRAKE for DualDrive:
see page 54.

Caution:
Not suitable for tandems, trademen's delivery bicycles and similar.

Cycle frame:
The strength must be such that with a maximum braking torque of 250 Nm (2200 in.lbs.) on the rear wheel no residual deformation can occur on the rear structure.

HUBS

		DualDrive · Without brake		DualDrive · for i-BRAKE		DualDrive · for Disc brake	
	Version (Speeds)	DualDrive 27	DualDrive 24	DualDrive 27	DualDrive 24	DualDrive 27	DualDrive 24
	Brake	Without brake		Adaptor for i-BRAKE		Adaptor for Disc brake	
	Over Locknut Dim.	135 mm		135 mm		135 mm	
Axle	**Length**	182.6 mm		182.6 mm		182.6 mm	
Axle	**Ends Diameter**	FG 10,5		FG 10,5		FG 10,5	
Spoke	**Holes**	36 or 28		36		36 or 32	
Spoke	**Hole Diameter**	2.6 mm (28 holes also available in 2,8 mm)		2.6 mm		2.6 mm	
Spoke	**Hole Ref. ø**	67 mm		67 mm		67 mm	
Spoke	**Flange Dist. to $^1/_2$ OLD**	33 mm / 18 mm		33 mm / 18 mm		33 mm / 18 mm	
Ratio	**Totally**	575 % (27spd)	541 % (24spd)	575 % (27spd)	541 % (24spd)	575 % (27spd)	541 % (24spd)
Ratio	**Totally hub**	186 %		←		←	
Ratio	**Speed 1**	73 %		←		←	
Ratio	**Speed 2**	100 %		←		←	
Ratio	**Speed 3**	136 %		←		←	
	Chainline	45 mm		45 mm		42 mm	
	Crankset	33 / 38 Teeth		←		←	
	Cogset	11-34 Teeth	11-32 Teeth	11-34 Teeth	11-32 Teeth	11-34 Teeth	12-32 Teeth
	Cogset Compatib.	DualDrive 27	DualDrive 24	DualDrive 27	DualDrive 24	DualDrive 27	DualDrive 24
	Shifter Compatib.	DualDrive 27	DualDrive 24	DualDrive 27	DualDrive 24	DualDrive 27	DualDrive 24
	Sealing	Extra gedichtet		←		←	
	Tandem compatib.	—		—		—	
	Disc brake compatib.	—		—		SRAM / Magura / Hayes / Shimano	
	Weight	970 g		1640 g (complete with i-BRAKE)		985 g	
Finish	**Hub Shell**	Aluminum, silver anodized		Aluminum, silver anodized		Aluminum, silver anodized	
Finish	**Shifting device**	Composite		Composite		Composite	

DUALDRIVE
TECHNICAL DATA / ASSEMBLY REQUIREMENTS

DERAILLEURS

		DualDrive 27	DualDrive 24
	Speeds	9 / 8	9 / 8
	Shifter Compatibility	DualDrive 27	DualDrive 24
	Cage Length	Short, 75 mm	Short, 75 mm
	Sprocket, max.	34 Teeth	32 Teeth
	Sprocket, min.	11 Teeth	11 Teeth
	Pulleys	Exchangeable / Bushing	Exchangeable / Bushing
	Direct Mount	●	●
	Weight	258 g	265 g
Design	Upper Knuckle	Aluminum, forged	Aluminum, forged
Design	Lower Knuckle	Grilon Composite silver	Grilon Composite silver
Design	Outer Link	Aluminum	Grilon Composite silver
Design	Inner Link	Steel / Zinc coat	Steel / Zinc coat
Design	Outer Cage	Aluminum, forged	Grilon Composite black
Design	Inner Cage	Grilon Composite black	Grilon Composite black
Design	Hanger Bolt	Aluminum	Steel

CASSETTES

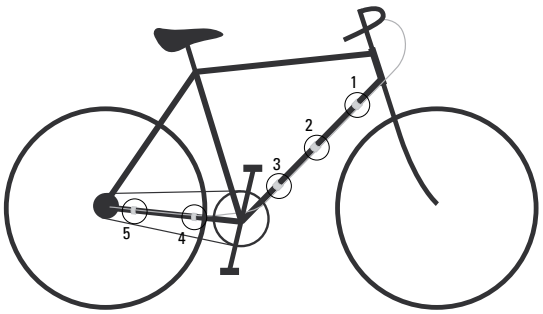
		DualDrive 27	DualDrive 24
	Largest Cog	34 Teeth	32 Teeth
	Speeds	9	8
	Cogs	11/13/15/17/20/23/26/30/34	11/12/14/16/18/21/26/32
	Spacers	Dark Gray	Black
	Chain compatib.	9spd, HG/IG/PC comp.	8spd, HG/IG/PC comp.
	Weight	410 g	280 g
Design	Cogs	SAPH 440 Stahl	←
Design	Screws	Steel / Zinc Coat	←
Design	Finish	Chrome, matt	Chrome

SHIFTERS

		DualDrive single sided shifter		Trigger shifter	Twist shifter	
	Version	DualDrive 27	DualDrive 24	DualDrive 27	DualDrive 27	DualDrive 24
	Clickbox Cable	1400 mm / 1500 mm / 1600 mm / 1700 mm / 2100 mm		see Price list	see Price list	←
	Shifter Type	SRS Twistring-Thumbshifter-Combo (2in1)		Trigger shifter	Twist shifter	←
	Arrangement	Rechte Lenkerseite	←	left and right	left and right	←
Compat.	Gear Hub	DualDrive 27	DualDrive 24	DualDrive 27	DualDrive 27	DualDrive 24
Compat.	Derailleur	DualDrive 27	DualDrive 24	DualDrive 27	DualDrive 27	DualDrive 24
	Gear Indication Der.	Window	Printed	Window	Printed	Printed
	Riding Mode Indic.	Printed	Printed	Window	Printed	Printed
	Barrel Adj. Gear Hub	None	←	Indexing	Indexing	←
	Barrel Adj. Derailleur	Indexing	←	Indexing	Indexing	←
	Clamping Diameter	22.3 mm	←	22.3 mm	22.3 mm	←
	Handlebar, Straight Area	Minimum length = 150 mm		N/A	N/A	←
	Cable Routing, Gear Hub	Continuous housing (preassembled)		Open or continuous	Continuous housing (preassembled)	
	Cable Routing, Der.	Open or continuous		Open or continuous	Open or continuous	
	Weight	N/A	←	N/A	N/A	←
Design	Cables	Stainless steel	←	Stainless steel	Stainless steel	←
Design	Housing	Glass filled PA – Silver painted		Aluminum	Glass filled PA	←
Design	Grip Cover	Thermoplastic elastomer		—	Thermoplastic elastomer	
Design	Clamping Collar	Aluminum	←	Aluminum	Aluminum	←
Design	Clickbox	Composite	←	Composite	Composite	←

DUALDRIVE
TECHNICAL DATA / ASSEMBLY REQUIREMENTS

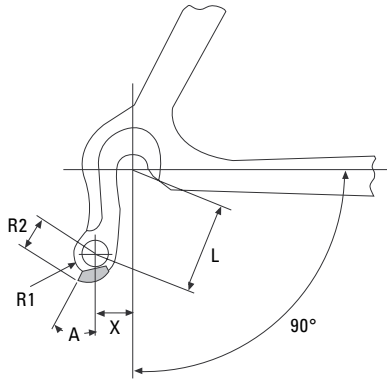
1



Cable routing	DualDrive 27 / DualDrive 24
Hub cable	Along chainstay only
Derailleur cable	Along chainstay only

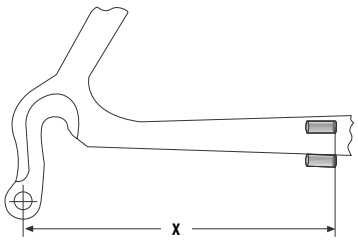
Cable attachement see Fig. 1	Cable housing	Attachement points	Cable stops
Hub	Continuous	1/2/3/4 ***(see Fig. 1)***	—
Derailleur	Continuous	1/2/3/4/5 ***(see Fig. 1)***	—
	Open	—	1/5 ***(Fig. 1)***

2



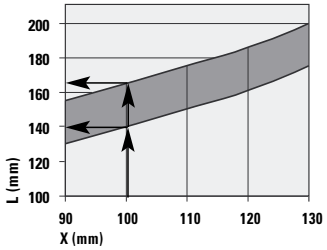
CABLE HOUSING FOR DERAILLEUR

Rear cable stop position



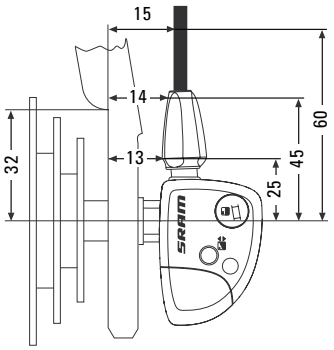
Length X min. 90 mm.
Cable stop below or beside chainstay.

Rear housing length



Example: Distance X = 100 mm ➔ cable housing length L = 140 – 165 mm.

3



CABLE HOUSING

- Use only new high quality cable and com-pressionless cable housing with end caps.
- When choosing cable housing lengths, be sure to allow enough housing for an extreme turn of the handlebars in both directions.
- Note also, that different stem lengths and cable stop positions effects cable housing length.

DROPOUT

Only flat and no off-set versions.
Dropout thickness: 7 – 8 mm.
Vertical or horizontal dropout slot.
Dropouts must be parallel.

Dropout dimensions: ***see Fig. 2 and 3.***

L	X	A	R1	R2
28	6–10	25°–30°	8.5 max	11.5–13.5
30	7.5–10	25°–30°	8.5 max	11.5–13.5

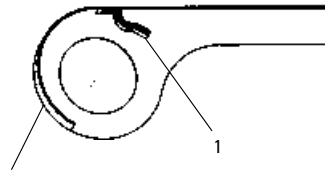
CRANKSET

Bicycle without chain case:
Use a chain guard disc (at the outer surface of chainring, material no resin)
Use only standard chainring version (non-shifting teeth).

Chainline
DualDrive 27 / 24: 45 mm

Ask for recommended DualDrive-cranks at:
Truvativ
http://www.truvativ.com

4



ø max. 220 mm

CHAIN GUIDE FORK

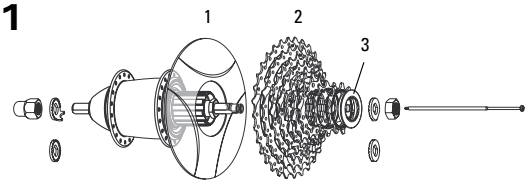
It prevents chain from jumping off front chainring, is bolted inside the chain case (1, ***Fig. 4)***.

HANDLEBAR

Diameter: 22.3 mm.
Minimum length of straight area for shifter: 150 mm.
Check the compatibility of intended handlebars and brake levers.

DUALDRIVE ASSEMBLY

1



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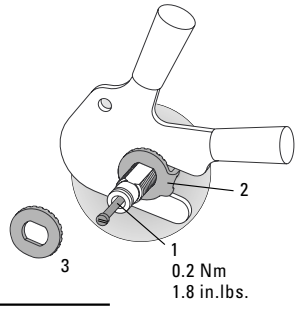

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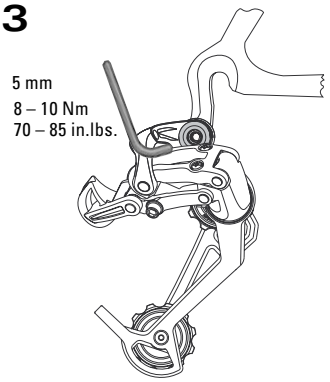

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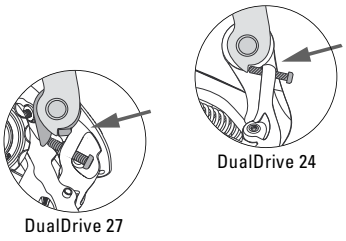

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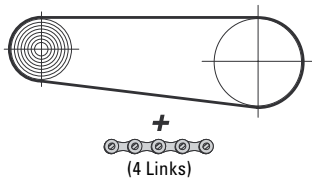

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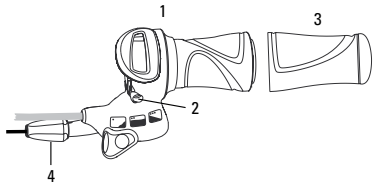


ASSEMBLY HUB

- Lace the wheel as normal.
- Place spoke protector disc (1, ***Fig. 1)*** on shoulder of hub, fit cassette (2) onto driver profile. Screw lock nut (3) with cassette tool (Park Tool FR-5 or SRAM Part No. 4624 411 010), tightening torque: 40 Nm (350 in.lbs.).
- Screw shifting rod (1, ***Fig. 2)*** into the hub axle and tighten it with 0.2 Nm (1.8 in.lbs.).
- Fit wheel in dropouts.
- Place retaining washers ***(Fig. 2)*** on both sides of the axle – the serrations must bear against the dropout.
  – Version for horizontal dropouts (2): the lug must engage in the dropout slot.
  – Version for vertical dropouts (3): without lug.
- Tighten up axle nuts. Tightening torque 30 – 40 Nm (266 – 350 in.lbs.).

ASSEMBLY DERAILLEUR

Advice:
Check the rear derailleur hanger alignment. A bent rear derailleur hanger will result in inaccurate index shifting.

- Attach the rear derailleur to the frame's rear derailleur hanger using a 5 mm hex head wrench ***(Fig. 3).***
- Check that the b-adjust washer tab (b-adjust screw at DualDrive 24) is clear of the rear derailleur dropout tab ***(Fig. 4).***
- Tighten the 5 mm hex hanger bolt to 8 – 10 Nm (70–85 in.lbs.).

CHAIN LENGTH

- Bypassing the rear derailleur, run the chain around the largest cog/large chainring combination ***(Fig. 5)***.
  – For rear suspension frames, position the rear suspension for the greatest chain length required.
- Add 4 LINKS or 3 link + Connecting Link to this length for proper chain length.

ASSEMBLY SHIFTER

Caution:

- ***Never use lubricants or solvents to install handlebar grips. Handlebar grips provide safety function.***
  For this reason, they should be mounted in such a way as to make sure they do not slip off handlebar!
- ***Always check the front and rear brake levers for proper operation.***
  If there is interference between shifters and brake levers, re-adjust lever and shifter placement.

DualDrive single sided shifter:

- Slide the shifter (1, ***Fig. 6)*** onto the handlebar.
- Rotate the shifter until the barrel adjuster (4) is beneath (but out of the way of) the brake lever.
- Tighten the 3 mm hex clamp bolt (2) to 1.9 – 2.5 Nm (17 – 22 in.lbs.).
- Slide the handlebar grip (3) onto the handlebar.

DualDrive Trigger shifter (without picture):

- Slide shifter and brake lever onto handlebar. Either component can be mounted first, depending on personal preference.
- Slide the handlebar grip onto the handlebar.
- Tighten the 5 mm hex clamp bolt to 5 Nm (44 in.lbs.).

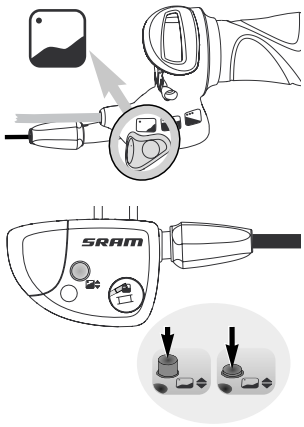
DualDrive Twist shifter (without picture):

- Slide the shifter onto the handlebar.
- Tighten the 3 mm hex clamp bolt to 1.9 Nm (17 in.lbs.).
- Slide the plastic washer onto the handlebar.
- Slide the stationary grip onto the handlebar.

INSTALLING CLICKBOX

- Fit the cable and avoid small radius.
- Cable attachment points ***see Page 5 / Fig. 1***.
  Cable housing must be movable inside attachment.
- Place shift lever in uphill riding mode / gear position „1" ***(Fig. 7)***.
- Push Clickbox button down ***(Fig. 7)***.
- Push on Clickbox to the stop on the hub axle.
- Press button up.
- Place thumb shift lever in standard riding mode / gear position „2" ***(Fig. 8)***.
- Match up the marks in the Clickbox viewing window by twisting the barrel adjuster ***(Fig. 8)***.

7



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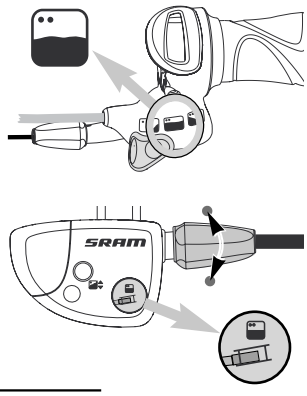

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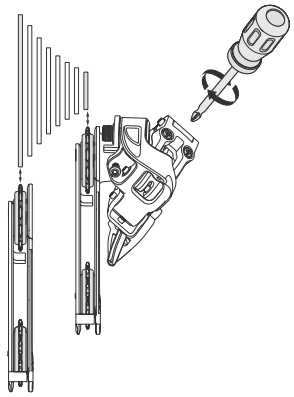

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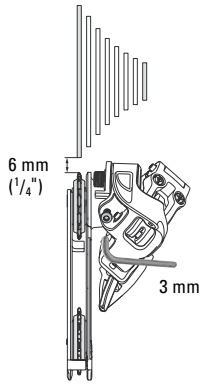

DERAILLEUR ADJUSTMENT

Limit screw adjustment:

- View the rear derailleur and pulleys from behind the rear of the bicycle ***(Fig. 9)***.
- Using a small screwdriver, turn the limit screw marked 'H' on the outer link of the derailleur to align the upper guide pulley center with the outboard edge of the smallest cog – clockwise moves the guide pulley inboard towards the wheel.
- While turning the crank, push the rear derailleur towards the larger cogs by hand.
- Align the upper guide pulley under the largest cog, center to center, by turning the limit screw marked 'L' on the outer link – clockwise moves the guide pulley outboard away from the spokes.

Chain gap adjustment:

Chain gap is the distance between the upper guide pulley and the cog the chain is riding on. Optimal chain gap is small enough to allow quick, efficient shifts to and from any cog, but large enough to allow smooth shifts to and from the largest cog.

- Shift chain to the small chain ring.
- While turning the crank, push the rear derailleur inboard by hand to the largest cog.
- Hold the derailleur in this position while making the following adjustment.
- Use a 3 mm hex wrench, turn the b-adjust screw until the chain gap equals approximately 6 mm (1/4") from tip of the cog to tip of upper guide pulley ***(Fig. 10)***.

– Turn the b-adjust screw clockwise to increase the chain gap.
– Turn the b-adjust screw counterclockwise to decrease the chain gap.

Advice:
Do not use the b-adjust screw to adjust the rear derailleur to act as a chain-tensioning device or to prevent chain suck. This increases the chain gap causing poor shifting performance.

Index shifting adjustment:

- Check that the chain and the rear derailleur are in the smallest cog position.
- Measure and cut the rear piece of cable housing. Make sure that it is not too short or long ***(see page 5 for figure and chart).***
- Rotate the twist shifter until the largest number and gear indication tab/dash line up.
- Turn the twist shifter barrel adjuster (4, ***Fig. 6)*** clockwise fully into the shifter, then turn counterclockwise 1 full turn.
- Feed the shifter cable through the rear derailleur cable housing, stops and cable guides.
- Feed the rear derailleur cable through the rear derailleur-housing stop and through the cable guide on the fin.
- Pull the cable tight and position it under the cable anchor washer ***(Fig. 11)***.
- Tighten the 5 mm hex cable anchor bolt to 4 – 5 Nm (35–45 in.lbs.).
- Rapidly shift the chain and derailleur up and down the cassette several times. If the cable slips repeat the two former steps.
- Shift the chain to the smallest cog.
- While pedaling, move the shifter up one detent.
  – If the chain hesitates or does not shift to the second cog, increase the cable tension by turning the shifter barrel adjuster counterclockwise.
  – If the chain shifts beyond the second cog, decrease the cable tension by turning the shifter barrel adjuster clockwise.
- Repeat the two former steps until shifting and cable tension is accurate.
- While turning the crank, shift the chain up and down the cassette and chain rings several times to ensure that your derailleur is indexing smoothly.

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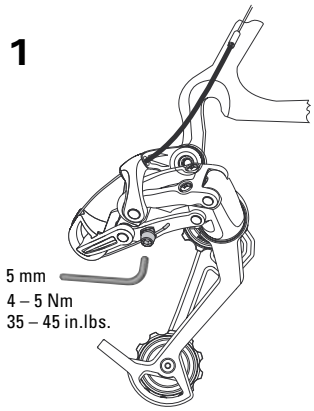
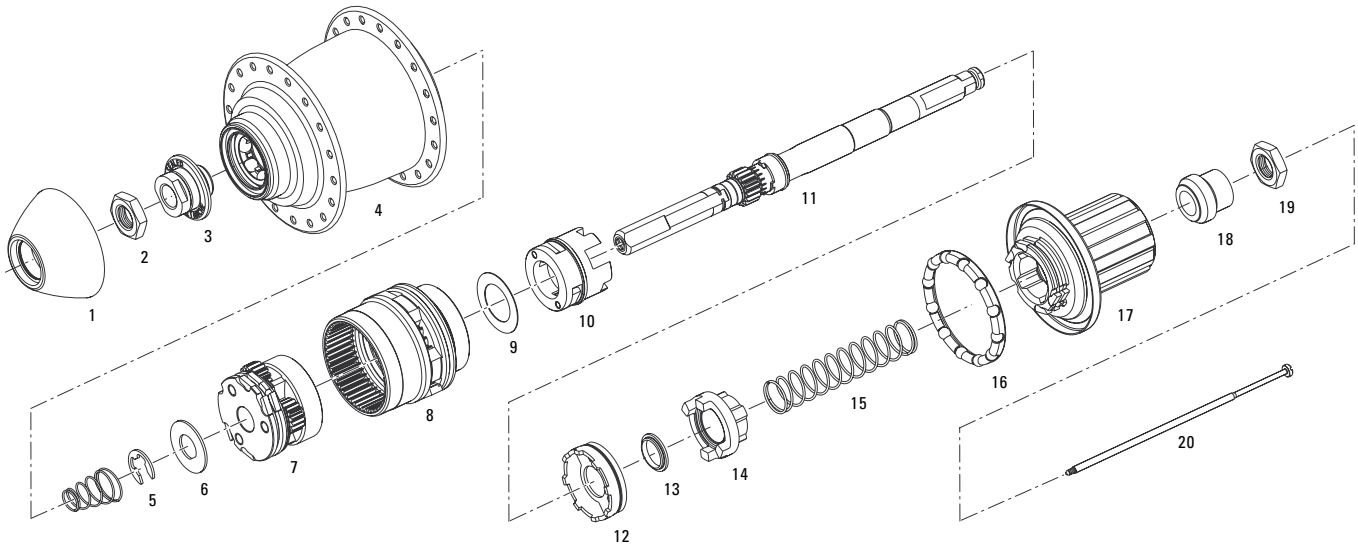


DUALDRIVE MAINTENANCE

1



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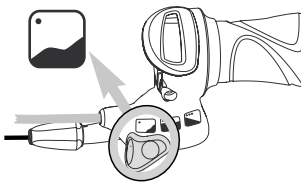

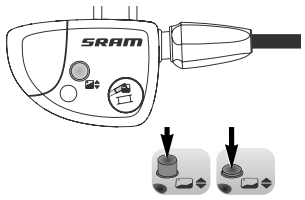

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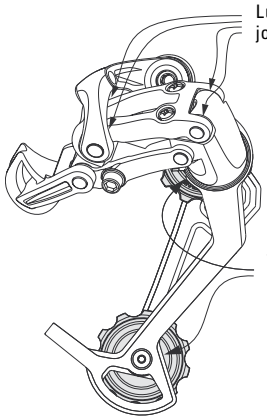

Lubricate the shifting joints regularly

When disassembled – use a waterproof grease

REMOVE WHEEL

- Rotate the twist shifter to the highest gear position (speed "8/9").
- Place shift lever in uphill riding mode / gear position "1" ***(Fig. 2)***.
- Push Clickbox button down ***(Fig. 2)***.
- Pull Clickbox off the axle.
- Screw out shifting rod (20, ***Fig. 1)***.
- Dismantle wheel.

DISMANTLING HUB

see Figure 1

- Dismantle cassette lock nut with cassette tool (Park Tool FR-5 or SRAM Part No. 4624 411 010).
- Remove cassette and spoke protector disc.
- Clamp hub with the two axle flats (driverside facing downwards).
- Remove cap (1), unscrew lock nut (2), screwed adjusting cone (3) and hub shell (4).
- Dismantle retaining washer (5), remove washer (6), planetary gear carrier (7) and gear ring (8).
- Squeeze down pawls and remove pawl carrier (10) with washer (9) and ball retainer (16).
- Clamp other axle end (longer axle thread).
- Dismantle lock nut (19) and cone (18).
- Remove driver (17), compression spring (15), coupling gear clutch (14) and shift sleeve (12) with bushing (13).

REASSEMBLY HUB

see Fig. 1

Lubrication see "LUBRICATION GEAR HUB".

- Clamp axle with the two axle flats (longer axle thread).
- Fit shift sleeve (12), bushing (13) with small diameter first, compression spring (15), coupling gear clutch (14), and driver (17).
- Mount cone (18) and lock nut (19). Tightening torque 15 – 20 Nm (133 – 177 in.lbs.).
- Clamp other axle end (driver side facing downwards).
- Mount ball retainer (16), pawl carrier (10) and washer (9).
- Press pawls against spring force and mount gear ring (8) with smaller diameter first. Rotate gear ring counterclockwise until pawls engage inside the gear ring.
- Fit planetary gear carrier (7) and washer (6).
- Press and rotate planetary gear carrier until axle groove is visible.
- Mount retaining washer (5).
- Mount hub shell (4), obligatory with a slight counterclockwise turn.
- Mount adjusting cone (3).
- Screw on counternut (2), adjust bearings to be nearly free of play and tighten with a torque of 15 – 20 Nm (133 – 177 in.lbs.).
- Mount cap (1).
- Unclamp hub and mount shifing rod (20) with a torque of 0,2 Nm (1.8 in.lbs.). Mount spoke protector disc and cassette.

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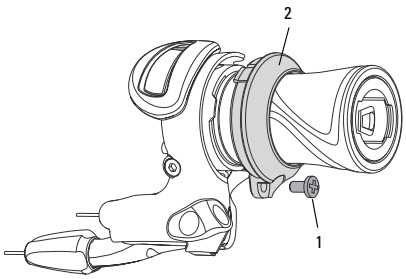

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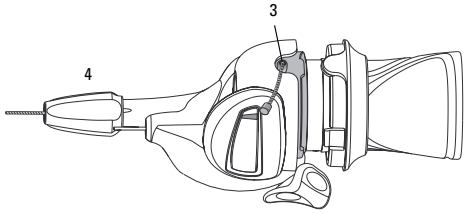

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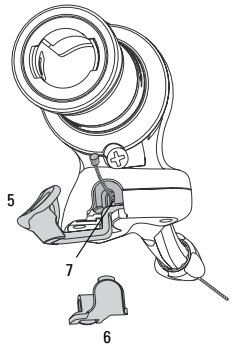

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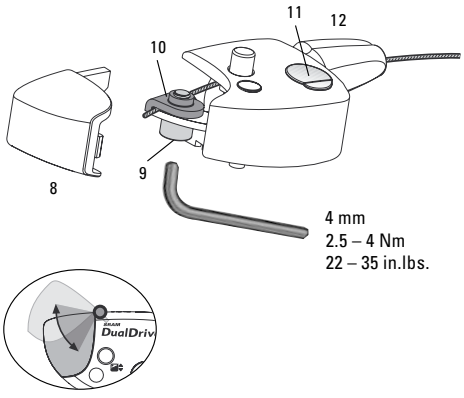


LUBRICATION GEAR HUB

Hubs are provided with permanent lubrication and maintenance-free under normal conditions.

Cleaning of parts:

- All parts – except the planetary gear carrier and the driver – can be degreased in a cleaning bath.
- Planetary gear carrier and driver only need to be cleaned on the outside with a brush so as not to degrease the bearings.

Lubrication of parts:

Use only SRAM grease (Part No. 0369 135 200/ ...201) and standard bicycle oil.

- To lubricate the bearing points on the planetary gear sets, position the planetary gear carrier pawls upside and apply 2 – 3 drops of oil to the bearing bolts – at the same time turning the planetary gears so that the bearing points are completely wet. Oil axle slot, apply a thin coating of grease to the outside.
- Grease the teeth of the axle (fill the gaps).
- Apply grease to gear ring teeth but just oil the pawls and pawl teeth.
- Oil pawl carrier pawls and pawl bearings.
- Oil cartridge bearing.
- Regrease ball retainers, line ball bearing running tracks with grease.

Caution:
Do not use high-pressure water when cleaning the gear hub (e.g. strong water jets, high-pressure cleaners etc.) – if water penetrates it could lead to functional problems.

LUBRICATION REAR DERAILLEUR

- Do not use solvants or corrosive materials to clean the components.
- Lubricate the shifting joints regularly ***(Fig. 3)***.
- Grease any cable guides (e.g. beneath the bottom bracket).

CABLE CHANGE

Advice:
Use only new high quality cable and compressionless cable housing with end caps.

Twist shifter (rear derailleur):

- Detach the cable from the derailleur.
- Cut cable off 15 cm (6") from shifter barrel adjuster. Discard old cable and cable housing.
- Remove screw (1, ***Fig. 4)*** and pull open the cable change sleeve (2).
- Rotate the shifter fully in the cable release direction (gear position "8/9").
- Look for cable head entry (3, ***Fig. 5)***.
- Push cable up/out of the shifter and discard.
- Feed the new cable through the cable entry and out the barrel adjuster (4).
- Pull cable snug.
- Install cable change sleeve (2, ***Fig. 4)***.
- Feed the cable through the new cable housing and frame stops.
- Attach cable to the derailleur.
- Adjust indexing per derailleur instruction.

Thumb shift lever (gear hub):

- Place thumb shift lever (5, ***Fig. 6)*** in uphill riding mode / gear position "1".
- Remove Clickbox from the axle ***(see page 8)***.
- Snap open Clickbox-cover (8, ***Fig. 7)*** as shown.
- Unscrew clamping bolt (9).
- Remove the shifter escape hatch (6, ***Fig. 6)***.
- Remove and discard the old cable.
- Feed the new cable through the cable entry (7, ***Fig. 6)***, the new calbe housing and pull the cable snug.
- Attach the escape hatch.
- Pull the cable tight and position it under the cable anchor washer (10, ***Fig. 7)***.
- Tighten the 4 mm hex cable anchor bolt to 2.5 – 4 Nm (22 – 35 in.lbs.).
- Cut off cable end to 1 – 2 mm.
- Snap in Clickbox-cover (8).
- Install Clickbox ***(see page 6)***.
- Place thumb shift lever in standard riding mode / gear position "2".
- Match up the marks in the Clickbox viewing window (11, ***Fig. 7)*** by turning the barrel adjuster (12).

DUALDRIVE MAINTENANCE

TROUBLESHOOTING

Problem	Cause	Remedy
Hub: Shifting difficulties	Incorrect gear setting	Adjust shifting system, oil control cable, check that cable stop is fastened correctly.
Pedals are carried forward when freewheeling	Bearings set too tight	Re-adjust bearing
	Loose lock nuts	Tighten lock nuts (15 – 20 Nm, 133 – 177 in.lbs.)
	Rear frame dropouts non parallel	Bend / reorient dropouts
Derailleur: Chain jumps from smallest sprocket to frame dropout.	High gear limit screw is not adjusted properly.	Turn in screw H until the guide pulley is aligned with the smallest sprocket.
Difficult or impossible to shift chain onto smallest sprocket.	High gear limit screw is not adjusted properly.	Unscrew screw H until the guide pulley is aligned with the smallest sprocket.
Chain jumps over largest sprocket and falls between the spokes and largest sprocket or inner cage plate scrapes on spokes.	Low gear limit screw is not adjusted properly.	Turn in screw L until the guide pulley is aligned with the largest sprocket.
	Rear derailleur or derailleur hanger is bent.	Straighten or replace.
Delayed shifting.	Clearance between guide pulley / sprocket is too large.	Adjust b-adjust screw by rotating counterclockwise.
Rough shifting behavior.	Clearance between guide pulley / sprocket is too small.	Adjust b-adjust screw by rotating clockwise.
Chain jumps two gears on small sprocket	Shift cable insufficiently tensioned.	Turn barrel adjuster on the shifter counterclockwise.
Delayed shifting onto larger sprocket	Shift cable insufficiently tensioned.	Turn barrel adjuster on the shifter counterclockwise.
Delayed shifting onto smaller sprocket	Shift cable is too tight.	Turn barrel adjuster on the shifter clockwise.
	Excessive cable friction, pinched or poorly routed cable.	Lubricate or replace cable and housing. Check for excessive bending of cable housing.

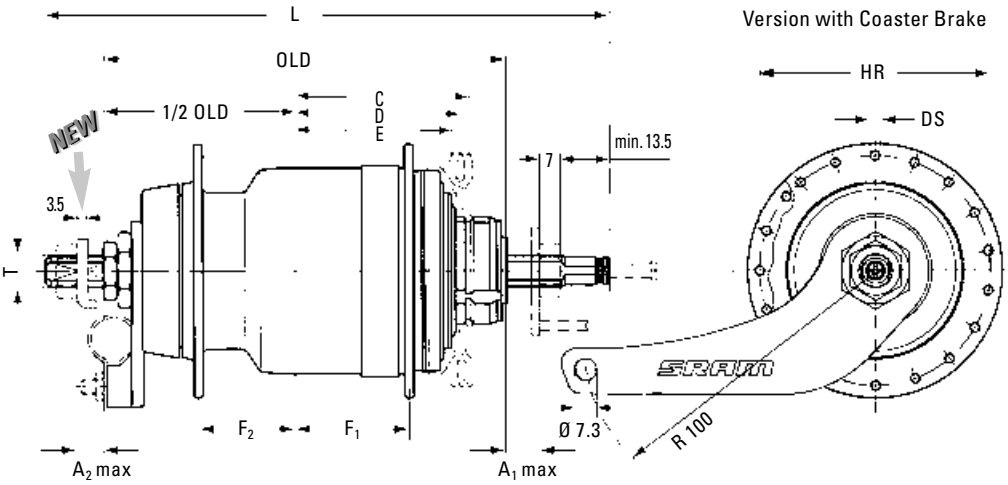
DUALDRIVE MAINTENANCE

SRAM S7
TECHNICAL DATA / ASSEMBLY REQUIREMENTS

i-BRAKE for SRAM S7:
see page 54.

Caution:
- ***SRAM S7 hubs are not suitable for tandems, trademen's delivery bicycles and similar.***
- ***SRAM S7 with coaster brake resp. i-BRAKE are „DIN Plus City" certified.***

Cycle frame:
- Dropouts must be parallel.
- Slot width at rear dropout max. 10,5 mm.
- The strength must be such that with a maximum braking torque of 250 Nm (2200 in.lbs.) on the rear wheel no residual deformation can occur on the rear structure.



Version with Coaster Brake

HUBS

		SRAM S7 with coaster brake	SRAM S7 for i-BRAKE	SRAM S7 with drum brake	SRAM S7 without brake
	Type	MH 7215	–	MH 7225	MH 7205
	Brake	Coaster NEW	i-BRAKE (see page 54)	Drum „D" „NL"	None
	Over Locknut Dim., OLD	130 mm	135 mm	135 mm	130 mm
Axle	**Length, L**	183.4 mm	188.5 mm	188.5 mm	183.4 mm
Axle	**Ends Diameter, T**	FG 10.5	FG 10.5	FG 10.5	FG 10.5
Axle	**Dropout Width Dim.**	A_1 max. = 12.5 mm / A_2 max. = 12 mm	A_1 max. = 12.5 mm / A_2 max. = 12.2 mm	A_1 max. = 12.5 mm / A_2 max. = 12.2 mm	A_1 max. = 12.5 mm / A_2 max. = 10 mm
Spoke	**Holes**	36	36	36	36
Spoke	**Hole Diameter, DS**	3.0 mm	3 mm	2.9 mm	3.0 mm
Spoke	**Hole Ref. ø, HR**	75 mm	75 mm	89 mm	75 mm
Spoke	**Flange Dist. to 1/2 OLD**	F_1 = 33 mm / F_2 = 34 mm	F_1 = 35.4 mm / F_2 = 32.7 mm	F_1 = 34.8 mm / F_2 = 35.7 mm	F_1 = 33 mm / F_2 = 34 mm
Gear Hub Ratio	**Totally**	303 %	←	←	←
Gear Hub Ratio	**Speed 1**	57 %	←	←	←
Gear Hub Ratio	**Speed 2**	68 %	←	←	←
Gear Hub Ratio	**Speed 3**	81 %	←	←	←
Gear Hub Ratio	**Speed 4**	100 %	←	←	←
Gear Hub Ratio	**Speed 5**	124 %	←	←	←
Gear Hub Ratio	**Speed 6**	148 %	←	←	←
Gear Hub Ratio	**Speed 7**	174 %	←	←	←
Chain	**Usable Dimensions**	1/2" x 1/8" or 1/2" x 3/32"	1/2" x 1/8" or 1/2" x 3/32"	1/2" x 1/8" or 1/2" x 3/32"	1/2" x 1/8" or 1/2" x 3/32"
Chain	**Line, C/D/E**	54 / 51 / 48 mm	55.5 / 52.5 / 49.5 mm	55.5 / 52.5 / 49.5 mm	54 / 51 / 48 mm
Chain	**Ratio**	24", 26", 28" = 1.83 – 1.90 / 20" = 1.83 – 2.00		←	←
Compatibility	**Shifter**	SRAM Grip 7	←	←	←
Compatibility	**Clickbox**	Clickbox S7	←	←	←
Compatibility	Hand **Brake Lever**	—	see page 55	see page 15	—
Compatibility	**Tandem**	—	—	—	—
	Weight	1714 g	2164 g (complete with i-BRAKE)	1737 g	1556 g
Finish	**Hub Shell Material**	Steel	Steel	Aluminum	Steel
Finish	**Finish**	Matt Chrome Plated or Black	Matt Chrome Plated	Clear Coat	Matt Chrome Plated or Black

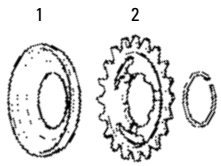
SRAM S7
TECHNICAL DATA / ASSEMBLY REQUIREMENTS

SHIFTERS

	SRAM Grip 7							
Shifter Type	Twist Shifter							
Cable Length	1450 mm	1550 mm	1650 mm	1750 mm	1850 mm	1950 mm	2050 mm	2150 mm
Gear Indication	Window							
Clamping Diameter	22.3 mm							
Handlebar, Straight Area	Minimum length for shifter = 150 mm							
Weight	89g							
Design **Housing**	Glass filled PA							
Grip	PP							
Grip Cover	Thermoplastic elastomer, Overmolded							
Clamping Collar	Aluminum							

SRAM S7
ASSEMBLY

1



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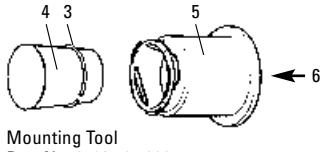

Mounting Tool
Part No. 0582 104 000

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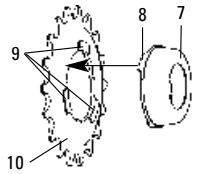

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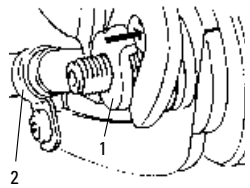


ASSEMBLY HUB

- Lace the wheel as normal. See spoke length table.
- Place the dust cap (1, ***Fig. 1)*** and sprocket (2) on the driver.
- Push sprocket circlip (3, ***Fig. 2)*** onto the cone of tool sleeve (4). Place tool sleeve with large diameter on the driver.
- Push the spring end of sliding sleeve (5) of the tool over the tool sleeve. Thrust sliding sleeve in direction (6), this forces circlip into the recess of the driver.
- Remove tool and check that the circlip is seated correctly.
- Turn dust cap (7, ***Fig. 3)*** until the three lugs (8) are between the three beads (9) on the sprocket (10).
- Position dust cap and push towards sprocket until it is felt to lock into place.
- Placing the wheel in the rear frame.

NEW

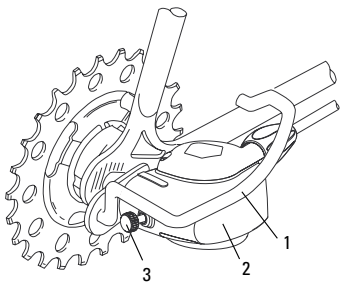
- Fit new retaining washer (3,5 mm thick) on left axle end (1, ***Fig. 4)***. The serrations must bear against the dropout and the lug must engage in the dropout slot.
  Advice:
  For bicycles with chain tensioner use previous retaining washers (2 pieces, 2 mm thick) – see Tech. Manual 2005.
- On the sprocket side fit the protective bracket (1, ***Fig. 5)*** directly below the axle nut. Tightening torque on axle nuts 30 – 40 Nm (266 – 350 in.lbs.).
- Mount the brake lever using a suitable frame clamp (2, ***Fig. 4 resp. Fig. 10)***.
  Caution:
  Mount the brake lever between the two straps of the frame clamp.
  The clamp must be seated on the frame without play.
  Use a self-locking nut! Tightening torque: 2 – 3 Nm (18 – 27 in.lbs.).

Spoke length table:

Tire Size		Cross	Length MH 7215/7205	Length MH 7225
47–406	20" x 1.75 x 2	3 x	181 mm	179 mm
37–490	22" x 1 3/8	3 x	225 mm	222 mm
47–507	24" x 1.75 x 2	3 x	232 mm	229 mm
37–540	24" x 1 3/8	3 x	251 mm	248 mm
47–559	26" x 1.75 x 2	3 x	259 mm	256 mm
37–590	26" x 1 3/8	3 x	275 mm	272 mm
47–622	28" x 1.75	3 x	289 mm	286 mm
37–622	28" x 1 3/8 x 1 5/8	3 x	289 mm	286 mm
28–622	28" x 1 1/8	3 x	289 mm	286 mm
32–622	28" x 1 5/8 x 1 1/4	3 x	289 mm	286 mm
28–630	27" x 1 1/4 fifty	3 x	294 mm	291 mm
32–630	27" x 1 1/4	3 x	294 mm	291 mm

Spoke lengths are approximate values. They must be checked through lacing attempts and adjusted accordingly.

5



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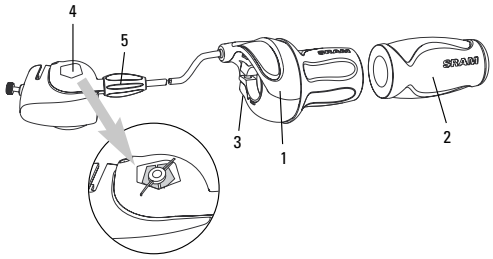

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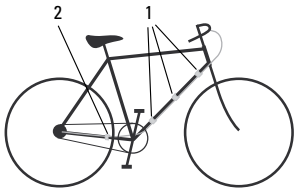

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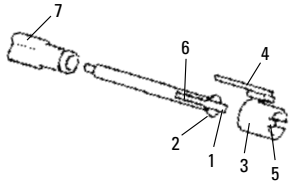

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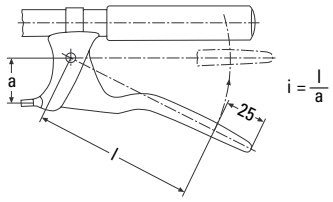

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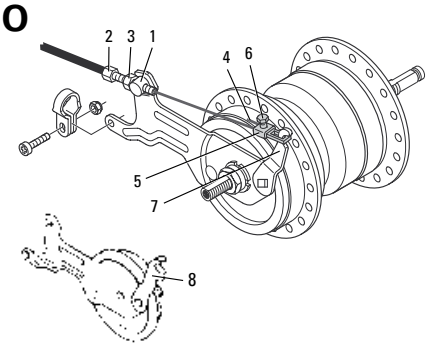


Advice:

- ***If a different protective bracket*** (1, ***Fig. 5)*** ***is used the thickness of the attachment plate must be max. 3 mm.***
- ***Do not use additional washers.***
- ***At least the beginning of the axle thread must be visible in front of the axle nut.***

Caution:
Check that all the brake system components are functioning properly!

ASSEMBLY SHIFTER

Advice:

- ***When choosing cable housing lengths, be sure to allow enough housing for an extreme turn of the handlebars in both directions.***
- ***Note also, that different stem lengths and handlebar positions effects cable housing length.***
- Slide shifter (1, ***Fig. 6)*** onto handlebar.
- Mount fixed grip (2) onto end of handlebar.
- Slide shifter against fixed grip, adjust shifter on handlebar and tighten with bolt (3) with a torque of 1.5 Nm (13 in.lbs.).

Caution:

- ***Never use lubricants or solvents to install fixed grips.***
  Fixed grips provide an axial safety function. For this reason, they should be mounted in such a way as to make sure they do not slip off handlebar.
- ***Check that the shifter and brake lever function properly and are unobstructed (realign if necessary).***

- When fitting the cable avoid small radius. Attach the cable 3 times to the down tube (1, ***Fig. 7).***
- Last attachment point is on the lower rear wheel fork (2, ***Fig. 7)*** immediately behind the chain wheel.
  Cable housing must be movable inside attachment.

INSTALLING CLICKBOX

- Insert shift rod (1, ***Fig. 8)*** in shift tube (2) (oil parts lightly) and then push into axle bore as far as the stop. Turn slot (6) in shift tube to a position where it is easily visible.
- Push locating sleeve (3) with guiding rib (4) to the front onto the hub axle – making sure that the internal lug (5) is guided in the slot (6) of the shift tube until it can be felt – and heard – to engage.
- Turn locating sleeve on the axle until the guiding rib (4) is facing roughly upwards.
- Place shifter in gear position “1”.
- Push on Clickbox (2, ***Fig. 5)*** to the stop on the hub axle. The guiding rib (4, ***Fig. 8)*** of the locating sleeve thereby engages in the slot on the housing. In the end position tighten up the knurled bolt (3, ***Fig. 5)*** by hand (0.3 Nm / 2.7 in.lbs.).

ADJUSTMENT

- Be sure to reset rotational shifter from 5th to 4th gear.
- Match up the marks in the Clickbox viewing window (4, ***Fig. 6)*** by turning the adjusting screw (5).

CONNECTING DRUM BRAKE

Caution:
Only use brake levers with a cable moving distance of at least 15 mm and a leverage of “i” = 3.8 – 4.2 (Fig. 9).

- Fit cable stop (1, ***Fig. 10)*** with adjusting bolt (2) and nut (3) and insert into the slot on the brake anchor plate.
- Turn adjusting bolt down by approx. $^2/_3$ and route the brake cable from the brake handle.
- Push lower brake cable end through adjusting bolt (2) and insert lower cable housing end into adjusting bolt.
- Thread brake cable end (4) into fork unit (5).
- Tighten screw (6) slightly.
- Attach fork unit to brake lever (7).
- Pull brake cable end taut with pliers so that fork unit can still be attached and removed (important for changing wheel).
- Tighten screw (6).

Caution:
For NL version drum brake hub with special lever (8), only use original NL brake cable (fork unit (5) is not suitable).

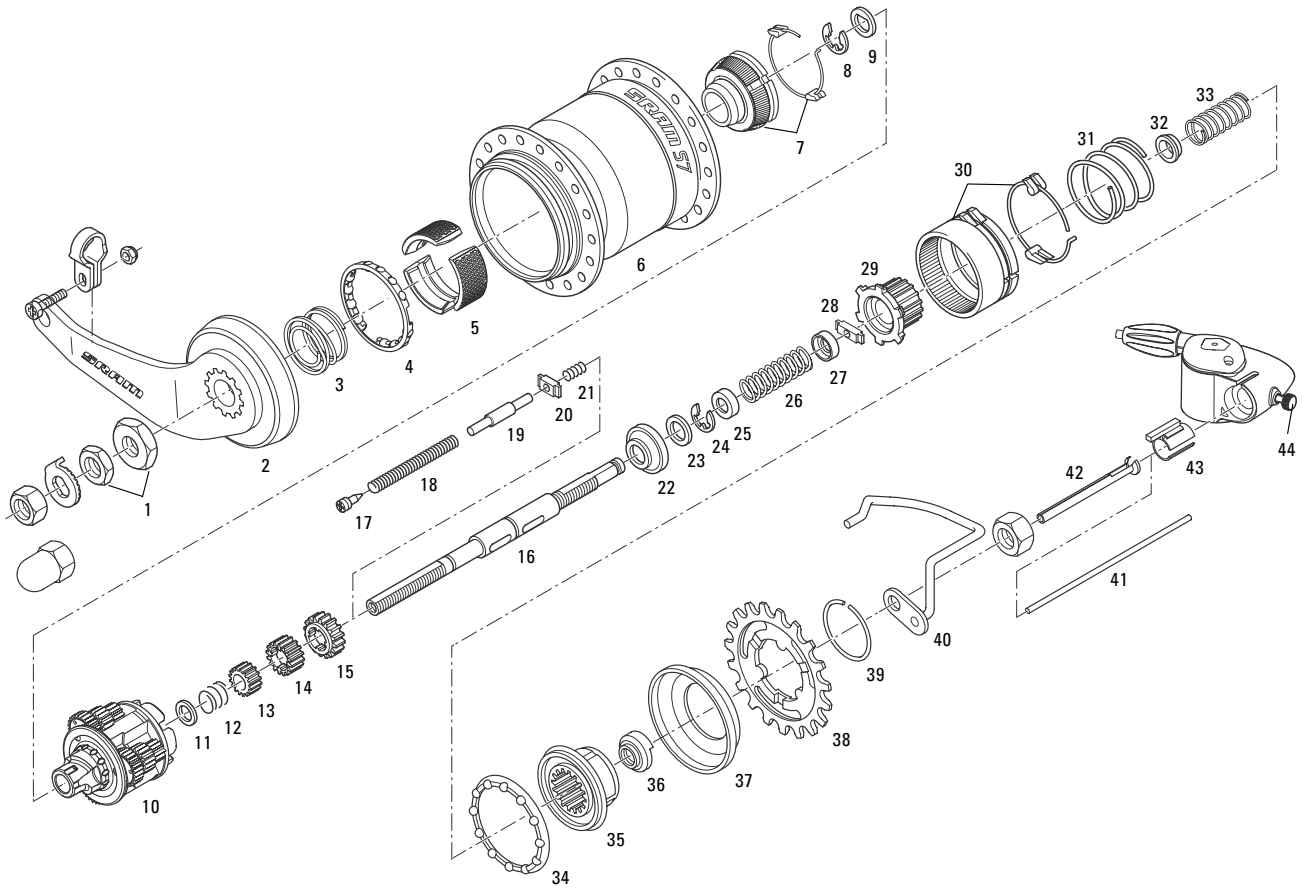
ADJUSTMENT DRUM BRAKE

- Unscrew adjusting screw (2, ***Fig. 10)*** until the brake pads drag lightly.
- Actuate the hand brake lever forcefully several times and then, if necessary, turn the adjusting screw further in just until the wheel starts spinning freely.
- Lock hex nut (3).

Caution:
Check that all the brake system components are functioning properly!

SRAM S7
MAINTENANCE

1



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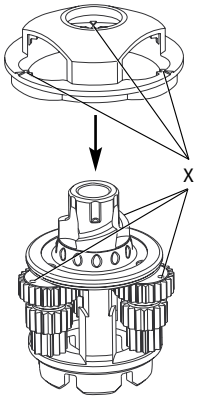
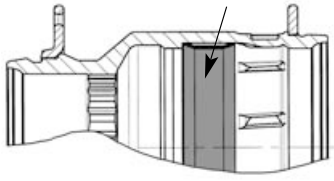


SRAM S7 mounting aid
Part No. 65 0324 103 000

3



REMOVE WHEEL

- Place shifter in gear position "1".
- Loosen the knurled screw (44, ***Fig. 1)*** and pull the Clickbox off the axle.
- Disengage the red location sleeve (43) and pull it off.
- Remove shift rod (42) and shift tube (41) out of the axle bore.
- Remove wheel.

DISMANTLING HUB

see Fig. 1

- Remove circlip (38), sprocket (37) and dust cap (36) as normal.
- Clamp hub by the axle between aluminum jaws with sprocket side facing downwards.
- Unscrew both locknuts (1).

NEW

- While turning clockwise, remove lever cone (2) with friction spring (3) and ball retainer (4).
- Take out 3 brake segments (5).
- Withdraw hub sleeve (6) upwards.
- Remove brake cone (7).
- Take out retaining washer (8) and thrust washer (9).
- Remove planetary gear carrier (10), washer (11) compression spring (12) and the three sun gears (13, 14, 15).
- Clamp other axle end.
- Unscrew fixed cone (36).
- Remove driver (35), compression spring (33) with cover (32), large compression spring (31), ball retainer (34), gear ring (30) and coupling gear (29).
- Compress spring (26) and remove thrust block (28).
- Remove cover (27), spring (26) and cover (25).
- Dismantle retaining washer (24).
- Remove thrust washer (23) and plastic profile washer (22).
- Unscrew grub screw (17) (Caution: It is subject to spring pressure) – and dismantle the long compression spring (18) guide pin (19), thrust block (20) and the short compression spring (21).

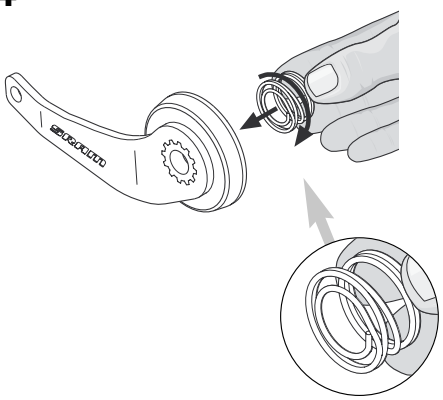
REASSEMBLY HUB

see Fig. 1

Lubrication see "MAINTENANCE/ LUBRICATION".

- Insert into the axle (on the side with the internal thread):
  Short compression spring (21), thrust block (20) – it is the same both sides, guide rod (19) – it is the same both sides, long compression spring (18).
- Compress spring and fit grub screw (17).

4



- Clamp axle, end with groove for Clickbox facing upwards.
- Fit plastic profile washer (22) with its large diameter upwards.
- Fit thrust washer (23) and retaining washer (24).
- Locate cover (25), compression spring (26) with 7 turns and cover (27, insides to the spring).
- Compress spring and position thrust block (28) – it is the same both sides – centrally in the axle.
- Clamp other axle end (groove is facing downwards).
- Fit large sun gear (15), with deflector bevels upwards.
- Position medium sun gear (14), with deflector bevels upwards.
- Fit small sun gear (13) – with recesses in front, thrust block engages in the slots.
- Position smallest compression spring (12).
- Fit 1 mm thick washer (11).
- Fit planetary gear carrier (10):
  Place the mounting aid ***(Fig. 2)*** on the planetary gear carrier such that the markings (X) on the 3 small planet gears and the mounting aid match up.
- Turn planetary gear carrier and at the same time push it downwards over the sun gears.
- Fit thrust washer (9) and retaining washer (8) in the undercut.
  Now remove the mounting aid.

Advice:
If the gears are not accurately assembled the hub may feel tight in use. This may lead to gear wheel damage during travel.

- Clamp other axle end (groove for Clickbox facing upwards).
- Fit coupling gear (29) with carrier plate downwards
- Push ring gear (30) over the coupling gear.
- Locate large spring (31).
- Fit largest ball retainer (34) with balls underneath.
- Fit cover (32, inside to the spring).
- Assemble the compression spring (33) with 12 turns.
- Position driver (35) – push it down – and screw on fixed cone (36) to the stop, tightening torque 20 Nm (177 in.lbs.).
- Clamp other axle end (groove for Clickbox is facing downwards).
- Assemble hub shell (6) with a slight counter-clockwise movement.
  In case the hub shell jams, position the plastic ring ***(Fig. 3)*** correctly.

NEW

- Screw brake cone (7) clockwise onto the planetary gear carrier (10) until it stops.
- Insert 3 brake segments (5).
- Turn in friction spring (3) counterclockwise into the lever cone (2) (inlying winding of the spring has to lie against the lever cone) ***(Fig. 4)***.
- Insert ball retainer (4) (balls are facing upwards) into lever cone (2): the 3 recesses have to engage into the retaining lugs of the lever cone. Slightly turn ball retainer to prevent it from falling off.
- Fit lever cone onto hub shell: the retaining lugs of the lever cone have to engage into the openings between the brake segments. Make sure that lever cone engages while turning it back and forth slightly.
- Screw on locknuts (1), adjust bearing so that there is no play and lock nuts together with 15 – 20 Nm (133 – 177in.lbs.).

Caution:
Check that all the brake system components are functioning properly!

Advice:
Dismantling and reassembly of hub types without coaster brake (MH 7205 / MH 7225) should be carried out in the same way. Differences: Instead of brake segments / cone a click-and-pawl carrier is installed on the planetary gear carrier.

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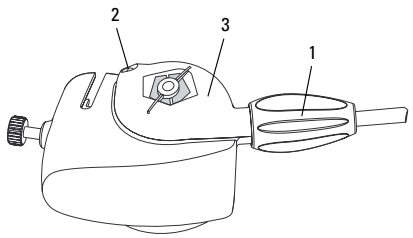

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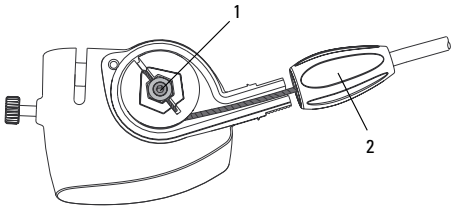

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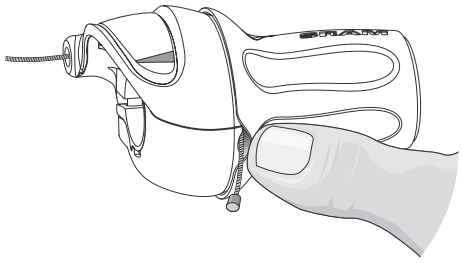

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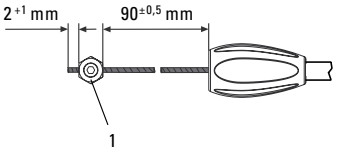

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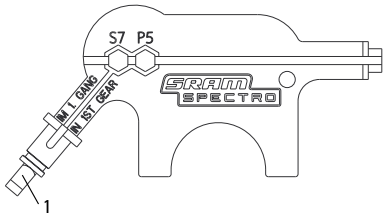


CABLE CHANGE

Dismantling shifter cable:

- Place shifter in gear position "1".
- Do not remove the Clickbox from the axle end.
- Unscrew the adjusting screw (1, ***Fig. 5)*** completely. Unscrew the cover screw (2), brush aside the adjusting screw (1) and remove the cover (3).
- Withdraw shifter cable and clamping bolt (1, ***Fig. 6)*** upwards, loosen clamp and pull clamping piece from the cable.
- Slightly lift the grip cover ***(Fig. 7)***, push the cable out and discard.

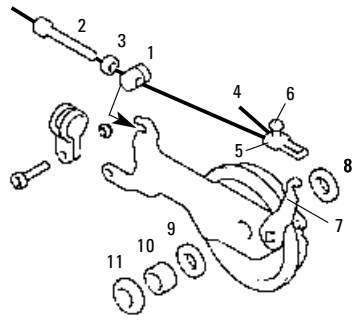
Assembly shifter cable:

- Route new cable through shifter housing and pull cable to seat cable head completely into cable recess.
  Feed the cable through the new cable housing and adjusting screw.
- Position clamping bolt (1, ***Fig. 8)*** at a distance of 90 mm, tighten up with 1.5 Nm (13 in.lbs.) and cut off cable ends to 2 – 3 mm. For positioning the clamping bolt use adjust gauge ***(Fig. 9)***. (Part. No. 65 0324 107 000)
- Locate clamping bolt (1, ***Fig. 6)*** and place shifter cable around the carrier cylinder (counter-clockwise winding).
- Position the cover (3, ***Fig. 5)*** and tighten up with the cover screw (2).
  Torque 0.35 – 0.45 Nm (3.1 – 4.0 in.lbs.).
  Screw in the adjusting screw (1) completely.

Advice:

- ***If you want to remove the Clickbox from the axle end for changing the cable, do as follows:***
  - ***Place shifter in gear position "1".***
  - ***Loosen the knurled screw and pull the Clickbox off the axle.***
  - ***Now it's essential to push the end*** (1, ***Fig. 8) of the adjust gauge completely into the Clickbox and tighten up the knurled bolt (so that you maintain the initial tension of the spring inside the Clickbox).***
  - ***Change cable as per description above.***
- ***If you remove the Clickbox from the axle and change the cable without using the end of the adjust gauge, then you will lose the initial tension of the spring inside the Clickbox. In this case you must assemble the cable by placing it around the carrier cylinder with an additional winding (Fig. 6).***

10



DRUM BRAKE

Install brake anchor plate (or exchange it):

- Place thrust washer (8, ***Fig. 10)*** over the axle on the adjusting cone and fit complete brake anchor plate. Position washer (9) distance sleeve (10) and screw on locknut (11).
- Push brake lever (7) to the stop and hold it there to center the brake jaws in the brake drum – tighten up locknut with a torque of 15 – 20 Nm (133 – 177 in.lbs.).

ADJUSTMENT DRUM BRAKE

- Unscrew adjusting screw (2, ***Fig. 10)*** until the brake pads drag lightly.
- Actuate the hand brake lever forcefully several times and then, if necessary, turn the adjusting screw further in just until the wheel starts spinning freely.
- Lock hex nut (3).

Caution:
Check that all the brake system components are functioning properly!

MAINTENANCE / LUBRICATION

Caution:
The SRAM hubs are provided with permanent lubrication and under normal conditions is maintenance-free. If the coaster brake is loaded excessively its effect can be too strong, the hub may lock. In such a case the 3 brake segments should be lubricated with a special grease (Part No. 0369 135 200/ ...201). Renew brake segments when rhombic pattern is worn out.

Cleaning of parts:

- All parts – except for the planetary gear carrier – can be degreased in a cleaning bath.
- The planetary gear carrier only needs to be cleaned on the outside with a brush so as not to degrease the planetary gear bearing.

Caution:
Do not use high-pressure water when cleaning the gear hub (e.g. strong water jets, high-pressure cleaners etc.) – if water penetrates it could lead to functional problems.

Lubrication of parts:
Use only SRAM grease (Part No. 0369 135 200/ ...201) and standard bicycle oil.

- To lubricate the bearing points on the planetary gear sets, position the planetary gear carrier on its crown and apply 2 – 3 drops of oil to the bearing bolts – at the same time turning the planetary gears so that the bearing points are completely wet. Oil axle through the axle bore and axle slot, apply a thin coating of grease to the outside.
- Oil the inside of the sun gears, grease the outside teeth (fill the gaps in the teeth).
- Oil outside teeth and carrier plate on the coupling gear and lightly grease the borehole from right and left.
- Do not apply grease to ring gear but just oil the pawl pockets.
- NEW! Slightly grease the actuation ramps of the planetary gear carrier.
- Apply grease all around the seat area of the friction spring. Oil the pawl pockets.
- Spread grease on the complete surfaces inside and outside of the 3 brake segments.
- Regrease ball retainer and insert into lever cone, slightly grease cone surface of the lever cone.
- Line ball bearing running tracks and brake cylinder in hub shell with grease.

TROUBLESHOOTING

Problem	Cause	Remedy
Shifting difficulties	Damaged control cable	Replace control cable
	Incorrect gear setting	Adjust shift. system
	To much additional axle attachments between hub and axle nut	Beginning of axle thread must be visible in front of the axle nut
Pedals are carried forward when freewheeling	Bearings set too tight	Re-adjust bearings
	Loose lock nuts	Tighten lock nuts (15 – 20 Nm)
	Chain is overtensioned	Reduce chain tension
Hub locks when braking (coaster brake)	Brake segments has run dry	Wash out hub sleeve, repolish and relubricate brake cylinder, renew brake segments
Coaster brake without function	Incorrect mounted friction spring (3, Fig. 1/Page 16)	Fit friction spring in correct way

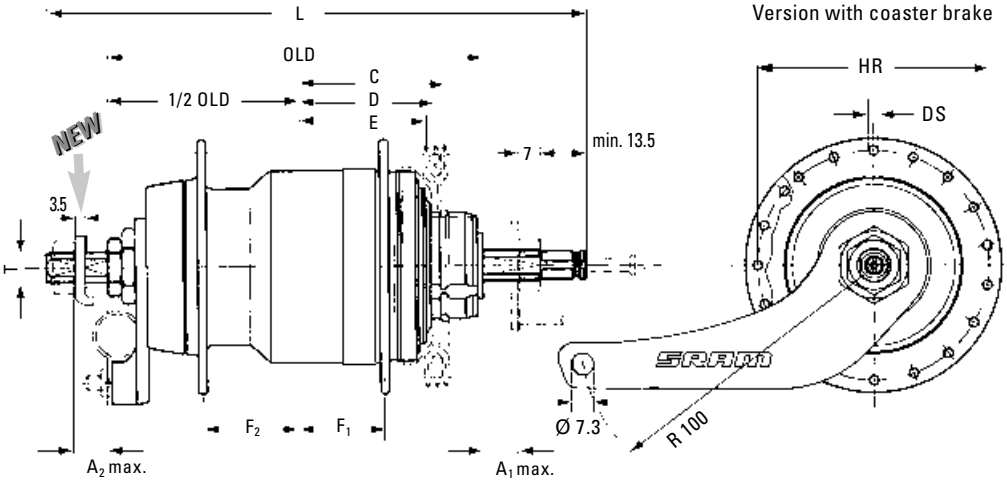
SRAM P5
TECHNICAL DATA / ASSEMBLY REQUIREMENTS

i-BRAKE for SRAM P5:
see page 54.

Version SRAM P5 Cargo:
see page 29.

Caution:
- ***SRAM P5 hubs are not suitable for tandems, trademen's delivery bicycles and similar.***
- ***SRAM P5 with coaster brake resp. i-BRAKE are „DIN Plus City" certified.***

Cycle frame:
- Dropouts must be parallel.
- Slot width at rear dropout max. 10,5 mm
- The strength must be such that with a maximum braking torque of 250 Nm (2200 in.lbs.) on the rear wheel no residual deformation can occur on the rear structure.



HUBS

		SRAM P5 with coaster brake	SRAM P5 für i-BRAKE	SRAM P5 with drum brake	SRAM P5 without brake
	Type	MH 5215	—	MH 5225	MH 5205
	Brake	Coaster NEW	i-BRAKE (see page 54)	Drum „D" / „NL"	None
	Over Locknut Dim., OLD	122 mm	126 mm	126 mm	122 mm
Axle	**Length, L**	175 mm	179 mm	179 mm	175 mm
Axle	**Ends Diameter, T**	FG 10.5 / FG 10.5 toothed cone	FG 10.5	FG 10.5	FG 10.5
Axle	**Dropout Width Dim.**	A_1 max. = 12.5 mm / A_2 max. = 11.5 mm	A_1 max. = 12.5 mm / A_2 max. = 12.5 mm	A_1 max. = 12.5 mm / A_2 max. = 10.5 mm	A_1 max. = 12.5 mm / A_2 max. = 10.5 mm
Spoke	**Holes**	36	36	36	36
Spoke	**Hole Diameter, DS**	3,0 mm	3,0 mm	2,9 mm	3,0 mm
Spoke	**Hole Ref. ø, HR**	75 mm	75 mm	89 mm	75 mm
Spoke	**Flange Dist. to $^1/_2$ OLD**	F_1 = 28.5 mm / F_2 = 29.5 mm	F_1 = 31 mm / F_2 = 27.7 mm	F_1 = 30.5 mm / F_2 = 29.5 mm	F_1 = 29 mm / F_2 = 29 mm
Gear Hub Ratio	**Totally**	251 %	←	←	←
Gear Hub Ratio	**Speed 1**	63 %	←	←	←
Gear Hub Ratio	**Speed 2**	78 %	←	←	←
Gear Hub Ratio	**Speed 3**	100 %	←	←	←
Gear Hub Ratio	**Speed 4**	128 %	←	←	←
Gear Hub Ratio	**Speed 5**	158 %	←	←	←
Chain	**Usable Dimensions**	$^1/_2$" x $^1/_8$" or $^1/_2$" x $^3/_{32}$"	$^1/_2$" x $^1/_8$" or $^1/_2$" x $^3/_{32}$"	$^1/_2$" x $^1/_8$" or $^1/_2$" x $^3/_{32}$"	$^1/_2$" x $^1/_8$" or $^1/_2$" x $^3/_{32}$"
Chain	**Line, C/D/E**	49 / 45.5 / 43 mm	51.5 / 48.5 / 45.5 mm	51.5 / 48.5 / 45.5 mm	49 / 45.5 / 43 mm
Chain	**Ratio**	24", 26", 28" = 1.8 – 1.9 / 20" = 1.8 – 2.0		←	←
Compatibility	**Shifter**	SRAM Grip 5	←	←	←
Compatibility	**Clickbox**	Clickbox P5	←	←	←
Compatibility	**Hand Brake Lever**	—	see page 55	see page 23	—
Compatibility	**Tandem**	—	—	—	
	Weight	1495 g	1920 g (complete with i-BRAKE)	1536 g	1330 g
Finish	**Hub Shell Material**	Steel	Steel	Aluminum	Steel
Finish	**Finish**	Matt Chrome Plated	Matt Chrome Plated	Clear Coat / Clear o. Black	Matt Chrome Plated

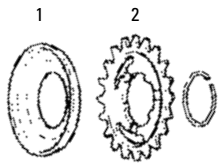
SRAM P5
TECHNICAL DATA / ASSEMBLY REQUIREMENTS

SHIFTERS

		SRAM Grip 5							
	Shifter Type	Twist Shifter							
	Cable Length	1450 mm	1550 mm	1650 mm	1750 mm	1850 mm	1950 mm	2150 mm	2350 mm
	Gear Indication	Window							
	Clamping Diameter	22.3 mm							
	Handlebar, Straight Area	Minimum length for shifter = 150 mm							
	Weight	89g							
Design	Housing	Glass filled PA							
Design	Grip	PP							
Design	Grip Cover	Thermoplastic elastomer, Overmolded							
Design	Clamping Collar	Aluminum							

SRAM P5
ASSEMBLY

1



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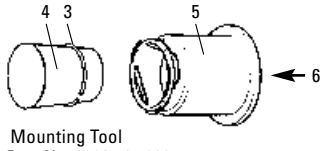

Mounting Tool
Part No. 0582 104 000

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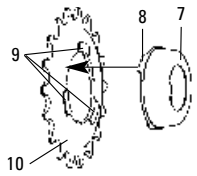

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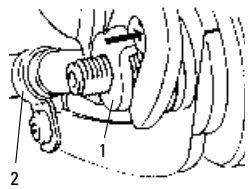


ASSEMBLY HUB

- Lace the wheel as normal. See spoke length table.
- Place the dust cap (1, ***Fig. 1)*** and sprocket (2) on the driver.
- Push sprocket circlip (3, ***Fig. 2)*** onto the cone of tool sleeve (4). Place tool sleeve with large diameter on the driver.
- Push the spring end of sliding sleeve (5) of the tool over the tool sleeve. Thrust sliding sleeve in direction (6), this forces circlip into the recess of the driver.
- Remove tool and check that the circlip is seated correctly.
- Turn dust cap (7, ***Fig. 3)*** until the three lugs (8) are between the three beads (9) on the sprocket (10).
- Position dust cap and push towards sprocket until it is felt to lock into place.
- Placing the wheel in the rear frame.

NEW

- Fit new retaining washer (3,5 mm thick) on left axle end (1, ***Fig. 4)***. The serrations must bear against the dropout and the lug must engage in the dropout slot.
  Advice:
  For bicycles with chain tensioner use previous retaining washers (2 pieces, 2 mm thick) – see Tech. Manual 2005.
- On the sprocket side fit the protective bracket (1, ***Fig. 5)*** directly below the axle nut. Tightening torque on axle nuts 30 – 40 Nm (266 – 350 in.lbs.).
- Mount the brake lever using a suitable frame clamp (2, ***Fig. 4 resp. Fig. 10)***.
  Caution:
  Mount the brake lever between the two straps of the frame clamp.
  The clamp must be seated on the frame without play.
  Use a self-locking nut! Tightening torque: 2 – 3 Nm (18 – 27 in.lbs.).

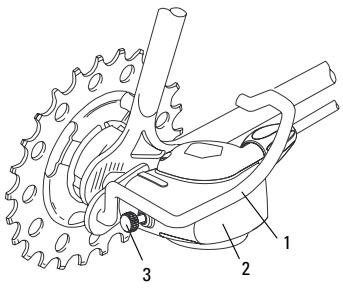
Spoke length table:

Tire Size		Cross	Length MH 5215/5205	Length MH 5225
47–406	20" x 1.75 x 2	3 x	181 mm	179 mm
37–490	22" x 1 3/8	3 x	225 mm	222 mm
47–507	24" x 1.75 x 2	3 x	232 mm	229 mm
37–540	24" x 1 3/8	3 x	251 mm	248 mm
47–559	26" x 1.75 x 2	3 x	259 mm	256 mm
37–590	26" x 1 3/8	3 x	275 mm	272 mm
47–622	28" x 1.75	3 x	289 mm	286 mm
37–622	28" x 1 3/8 x 1 5/8	3 x	289 mm	286 mm
28–622	28" x 1 1/8	3 x	289 mm	286 mm
32–622	28" x 1 5/8 x 1 1/4	3 x	289 mm	286 mm
28–630	27" x 1 1/4 fifty	3 x	294 mm	291 mm
32–630	27" x 1 1/4	3 x	294 mm	291 mm

Spoke lengths are approximate values. They must be checked through lacing attempts and adjusted accordingly.

SRAM P5
ASSEMBLY

5



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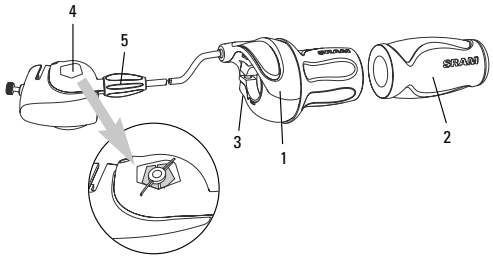

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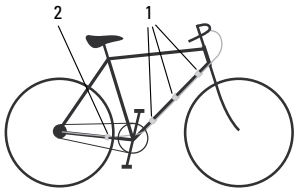

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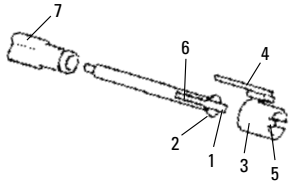

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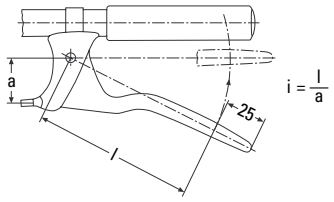

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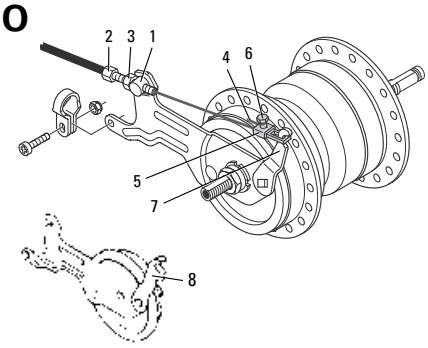


Advice:

- ***If a different protective bracket*** (1, ***Fig. 5)*** ***is used the thickness of the attachment plate must be max. 3 mm.***
- ***Do not use additional washers.***
- ***At least the beginning of the axle thread must be visible in front of the axle nut.***

Caution:
Check that all the brake system components are functioning properly!

ASSEMBLY SHIFTER

Advice:

- ***When choosing cable housing lengths, be sure to allow enough housing for an extreme turn of the handlebars in both directions.***
- ***Note also, that different stem lengths and handlebar positions effects cable housing length.***
- Slide shifter (1, ***Fig. 6)*** onto handlebar.
- Mount fixed grip (2) onto end of handlebar.
- Slide shifter against fixed grip, adjust shifter on handlebar and tighten with bolt (3) with a torque of 1.5 Nm (13 in.lbs.).

Caution:

- ***Never use lubricants or solvents to install fixed grips.***
  Fixed grips provide an axial safety function. For this reason, they should be mounted in such a way as to make sure they do not slip off handlebar.
- ***Check that the shifter and brake lever function properly and are unobstructed (realign if necessary).***

- When fitting the cable avoid small radius. Attach the cable 3 times to the down tube (1, ***Fig. 7).***
- Last attachment point is on the lower rear wheel fork (2, ***Fig. 7)*** immediately behind the chain wheel.
  Cable housing must be movable inside attachment.

INSTALLING CLICKBOX

- Insert shift rod (1, ***Fig. 8)*** in shift tube (2) (oil parts lightly) and then push into axle bore as far as the stop. If the shifting rod is sticking up out of the axle end: apply slight pressure on the shift rod with its threaded section and screw inwards in a clockwise direction until it can again be moved axially (valid for older hub versions). Turn slot (6) in shift tube to a position where it is easily visible.
- Push locating sleeve (3) with guiding rib (4) to the front onto the hub axle – making sure that the internal lug (5) is guided in the slot (6) of the shift tube until it can be felt – and heard – to engage.
- Turn locating sleeve on the axle until the guiding rib (4) is facing roughly upwards.
- Place shifter in gear position "2".
- Push on Clickbox (2, ***Fig. 5)*** to the stop on the hub axle. The guiding rib (4, ***Fig. 8)*** of the locating sleeve thereby engages in the slot on the housing. In the end position tighten up the knurled bolt (3, ***Fig. 5)*** by hand (0.3 Nm / 2.7 in.lbs.).

ADJUSTMENT

- Be sure to reset rotational shifter from 4th to 3rd gear.
- Match up the marks in the Clickbox viewing window (4, ***Fig. 6)*** by turning the adjusting screw (5).

CONNECTING DRUM BRAKE

Caution:
Only use brake levers with a cable moving distance of at least 15 mm and a leverage of "i" = 3.8 – 4.2 (Fig. 9).

- Fit cable stop (1, ***Fig. 10)*** with adjusting bolt (2) and nut (3) and insert into the slot on the brake anchor plate.
- Turn adjusting bolt down by approx. $^2/_3$ and route the brake cable from the brake handle.
- Push lower brake cable end through adjusting bolt (2) and insert lower cable housing end into adjusting bolt.
- Thread brake cable end (4) into fork unit (5).
- Tighten screw (6) slightly.
- Attach fork unit to brake lever (7).
- Pull brake cable end taut with pliers so that fork unit can still be attached and removed (important for changing wheel).
- Tighten screw (6).

Caution:
For NL version drum brake hub with special lever (8), only use original NL brake cable (fork unit (5) is not suitable).

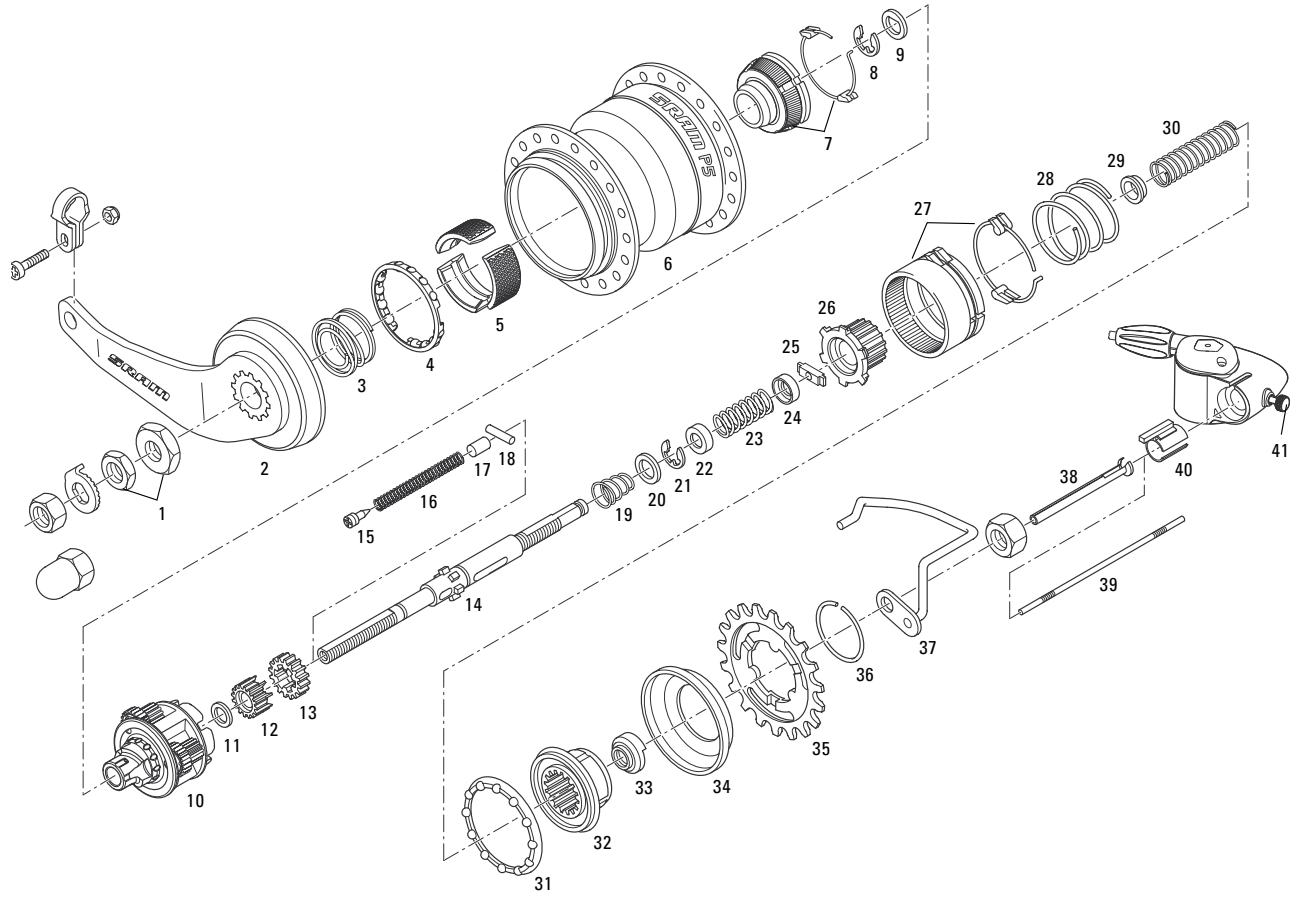
ADJUSTMENT DRUM BRAKE

- Unscrew adjusting screw (2, ***Fig. 10)*** until the brake pads drag lightly.
- Actuate the hand brake lever forcefully several times and then, if necessary, turn the adjusting screw further in just until the wheel starts spinning freely.
- Lock hex nut (3).

Caution:
Check that all the brake system components are functioning properly!

SRAM P5
MAINTENANCE

1



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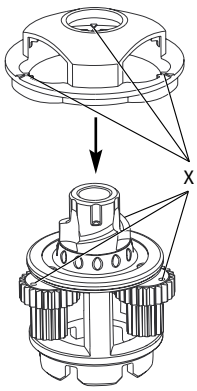
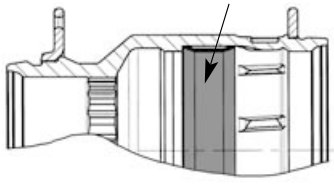


SRAM P5 mounting aid
Part No. 65 0524 300 000

3



REMOVE WHEEL

- Place shifter in gear position "2".
- Loosen the knurled screw (41, ***Fig. 1)*** and pull the Clickbox off the axle.
- Disengage the red location sleeve (40) and pull it off.
- Remove shift rod (39) and shift tube (38) out of the axle bore.
- Remove wheel.

DISMANTLING HUB

see Fig. 1

- Remove circlip (36), sprocket (35) and dust cap (34).
- Clamp hub with sprocket side facing downwards with the two axle flats.
- Unscrew both locknuts (1).

NEW

- While turning clockwise, remove lever cone (2) with friction spring (3) and ball retainer (4).
- Take out 3 brake segments (5).
- Withdraw hub sleeve (6) upwards.
- Remove brake cone (7).
- Remove retaining washer (8), thrust washer (9).
- Remove planetary gear carrier (10) and thrust washer (11).
- Clamp other axle end.
- Unscrew fixed cone (33).
- Remove driver (32), compression spring (30), large compression spring (28) and ball retainer (31).
- Withdraw gear ring (27) and coupling gear (26) and then remove cover (29) from the coupling gear.
- Take out thrust block (25), (to do this compress the spring). Remove spring (23) and the two covers (24/22).
- Dismantle retaining washer (21), washer (20), conical compression spring (19), and the large sun gear (13). Clamp other axle end (thrust block visible).
- Unscrew grub screw (15) – Dismantle spring (16), guide bolt (17) and thrust block (18).
- Remove small sun sun gear (12).

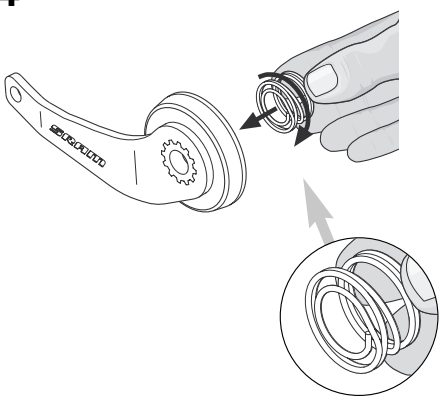
REASSEMBLY HUB

see Fig. 1

Lubrication see "MAINTENANCE/ LUBRICATION".

- Clamp axle with internal thread upwards.
- Position small sun gear (12) with crown gears to the front.
- Position thrust block (18) in the slotted hole (is laterally guided when the sun gear is screwed in).

4



- Locate bolt (17), then spring (16) in the axle and screw in grub screw (15) until it is flush with the axle.
- Reclamp axle. Fit large sun gear (13) (it is the same both sides). Position conical compression spring (19), with the large diameter first. Press spring together and fit washer (20) and retaining washer (21).
- Assemble cover (22), compression spring with 7 turns (23) and the second cover (24, insides to the spring).
- Compress spring and position thrust block (25) (it is the same both sides) in the center of the slotted hole.
- Position coupling gear (26) with carrier plate facing downwards.
- Fit cover (29, inside to the spring) for compression spring.
- Position gear ring (27) over the teeth of the coupling gear.
- Place ball retainer (31), with balls below on the gear ring.
- Position large compression spring (28) on gear ring.
- Mount compression spring with 13 turns (30) on the axle. (Is supported in the coupling wheel by the cover).
- Locate driver (32), press it down and screw on fixed cone (33) as far as the stop. Tightening torque 20 Nm.
- Clamp other axle end.
- Push on thrust washer (11) and fit planetary gear carrier (10). In doing this: Position mounting aid ***(Fig. 2)*** on the planetary gear carrier so that the (X) markings on the three planetary gears match with the mounting aid.
- Insert planetary gear carrier, place thrust washer (8) on it and mount retaining washer (9) in recess.
  Now remove the mounting aid.

Advice:
If the gears are not accurately installed the hub may be tight to move.
This could lead to damage to the gear-wheels in operation.

- Assemble hub shell (6) with a slight counter-clockwise movement.
  In case the hub shell jams, position the plastic ring ***(Fig. 3)*** correctly.

NEW
- Screw brake cone (7) clockwise onto the planetary gear carrier (10) until it stops.
- Insert 3 brake segments (5).
- Turn in friction spring (3) counterclockwise into the lever cone (2) (inlying winding of the spring has to lie against the lever cone) ***(Fig. 4)***.
- Insert ball retainer (4) (balls are facing upwards) into lever cone (2): the 3 recesses have to engage into the retaining lugs of the lever cone. Slightly turn ball retainer to prevent it from falling off.
- Fit lever cone onto hub shell: the retaining lugs of the lever cone have to engage into the openings between the brake segments. Make sure that lever cone engages while turning back and forth slightly.
- Screw on locknuts (1), adjust bearing so that there is no play and lock nuts together with 15 – 20 Nm (133 – 177in.lbs.).

Caution:
Check that all the brake system components are functioning properly!

Advice:
Dismantling and reassembly of hub types without coaster brake (MH 5205 / MH 5225) should be carried out in the same way.
Differences: Instead of brake segments / cone a click-and-pawl carrier is installed on the planetary gear carrier.

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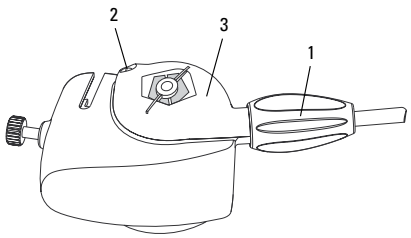

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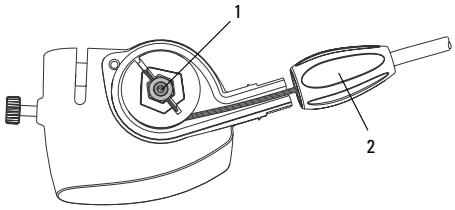

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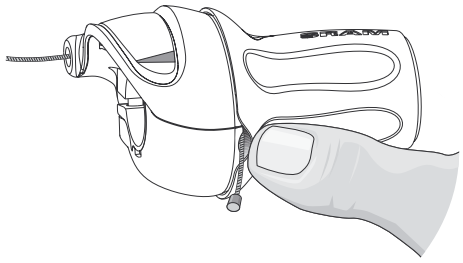

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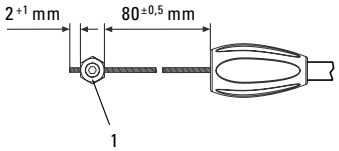

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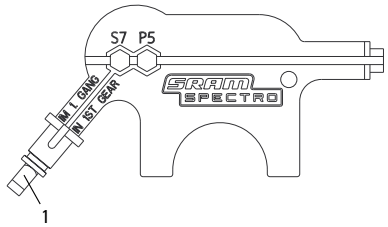

CABLE CHANGE

Dismantling shifter cable:

- Place shifter in gear position "1".
- Do not remove the Clickbox from the axle end.
- Unscrew the adjusting screw (1, ***Fig. 5)*** completely. Unscrew the cover screw (2), brush aside the adjusting screw (1) and remove the cover (3).
- Withdraw shifter cable and clamping bolt (1, ***Fig. 6)*** upwards, loosen clamp and pull clamping piece from the cable.
- Slightly lift the grip cover ***(Fig. 7)***, push the cable out and discard.

Assembly shifter cable:

- Route new cable through shifter housing and pull cable to seat cable head completely into cable recess.
  Feed the cable through the new cable housing and adjusting screw.
- Position clamping bolt (1, ***Fig. 8)*** at a distance of 80 mm, tighten up with 1.5 Nm (13 in.lbs.) and cut off cable ends to 2 – 3 mm. For positioning the clamping bolt use adjust gauge ***(Fig. 9)***. (Part. No. 65 0324 107 000)
- Locate clamping bolt (1, ***Fig. 6)*** and place shifter cable around the carrier cylinder (counter-clockwise winding).
- Position the cover (3, ***Fig. 5)*** and tighten up with the cover screw (2).
  Torque 0.35 – 0.45 Nm (3.1 – 4.0 in.lbs.).
  Screw in the adjusting screw (1) completely.

Advice:

- ***If you want to remove the Clickbox from the axle end for changing the cable, do as follows:***
  - ***Place shifter in gear position "1".***
  - ***Loosen the knurled screw and pull the Clickbox off the axle.***
  - ***Now it's essential to push the end*** (1, ***Fig. 8) of the adjust gauge completely into the Clickbox and tighten up the knurled bolt (so that you maintain the initial tension of the spring inside the Clickbox).***
  - ***Change cable as per description above.***
- ***If you remove the Clickbox from the axle and change the cable without using the end of the adjust gauge, then you will lose the initial tension of the spring inside the Clickbox. In this case you must assemble the cable by placing it around the carrier cylinder with an additional winding (Fig. 6).***

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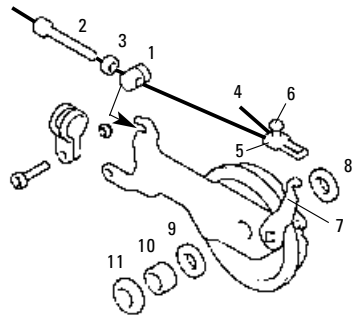


DRUM BRAKE

Install brake anchor plate (or exchange it):

- Place thrust washer (8, ***Fig. 10)*** over the axle on the adjusting cone and fit complete brake anchor plate. Position washer (9) distance sleeve (10) and screw on locknut (11).
- Push brake lever (7) to the stop and hold it there to center the brake jaws in the brake drum – tighten up locknut with a torque of 15 – 20 Nm (133 – 177 in.lbs.).

ADJUSTMENT DRUM BRAKE

- Unscrew adjusting screw (2, ***Fig. 10)*** until the brake pads drag lightly.
- Actuate the hand brake lever forcefully several times and then, if necessary, turn the adjusting screw further in just until the wheel starts spinning freely.
- Lock hex nut (3).

Caution:
Check that all the brake system components are functioning properly!

MAINTENANCE / LUBRICATION

Caution:
The SRAM hubs are provided with permanent lubrication and under normal conditions is maintenance-free. If the coaster brake is loaded excessively its effect can be too strong, the hub may lock. In such a case the 3 brake segments should be lubricated with a special grease (Part No. 0369 135 200/ ...201). Renew brake segments when rhombic pattern is worn out.

Cleaning of parts:

- All parts – except for the planetary gear carrier – can be degreased in a cleaning bath.
- The planetary gear carrier only needs to be cleaned on the outside with a brush so as not to degrease the planetary gear bearing.

Caution:
Do not use high-pressure water when cleaning the gear hub (e.g. strong water jets, high-pressure cleaners etc.) – if water penetrates it could lead to functional problems.

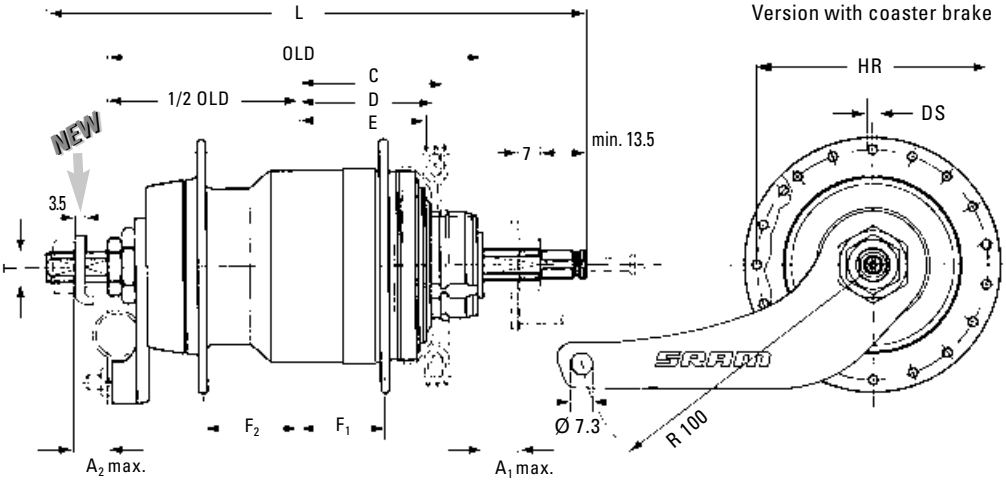
Lubrication of parts:
Use only SRAM grease (Part No. 0369 135 200/ ...201) and standard bicycle oil.

- To lubricate the bearing points on the planetary gear sets, position the planetary gear carrier on its crown and apply 2 – 3 drops of oil to the bearing bolts – at the same time turning the planetary gears so that the bearing points are completely wet. Oil axle through the axle bore and axle slot, apply a thin coating of grease to the outside.
- Oil the inside of the sun gears, grease the outside teeth (fill the gaps in the teeth).
- Oil outside teeth and carrier plate on the coupling gear and lightly grease the borehole from right and left.
- Do not apply grease to ring gear but just oil the pawl pockets.
- NEW Slightly grease the actuation ramps of the planetary gear carrier.
- Apply grease all around the seat area of the friction spring. Oil the pawl pockets.
- Spread grease on the complete surfaces inside and outside of the 3 brake segments.
- Regrease ball retainer and insert into lever cone, slightly grease cone surface of the lever cone.
- Line ball bearing running tracks and brake cylinder in hub shell with grease.

TROUBLESHOOTING

Problem	Cause	Remedy
Shifting difficulties	Damaged control cable	Replace control cable
	Incorrect gear setting	Adjust shift. system
	To much additional axle attachments between hub and axle nut	Beginning of axle thread must be visible in front of the axle nut
Pedals are carried forward when freewheeling	Bearings set too tight	Re-adjust bearings
	Loose lock nuts	Tighten lock nuts (15 – 20 Nm)
	Chain is overtensioned	Reduce chain tension
Hub locks when braking (coaster brake)	Brake segments has run dry	Wash out hub sleeve, repolish and relubricate brake cylinder, renew brake segments
Coaster brake without function	Incorrect mounted friction spring (3, Fig. 1/Page 24)	Fit friction spring in correct way

SRAM P5 CARGO
TECHNICAL DATA / ASSEMBLY REQUIREMENTS



Caution:
- ***The SRAM P5 Cargo is suitable for tandems, trademen's delivery bicycles and similar. An additional external rear brake is necessary due to the high load.***
- ***SRAM P5 Cargo with coaster brake is „DIN Plus City" certified.***

Tolerable stress:
Axle load: max. 120 kilograms
Torque/driver body: max. 85 Nm (750 in.lbs.), no continuous stress.

Identification SRAM P5 Cargo:
Yellow grub screw inside the axle end.

Version SRAM P5 for normal bikes:
see page 21.

Cycle frame:
- Dropouts must be parallel.
- Slot width at rear dropout max. 10,5 mm.
- The strength must be such that with a maximum braking torque of 250 Nm (2200 in.lbs.) on the rear wheel no residual deformation can occur on the rear structure.

HUBS

		SRAM P5 Cargo with coaster brake	SRAM P5 with drum brake	
	Typ	MH 5215 Cargo	MH 5225 Cargo	
	Brake	Coaster NEW	Drum Version „D"	
Over Locknut Dim., OLD		122 mm	126 mm	
Axle	Length, L	175 mm	179 mm	
Axle	Ends Diameter, T	FG 10.5 toothed cone	FG 10.5	
Axle	Dropout Width Dim.	A_1 max. = 12.5 mm / A_2 max. = 11.5 mm	A_1 max. = 12.5 mm / A_2 max. = 12.5 mm	
Spoke	Holes	36	36	
Spoke	Hole Diameter, DS	3.0 mm	2.9 mm	
Spoke	Hole Ref. ø, HR	75 mm	89 mm	
Spoke	Flange Dist. to $^1/_2$ OLD	F_1 = 28.5 mm / F_2 = 29.5 mm	F_1 = 30.5 mm / F_2 = 29.5 mm	
Gear Hub Ratio	Totally	224 %	←	
Gear Hub Ratio	Speed 1	67 %	←	
Gear Hub Ratio	Speed 2	78 %	←	
Gear Hub Ratio	Speed 3	100 %	←	
Gear Hub Ratio	Speed 4	128 %	←	
Gear Hub Ratio	Speed 5	150 %	←	
Chain	Usable Dimensions	$^1/_2$" x $^1/_8$" or $^1/_2$" x $^3/_{32}$"	$^1/_2$" x $^1/_8$" or $^1/_2$" x $^3/_{32}$"	
Chain	Line, C/D/E	49 / 45.5 / 43 mm	51.5 / 48.5 / 45.5 mm	
Chain	Ratio	24", 26", 28" = 1.8 – 1.9 / 20" = 1.8 – 2.0	←	
Compatibility	Shifter	SRAM Grip 5	←	
Compatibility	Clickbox	Clickbox P5	←	
Compatibility	Hand Brake Lever	—	see page 31	
Compatibility	Tandem	Yes	Yes	
	Weight	1495 g	1536 g	
Finish	Hub Shell Material	Steel	Aluminum	
Finish	Finish	Matt Chrome Plated	Clear Coat	

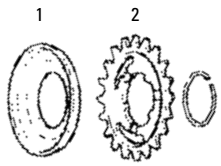
SRAM P5 CARGO
TECHNICAL DATA / ASSEMBLY REQUIREMENTS

SHIFTERS

		SRAM Grip 5							
	Shifter Type	Twist Shifter							
	Cable Length	1450 mm	1550 mm	1650 mm	1750 mm	1850 mm	1950 mm	2150 mm	2350 mm
	Gear Indication	Window							
	Clamping Diameter	22.3 mm							
	Handlebar, Straight Area	Minimum length for shifter = 150 mm							
	Weight	89g							
Design	Housing	Glass filled PA							
Design	Grip	PP							
Design	Grip Cover	Thermoplastic elastomer, Overmolded							
Design	Clamping Collar	Aluminum							

SRAM P5 CARGO
ASSEMBLY

1



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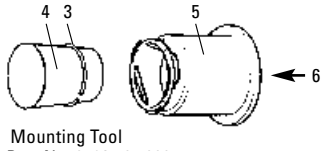
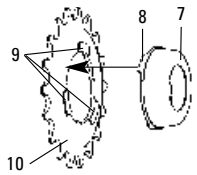


Mounting Tool
Part No. 0582 104 000

3



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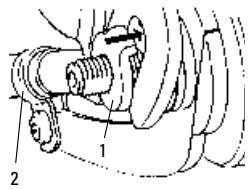

ASSEMBLY HUB

- Lace the wheel as normal. See spoke length table.
- Place the dust cap (1, ***Fig. 1)*** and sprocket (2) on the driver.
- Push sprocket circlip (3, ***Fig. 2)*** onto the cone of tool sleeve (4). Place tool sleeve with large diameter on the driver.
- Push the spring end of sliding sleeve (5) of the tool over the tool sleeve. Thrust sliding sleeve in direction (6), this forces circlip into the recess of the driver.
- Remove tool and check that the circlip is seated correctly.
- Turn dust cap (7, ***Fig. 3)*** until the three lugs (8) are between the three beads (9) on the sprocket (10).
- Position dust cap and push towards sprocket until it is felt to lock into place.
- Placing the wheel in the rear frame.

NEW

- Fit new retaining washer (3,5 mm thick) on left axle end (1, ***Fig. 4)***. The serrations must bear against the dropout and the lug must engage in the dropout slot.
  Advice:
  For bicycles with chain tensioner use previous retaining washers (2 pieces, 2 mm thick) – see Tech. Manual 2005.
- On the sprocket side fit the protective bracket (1, ***Fig. 5)*** directly below the axle nut. Tightening torque on axle nuts 30 – 40 Nm (266 – 350 in.lbs.).
- Mount the brake lever using a suitable frame clamp (2, ***Fig. 4 resp. Fig. 10)***.
  Caution:
  Mount the brake lever between the two straps of the frame clamp.
  The clamp must be seated on the frame without play.
  Use a self-locking nut! Tightening torque: 2 – 3 Nm (18 – 27 in.lbs.).

Spoke length table:

Tire Size		Cross	Length MH 5215	Length MH 5225
47–406	20" x 1.75 x 2	3 x	181 mm	179 mm
37–490	22" x 1 3/8	3 x	225 mm	222 mm
47–507	24" x 1.75 x 2	3 x	232 mm	229 mm
37–540	24" x 1 3/8	3 x	251 mm	248 mm
47–559	26" x 1.75 x 2	3 x	259 mm	256 mm
37–590	26" x 1 3/8	3 x	275 mm	272 mm
47–622	28" x 1.75	3 x	289 mm	286 mm
37–622	28" x 1 3/8 x 1 5/8	3 x	289 mm	286 mm
28–622	28" x 1 1/8	3 x	289 mm	286 mm
32–622	28" x 1 5/8 x 1 1/4	3 x	289 mm	286 mm
28–630	27" x 1 1/4 fifty	3 x	294 mm	291 mm
32–630	27" x 1 1/4	3 x	294 mm	291 mm

Spoke lengths are approximate values. They must be checked through lacing attempts and adjusted accordingly.

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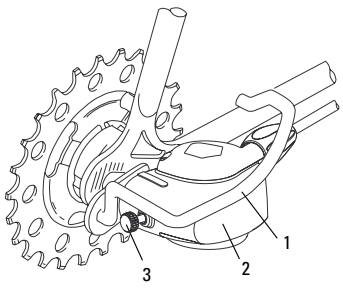

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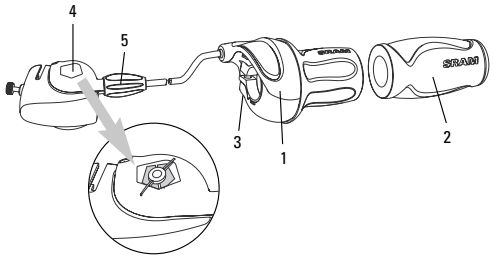

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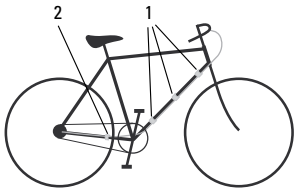

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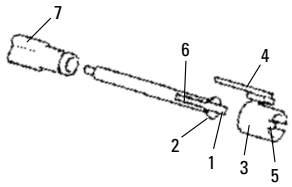

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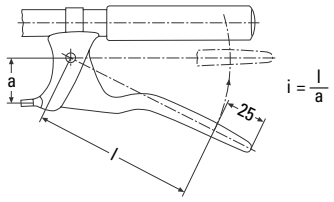

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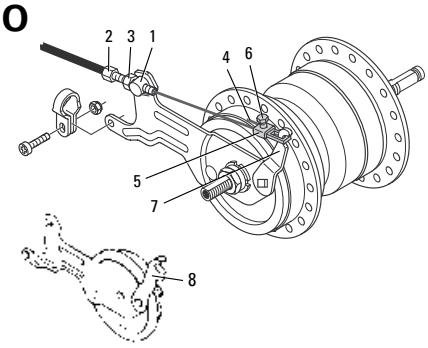


Advice:

- ***If a different protective bracket*** (1, ***Fig. 5)*** ***is used the thickness of the attachment plate must be max. 3 mm.***
- ***Do not use additional washers.***
- ***At least the beginning of the axle thread must be visible in front of the axle nut.***

Caution:
Check that all the brake system components are functioning properly!

ASSEMBLY SHIFTER

Advice:

- ***When choosing cable housing lengths, be sure to allow enough housing for an extreme turn of the handlebars in both directions.***
- ***Note also, that different stem lengths and handlebar positions effects cable housing length.***
- Slide shifter (1, ***Fig. 6)*** onto handlebar.
- Mount fixed grip (2) onto end of handlebar.
- Slide shifter against fixed grip, adjust shifter on handlebar and tighten with bolt (3) with a torque of 1.5 Nm (13 in.lbs.).

Caution:

- ***Never use lubricants or solvents to install fixed grips.***
  Fixed grips provide an axial safety function. For this reason, they should be mounted in such a way as to make sure they do not slip off handlebar.
- ***Check that the shifter and brake lever function properly and are unobstructed (realign if necessary).***
- ***Never ride without the fixed grips. The turning grip may loosen from housing and slip off handlebar – this can result in severe injury or death.***

- When fitting the cable avoid small radius. Attach the cable 3 times to the down tube (1, ***Fig. 7).***
- Last attachment point is on the lower rear wheel fork (2, ***Fig. 7)*** immediately behind the chain wheel.
  Cable housing must be movable inside attachment.

INSTALLING CLICKBOX

- Insert shift rod (1, ***Fig. 8)*** in shift tube (2) (oil parts lightly) and then push into axle bore as far as the stop. If the shifting rod is sticking up out of the axle end: apply slight pressure on the shift rod with its threaded section and screw inwards in a clockwise direction until it can again be moved axially (valid for older hub versions). Turn slot (6) in shift tube to a position where it is easily visible.
- Push locating sleeve (3) with guiding rib (4) to the front onto the hub axle – making sure that the internal lug (5) is guided in the slot (6) of the shift tube until it can be felt – and heard – to engage.
- Turn locating sleeve on the axle until the guiding rib (4) is facing roughly upwards.
- Place shifter in gear position "2".
- Push on Clickbox (2, ***Fig. 5)*** to the stop on the hub axle. The guiding rib (4, ***Fig. 8)*** of the locating sleeve thereby engages in the slot on the housing. In the end position tighten up the knurled bolt (3, ***Fig. 5)*** by hand (0.3 Nm / 2.7 in.lbs.).

ADJUSTMENT

- Be sure to reset rotational shifter from 4th to 3rd gear.
- Match up the marks in the Clickbox viewing window (4, ***Fig. 6)*** by turning the adjusting screw (5).

CONNECTING DRUM BRAKE

Caution:
Only use brake levers with a cable moving distance of at least 15 mm and a leverage of "i" = 3.8 – 4.2 (Fig. 9).

- Fit cable stop (1, ***Fig. 10)*** with adjusting bolt (2) and nut (3) and insert into the slot on the brake anchor plate.
- Turn adjusting bolt down by approx. $^2/_3$ and route the brake cable from the brake handle.
- Push lower brake cable end through adjusting bolt (2) and insert lower cable housing end into adjusting bolt.
- Thread brake cable end (4) into fork unit (5).
- Tighten screw (6) slightly.
- Attach fork unit to brake lever (7).
- Pull brake cable end taut with pliers so that fork unit can still be attached and removed (important for changing wheel).
- Tighten screw (6).

Caution:
For NL version drum brake hub with special lever (8), only use original NL brake cable (fork unit (5) is not suitable).

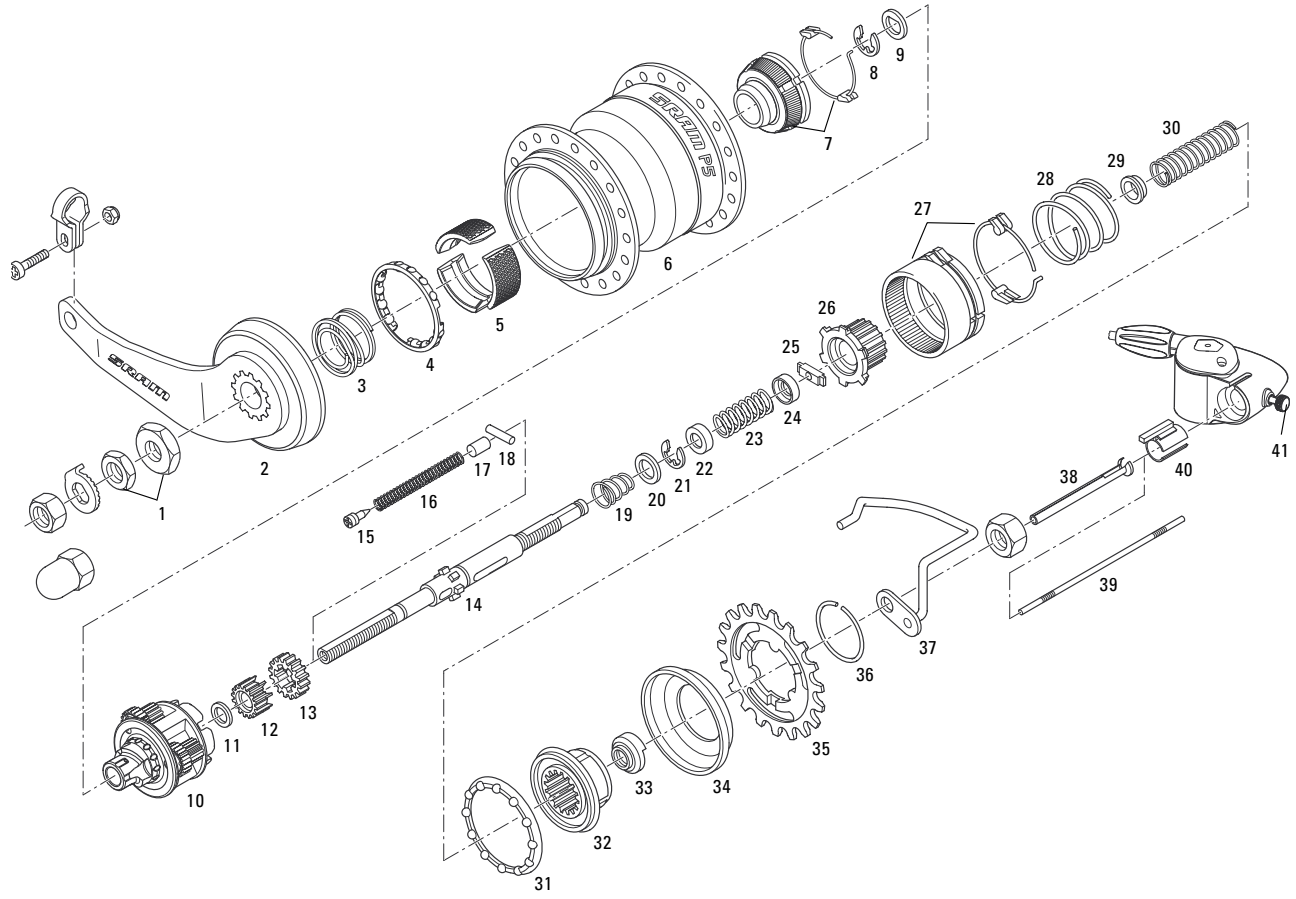
ADJUSTMENT DRUM BRAKE

- Unscrew adjusting screw (2, ***Fig. 10)*** until the brake pads drag lightly.
- Actuate the hand brake lever forcefully several times and then, if necessary, turn the adjusting screw further in just until the wheel starts spinning freely.
- Lock hex nut (3).

Caution:
Check that all the brake system components are functioning properly!

SRAM P5 CARGO MAINTENANCE

1



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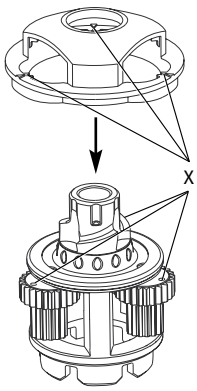
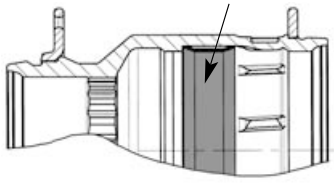


SRAM P5 mounting aid
Part No. 65 0524 300 000

3



REMOVE WHEEL

- Place shifter in gear position "2".
- Loosen the knurled screw (41, ***Fig. 1)*** and pull the Clickbox off the axle.
- Disengage the red location sleeve (40) and pull it off.
- Remove shift rod (39) and shift tube (38) out of the axle bore.
- Remove wheel.

DISMANTLING HUB

see Fig. 1

- Remove circlip (36), sprocket (35) and dust cap (34).
- Clamp hub with sprocket side facing downwards with the two axle flats.
- Unscrew both locknuts (1).

NEW

- While turning clockwise, remove lever cone (2) with friction spring (3) and ball retainer (4).
- Take out 3 brake segments (5).
- Withdraw hub sleeve (6) upwards.
- Remove brake cone (7).
- Remove retaining washer (8), thrust washer (9).
- Remove planetary gear carrier (10) and thrust washer (11).
- Clamp other axle end.
- Unscrew fixed cone (33).
- Remove driver (32), compression spring (30), large compression spring (28) and ball retainer (31).
- Withdraw gear ring (27) and coupling gear (26) and then remove cover (29) from the coupling gear.
- Take out thrust block (25), (to do this compress the spring). Remove spring (23) and the two covers (24/22).
- Dismantle retaining washer (21), washer (20), conical compression spring (19), and the large sun gear (13). Clamp other axle end (thrust block visible).
- Unscrew grub screw (15) – Dismantle spring (16), guide bolt (17) and thrust block (18).
- Remove small sun sun gear (12).

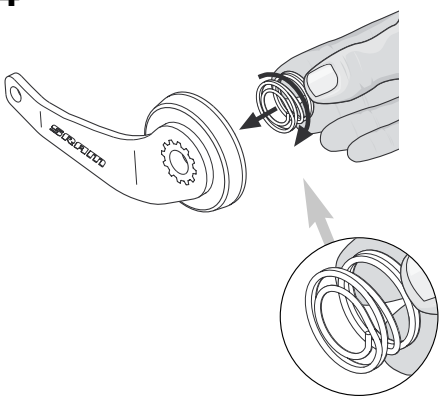
REASSEMBLY HUB

see Fig. 1

Lubrication see "MAINTENANCE/ LUBRICATION".

- Clamp axle with internal thread upwards.
- Position small sun gear (12) with crown gears to the front.
- Position thrust block (18) in the slotted hole (is laterally guided when the sun gear is screwed in).

4



- Locate bolt (17), then spring (16) in the axle and screw in grub screw (15) until it is flush with the axle.
- Reclamp axle. Fit large sun gear (13) (it is the same both sides). Position conical compression spring (19), with the large diameter first. Press spring together and fit washer (20) and retaining washer (21).
- Assemble cover (22), compression spring with 7 turns (23) and the second cover (24, insides to the spring).
- Compress spring and position thrust block (25) (it is the same both sides) in the center of the slotted hole.
- Position coupling gear (26) with carrier plate facing downwards.
- Fit cover (29, inside to the spring) for compression spring.
- Position gear ring (27) over the teeth of the coupling gear.
- Place ball retainer (31), with balls below on the gear ring.
- Position large compression spring (28) on gear ring.
- Mount compression spring with 13 turns (30) on the axle. (Is supported in the coupling wheel by the cover).
- Locate driver (32), press it down and screw on fixed cone (33) as far as the stop. Tightening torque 20 Nm.
- Clamp other axle end.
- Push on thrust washer (11) and fit planetary gear carrier (10). In doing this: Position mounting aid ***(Fig. 2)*** on the planetary gear carrier so that the (X) markings on the three planetary gears match with the mounting aid.
- Insert planetary gear carrier, place thrust washer (8) on it and mount retaining washer (9) in recess.
  Now remove the mounting aid.

Advice:
If the gears are not accurately installed the hub may be tight to move.
This could lead to damage to the gear-wheels in operation.

- Assemble hub shell (6) with a slight counter-clockwise movement.
  In case the hub shell jams, position the plastic ring ***(Fig. 3)*** correctly.

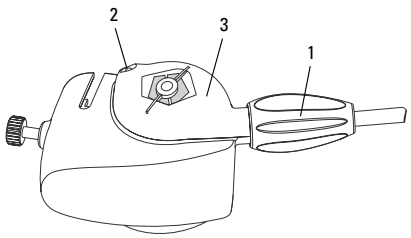
NEW

- Screw brake cone (7) clockwise onto the planetary gear carrier (10) until it stops.
- Insert 3 brake segments (5).
- Turn in friction spring (3) counterclockwise into the lever cone (2) (inlying winding of the spring has to lie against the lever cone) ***(Fig. 4)***.
- Insert ball retainer (4) (balls are facing upwards) into lever cone (2): the 3 recesses have to engage into the retaining lugs of the lever cone. Slightly turn ball retainer to prevent it from falling off.
- Fit lever cone onto hub shell: the retaining lugs of the lever cone have to engage into the openings between the brake segments. Make sure that lever cone engages while turning back and forth slightly.
- Screw on locknuts (1), adjust bearing so that there is no play and lock nuts together with 15 – 20 Nm (133 – 177in.lbs.).

Caution:
Check that all the brake system components are functioning properly!

Advice:
Dismantling and reassembly of hub types with drum brake (MH 5225 Cargo) should be carried out in the same way.
Differences: Instead of brake segments / cone a click-and-pawl carrier is installed on the planetary gear carrier.

5



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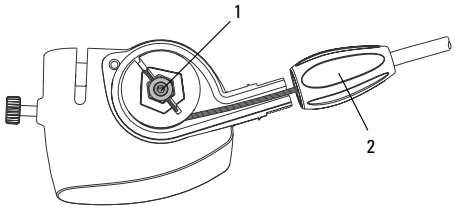

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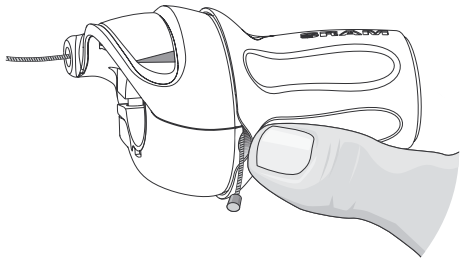

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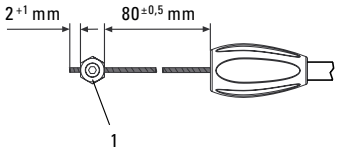

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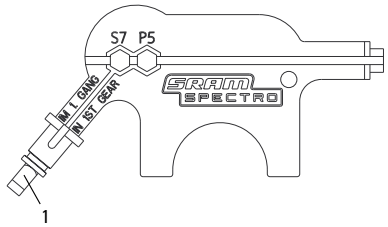

CABLE CHANGE

Dismantling shifter cable:

- Place shifter in gear position "1".
- Do not remove the Clickbox from the axle end.
- Unscrew the adjusting screw (1, ***Fig. 5)*** completely. Unscrew the cover screw (2), brush aside the adjusting screw (1) and remove the cover (3).
- Withdraw shifter cable and clamping bolt (1, ***Fig. 6)*** upwards, loosen clamp and pull clamping piece from the cable.
- Slightly lift the grip cover ***(Fig. 7)***, push the cable out and discard.

Assembly shifter cable:

- Route new cable through shifter housing and pull cable to seat cable head completely into cable recess.
  Feed the cable through the new cable housing and adjusting screw.
- Position clamping bolt (1, ***Fig. 8)*** at a distance of 80 mm, tighten up with 1.5 Nm (13 in.lbs.) and cut off cable ends to 2 – 3 mm. For positioning the clamping bolt use adjust gauge ***(Fig. 9)***. (Part. No. 65 0324 107 000)
- Locate clamping bolt (1, ***Fig. 6)*** and place shifter cable around the carrier cylinder (counter-clockwise winding).
- Position the cover (3, ***Fig. 5)*** and tighten up with the cover screw (2).
  Torque 0.35 – 0.45 Nm (3.1 – 4.0 in.lbs.).
  Screw in the adjusting screw (1) completely.

Advice:

- ***If you want to remove the Clickbox from the axle end for changing the cable, do as follows:***
  - ***Place shifter in gear position "1".***
  - ***Loosen the knurled screw and pull the Clickbox off the axle.***
  - ***Now it's essential to push the end*** (1, ***Fig. 8) of the adjust gauge completely into the Clickbox and tighten up the knurled bolt (so that you maintain the initial tension of the spring inside the Clickbox).***
  - ***Change cable as per description above.***
- ***If you remove the Clickbox from the axle and change the cable without using the end of the adjust gauge, then you will lose the initial tension of the spring inside the Clickbox. In this case you must assemble the cable by placing it around the carrier cylinder with an additional winding (Fig. 6).***

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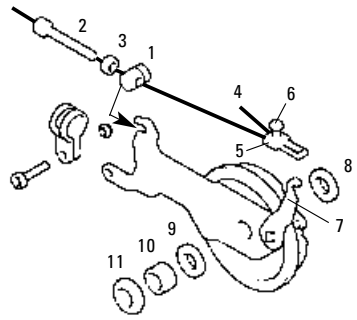


DRUM BRAKE

Install brake anchor plate (or exchange it):

- Place thrust washer (8, ***Fig. 10)*** over the axle on the adjusting cone and fit complete brake anchor plate. Position washer (9) distance sleeve (10) and screw on locknut (11).
- Push brake lever (7) to the stop and hold it there to center the brake jaws in the brake drum – tighten up locknut with a torque of 15 – 20 Nm (133 – 177 in.lbs.).

ADJUSTMENT DRUM BRAKE

- Unscrew adjusting screw (2, ***Fig. 10)*** until the brake pads drag lightly.
- Actuate the hand brake lever forcefully several times and then, if necessary, turn the adjusting screw further in just until the wheel starts spinning freely.
- Lock hex nut (3).

Caution:
Check that all the brake system components are functioning properly!

MAINTENANCE / LUBRICATION

Caution:
The SRAM hubs are provided with permanent lubrication and under normal conditions is maintenance-free. If the coaster brake is loaded excessively its effect can be too strong, the hub may lock. In such a case the 3 brake segments should be lubricated with a special grease (Part No. 0369 135 200/ ...201). Renew brake segments when rhombic pattern is worn out.

Cleaning of parts:

- All parts – except for the planetary gear carrier – can be degreased in a cleaning bath.
- The planetary gear carrier only needs to be cleaned on the outside with a brush so as not to degrease the planetary gear bearing.

Caution:
Do not use high-pressure water when cleaning the gear hub (e.g. strong water jets, high-pressure cleaners etc.) – if water penetrates it could lead to functional problems.

Lubrication of parts:
Use only SRAM grease (Part No. 0369 135 200/ ...201) and standard bicycle oil.

- To lubricate the bearing points on the planetary gear sets, position the planetary gear carrier on its crown and apply 2 – 3 drops of oil to the bearing bolts – at the same time turning the planetary gears so that the bearing points are completely wet. Oil axle through the axle bore and axle slot, apply a thin coating of grease to the outside.
- Oil the inside of the sun gears, grease the outside teeth (fill the gaps in the teeth).
- Oil outside teeth and carrier plate on the coupling gear and lightly grease the borehole from right and left.
- Do not apply grease to ring gear but just oil the pawl pockets.
- NEW Slightly grease the actuation ramps of the planetary gear carrier.
- Apply grease all around the seat area of the friction spring. Oil the pawl pockets.
- Spread grease on the complete surfaces inside and outside of the 3 brake segments.
- Regrease ball retainer and insert into lever cone, slightly grease cone surface of the lever cone.
- Line ball bearing running tracks and brake cylinder in hub shell with grease.

TROUBLESHOOTING

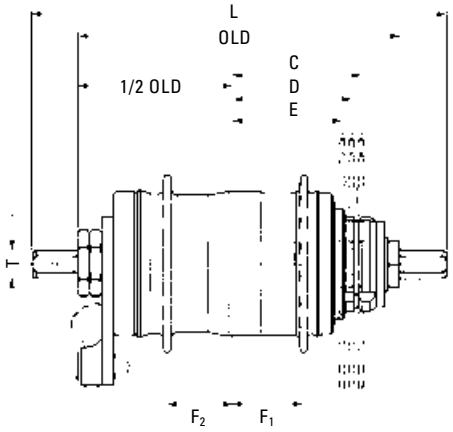
Problem	Cause	Remedy
Shifting difficulties	Damaged control cable	Replace control cable
	Incorrect gear setting	Adjust shift. system
	To much additional axle attachments between hub and axle nut	Beginning of axle thread must be visible in front of the axle nut
Pedals are carried forward when freewheeling	Bearings set too tight	Re-adjust bearings
	Loose lock nuts	Tighten lock nuts (15 – 20 Nm)
	Chain is overtensioned	Reduce chain tension
Hub locks when braking (coaster brake)	Brake segments has run dry	Wash out hub sleeve, repolish and relubricate brake cylinder, renew brake segments
Coaster brake without function	Incorrect mounted friction spring (3, Fig. 1/ Page 24)	Fit friction spring in correct way

SRAM T3
TECHNICAL DATA / ASSEMBLY REQUIREMENTS

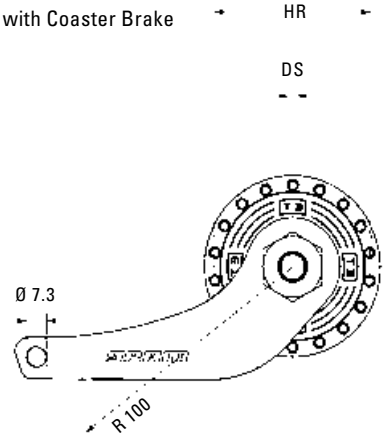
i-BRAKE for SRAM T3:
see page 54.

Caution:
SRAM T3 hubs are not suitable for tandems, trademen's delivery bicycles and similar.

Cycle frame:
- Dropouts must be parallel.
- Slot width at rear dropout max. 10,5 mm.
- The strength must be such that with a maximum braking torque of 250 Nm (2200 in.lbs.) on the rear wheel no residual deformation can occur on the rear structure.



Version with Coaster Brake



HUBS

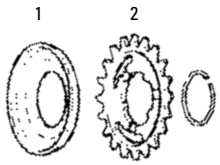
		SRAM T3 with coaster brake		SRAM T3 for i-BRAKE	SRAM T3 with drum brake		SRAM T3 without brake
	Type	MH 3115		—	MH 3125		MH 3105
	Brake	Coaster		i-BRAKE (see page 54)	Drum „D“	„NL“	None
	Over Locknut Dim., OLD	118 mm	127 mm	118 mm	118 mm		117 mm
Axle	**Length, L**	155 oder 166 mm	166 mm	166 mm	166 mm		155 mm oder 166 mm
Axle	**Ends Diameter, T**	FG 10.5		FG 10.5	FG 10.5		FG 10.5
Spoke	**Holes**	36 or 28	36	36	36		36
Spoke	**Hole Diameter, DS**	3.0 mm		3.0 mm	2.8 mm		3.0 mm
Spoke	**Hole Ref. ø, HR**	58 mm		58 mm	89 mm		58 mm
Spoke	**Flange Dist. to $^1/_2$ OLD**	F_1 = 24.5 mm / F_2 = 25.5 mm		F_1 = 23.7 mm / F_2 = 26.3 mm	F_1 = 25.5 mm / F_2 = 32.5 mm		F_1 = 24.5 mm / F_2 = 25.5 mm
Gear Hub Ratio	**Totally**	186 %		←	←		←
Gear Hub Ratio	**Speed 1**	73 %		←	←		←
Gear Hub Ratio	**Speed 2**	100 %		←	←		←
Gear Hub Ratio	**Speed 3**	136 %		←	←		←
Chain	**Line, C/D/E**	44.5 / 41.5 / 38.5 mm		44.5 / 41.5 / 38.5 mm	44.5 / 41.5 / 38.5 mm		44 / 41 / 38 mm
Chain	**Ratio**	24", 26", 28" = 2.0 – 2.4 / 20" = 2.0 – 2.5			←		←
Compatibil.	**Shifter**	SRAM T3 / SRAM Bandix 3		←	←		←
Compatibil.	**Hand Brake Lever**	—		see page 55	see page 39		—
Compatibil.	**Tandem**	—		—	—		—
	Weight	1182 g		1554 g (complete with i-BRAKE)	1270 g		911 g
Finish	**Hub Shell Material**	Steel		Steel	Aluminum		Steel
Finish	**Finish**	Matt Chrome Plated		Matt Chrome Plated	Silver Painted		Matt Chrome Plated

SHIFTERS

		SRAM T3 (for adults)	**SRAM Bandix 3** (for kids)
	Shifter Type	Twist Shifter	Twist Shifter
	Cable	ø 1.2 mm 2174 mm / 2500 mm	ø 1.2 mm 2174 mm
	Comp. Cable Housing	Capped, Compressionless with Resin Liner inside	
	Gear Indication	Printed	Printed
	Clamping Diameter	22.3 mm	22.3 mm
	Handlebar, Straight Area	Minimum length for shifter = 155 mm	Minimum length for shifter = 155 mm
	Weight	65 g	65 g
Design	**Housing**	PA	PA
Design	**Grip**	PP	PP
Design	**Grip Cover**	Thermoplastic elastomer	Thermoplastic elastomer
Design	**Clamping Collar**	Aluminum	Aluminum

SRAM T3
ASSEMBLY

1



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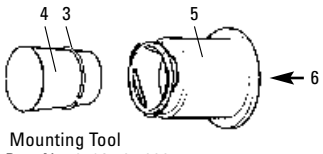
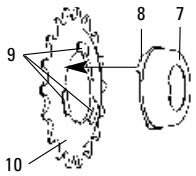


Mounting Tool
Part No. 0582 104 000

3



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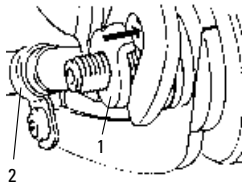

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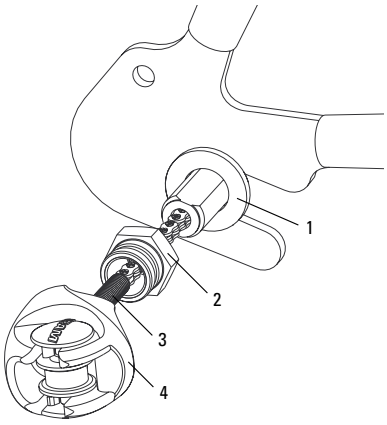

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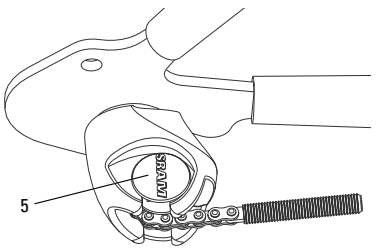

ASSEMBLY HUB

- Lace the wheel as normal. See spoke length table.
- Place the dust cap (1, ***Fig. 1)*** and sprocket (2) on the driver.
- Push sprocket circlip (3, ***Fig. 2)*** onto the cone of tool sleeve (4). Place tool sleeve with large diameter on the driver.
- Push the spring end of sliding sleeve (5) of the tool over the tool sleeve. Thrust sliding sleeve in direction (6), this forces circlip into the recess of the driver.
- Remove tool and check that the circlip is seated correctly.
- Turn dust cap (7, ***Fig. 3)*** until the three lugs (8) are between the three beads (9) on the sprocket (10).
- Position dust cap and push towards sprocket until it is felt to lock into place.
- Screw tension chain (2, ***Fig. 5)*** into the axle end.
- Placing the wheel in the rear frame.
- Mount the chain.

NEW

- Fit new retaining washer (3,5 mm thick) on left axle end (1, ***Fig. 4)***. The serrations must bear against the dropout and the lug must engage in the dropout slot.
  Advice:
  For bicycles with chain tensioner use previous retaining washers (2 pieces, 2 mm thick) – see Tech. Manual 2005.
- Tighten up special type axle nut (1, ***Fig. 5)*** and axle nut at other axle end. Tightening torque 30 – 40 Nm (266 – 350 in.lbs.).
- Guide tension chain (2) trough deflection pulley (3).
- Position deflection pulley at axle nut and push until it is felt to lock into place. Turn deflection pulley until the circular area is at the top (4, ***Fig. 6)***.

Caution:

- ***Only install additional axle attachments (e.g. struts) between nut and retaining washer.***
- ***Cable stop bracket: dimensions see Fig. 9.***
- ***Axle end must protrude by min. 1 mm to max. 4 mm beyond the nut (1, Fig. 5).***

- Mount the brake lever using a suitable frame clamp (2, ***Fig. 4*** resp. ***Fig 11)***.
  Caution:
  Mount the brake lever between the two straps of the frame clamp.
  The clamp must be seated on the frame without play.
  Use a self-locking nut! Tightening torque: 2 – 3 Nm (18–27 in.lbs.).

Caution:
Check that all the brake system components are functioning properly!

Spoke length table:

Tire Size		Cross 28 / 36 Holes	Length MH 3115/3105 28 / 36 Holes	Length MH 3125 36 Holes
47–406	20" x 1.75 x 2	2 x / 3 x	182 mm / 184 mm	—
37–490	22" x 1 3/8	— / 3 x	— / 228 mm	—
47–507	24" x 1.75 x 2	2 x / 3 x	234 mm / 235 mm	—
37–540	24" x 1 3/8	— / 3 x	— / 254 mm	—
47–559	26" x 1.75 x 2	2 x / 3 x	258 mm / 262 mm	253 mm
37–590	26" x 1 3/8	— / 3 x	— / 254 mm	273 mm
47–622	28" x 1.75	2 x / 3 x	289 mm / 292 mm	285 mm
28–622	28" x 1 1/8	— / 3 x	— / 292 mm	285 mm
32–622	28" x 1 5/8 x 1 1/4	— / 3 x	— / 292 mm	285 mm
37–622	28" x 1 3/8 x 1 5/8	— / 3 x	— / 292 mm	285 mm
28–630	27" x 1 1/4 fifty	— / 3 x	— / 297 mm	287 mm
32–630	27" x 1 1/4	— / 3 x	— / 297 mm	287 mm

Spoke lengths are approximate values. They must be checked through lacing attempts and adjusted accordingly.

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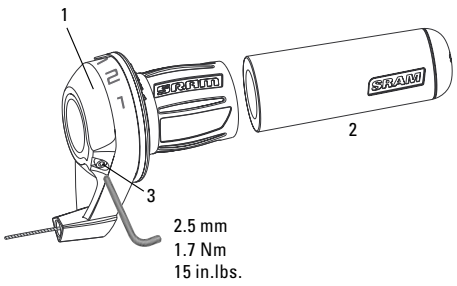

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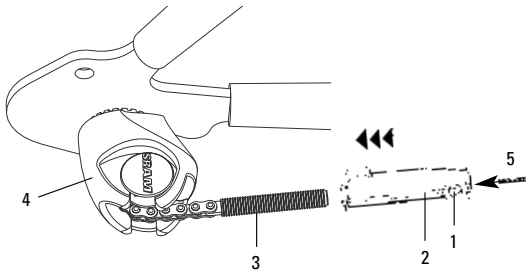

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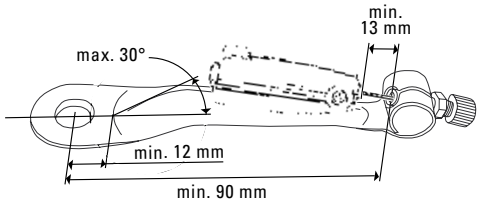

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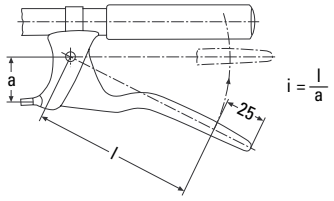

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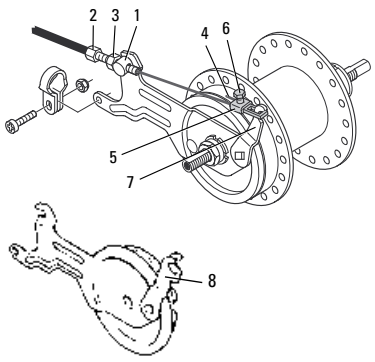


ASSEMBLY SHIFTER

- Slide shifter (1, ***Fig. 7)*** onto handlebar.
- Mount fixed grip (2) onto end of handlebar.
- Without applying pressure, slide shifter against fixed grip, adjust shifter on handlebar and tighten with bolt (3). Allen key 2.5 mm, torque 1,7 Nm (15 in.lbs.)
- Not recommended for use on thin walled aluminum handlebars such as Hyperlite© type handlebars.

Caution:

- ***Never use lubricants or solvents to install fixed grips.***
  Fixed grips provide an axial safety function. For this reason, they should be mounted in such a way as to make sure they do not slip off handlebar.
- ***Check that the shifter and brake lever function properly and are unobstructed (realign if necessary).***
- ***Never ride without the fixed grips. The turning grip may loosen from housing and slip off handlebar – this can result in severe injury or death.***

INSTALLING CABLE

- When fitting the cable avoid small radius. **Use only compressionless cable housings with resin liner inside and capped.**
- Screw the cable stop clamp and cable pully clamp on the down tube or seat tube.
- Secure the lubricated shift cable at equidistant intervals on the frame (in case of continuous cable housing).

Advice:

To avoid malfunction the cable frictional force must not exceed 6 N (1.4 lbs.).

- Feed the shifter cable into the locating sleeve (5, ***Fig. 8)***, fix at the appropriate length (cable stop bracket: ***see Fig. 9)*** using the clamping bolt (1).
  Allen key 2.5 mm, tightening torque 1.5 Nm (13 in.lbs.). Shorten any cable which is sticking out.
- Connect to the hub: push locating sleeve (2, ***Fig. 8)*** loosely onto small pull rod (3).

ADJUSTMENT

- Place the shifter in gear position "3". Move the crank to check that the gear is engaged.
- To make the adjustment, the cable must be taut in third gear to be able to transfer a shift movement directly to the hub.
- Push locating sleeve (2, ***Fig. 8)*** onto the small pull rod (3) until the control cable is taut. Make sure that you don't pull the indicator chain out of the deflection pulley (4).

Check:

- Place shifter in gear position "1" while moving the crank.
- Setting too loose: In gear position "1" the tension chain can be pulled out of the deflection pulley by hand.
- Setting too tight: It is difficult to place the shift lever in gear position "1".
- If required, readjust the shift mechanism (in third gear).

CONNECTING DRUM BRAKE

Caution:

Only use brake levers with a cable moving distance of at least 15 mm and a leverage of "i" = 3.8 – 4.2 (Fig. 10).

- Fit cable stop (1, ***Fig. 11)*** with adjusting bolt (2) and nut (3) and insert into the slot on the brake anchor plate.
- Turn adjusting bolt down by approx. $^2/_3$ and route the brake cable from the brake handle.
- Push lower brake cable end through adjusting bolt (2) and insert lower cable housing end into adjusting bolt.
- Thread brake cable end (4) into fork unit (5).
- Tighten screw (6) slightly.
- Attach fork unit to brake lever (7).
- Pull brake cable end taut with pliers so that fork unit can still be attached and removed (important for changing wheel).
- Tighten screw (6).

Caution:

For NL version drum brake hub with special lever (8), only use original NL brake cable (fork unit (5) is not suitable).

ADJUSTMENT DRUM BRAKE

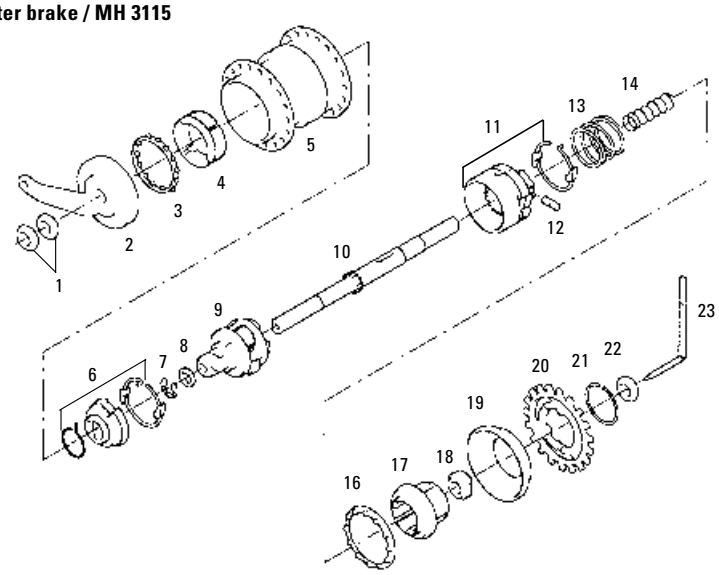
- Unscrew adjusting screw (2, ***Fig. 11)*** until the brake pads drag lightly.
- Actuate the hand brake lever forcefully several times and then, if necessary, turn the adjusting screw further in just until the wheel starts spinning freely.
- Lock hex nut (3).

Caution:

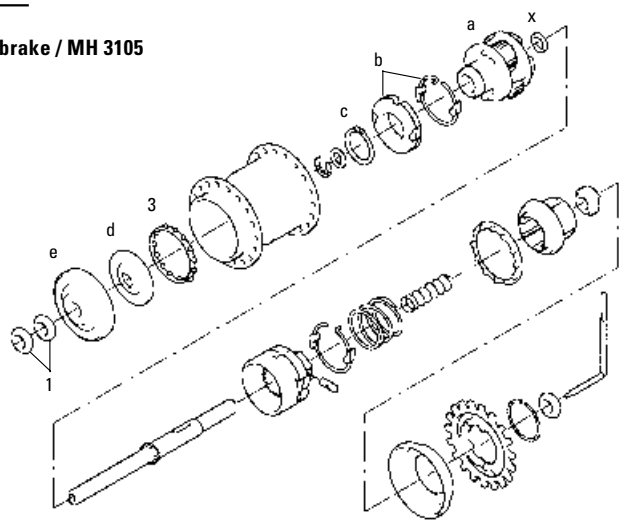
Check that all the brake system components are functioning properly!

SRAM T3
MAINTENANCE

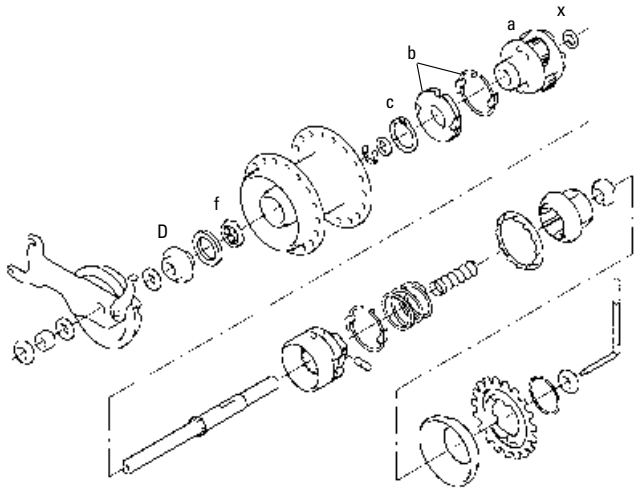
1 Coaster brake / MH 3115



2 Without brake / MH 3105



3 Drum brake / MH 3125



REMOVE WHEEL

- Apply fingertip pressure onto the metal key of locating sleeve to release it from the pull rod.
- Remove deflection pulley.
- Screw off both axle nuts and remove retaining washers.
- Remove wheel.

DISMANTLING HUB

see Fig. 1

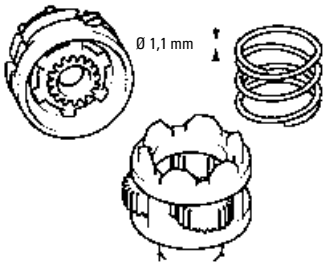
- Unscrew indicator chain (23), remove circlip (21), sprocket (20), dust cap (19) and clamp axle (10) on the driver side.
- Unlock hexagonal nuts (1) and unscrew.
- Remove brake arm (2), ball retainer (3) and brake sleeve (4) and remove hub shell (5).
- Remove safety washer (7), thrust washer (8) and then the planet carrier (9) complete with brake cone (6). Unscrew the brake cone from the planet carrier.
- Clamp other axle end.
- Loosen the lock nut (22) and fixed cone (18) and remove.
- Remove driver (17), compression springs (14 and 13) and ball retainer (16).
- Push the sliding key (12) through the large bore in the coupling wheel of the ring gear (11) – the bore and thrust block must be aligned.
- Remove the gear ring (11) from the axle.

Advice:
The dismantly and reassembly of the hubs with drum brake and without brake should be carried out in the same way (Fig. 2 / 3).

Differences

- There is no brake sleeve (4) and brake cone (6).
- The planet carriers (a) have a cylindrical shaft instead of a flat thread, which houses a pawl carrier (b) held by a safety washer instead of the brake cone.
- Further differences: instead of a lever cone (2) for type MH 3115, an adjusting cone (d) with dust cap (e) for type MH 3105 and a small adjusting cone (D) and corresponding ball retainer (f) for type MH 3125 are fitted.

4



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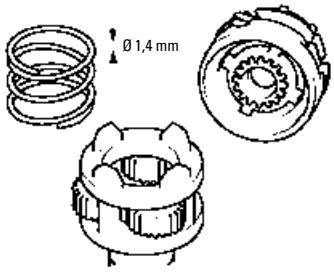

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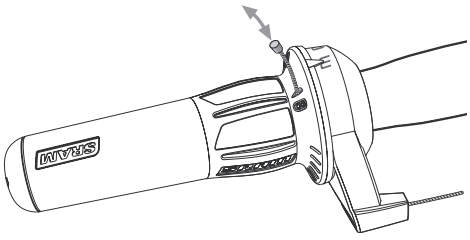

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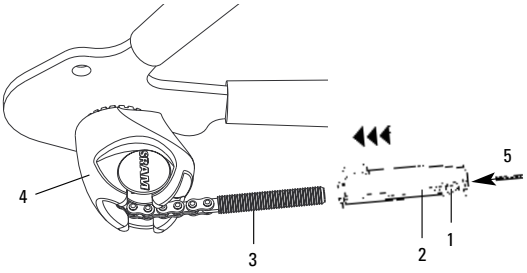


REASSEMBLY HUB

see Fig. 1 / 2 / 3

Lubrication see "MAINTENANCE/ LUBRICATION".

- Clamp the hub axle (10) with the slot for thrust block upwards), fit ring gear (11) and align the large bore in the coupling wheel with the slot. Position the radius of the sliding key (12) facing downwards and turn the coupling wheel slightly.
- Fit the compression springs (13 and 14).
- Place ball retainer with balls in (16) on ring gear (11), mount driver (17), fit fixed cone and lock with hexagonal nut (22), tightening torque 15 – 20 Nm (133 – 177 in.lbs).
- Turn hub over and slide on planet carrier (9) – thrust washer (X) must first be fitted for types MH 3105/3125. (For type MH 3115, this washer is already integrated in the planet carrier). Mount thrust washer (8) and place safety washer (7) in the recess of the axle.
- Screw brake cone (6, type MH 3111) onto the flat thread – for types MH 3105/3125 mount pawl carrier (b) and secure in place using safety washer (c).
- Fit hub shell (5) – turning it counter-clockwise slightly to get past the stop notches – until the shell runs cleanly onto the ball retainer.
- For type MH 3115, insert the brake sleeve (4) so that the spring end of the friction spring on the brake cone (6) sits in one of the two slots on the brake sleeve. Insert the ball retainer and fit the lever cone – move the lever cone lightly until the lugs on the brake lever catch in the grooves on the adjusting cone.
- Adjust the hub clearance by screwing on hexagonal nut (1) until the hub shell runs free of play but not under tension. Lock with a second nut to a tightening torque of 15 – 20 Nm (133 – 177 in.lbs.).
- For type MH 3105 insert ball retainer (3), mount adjusting cone (d) with dust cap (e) and hexagonal nuts (1). Adjust the hub clearance as for type MH 3115.
- For type MH 3125, the ball retainer (f) and dust cap (pressed in) normally remain in the hub shell. The hub clearance is set with adjusting cone (D) as for type MH 3115.

CABLE CHANGE

Dismantling shifter cable:

- Use only new cable and compression-less cable housing
- Detach the cable from the internal hub.
- Remove the cable housing. Cut the cable off 15 cm (6") from the shifter barrel adjuster. Discard the old cable and cable housing.
- Line up the '3' gear number mark with the indicator mark.
- Remove and discard the rest of the old cable ***(Fig. 6)***.

Assembly shifter cable:

- Feed the new cable through the shifter.
- Feed the cable through the new cable housing and stops.
- Feed the shifter cable into the locating sleeve (5, ***Fig. 7)***, fix at the appropriate length using the clamping bolt (1). Allan key 2.5 mm, tightening torque 1.5 Nm (13 in.lbs.). Shorten any cable which is sticking out.
- Connect to the hub: push locating sleeve (2, ***Fig. 7)*** loosely onto small pull rod (3).

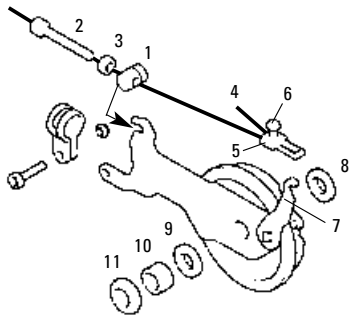
ADJUSTMENT

- Place the shifter in gear position "3". Move the crank to check that the gear is engaged.
- To make the adjustment, the cable must be taut in third gear to be able to transfer a shift movement directly to the hub.
- Push locating sleeve (2, ***Fig. 7)*** onto the small pull rod (3) until the control cable is taut. Make sure that you don't pull the indicator chain out of the deflection pulley (4).

Check:

- Place shifter in gear position "1" while moving the crank.
- Setting too loose: In gear position "1" the tension chain can be pulled out of the deflection pulley by hand.
- Setting too tight: It is difficult to place the shift lever in gear position "1".
- If required, readjust the shift mechanism (in third gear).

8



DRUM BRAKE

Install brake anchor plate (or exchange it):

- Place thrust washer (8, ***Fig. 8)*** over the axle on the adjusting cone and fit complete brake anchor plate. Position washer (9) distance sleeve (10) and screw on locknut (11).
- Push brake lever (7) to the stop and hold it there to center the brake jaws in the brake drum – tighten up locknut with a torque of 15 – 20 Nm (133 – 177 in.lbs.).

ADJUSTMENT DRUM BRAKE

- Unscrew adjusting screw (2, ***Fig. 8)*** until the brake pads drag lightly.
- Actuate the hand brake lever forcefully several times and then, if necessary, turn the adjusting screw further in just until the wheel starts spinning freely.
- Lock hex nut (3).

Caution:
Check that all the brake system components are functioning properly!

MAINTENANCE / LUBRICATION

Coaster Brake:

Improved braking in third gear after production date CW 38/96

- In case of repair, older hub models ***(Fig. 4)*** can be converted with a repair set ***(Fig. 5)***. It is important that all three parts are replaced at the same time – new, reinforced compression springs, planet carrier with 4 lugs and ring gear with 4 lugs on the driving plate.
- Feature of the new or converted hubs: When braking in third gear, the indicator chain moves out of the deflection pulley by approx. one chain link – after braking, the tension chain returns immediately to its normal position.

Caution:
The SARM hubs are provided with permanent lubrication and are maintenance-free under normal conditions. For type MH 3115, however, particularly high loading of the coaster brake can cause to overcompensate. In this case, apply special grease (Part No. 0369 135 200/...201). to the brake sleeve or replace it.
Renew brake shell, when rhombic pattern is worn out.

Cleaning of parts:

- All parts – except for the planetary gear carrier – can be degreased in a cleaning bath.
- The planetary gear carrier only needs to be cleaned on the outside with a brush so as not to degrease the planetary gear bearing.

Lubrication of parts:

Use only SRAM grease (Part No. 0369 135 200/ ...201) and standard bicycle oil.

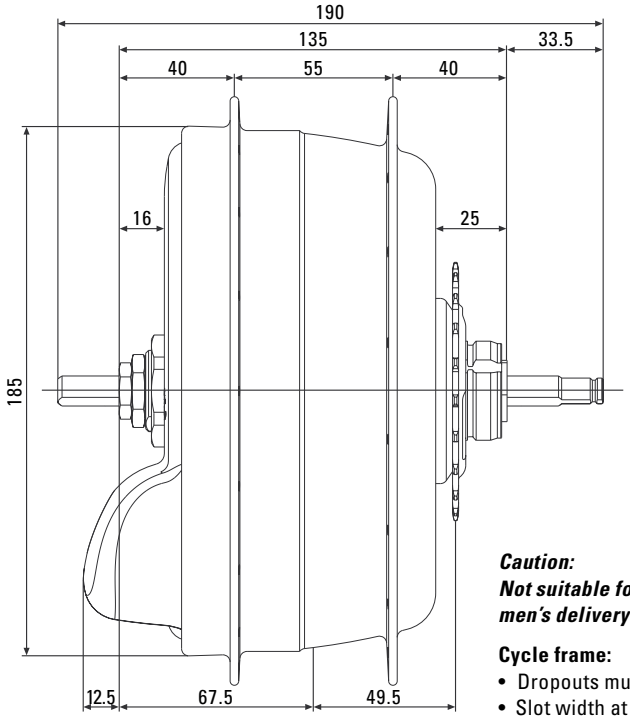
- To lubricate the bearing points on the planetary gear sets, position the planetary gear carrier on its crown and apply 2 – 3 drops of oil to the bearing bolts – at the same time turning the planetary gears so that the bearing points are completely wet. Oil axle through the axle bore and axle slot, apply a thin coating of grease to the outside.
- Oil the inside of the sun gears, grease the outside teeth (fill the gaps in the teeth).
- Oil outside teeth and carrier plate on the coupling gear and lightly grease the borehole from right and left.
- Do not apply grease to ring gear but just oil the pawl pockets.
- Grease the brake cone in the borehole and the friction spring.
- Spread grease on the inside and outside of the brake shell.
- Fill lever cone with grease reserves for brakes.
- Regrease ball retainer, line ball bearing running tracks with grease.

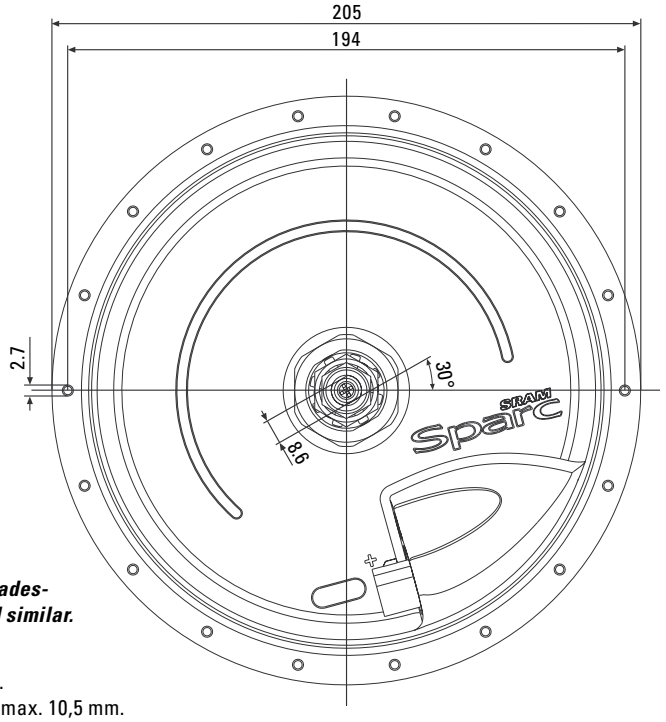
Caution:
Do not use high-pressure water when cleaning the gear hub (e.g. strong water jets, high-pressure cleaners etc.) – if water penetrates it could lead to functional problems.

TROUBLESHOOTING

Problem	Cause	Remedy
Shifting difficulties	Incorrect gear setting	Adjust shifting system, oil control cable, check that cable stop is fastened correctly.
Pedals are carried forward when freewheeling	Bearings set too tight	Re-adjust bearing
	Loose lock nuts	Tighten lock nuts (15 – 20 Nm)
	Chain is overtensioned	Reduce chain tension
Ccoaster brake: Hub locks when braking	Brake shell has run dry	Wash out hub sleeve, re-polish and relubricate brake cylinder, renew brake shell
Pedals yield slowly during braking (does not impair safety).	Brake cone / brake sleeve	Replace brake cone and brake sleeve

SPARC
TECHNICAL DATA / ASSEMBLY REQUIREMENTS





Caution:
Not suitable for tandems, trades-men's delivery bicycles and similar.

Cycle frame:
- Dropouts must be parallel.
- Slot width at rear dropout max. 10,5 mm.

HUB

		Sparc hub 16,8V		
	Wheel ø	28" / 26"	20"	26" USA
V max.	**Econ Mode**	20 km/h	16 km/h	26 km/h
	Speed Mode	25 km/h	23 km/h	32 km/h
Range	**with 15 km/h ø**	about 15 km (Speed Mode)		
	with 20 km/h ø	about 25 km (Speed Mode)		
	with 24 km/h ø	about 35 km (Speed Mode)		
Electric Drive	**Engine Type**	2 x 16,8V DC engines		
	Power	2 x 100 W max.		
	Assist Type	Pedal controlled		
	Assist Ratio	Econ / Speed		
	Brake	None		
	Over Locknut Dim.	135 mm		
Axle	**Length**	190 mm		
	Ends Diameter	FG 10.5		
Spoke	**Holes**	36		
	Hole Diameter	2.9 mm		
	Hole Reference ø	194 mm		
Ratio	**Totally**	251 %		
	Speed 1/2/3/4/5	63 % / 78 % / 100 % / 128 % / 158 %		
Chain	**Usable Dimension**	$^1/_2$" x $^1/_8$" or $^1/_2$" x $^3/_{32}$"		
	Line	49.5 mm (only off-set sprockets)		
	Ratio	1.7 – 2.6		
	Shifter Compatib.	Sparc Shifter		
	Frame Compatib.	Dropouts max. 7 mm		
		Over Locknut Dim. (OLD) 135 mm		
	Weight	2450 g		

SHIFTER

	Sparc Shifter				
Shifter Type	Twist Shifter				
Cable Length	1450 mm	1550 mm	1650 mm	1750 mm	1850 mm
	1950 mm	2150 mm	2350 mm		
Gear Indication	Window				
Clamping Diameter	22.3 mm				
Handlebar, Straight Area	Minimum length = 150 mm				
Weight	89 g				

REM. CON.

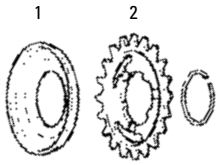
	Sparc Remote Control Unit					
Part. No.	—	—	—	—	—	—
Cable Length (mm)	1500	1600	1700	1800	2000	2200
Mode Selector	Off / Econ / Speed					
Mode Indication	Printed					
Clamping Diameter	22.3 mm					
Cable Connection	3.5 mm stereo jack					
Weight	45 g					

BA. BOX

	Sparc Battery Box 16,8V					
Part. No.	—	—	—	—	—	—
Cable Length (mm)	650	750	850	1400	1650	1950
Battery	16,8V / 8 Ah NiMH battery					
Charger	16,8V / 2A					
Charging time	4 hours 30 minutes					
Luggage carrier comp.	Struts: ø 8 mm / dist. 68 mm center to center / parallel					
Weight	2400 g					

SPARC ASSEMBLY

1



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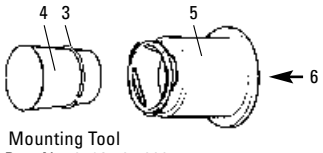
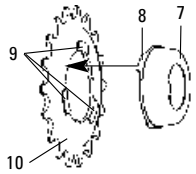


Mounting Tool
Part No. 0582 104 000

3



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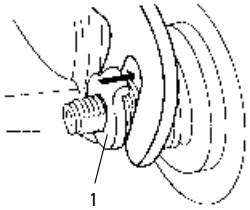

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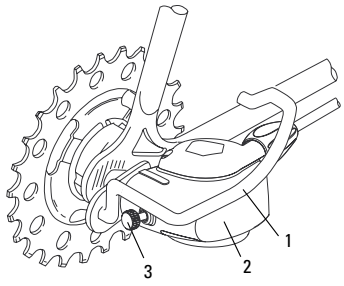

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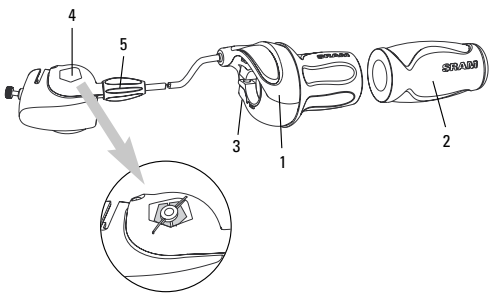

LACING THE WHEEL

Version 28" / 26":
1-cross only.
All spoke heads must be positioned either at the outside or the inside of the respective spoke flange.
Spoke tension about 1000 N recommended.

Version 20":
- 1-cross:
  Use only rim „Rigida 20x406 59 (L 01 12 E)" (or contact SRAM).
  All spoke heads must be positioned at the outside of the spoke flange.
  Spoke tension about 1000 N recommended.
- Radial lacing:
  No restrictions.
  Spoke tension about 1000 N recommended.

ASSEMBLY HUB

- Place the dust cap (1, ***Fig. 1)*** and sprocket (2) on the driver. Toothing close to the hub (only sprocket version off-set).
- Push sprocket circlip (3, ***Fig. 2)*** onto the cone of tool sleeve (4). Place tool sleeve with large diameter on the driver.
- Push the spring end of sliding sleeve (5) of the tool over the tool sleeve. Thrust sliding sleeve in direction (6), this forces circlip into the recess of the driver.
- Remove tool and check that the circlip is seated correctly.
- Turn dust cap (7, ***Fig. 3)*** until the three lugs (8) are between the three beads (9) on the sprocket (10).
- Position dust cap and push towards sprocket until it is felt to lock into place.
- Placing the wheel in the rear frame.
  Advice:
  Dropouts must be parallel.

NEW
- Fit new retaining washer (3,5 mm thick) on left axle ends (1, ***Fig. 4)***. The serrations must bear against the dropout and the lug must engage in the dropout slot.
  Advice:
  For bicycles with chain tensioner use previous retaining washers (2 pieces, 2 mm thick) – see Tech. Manual 2005, Page 46.
- On the sprocket side fit the protective bracket (1, ***Fig. 5)*** directly below the axle nut. Tightening torque on axle nuts 30 – 40 Nm (266 – 350 in.lbs.).

Advice:
- ***If a different protective bracket is used the thickness of the attachment plate must be max. 3 mm.***
- ***Do not use additional washers.***
- ***At least the beginning of the axle thread must be visible in front of the axle nut.***

ASSEMBLY SHIFTER

- Slide shifter (1, ***Fig. 6)*** onto handlebar.
- Mount fixed grip (2) onto end of handlebar.
- Slide shifter against fixed grip, adjust shifter on handlebar and tighten with bolt (3) with a torque of 1.5 Nm (13 in.lbs.).

Caution:
- ***Never use lubricants or solvents to install fixed grips.***
  Fixed grips provide an axial safety function. For this reason, they should be mounted in such a way as to make sure they do not slip off handlebar.
- ***Check that the shifter and brake lever function properly and are unobstructed (realign if necessary).***

- When fitting the cable (1, ***Fig. 7)*** avoid small radius.
- Last attachment point is on the lower rear wheel fork (2, ***Fig. 7)*** immediately behind the chain wheel.
  Cable housing must be movable inside attachment.

INSTALLING CLICK BOX

- Insert shift rod (1, ***Fig. 8)*** in shift tube (2) (oil parts lightly) and then push into axle bore as far as the stop. Turn slot (6) in shift tube to a position where it is easily visible.
- Push locating sleeve (3) with guiding rib (4) to the front onto the hub axle – making sure that the internal lug (5) is guided in the slot (6) of the shift tube until it can be felt – and heard – to engage.
- Turn locating sleeve on the axle (7) until the guiding rib (4) is facing roughly upwards.
- Place shifter in gear position "2".
- Push on clickbox (2, ***Fig. 5)*** to the stop on the axle. The guiding rib (4, ***Fig. 8)*** of the locating sleeve thereby engages in the slot on the housing. In the end position tighten up the knurled bolt (3, ***Fig. 5)*** by hand (0.3 Nm / 2.7 in.lbs.).

ADJUSTMENT HUB

- Be sure to reset rotational shifter from 4th. to 3rd gear.
- Match up the arrow marks in the Clickbox viewing window (4, ***Fig. 6)*** by turning the adjusting screw (5).

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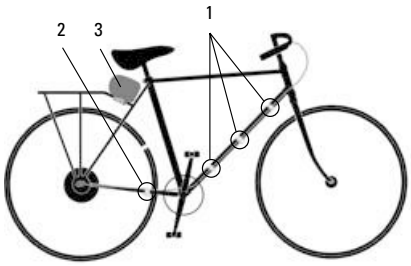

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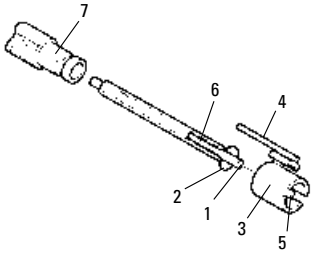

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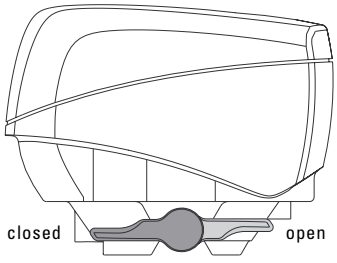

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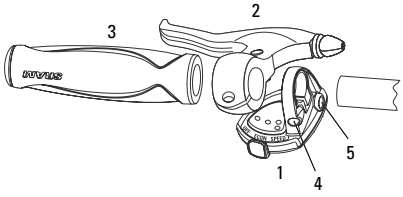


ASSEMBLY BATTERY BOX

- Pull both quick releases outward and turn them to the „open" position ***(Fig. 9)***.
- Position battery box onto luggage carrier struts (3, ***Fig. 7)***.
- Push quick releases inwards and turn them to the „closed" position ***(Fig. 9)***.
- Slide plug of battery cable in the slot of the battery box until it snaps in.
- Attach cable along the frame or luggage carrier strut.
  Advice:
  Last attachment point of the cable at the rear fork: approx. 8 cm away from the axle end.
  Do not jam the cable between frame and rear hub and keep it away from the rotating hub shell.
- Slide plug in the slot on the hub until it snaps in.

Advice:
Closed elements such as brazed-on eye bolts are not suitable because plug will not pass through.

STORING BATTERY BOX

The battery box should be stored fully charged in a dry and cool place. Remove the plug of the battery cable from the box.

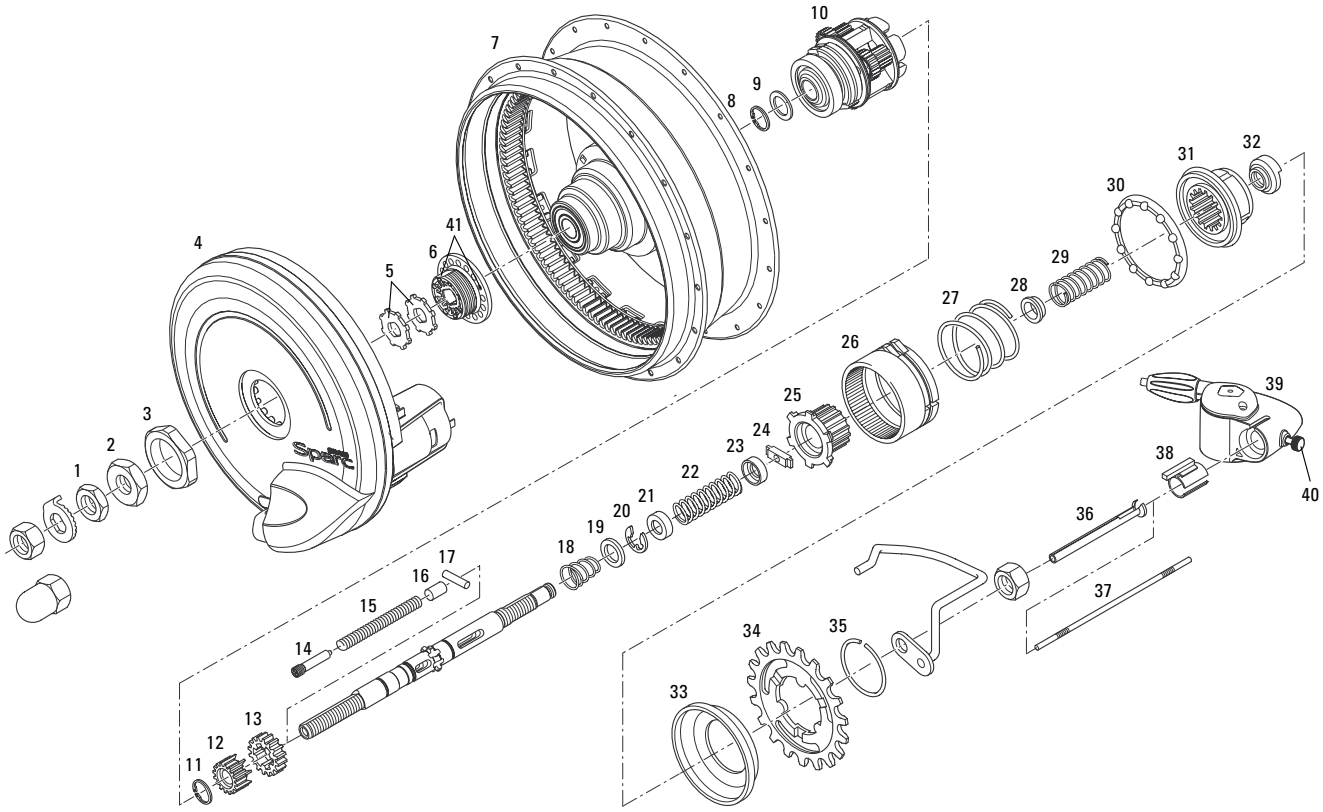
All batteries are shipped with an additional documentation about the last charging date within our SRAM facility. This documentation of battery charging also allows you to fill in the dates of additional charge actions that you would need to perform if the batteries stay in your warehouse over a longer period of time. You can identify the next necessary charge date at a glance (at least 3 months after last charge).

ASSEMBLY REMOTE CONTROL UNIT

- Slide remote control unit (1, ***Fig. 10)*** onto handlebar.
- Mount brake lever (2) and fixed grip (3).
- Adjust remote control unit on handlebar and tighten the bolt (4) with a torque of 1.5 Nm (13 in.lbs.).
- Slide plug of remote control cable in the slot (5) of the remote control unit until it snaps in.
- Attach cable along the frame.
  Advice:
  Last attachment point of the cable at the rear fork: approx. 8 cm away from the axle end.
  Do not jam the cable between frame and rear hub.
  Make a cable loop between plug and cable attachment point to avoid tensile load.
- Slide the plug straightly in the slot on the hub until it snaps in.
  Angular installation may damage the slot.

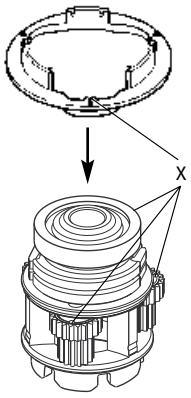
Check:
Switch remote control to „Speed" position and rotate the rear wheel (Battery has to be fully charged).
At least 1 green and the red LED must gleam. If not, assemble plugs again completely / right.

1



2

Sparc mounting aid
Part No. 65 3024 001 000



REMOVE WHEEL

- Pull the remote control cable plug off the hub.
- Apply fingertip pressure onto the tap and pull battery cable plug off the hub.
- Loosen the knurled screw (40, ***Fig. 1)*** and pull the Clickbox off the axle.
- Disengage the red locating sleeve (38) and pull it off. Remove shift rod (37) and shift tube (36) out of the axle bore.
- Remove wheel.

ELECTRIC DRIVE

Remove:

- Unscrew resin nut (3, ***Fig. 1)***.
- Remove electric drive (4).

Caution:
Do not disassemble and do not lubricate the electric drive.

Reassembly:

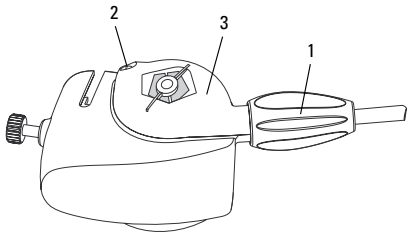
- Position electric drive onto hub.
- While rotating the electric drive push it inside until the two small inside pins engage in corresponding small holes (41). Check: The thread (6) must be visible at least 8 mm.
- Screw on resin nut (3) with a torque of 3 – 5 Nm (27 – 44 in.lbs.).

DISMANTLING GEAR HUB

see Fig. 1

- Remove circlip (35), sprocket (34) and dust cap (33).
- Clamp hub with the two axle flats sprocket side facing downwards.
- Remove electric drive (4) (see left column).
- Unscrew the locknuts (1+2).
- Remove plate (6) and 2 washers (5).
- Remove hub shell (7).
- Remove circlip (8) and washer (9).
- Remove planetary gear carrier (10) and circlip (11).
- Clamp other axle end.
- Unscrew fixed cone (32).
- Remove driver (31), compression spring (29), large compression spring (27) and ball retainer (30). – Withdraw gear ring (26) and coupling gear (25) and remove cover (28) from the coupling gear.
- Take out thrust block (24), (to do this compress the spring). Remove spring (22) and the two covers (23/21).
- Dismantle retaining washer (20), washer (19), conical compression spring (18), and the large sun gear (13).
- Clamp other axle end.
- Unscrew grey grub screw (14) – dismantle spring (15), guide bolt (16) and thrust block (17).
- Remove small sun gear (12).

3



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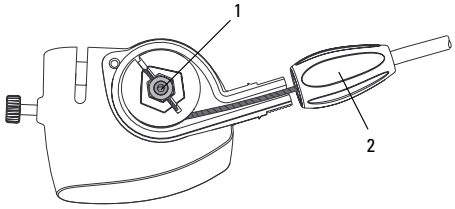

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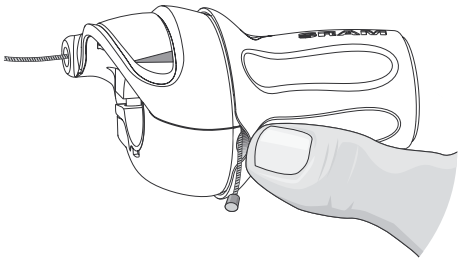

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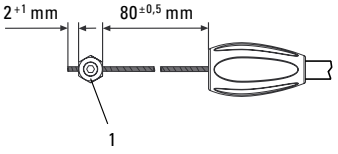

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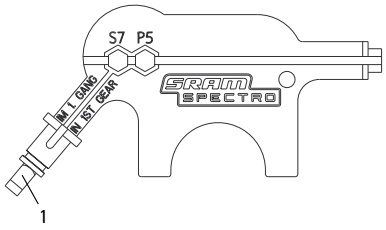


REASSEMBLY HUB

see Fig. 1

Lubrication see "LUBRICATION GEAR HUB", *next page.*

- Clamp axle with small internal thread upwards.
- Position small sun gear (12) with crown gears to the front.
- Position thrust block (17) in the slotted hole (is laterally guided when the sun gear is mounted).
- Locate bolt (16), then spring (15) in the axle and screw in grey grub screw (14) until it is flush with the axle end.
- Clamp other axle end. Fit large sun gear (13). Position conical compression spring (18), with the large diameter first. Compress spring and fit washer (19) and retaining washer (20).
- Assemble cover (21), compression spring with 7 turns (22) and the second cover (23, insides to the spring).
- Compress spring and position thrust block (24) (it is the same both sides) in the center of the slotted hole.
- Position coupling gear (25) with carrier plate facing downwards.
- Fit cover (28, inside to the spring) for compression spring.
- Position gear ring (26) over the teeth of the coupling gear.
- Place ball retainer (30), with balls below on the gear ring.
- Position large compression spring (27) on gear ring.
- Mount compression spring with 13 turns (29) on the axle. (Is supported in the coupling wheel by the cover.)
- Locate driver (31), press it down and screw on fixed cone (32). Tightening torque 20 Nm.
- Clamp other axle end.
- Push on thrust washer (11) and fit planetary gear carrier (10). In doing this: Position mounting aid ***(Fig. 2)*** on the planetary gear carrier so that the (X) markings on the three planetary gears match with the mounting aid.
- Insert planetary gear carrier, place thrust washer (9) and mount circlip (8) in recess.
  Remove the mounting aid.

Advice:
If the gears are not accurately installed the hub may be tight to move.
This could lead to damage to the gear-wheels in operation.

- Mount hub shell (7), with a slight counterclockwise turn.
- Fit plate (6) and 2 washers (5).
- Screw on counternuts (2+1), tightening torque 15 – 20 Nm (133 – 177 in.lbs.).
- Reassemble electric drive.

CABLE CHANGE

Dismantling shifter cable:

- Place shifter in gear position "1".
- Do not remove the Clickbox from the axle end.
- Unscrew the adjusting screw (1, ***Fig. 3)*** completely. Unscrew the cover screw (2), brush aside the adjusting screw (1) and remove the cover (3).
- Withdraw shifter cable and clamping bolt (1, ***Fig. 4)*** upwards, loosen clamp and pull clamping piece from the cable.
- Slightly lift the grip cover ***(Fig. 5)***, push the cable out and discard.

Assembly shifter cable:

- Route new cable through shifter housing and pull cable to seat cable head completely into cable recess.
  Feed the cable through the new cable housing and adjusting screw.
- Position clamping bolt (1, ***Fig. 6)*** at a distance of 80 mm, tighten up with 1.5 Nm (13 in.lbs.) and cut off cable ends to 2 – 3 mm. For positioning the clamping bolt use adjust gauge ***(Fig. 7)***. (Part. No. 65 0324 107 000)
- Locate clamping bolt (1, ***Fig. 4)*** and place shifter cable around the carrier cylinder (counter-clockwise winding).
- Position the cover (3, ***Fig. 3)*** and tighten up with the cover screw (2).
  Torque 0.35 – 0.45 Nm (3.1 – 4.0 in.lbs.).
  Screw in the adjusting screw (1) completely.

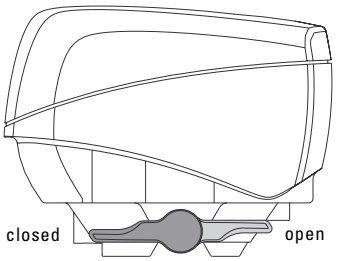
Advice:

- ***If you want to remove the Clickbox from the axle end for changing the cable, do as follows:***
  - ***Place shifter in gear position "1".***
  - ***Loosen the knurled screw and pull the Clickbox off the axle.***
  - ***Now it's essential to push the end*** (1, ***Fig. 7) of the adjust gauge completely into the Clickbox and tighten up the knurled bolt (so that you maintain the initial tension of the spring inside the Clickbox).***
  - ***Change cable as per description above.***
- ***If you remove the Clickbox from the axle and change the cable without using the end of the adjust gauge, then you will lose the initial tension of the spring inside the Clickbox. In this case you must assemble the cable by placing it around the carrier cylinder with an additional winding (Fig. 4).***

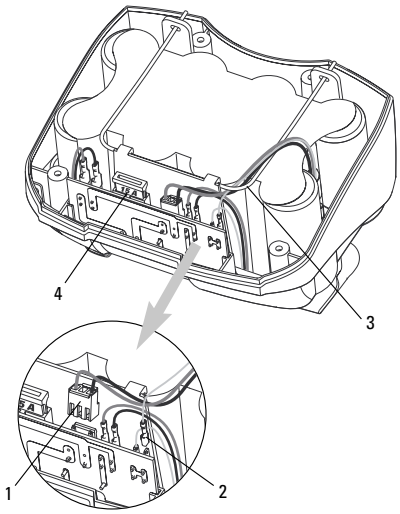
ADJUSTMENT

- Be sure to reset rotational shifter from 4th to 3rd gear.
- Match up the marks in the Clickbox viewing window ***(Fig. 3)*** by turning the adjusting screw (1).

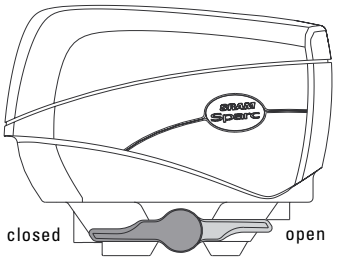
8 **16,8 V NiMH battery**



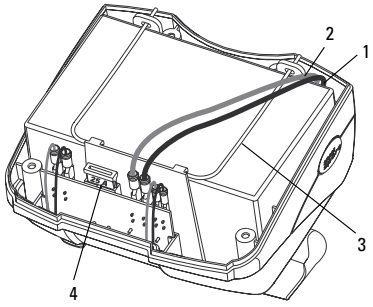
9 **16,8 V NiMH battery**



10 **12 V lead battery**



11 **12 V lead battery**



LUBRICATION GEAR HUB

Cleaning of parts:

- All parts – except for the planetary gear carrier – can be degreased in a cleaning bath.
- The planetary gear carrier only needs to be cleaned on the outside with a brush so as not to degrease the planetary gear bearing.

Lubrication of parts:

Use only SRAM grease (Part No. 0369 135 200/ ...201) and standard bicycle oil.

- To lubricate the bearing points on the planetary gear sets, position the planetary gear carrier on its crown and apply 2 – 3 drops of oil to the bearing bolts – at the same time turning the planetary gears so that the bearing points are completely wet.
- Oil axle through the axle bore and axle slot, apply a thin coating of grease to the outside.
- Oil the inside of the sun gears, grease the outside teeth (fill the gaps in the teeth).
- Oil outside teeth and carrier plate on the coupling gear and lightly grease the borehole from right and left.
- Do not apply grease to ring gear but just oil the pawl pockets.
- Regrease ball retainer, line ball bearing running tracks with grease.

Advice:
Do not use high-pressure water when cleaning (e.g. strong water jets, high-pressure cleaners etc.) – if water penetrates it could lead to functional problems.

BATTERY CHANGE

16,8 V NiMH battery
(see Fig. 8 and 9)
Disassembly:

- Apply fingertip pressure onto the tap and pull battery cable plug off the battery box.
- Turn quick releases to the „open" position ***(Fig. 8)*** and pull them outward.
- Take off battery box from luggage carrier.
- Unscrew the 4 bottom screws (slotted screwdriver / Torx T10) and take off battery box cover.
- Hang out stirrup (3, ***Fig. 9)***.
- Take out battery and pull off plug (1) and cable shoe (2) from card modul.

Reassembly:

- Connect plug and cable shoe of new battery to card modul:
  – white plug with red and black cable (1, ***Fig. 9)***
  – cable shoe with yellow cable (2)
  and put battery inside.
- Assemble stirrup (3) (bulge downward). Pay attention of correct cable routing ***(Fig. 9)***.
- Mount battery box cover by the 4 screws.
- Pull both Quick Releases outward and turn them to the „open" position ***(Fig. 8)***.
- Position battery box onto luggage carrier struts.
- Push Quick Releases inwards and turn them to the „closed" position ***(Fig. 8)***.
- Slide plug of battery cable in the slot of the battery box until it snaps in.

Advice:
Use only batteries as specified by SRAM.

12 V lead battery
(see Fig. 10 and 11)
Disassembly:

- Apply fingertip pressure onto the tap and pull battery cable plug off the battery box.
- Turn quick releases to the „open" position ***(Fig. 10)*** and pull them outward.
- Take off battery box from luggage carrier.
- Unscrew the 4 bottom screws (slotted screwdriver / Torx T10) and take off battery box cover.
- Hang out stirrup (3, ***Fig. 11)***.
- Take out battery and pull off plugs (1+2) from battery.
  Advice:
  Do not pull off any plug from card modul.

Reassembly:

- Connect plugs to new battery:
  – black cable: Negative Pole (1, ***Fig. 11)***
  – red cable: Positive Pole (2)
  and put battery inside.
- Assemble stirrup (3) (bulge downward). Pay attention of correct cable routing ***(Fig. 11)***.
- Mount battery box cover by the 4 screws.
- Pull both Quick Releases outward and turn them to the „open" position ***(Fig. 10)***.
- Position battery box onto luggage carrier struts.
- Push Quick Releases inwards and turn them to the „closed" position ***(Fig. 10)***.
- Slide plug of battery cable in the slot of the battery box until it snaps in.

Advice:
Use only batteries as specified by SRAM.

CHARGING THE BATTERY

- Insert the plug of the charger into the socket of the battery box.
- Insert the charger into an electric mains socket.

The LED will glow red during charging, changing to green when the battery is fully recharged.
When not in use always withdraw the plugs from the socket and the battery box

Caution:

- ***Recharge the battery at least every 3 months.***
- ***The battery must only be charged in a temperature range of +5°C to +30°C.***
- ***Only charge the battery in the operating position.***
- ***Only use in dry internal areas.***
- ***Do not use in rooms (garages) with an explosion risk.***
- ***Do not dismantle the charging unit and battery box yourself.***
  Incorrect assembly can lead to electric shock or fire.
- ***The charging unit should not get into the hands of children.***
- ***Charging should only be carried out in sufficiently well ventilated areas.***
- ***When not in use always withdraw the plugs from the socket and the battery box (do not pull on the cables).***
- ***Regularly check the cable and protect it from sharp edges. If it is damaged have it renewed immediately by a specialist workshop.***
- ***Protect the unit from oil, grease, aggressive cleaning agents and paint thinners since they can destroy the housing.***
- ***If it falls, from a bench for example, the unit must immediately be given a safety check by a specialist workshop. This is also necessary if contact pins become loose.***
- ***The battery must never be burned. Risk of explosion!***
- ***The battery must be disposed of according to the waste disposal regulations.***
- ***Only ever use the right Sparc charging unit with the corresponding Sparc battery.***

STORING THE BATTERY

The battery box should be stored fully charged in a dry and cool place. Remove the plug of the battery cable from the box.

All batteries are shipped with an additional documentation about the last charging date within our SRAM facility. This documentation of battery charging also allows you to fill in the dates of additional charge actions that you would need to perform if the batteries stay in your warehouse over a longer period of time. You can identify the next necessary charge date at a glance (at least 3 months after last charge).

REMOTE CONTROL UNIT

Do not disassemble the remote control unit.

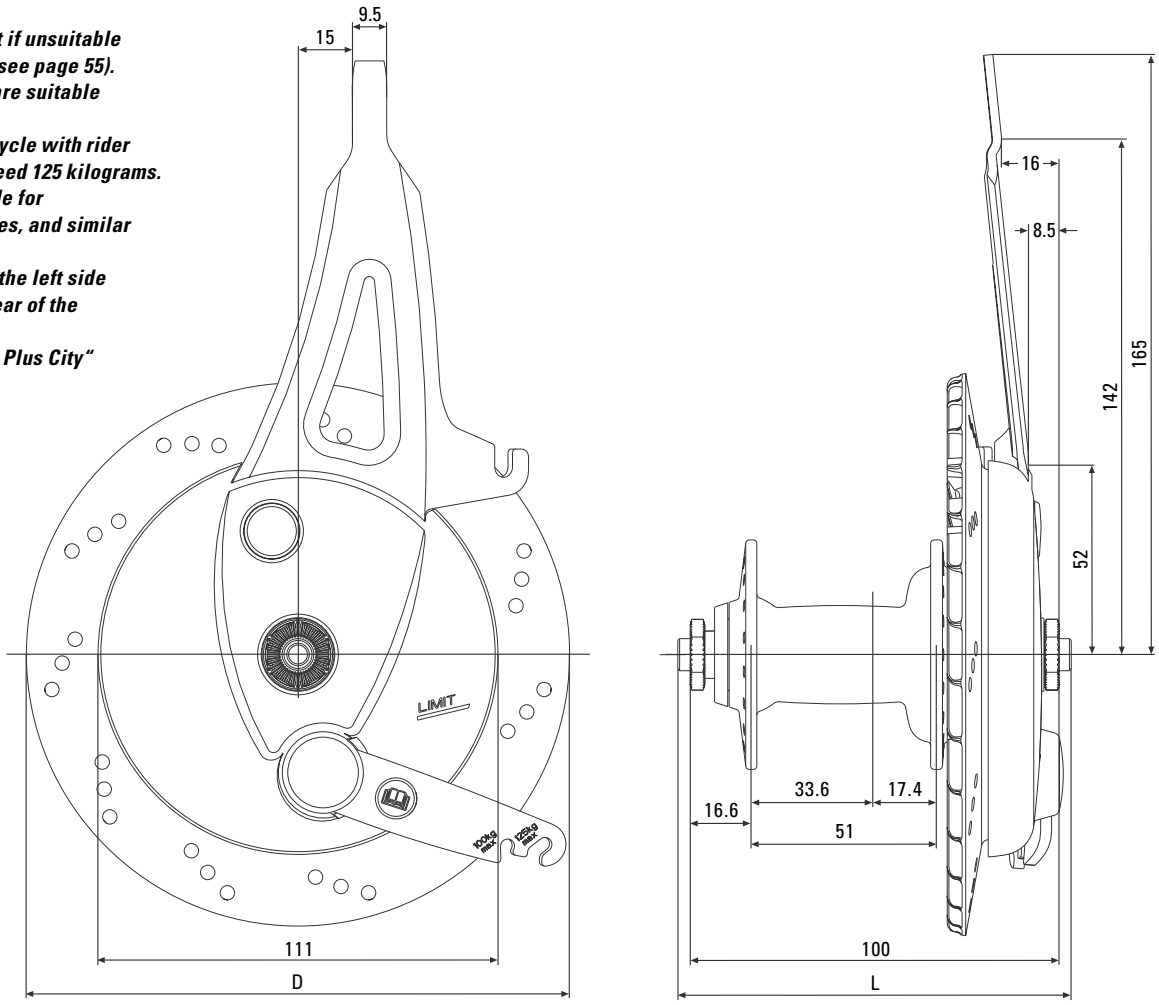
TROUBLESHOOTING

Problem	Cause	Remedy
Gear hub:		
Shifting difficulties	Damaged control cable	Replace control cable
	Incorrect gear setting	Adjust shifting system
	To much additional axle attachments between hub and axle nut	Beginning of axle thread must be visible in front of the axle nut
Pedals are carried forward when freewheeling	Bearings set too tight	Readjust bearings
	Loose lock nuts	Tighten lock nuts (15 – 20 Nm)
	Chain is overtensioned	Reduce chain tension
Electric system:		
Electric drive does not work	Remote control in position OFF	Switch to ECON or SPEED
	Remote control defect	Replace remote control
	Plugs not engaged	Slide all plugs completely in slots
	Cable defect	Replace defect cables
	Battery discharged	Charch battery
	Battery inside not connected	Connect battery inside box
	Battery defect	Replace battery
	Fuse blasted	Replace fuse (4, ***Fig. 9/11)*** in battery box: – 15 A for 16,8 V NiMH battery – 25 A for 12 V lead battery
	Electric drive defect	Replace electric drive
Electric drive emits unusual noise	Foreign body in electric drive	Take out foreign body
	Electric drive defect	Replace electric drive

i-BRAKE AND COMPATIBLE HUBS
TECHNICAL DATA / ASSEMBLY REQUIREMENTS

Caution:

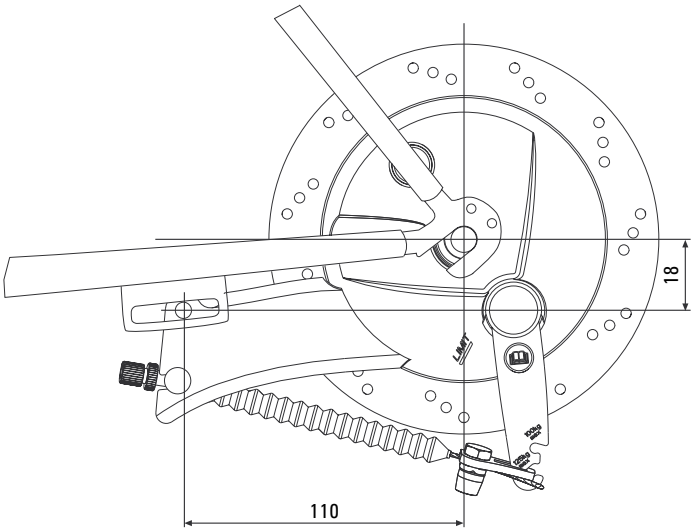
- ***There is a risk of accident if unsuitable forks or frames are used (see page 55).***
- ***Only 24"/26"/28" wheels are suitable for use.***
- ***The total weight of the bicycle with rider and baggage may not exceed 125 kilograms.***
- ***The i-BRAKE is not useable for tandems, transport bicycles, and similar loads.***
- ***The i-BRAKEs must go on the left side viewed from behind the rear of the bicycle.***
- ***SRAM i-BRAKEs are „DIN Plus City" certified.***

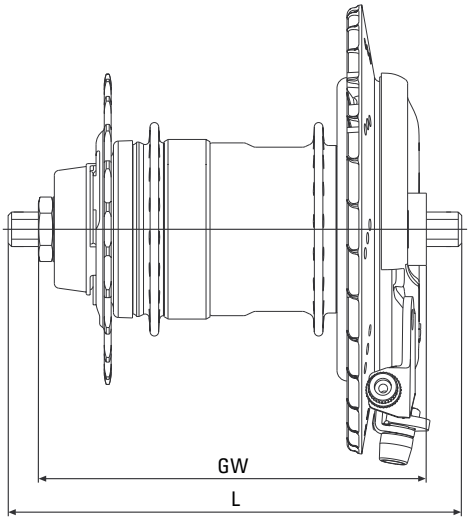


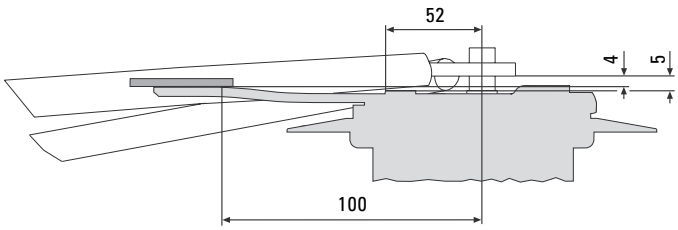
FRONT HUBS

NEW		**i-BRAKE System for Front Hubs**											
	Brake Model	IB 60 front						IB 40 front					
	Kühlscheiben-ø, D	155 mm						135 mm					
	Hub	Front Hub HB 40 IB		i-LIGHT hub D724 IB		i-LIGHT hub D730 IB		Front Hub HB 40 IB		i-LIGHT hub D724 IB		i-LIGHT hub D730 IB	
	Over Locknut Dim.	100 mm		100 mm		100 mm		100 mm		100 mm		100 mm	
Axle	**Length, L**	108 mm	140 mm	108 mm	140 mm	108 mm	140 mm	108 mm	140 mm	108 mm	140 mm	108 mm	140 mm
Axle	**Type**	Hollow	Solid	Hollow	Solid	Hollow	Solid	Hollow	Solid	Hollow	Solid	Hollow	Solid
Axle	**Material**	Steel		Steel		Steel		Steel		Steel		Steel	
Axle	**Ends Diameter**	9 mm	M 9x1	9 mm	M 9x1	9 mm	M 9x1	9 mm	M 9x1	9 mm	M 9x1	9 mm	M 9x1
Spoke	**Holes**	36		36		36		36		36		36	
Spoke	**Spoke Diameter**	2 mm		2 mm		2 mm		2 mm		2 mm		2 mm	
Spoke	**Hole Reference ø**	54 mm		80 mm		80 mm		54 mm		80 mm		80 mm	
	Bearing	Cartridge		Cartridge		Cartridge		Cartridge		Cartridge		Cartridge	
	Sealing	Lip Seal / Labyrinth / Dust Cap						Lip Seal / Labyrinth / Dust Cap					
	Tandem Compatib.	—	—	—	—	—	—	—	—	—	—	—	—
	Compat. brake lever	Linear Pull compatible		Linear Pull compatible		Linear Pull compatible		Linear Pull compatible		Linear Pull compatible		Linear Pull compatible	
	Brake anchor plate	Version D		Version D		Version D		Version D		Version D		Version D	
	Weight (complete)	943 g	955 g	1552 g	1556 g	NV	1582 g	913 g	925 g	1522 g	1526	NV	1589 g
Finish	**Hub Shell**	Aluminum, anodized		Aluminum, anodized		Aluminum, anodized		Aluminum, anodized		Aluminum, anodized		Aluminum, anodized	
Finish	**Brake Drum**	Stainless steel		Stainless steel		Stainless steel		Stainless steel		Stainless steel		Stainless steel	

i-BRAKE AND COMPATIBLE HUBS
TECHNICAL DATA / ASSEMBLY REQUIREMENTS







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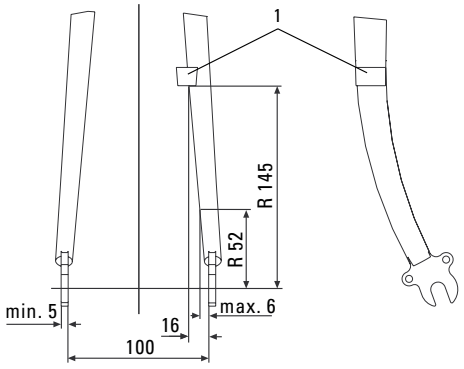
GEAR HUBS

NEW		DualDrive	SRAM S7	SRAM P5	SRAM T3
	Brake Model	i-BRAKE for DualDrive	i-BRAKE for SRAM S7	i-BRAKE for SRAM P5	i-BRAKE for SRAM T3
	Performance Level	Comfort / City / Trekking	←	←	←
	Hub	DD 27 / 24 i-BRAKE comp.	SRAM S7 i-BRAKE comp.	SRAM P5 i-BRAKE comp.	SRAM T3 i-BRAKE compatible
Over Locknut Dim., OLD		135 mm	135 mm	126 mm	118 mm
Axle	Length, L	182.6 mm	188.5 mm	179 mm	166 mm
Axle	Ends Diameter	FG 10.5	FG 10.5	FG 10.5	FG 10.5
Spoke	Holes	36	36	36	36
Spoke	Hole Diameter	2.6 mm	3 mm	3 mm	3 mm
Spoke	Hole Reference ø	67 mm	75 mm	75 mm	58 mm
	Tandem Compatib.	—	—	—	—
	Compat. brake lever	Linear Pull compatible	←	←	←
	Brake anchor plate	Version D	Version D	Version D	Version D
	Weight (complete)	1640 g	2164 g	1920 g	1554 g
Finish	Hub Shell	Aluminium, anodisiert	Steel, matt chrome plated	Steel, matt chrome plated	Steel, matt chrome plated
Finish	Brake Drum	Stainless steel	Stainless steel	Stainless steel	Stainless steel

i-BRAKE AND COMPATIBLE HUBS
TECHNICAL DATA / ASSEMBLY REQUIREMENTS

1



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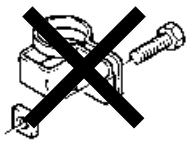

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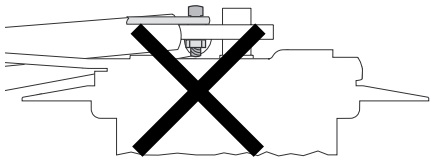


FRONT FORK REQUIREMENTS

Strength:
The strength must be such that with a maximum braking torque of 300 Nm (2700 in.lbs.) on the wheel no residual deformation can occur on the front fork.

Dimensions:
Important dimensions for front forks are shown in ***Fig. 1***.
Fork dropouts must be parallel.

Brake arm anchor boss (1, ***Fig. 1):***
Brazed-on or screwed (suspension forks)
Warning:
Don't use brake arm clamps (Fig. 2).

Mudguard and luggage carrier attachment:
Mounting screws should not collide with i-BRAKE ***(Fig. 3)***.

REAR FRAME REQUIREMENTS

Strength:
The strength must be such that with a maximum braking torque of 250 Nm (2200 in.lbs.) on the rear wheel no residual deformation can occur on the rear structure.

Dimensions:
Important dimensions for rear frames ***see previous page.***
Rear fork dropouts must be parallel.

Mudguard and luggage carrier attachment:
Mounting screws should not collide with i-BRAKE ***(Fig. 3)***.

HAND BRAKE LEVER COMPATIBILITY

- Use only Linear Pull compatible hand brake levers.
- Leverage must be 1.9 – 2.1.
- Cable pull of at least 25 mm.
- Hand brake lever with adjustable leverage:
  Einstellung so, daß vorgenannte Werte für die Übersetzung und den Zugweg erreicht werden.

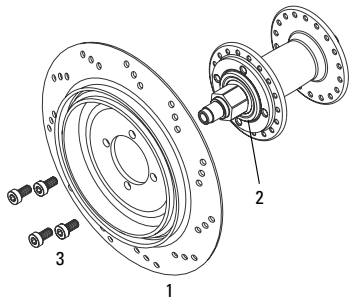
Warning:
There is a risk of accident if unsuitable brake levers are used.

BRAKE CABLES

- Use only new high quality cable and cable housing.
- When choosing cable housing lengths, be sure to allow enough housing for an extreme turn of the handlebars in both directions.
- Note also that different stem lengths effect cable housing length.

i-BRAKE AND COMPATIBLE HUBS ASSEMBLY

1



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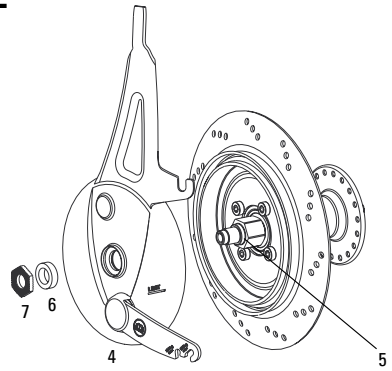

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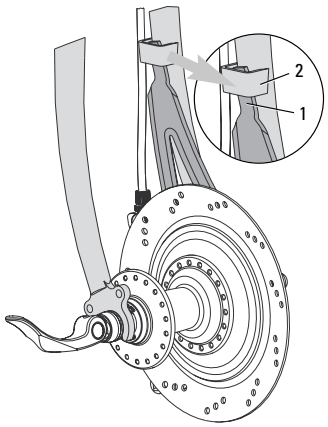

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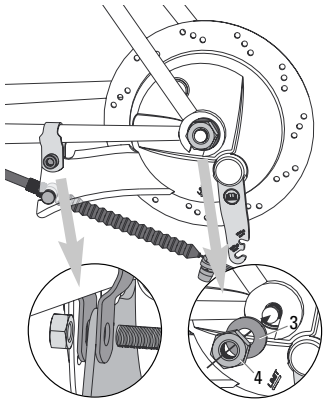


A S S E M B L Y

- Lace the wheel as normal. 3-cross only.

Caution:

- ***Plane faces of brake drum and hub must be clean and free from oily and greasy substances.***
- ***Internal area of the brake drum and brake lining material must be free of dirt and oil or other substances containing grease. Danger of accident!***

- Slide brake drum (1, ***Fig. 1)*** onto centering seat (2) and fasten crosswise with appropriate four cylinder head screws (3), (or four countersunk screws for version DualDrive). Torx T25, tightening torque 5.5 – 6 Nm (49 – 53 in.lbs.).
- Slide brake anchor plate (4, ***Fig. 2)*** onto centering seat (5) without tilting it.

Front hubs:

- Apply steel washer (6, ***Fig. 2)*** and lock nut (7), minted side outwards. Wrench 15 mm, tightening torque 15 – 20 Nm (133 – 177 in.lbs.).

Gear hubs:

- Apply steel/resin washer (6, ***Fig. 2)***. Lock nut (7) must not be used.

Front hubs and Gear hubs:
Advice:
The wheel must turn freely.

- Placing the wheel in fork ends. Guide the top end of brake anchor plate into the brazing part of the front fork resp. fit frame clamp to fasten the brake anchor plate at rear fork.
  Caution:
  Mount the brake anchor plate between the two straps of the frame clamp (Fig. 4). The clamp must be seated on the rear fork with no play.
  Use a self-locking nut! Hex screw, property class 8.8.
  Tightening torque: 7 – 8 Nm (62 – 70 in.lbs.).

Fastening wheel / solid axle:

- Fit washers resp. retaining washers (3, ***Fig. 4)*** to the axle ends.
- Tighten up axle nuts, torque 30 – 40 Nm (270 – 350 in.lbs.).

Fastening wheel / quick release ***(Fig. 5):***

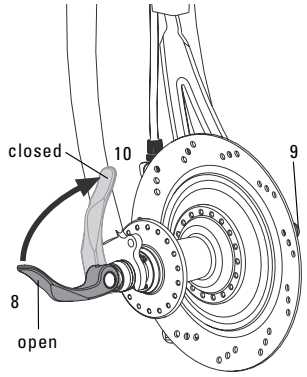
- Only use quick release devices with the correct length.
- Position quick release opposite to the brake.
- Turn release lever (8) outwards until it is at least at a right angle to the bike (position "OPEN").
- Tighten adjusting nut (9) as much as possible by hand.
- Turn release lever (8) to the "closed" position (10) (the word "CLOSE" is visible from the outside).
  After closure, the release lever should be parallel to the fork. If the release lever can be closed relatively easily, the tension force is inadequate.
  In this case, open release lever again, tighten adjusting nut (9) slightly and close release lever again.
  If considerable force is required to close the lever, open the lever again, undo the adjusting nut slightly and close lever again.

Warning:

- ***Do not tighten wheel by turning the quick release lever clockwise (Fig. 6)!***
- ***Only use hand force.***
- ***By incorrectly mounting the skewer or the wheel in the dropout, or by wrongly adjusting the closing force, the wheel may come loose and fall off during the ride. This may lead to severe rider injury or death.***

i-BRAKE AND COMPATIBLE HUBS ASSEMBLY

5



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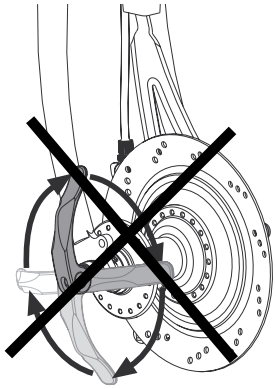

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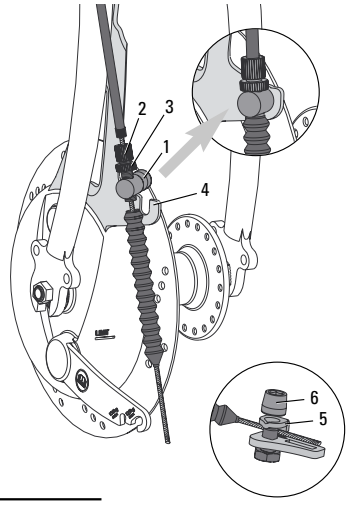

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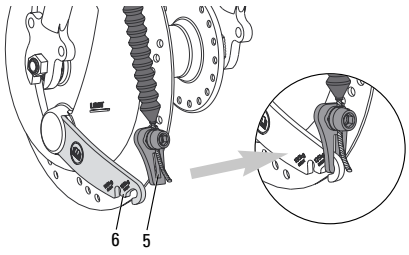


CONNECTING i-BRAKE

- Screw adjusting screw (2, ***Fig 7)*** with lock nut (2) completely into the cable stop (1) and insert into the slot on the brake anchor plate.
- Route the brake cable.
- Push brake cable end through adjusting screw.
- Insert cable housing end into adjusting screw.
- Attach the bellows to the adjustment screw.
- Thread brake cable end into link and under the washer (5) and tighten nut (6) slightly (hex wrench 5 mm).
  Caution:
  Ensure that the brake cable lies in the notch of the link.
- Attach link (5, ***Fig. 8)*** to brake lever (6).
  Caution:
  Curved side of the link should be outside and hex nut should point away from brake.
  Use outer standard position "125 kg" (overall weight).
- Pull brake cable end tight with pliers so that link can still be attached and removed (important for changing wheel).
- Tighten nut (6, ***Fig. 7)***, torque 7 – 8 Nm (62 – 70 in.lbs.). Counter the screw with a 10 mm wrench.

Advice:
Put the link in the position first that is closest to the total weight of the bicycle with cyclist and baggage.
Positioning of link can be changed to personal preferences, but we advise to use according to weight.
Make sure you use the same position after changing the wheel.

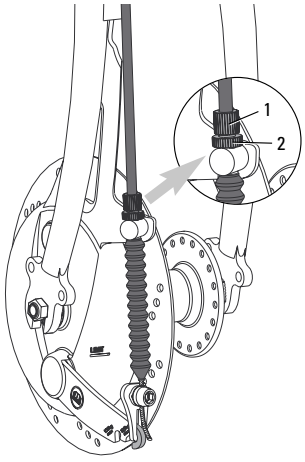
ADJUSTMENT i-BRAKE

- Unscrew adjusting screw (1, ***Fig. 9)*** until the brake pads drag lightly.
- Actuate the hand brake lever forcefully several times and then, if necessary, turn the adjusting screw further in just until the wheel starts spinning freely.
- Lock with nut (2).

Caution :

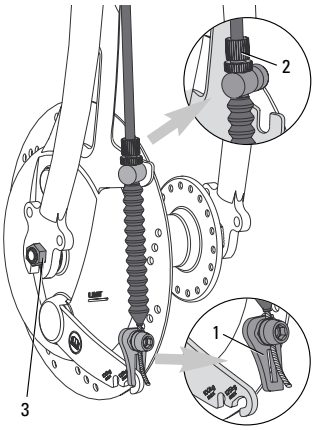
- ***Check that all the brake system components are functioning properly.***
- ***Please take particular note that the total weight of the bicycle with cyclist and baggage may not exceed 125 kilograms.***
- ***The i-BRAKE is not useable for tandems, transport bicycles, and similar loads.***
- ***Only 24"/26"/28" wheels are suitable for use.***
- ***The i-BRAKE must be mounted on the left side of the bicycle (viewed from the rear end).***
- ***There is a risk of accident if unsuitable forks or frames are used.***
- ***There is a risk of accident if unsuitable hand brake levers are used.***
- ***Installation of parts and accessories not originally intended could result in less than optimal performance and/or injury.***

9



i-BRAKE AND COMPATIBLE HUBS MAINTENANCE

1



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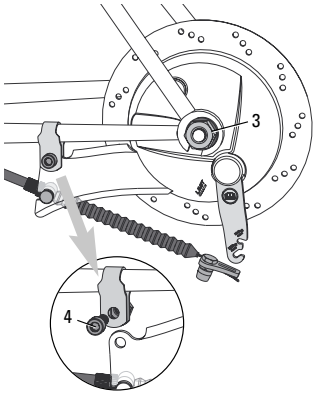

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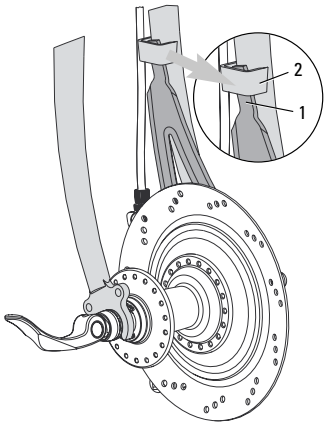

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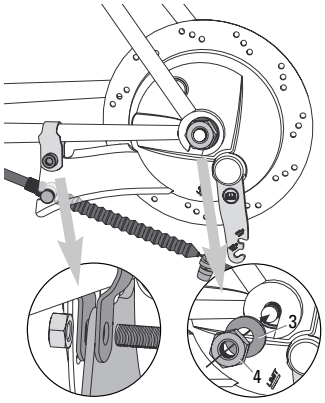

REMOVING THE WHEEL

Caution:
After cycling, the brake and hub should not be touched. Danger of getting burns!

- Detach the link (1, ***Fig. 1)*** on the brake lever (if necessary, screw the adjustment screw (2) in somewhat until the link can be detached).
- Grab the adjustment screw (2) and remove the entire brake cable unit from the brake anchor plate.
- **Rear wheel only:** Remove the screw (4, ***Fig. 2)*** on the frame clamp.
- **Attachment using axle nuts:**
  To remove the wheel, remove both axle nuts (3).
- **Attachment using quick-release:**
  To remove the wheel, open the quick-release lever.

MOUNTING THE WHEEL

- Placing the wheel in fork ends.

Front wheel:
Guide the top end of the brake anchor plate (1, ***Fig. 3)*** into the brazing part of the front fork (2).

Attaching a wheel with axle nuts:
Front and rear wheel:

- Slide the washers (3, ***Fig. 4)*** onto the ends of the axles.
- Mount the axle nuts (4) and tighten them with a torque of 30 – 40 Nm (270 – 350 in.lbs.).

Rear wheel:
Before tightening the axle nuts attach the brake anchor plate to the frame using a suitable frame clamp.
Caution:
Mount the brake anchor plate between the two straps of the frame clamp (Fig. 4). The frame clamp must be seated on the rear fork with no play. Use a self-locking nut! Screw M6, property class 8.8. Torque: 7 – 8 Nm (62 – 70 in.lbs.).

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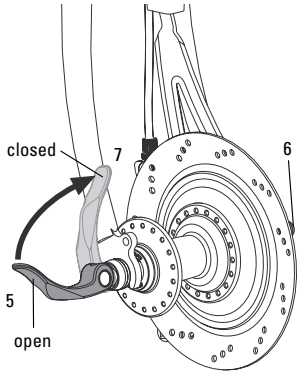

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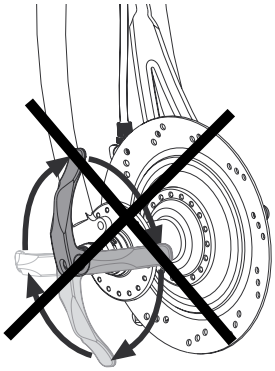

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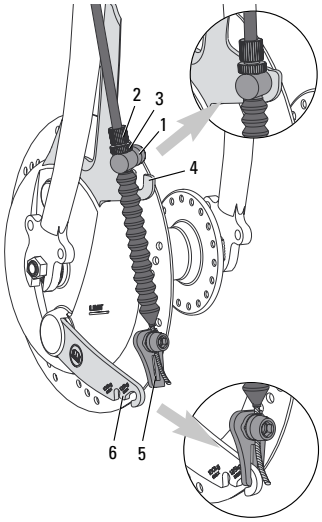

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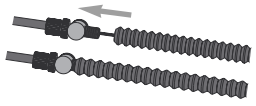


Attaching a wheel with quick release:

- Only use quick release devices with the correct length.
- Position quick release lever opposite to the brake.
- Turn release lever (5, ***Fig. 5)*** outwards until it is at a right angle to the bike (position „OPEN").
- Tighten adjusting nut (6) as much as possible by hand.
- Turn release lever to the closed position (7) (the word "CLOSE" is visible from the outside).
  After closure, the release lever should be parallel to the fork. If the release lever can be closed relatively easily, the tension force is inadequate.
  In this case, open release lever again, tighten adjusting nut (6) slightly and close release lever again.
  If considerable force is required to close the lever, open the lever again, undo the adjusting nut slightly and close lever again.

Caution:

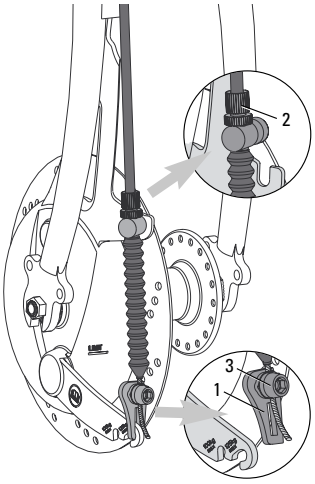
- ***Do not tighten the wheel by turning the release lever clockwise (Fig. 6).***
- ***Only use hand force.***
- ***By incorrectly mounting the skewer or the wheel in the dropout, or by wrongly adjusting the closing force, the wheel may come loose and fall off during the ride. This may lead to severe rider injury or death.***

CONNECTING THE BRAKE

- Fit cable stop (1, ***Fig. 7)*** with adjusting bolt (2) and nut (3) and insert into the slot (4) the brake anchor plate.
- Attach link (5) to brake lever (6). Use outer standard position "125 kg" (overall weight).
  Put the link in the position first that is closest to the total weight of the bicycle with cyclist and baggage.
  Positioning of link can be changed to personal preferences, but we advise to use according to weight.
  Make sure you use the same position after changing the wheel.
- Attach the bellows to the adjustment screw ***(Fig. 8)***.
- Check the brake adjusting.
  See "ADJUSTING THE BRAKE".

Caution:
Check whether the brake functions correctly.

9



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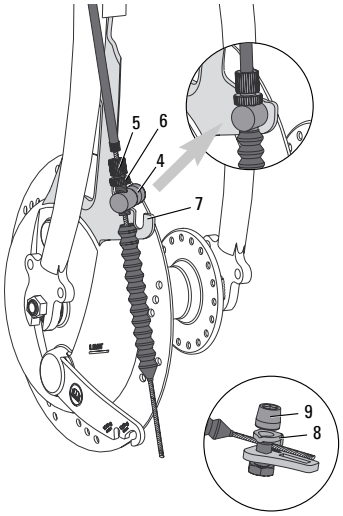

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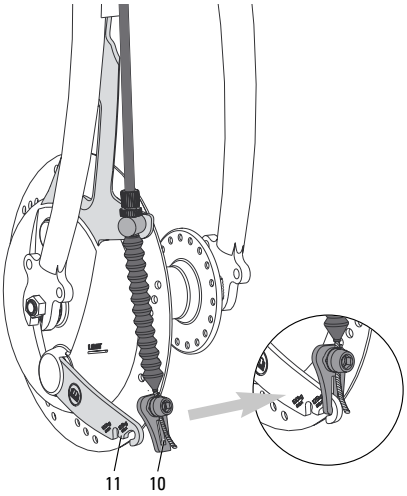


BRAKE CABLE CHANGE

Disassembling the brake cable :

- Detach the link (1, ***Fig. 9)*** on the brake lever (if necessary, screw the adjustment screw (2) in somewhat until the link can be detached).
- Remove the nut (3) on the link and remove the entire old brake cable.

Assembling the brake cable:

- Mount the new brake cable and new cable housing.

Advice:

- ***Only use new, high-quality brake cables and compression-free cable housings.***
- ***Ensure that the length of the cable housings allow a maximum turn of the handlebar.***

- Screw adjusting screw (5, ***Fig 10)*** with lock nut (6) completely into the cable stop (4) and insert into the slot (7) on the brake anchor plate.
- Push brake cable end through adjusting screw.
- Insert cable housing end into adjusting screw.
- Attach the bellows to the adjustment screw.
- Thread brake cable end into link and under the washer (8) and tighten nut (9) slightly (hex wrench 5 mm).
  Caution:
  Ensure that the brake cable lies in the notch of the link.
- Attach link (10, ***Fig. 11)*** to brake lever (11).
  Caution:
  Curved side of the link should be outside and hex nut should point away from brake.
  Use outer standard position “125 kg” (overall weight).
- Pull brake cable end tight with pliers so that link can still be attached and removed (important for changing wheel).
- Tighten nut (9, ***Fig. 10)***, torque 7 – 8 Nm (62 – 70 in.lbs.). Counter the screw with a 10 mm wrench.

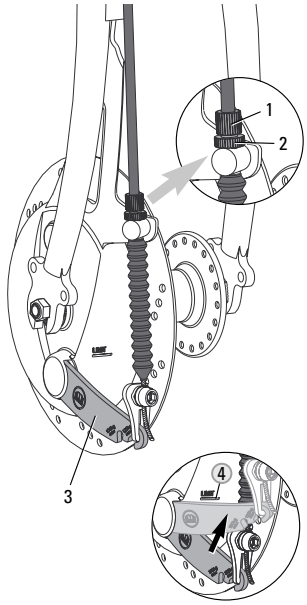
Advice:
Put the link in the position first that is closest to the total weight of the bicycle with cyclist and baggage.
Positioning of link can be changed to personal preferences, but we advise to use according to weight.
Make sure you use the same position after changing the wheel.

- Check the brake adjusting.
  See “ADJUSTING THE BRAKE“.

Caution:
Check whether the brake functions correctly.

i-BRAKE AND COMPATIBLE HUBS MAINTENANCE

12



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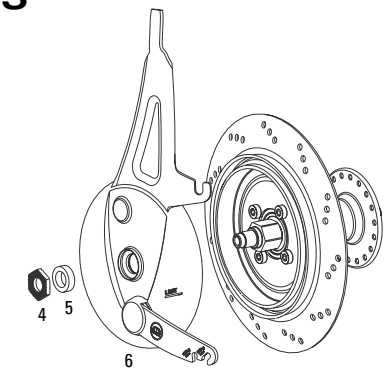

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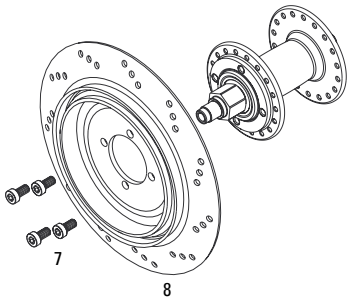


ADJUSTMENT i-BRAKE

Readjust the brake if the hand brake lever can be pulled close to the handlebar (for example, after the braking-in time or after long use).

- Unscrew adjusting screw (1, ***Fig. 12)*** until the brake pads drag lightly.
- Actuate the hand brake lever forcefully several times and then, if necessary, turn the adjusting screw further in just until the wheel starts spinning freely.
- Lock with nut (2).

Caution :
Check that all the brake system components are functioning properly.

WEAR INSPECTION

If the brake lining is worn, the complete brake anchor plate must be replaced.

Inspection:
With your finger, press brake lever (3, ***Fig. 12)*** forcefully against the spring resistance. If the upper edge of the brake lever reaches the "LIMIT" mark of the wear display (4), complete brake anchor plate must be replaced.

DISMANTLING i-BRAKE

Caution:
- ***Internal area of the brake drum and brake lining material must be free of dirt and oil or other substances containing grease.***
  Danger of accident!
- ***Plane faces of brake drum and hub must be clean and free from oily and greasy substances.***

Front hubs:
– Unscrew lock nut (4, ***Fig. 13)*** and remove steel washer (5).

Gear Hubs:
– Remove steel/resin washer (5, ***Fig. 13)***.

- Remove brake anchor plate (6).
- Unscrew four screws (7, ***Fig. 14)*** (Torx T25) and remove brake drum (8).

Caution:
Do not disassemble the brake anchor plate

REASSEMBLY i-BRAKE

***see* "ASSEMBLY"**

MAINTENANCE

Under normal circumstances, your i-BRAKE is maintenance-free and well-protected against external environmental influences.

- To avoid malfunctions caused by water entering the components, you should not use high-pressurized water for cleaning (i.e. high-pressure cleaners or strong water jets).
- Do not use any agressive cleansers, gasoline, petroleum or similar for cleaning.
- After cleaning your bicycle, you should do a test braking so that any moisture in the brake system can be eliminated.
- During the winter season, you should clean your bicycle in shorter intervals so that winter road salt cannot cause any damage.

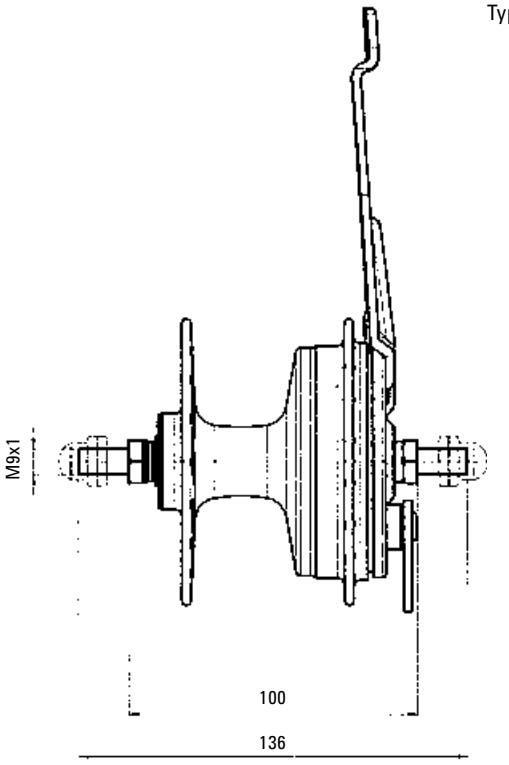
Caution :
The complete brake anchor plate absolutely must be replaced if oil or other greasy substances have contaminated the brake lining. An oily brake lining reduces the braking performance up to a complete brake failure. Accidents with serious injuries may result.

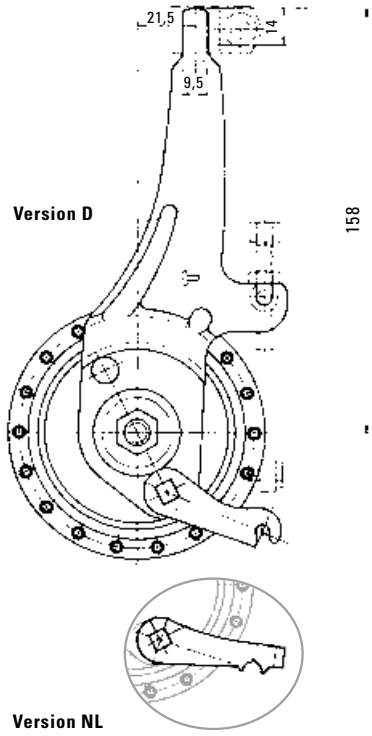
SRAM VT 5000 / VT 3000
TECHNICAL DATA / ASSEMBLY REQUIREMENTS

Front fork:
The strength must be such that with a maximum torque of 300 Nm (2700 in.lbs.) on the wheel no residual deformation can occur on the front fork.

Warning:
- ***There is a risk of accident if unsuitable forks are used!***
- ***Not suitable for tandem use.***
- ***Wheel size: only 24"/26"/28" wheels are suitable for use.***

Typ VT 5000



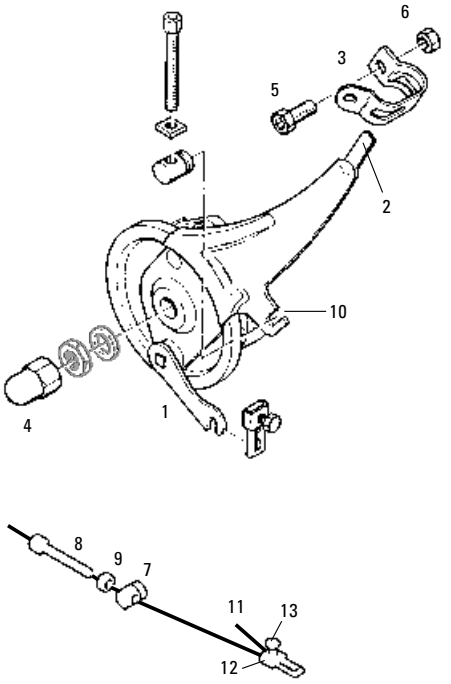


DRUM BRAKE

		VT 5000		VT 3000				
	Part No.	—	—	—	—	—	—	
	Brake anchor plate	Version D	Version NL	Version D		Version NL		
	Over Locknut Dim.	100 mm	100 mm	100 mm		100 mm		
Axle	**Length**	135 mm	135 mm	135 mm		135 mm		
Axle	**Type**	Solid	Solid	Solid		Solid		
Axle	**Material**	Steel	Steel	Steel		Steel		
Axle	**Ends Diameter**	M9x1	M9x1	M9x1		M9x1		
Spoke	**Holes**	36	36	36		36		
Spoke	**Hole Diameter**	2.9 mm	2.9 mm	3/3.3 mm		3/3.3 mm		
Spoke	**Hole Reference ø**	89 mm	89 mm	86 mm		86 mm		
	Hand Brake Lev. Comp.	see page 64 / Cable moving distance 15 mm and leverage 3.8 – 4.2				←		
	Bearing	Cartridge	Cartridge	Cartridge		Cartridge		
	Sealing	Lip Seal	Lip Seal	Lip Seal		Lip Seal		
	Weight	750 g	750 g	770 g		770 g		
Finish	**Hub Shell Material**	Aluminum	←	Aluminum / galvananized		Steel		
Finish	**Finish**	Clear Coat	←	Aluminum / Silver	Silver	Silver	Black	

SRAM VT 5000 / VT 3000 ASSEMBLY

1



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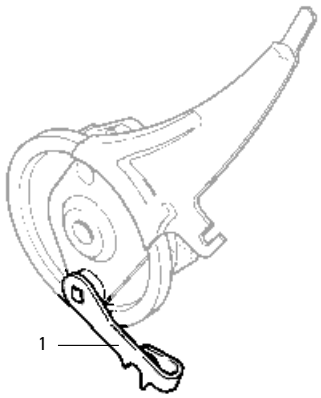

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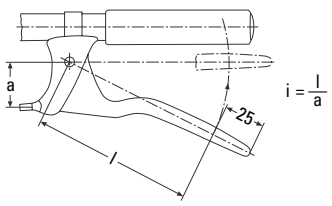


FITTING WHEEL IN FRONT FORK

- Lace the wheel as normal.
- Placing the wheel in front fork. The brake lever (1, ***Fig. 1)*** goes on the left side viewed from behind the rear of the bicycle. Guide the top end of brake anchor plate (2) into the brazing part of the fork if fitted. If there is no brazing part, use VT pipe clamp (3)**.**
- Slide washers or snap rings onto axle ends.
- Fit axle nuts (4) with wrench 15 mm, torque 30 – 40 Nm (266 – 350 in.lbs.).
- Tighten screw connections on VT pipe clamp (5/6), torque approx. 3 Nm (27 in.lbs.).
  Caution:
  The clamp must be seated on the fork with no play.

CONNECTING DRUM BRAKE

Caution:
Only use brake levers with a cable moving distance of at least 15 mm and a leverage of "i" = 3.8 – 4.2 (Fig. 3).

- Fit cable stop (7, ***Fig. 1)*** with adjusting bolt (8) and nut (9) and insert into the slot on the brake anchor plate (10).
- Turn adjusting bolt down by approx. $^{2}/_{3}$ and route the brake cable from the brake handle.
- Push lower brake cable end through adjusting bolt.
- Insert lower cable housing end into adjusting bolt.
- Thread brake cable end (11) into fork unit (12).
- Tighten screw (13) slightly.
- Attach fork unit to brake lever (1).
- Pull brake cable end taut with pliers so that fork unit can still be attached and removed (important for changing wheel).
- Tighten screw (13).

Caution:
For NL version drum brake hub with special lever (1, Fig. 2), only use original NL brake cable (fork unit (12, Fig. 1) is not suitable).

ADJUSTMENT DRUM BRAKE

- Unscrew adjusting screw (8, ***Fig. 1)*** until the brake pads drag lightly.
- Actuate the hand brake lever forcefully several times and then, if necessary, turn the adjusting screw further so that the brake once again brushes the wheel as it turns.
- Lock hex nut (9)

Caution:
Check that all the brake system components are functioning properly!

OPERATION

To get used to the new brake, operate the brake lever carefully to acquire a feel for the drum brake's deceleration.

Caution:

- ***If the bicycle is left standing for long periods, a rust film in the brake drum may increase braking effect. For this reason, start by braking gently a few times the next time the bicycle is used to remove the rust film. This will prevent the brake from aggressive braking.***
- ***On long, steep downhill stretches, also use the second brake (rear wheel) alternately to prevent the brakes from heating up excessively.***
- ***Do not touch hub after cycling – risk of burning!***

SRAM VT 5000 / VT 3000
MAINTENANCE

MAINTENANCE

- Bearings is sufficiently lubricated and essentially maintenance-free.
- Cable housing without inner tube: lubricate regularly.

Advice:

- ***Do not use high-pressure water when cleaning the hub (e.g. strong water jets, high-pressure cleaners etc.) – if water penetrates the unit it could lead to functional problems.***
- ***Do not rinse hub with benzine, petroleum etc. as this could produce impurities in the brake pads.***

Caution:

The brake anchor plate must be replaced if oil or other substances containing grease get into the brake pads. Oily brake pads reduce braking effect and cause the brake to fail completely. This may result in accidents with extremely serious injuries.

i-LIGHT
TECHNICAL DATA / ASSEMBLY REQUIREMENTS

i-LIGHT DYNAMO

		i-LIGHT Hub Dynamo	NEW		NEW			NEW	
	Model	D324s	D330s		D330b	D730s		D730s-ib and D724s-ib	
	Version	Standard	←		←	←		i-BRAKE compatible	
	Output	2.4 Watt	3.0 Watt		3.0 Watt	3.0 Watt		3,0 W (D724s-ib 2.4 Watt)	
	Voltage	6 V	6 V		6 V	6 V		6 V	
	Wheel ø	400 – 700 mm / 16" – 28"	←		←	←		400 – 700 mm / 16" – 28"	
	Over Locknut Dim.	100 mm	←		←	←		100 mm	
Axle	Length, L	140 mm	140 mm	108 mm	140 mm	140 mm	108 mm	140 mm	108 mm
Axle	Type	Solid	Solid	Hollow	Solid	Solid	Hohlachse	Solid	Hollow
Axle	Material	Steel	←		←	←		Steel	
Axle	Ends Diameter	FG 9.5	←		←	M 9 x1		M 9 x1	
Spoke	Holes	36	←		←	←		36	
Spoke	Spoke Diameter	2 mm	←		←	←		2 mm	
Spoke	Hole Reference ø	80 mm	←		←	←		80 mm	
Spoke	Flange Distance	60 mm	←		←	←		49 mm	
Spoke	Offset	0 mm	←		←	←		6 mm	
	Bearing	Cartridge	←		←	←		Cartridge	
	Sealing	Double Sealed	←		←	←		Double Sealed	
	Tandem Compatib.	—	—		—	—	—	—	—
	Weight	N/A	N/A		N/A	N/A	N/A	N/A	N/A
	Finish Hub Shell	Aluminum	←		Aluminum, black coated.	Aluminum, anodized		Aluminum, anodized	

i-LIGHT
ASSEMBLY

1

2

ASSEMBLY

- Align the front wheel with hub dynamo in its mounting position.
  The connection terminal of the hub dynamo should be on the right side (when the bicycle is facing forward) ***(Fig. 1)***.
- Assemble fender stays and basket stays. Make sure that the hub washer and hub nut have been put on in the correct order ***(Fig. 2)***.

Fastening wheel / solid axle:

- Tighten the hub nut.
  – Tighten the left and right hub nuts alternately, little by little, to course that the hub dynamo connection terminal do not turn away from the correct orientation.
  – The recommended hub nut tightening torque is 20 Nm (177 in.lbs.).

Fastening wheel / quick release:

- Only use quick release devices with the correct length.
- Position quick release opposite to the brake (i-BRAKE version).
- Turn release lever outwards until it is at least at a right angle to the bike (position "OPEN") ***(Fig. 3)***.
- Tighten adjusting nut on the end of the skewer as much as possible by hand.
- Turn release lever to the "closed" position (the word "CLOSE" is visible from the outside) ***(Fig. 3)***.
- After closure, the release lever should be parallel to the fork. If the release lever can be closed relatively easily, the tension force is inadequate.
  In this case, open release lever again, tighten adjusting nut slightly and close release lever again.
- If considerable force is required to close the lever, open the lever again, undo the adjusting nut slightly and close lever again.

Caution:

- ***Do not tighten the wheel by turning the release lever clockwise (Fig. 4).***
- ***Only use hand force.***
- ***By incorrectly mounting the skewer or the wheel in the dropout, or by wrongly adjusting the closing force, the wheel may come loose and fall off during the ride. This may lead to severe rider injury or death.***

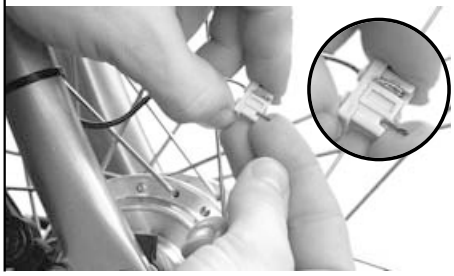
i-LIGHT
ASSEMBLY / MAINTENANCE

3

4

5

6



CONNECTING CABLES

- Recommended wire specifications:
  Inner wire size (AWG) 22 / Diameter approx. 0.8 mm.
  Insulation 1.8 – 2mm.
- Twist the cable wires before connecting ***(Fig. 5)***.
- Connect the cables. Bend the cable wires run them along the grooves ***(Fig. 6)***.
  Pay attention to a correct polarity. The system doesn't work in case of wrong connection .

Kontrolle:
Rotate the front wheel and check the lamp illumination.

Advice:
Hubs equipped with i-BRAKE:
Please read the i-BRAKE documentation.

MAINTENANCE

- Do not disassemble the internal hub mechanism.
- Do not apply any lubricant to the inside of the hub, otherwise the grease will come out and it may cause problems with conductivity.
- Compatible bulbs:
  Front lamp 6 V, 2.4 W
  Tail lamp 6 V, 0.6 W

Caution:
If the hub nuts are screwed on too tight, or if one or the other is screwed tighter or looser than the other, the hub axle may be forced to turn. Making the hub nuts looser or too tight, this could permanently damage the hub axle.

POWER CHAINS
TECHNICAL DATA / ASSEMBLY REQUIREMENTS

POWER CHAINS

		PC 991 NEW	PC 991 Hollow Pin NEW	PC 991 Cross Step NEW	PC 971 NEW	PC 951 NEW
Application		MTB / Road	MTB / Road	MTB / Road	MTB / Road	MTB / Road
Max. No. of sprockets		9 only	9 only	9 only	9 only	9 only
Compatibility Front		Truvativ / HG / EXA-Drive	Truvativ / HG / EXA-Drive	Truvativ / HG / EXA-Drive	Truvativ / HG / EXA-Drive	Truvativ / HG / EXA-Drive
Compatibility Rear		HG / PG / EXA-Drive	HG / PG / EXA-Drive	HG / PG / EXA-Drive	HG / PG / EXA-Drive	HG / PG / EXA-Drive
Dimension		1/2" x 11/128"	1/2" x 11/128"	1/2" x 11/128"	1/2" x 11/128"	1/2" x 11/128"
Pin	Length	6.65 mm	6.35 mm	6.65 mm	6.65 mm	6.65 mm
	Riveting	Step	Cylindrical	Cross Step	Step	Step
	Chrome Hardened	Yes	Yes	Yes	Yes	Yes
	Push Power	2000 N / 450 lbs.	2000 N / 450 lbs	2500 N / 562 lbs.	2000 N / 450 lbs.	2000 N / 450 lbs.
Min. Tensile Strength		9000 N / 2023 lbs.	9000 N / 2023 lbs.	9000 N / 2023 lbs.	9000 N / 2023 lbs.	9000 N / 2023 lbs.
Weight (114 links)		297 g	279 g	297 g	297 g	297 g
Design	External Pin Plate	Nickel Plated	Nickel Plated	Nickel Plated	Nickel Plated	Grey
	Internal Pin Plate	Nickel Plated	Nickel Plated	Nickel Plated	Grey	Grey
	Connecting Method[1]	Power Link Gold or Pin	Power Link Gold	Power Link Gold	Power Link Gold or Pin	Power Link Gold or Pin

[1] ***Caution:*** Hollow Pin and Cross step chains connecting method: with Power Link only (no pin)!

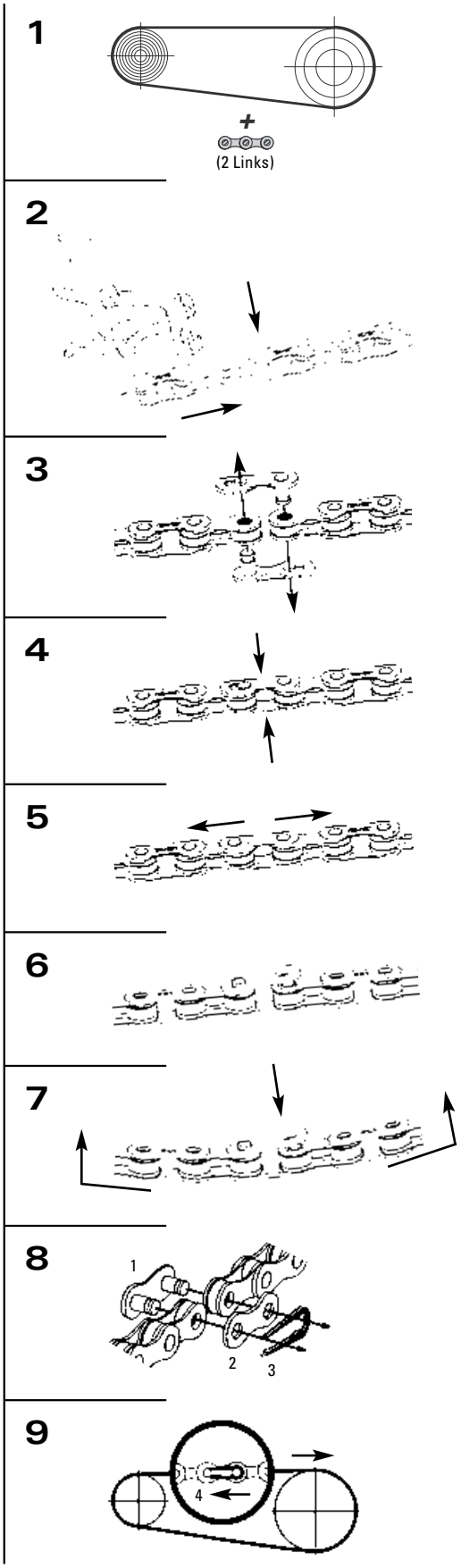
POWER CHAINS

		PC 68	PC 58	PC 48	PC 38 Saltshaker	PC 38
Application		MTB	MTB	MTB	MTB / Road	MTB / Road
Max. No. of sprockets		max. 8	max. 8	max. 8	max. 8	max. 8
Compatibility Front		HG / IG / PG / EXA-Drive	HG / IG / PG / EXA-Drive	HG / IG / PG / EXA-Drive	HG / IG / EXA-Drive	HG / IG / EXA-Drive
Compatibility Rear		HG/HG-I/IG/PG/EXA-Drive	HG/HG-I/IG/PG/EXA-Drive	HG/HG-I/IG/PG/EXA-Drive	HG/HG-I/IG/PG/EXA-Drive	HG/HG-I/IG/PG/EXA-Drive
Dimension		1/2" x 3/32"	1/2" x 3/32"	1/2" x 3/32"	1/2" x 3/32"	1/2" x 3/32"
Pin	Length	7.1 mm	7.1 mm	7.1 mm	7.1 mm	7.1 mm
	Riveting	Cross Step 2	Step	Step	Step	Step
	Chrome Hardened	Yes	Yes	Yes		
	Push Power	2000 N / 450 lbs.	1500 N / 340 lbs.	1500 N / 340 lbs.	1100 N / 247 lbs.	1300 N / 292 lbs.
Min. Tensile Strength		9000 N / 2023 lbs.	9000 N / 2023 lbs.	9000 N / 2023 lbs.	9000 N / 2023 lbs.	9000 N / 2023 lbs.
Weight (114 links)		307 g	307 g	307 g	307 g	307 g
Design	External Pin Plate	Silver / Nickel Plated	Silver / Nickel Plated	Grey / Polished	Light Grey	Grey / Polished
	Internal Pin Plate	Silver / Nickel Plated	Grey / Polished	Grey / Polished	Light Grey	Grey / Polished
	Connecting Method	Power Link Silver	Power Link Silver or Pin	Power Link Silver or Pin	Power Link SS2 or Pin	Power Link Silver or Pin

POWER CHAINS

		PC 10 Saltshaker	PC 10	PC 1 Saltshaker	PC 1 Ni	PC 1
Application		MTB	MTB	Gear Hubs	Gear Hubs	Gear Hubs
Max. No. of sprockets		8 / 7 / 6	7 / 6	1	1	1
Compatibility Front		Single / HG	Single / HG	Single	Single	Single
Compatibility Rear		Single / HG	Single / HG	Single	Single	Single
Dimension		1/2" x 3/32"	1/2" x 3/32"	1/2" x 1/8"	1/2" x 1/8"	1/2" x 1/8"
Pin	Length	6.9 mm	6.9 mm	7.8 mm	7.8 mm	7.8 mm
	Riveting	Step	Step	Step	Step	Step
	Push Power	1000 N / 225 lbs.	1000 N / 225 lbs.	800 N / 180 lbs.	800 N / 180 lbs.	800 N / 180 lbs.
Min. Tensile Strength		9000 N / 2023 lbs.	9000 N / 2023 lbs.	9000 N / 2023 lbs.	9000 N / 2023 lbs.	9000 N / 2023 lbs.
Weight (114 links)		300 g	300 g	330 g	330 g	330 g
Design	External Pin Plate	Light Grey	Brown	Light Grey	Silver / Nickel Plated	Brown
	Internal Pin Plate	Light Grey	Brown	Light Grey	Silver / Nickel Plated	Brown
	Connecting Method	Power Link SS1 or Pin	Power Link Grey or Pin	Snap Lock or Pin	Snap Lock, 3pcs Connection Link or Pin	

POWER CHAINS
ASSEMBLY / MAINTENANCE



PC 991 / PC 971 / PC 951 / PC 68 / PC 58 / PC 48 / PC 38 / PC 10 (1/2" x 3/32" AND 1/2" x 11/128")

Chain length:
- Shorten chain to the length specified by the derailleur manufacturer.

SRAM derailleurs:
- Place chain over largest front chainwheel and largest rear sprocket and add 2 links or 1 link + Power Link ***(Fig. 1)***.
- For rear suspension frame, position the rear suspension for the greatest chain length required.

Closing standard version with clamping pin:
Fit chain, bring the two ends together and press pin ***(Fig. 2)*** through with assembly tool. **The pin must extend by the same amount at both outer plates. It must be possible to move the connecting link slightly.**

Power Link connecting links:
Caution:
- ***Use only for SRAM chains, use as specified, to avoid material damage or the rider to fall off his bicycle resulting in injury.***
- ***Use only Power Link for closing Hollow Pin and Cross Step chains (no pin).***

Power Link Gray	gray coloured
	for PC 10
Power Link SS1 (SaltShaker 1)	light gray coloured
	for PC 10 SaltShaker
Power Link Silver	silver coloured
	for PC68, PC58, PC48, PC38
Power Link SS2 (SaltShaker 2)	light gray coloured
	for PC 38 SaltShaker
Power Link Gold	gold coloured
	for PC 991, PC 971, PC 951

Closing:
- Fit chain, bring the ends together and insert both halves of the Power Link into the chain ends. ***(Fig. 3)***
- Press both halves of the Power Link together ***(Fig. 4)*** and lock in place by pulling the chain apart. ***(Fig. 5)***

Opening:
- Press both plates of the Power Link together ***(Fig. 4)*** while sliding the chain ends together (unlock). Remove the two halves of the link from the chain ends.

Caution:
Always use a new Power Link when fitting a new chain. Failure to shorten the chain properly or to lock it exactly into place may cause damage to the chain and eventually total chain failure, material damage or the rider to fall off his bicycle resulting in injury.

PC 1 (1/2" x 1/8")

Closing chain with Snap Lock:
- Fit the shortened chain, bring the ends together and connect with the Snap Lock. Place the outer plate on one pin ***(Fig. 6)***.
- Gently flex the chain until the outside connector plate snaps into position over the second pin ***(Fig. 7)***.

Caution:
- ***Make sure plate is fully seated in the pin channel and plates are parallel to each other.***
- ***If movement of the connector plate is noticed a new Snap Lock must be used.***
- ***Always use a new Snap Lock when fitting a new chain. Failure to shorten the chain properly or to lock it exactly into place may cause damage to the chain and eventually total chain failure, material damage or the rider to fall off his bicycle resulting in injury.***

Closing chain with 3pcs Connection Link:
- Fit the shortened chain, bring the two ends together and connect with the chain lock. The chain lock consists of an outer plate with pins (1, ***Fig. 8***), an outer plate (2) and a retaining spring (3).
- Insert outer plate with pins (1) into the chain ends, attach outer plate (2) and press chain lock together (1+2).
- Attach retaining spring (3) with the closed end of the retaining ring pointing in the direction of chain travel ***(Fig. 9)***.
- Slide retaining spring in the direction of arrow (4, ***Fig. 9)*** to engage it in the grooves in the pins.

Closing standard version with clamping pin:
Fit chain, bring the two ends together and press pin ***(Fig. 2)*** through with assembly tool. **The pin must extend by the same amount at both outer plates. It must be possible to move the connecting link slightly.**

MAINTENANCE
- Regular lubrication will extend the chain's service life.
- Apply oil to the chain rollers and allow to work in.
  Clean dirty chains before oiling. Do not use any grease-dissolving or acidic agents. Cleaning agent must be rinsed off after a few minutes with water.
- Apply oil after chain is completely dried.

NOTICES

NOTICES

SUPPORT
WHO TO CALL / SPARE PARTS

WHO TO CALL

In warranty cases or need of technical support help, please contact the appropriate locations.

NORTH AMERICA

Dealer Helpdesk Number:

(800)-346-2928

EUROPE

Please contact your local distributor.

SPARE PARTS

You can find an extensive spare parts program in SRAM's Spare Parts List Model Year 2006 · Publ. Number 8506.

SRAM ORIGINAL PARTS

Caution:
Installation of parts and accessories not originally intended could result in less than optimal performance and/or injury.

www.sram.com

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