



dealer tech. manual
2000
gear hub systems

english

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GEAR HUB SYSTEMS




GEAR HUBS AND SHIFTERS

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SPECTRO S7

TECHNICAL DATA / ASSEMBLY REQUIREMENTS



- Comfort Action Shifting
- Improved Ergonomics
- Short Rotation
- Optimal Gear Ratio
- Spectro Design
- Matte Chrome Finish
- Improved Brake Performance
- Most Efficient Hub In Its Class

Available in versions:

With coaster brake, Type MH 7215

With drum brake, Type MH 7225

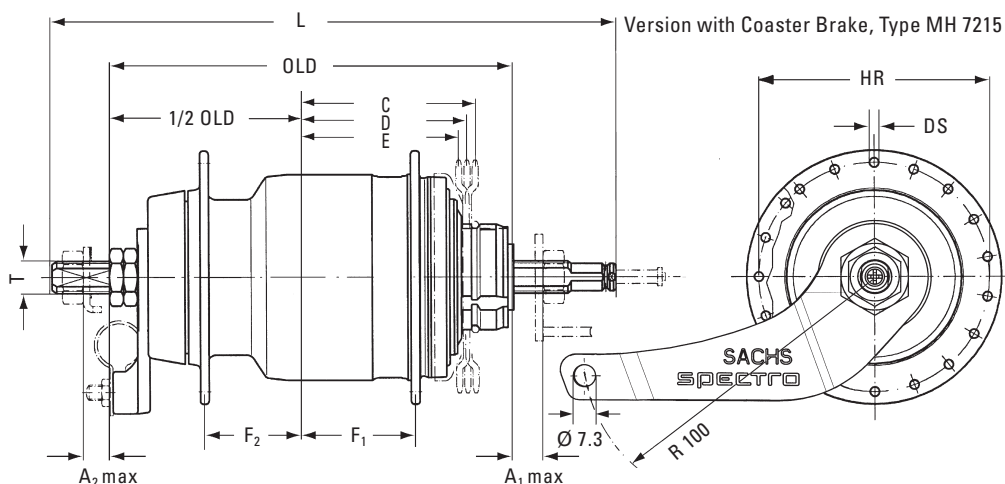
Without brake, Type MH 7205

Advice:

Spectro S7 hubs are not suitable for tandem use.

Cycle frame:

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



HUBS

	Part No.	MH 7215	MH 7225		MH 7205
		Coaster	Drum „D“	„NL“	None
Axle	Over Locknut Dim., OLD	130 mm	135 mm		132 mm
	Length, L	183.4 mm	188.5 mm		183.4 mm
	Ends Diameter, T	FG 10.5	FG 10.5		FG 10.5
	Dropout Width Dim.	A ₁ max. = 11.5 mm / A ₂ max. = 12 mm	A ₁ max. = 11.5 mm / A ₂ max. = 12.2 mm		A ₁ max. = 11.5 mm / A ₂ max. = 10 mm
Spoke	Holes	36	36		36
	Hole Diameter, DS	3.0 mm	2.9 mm		3.0 mm
	Hole Ref. ø, HR	75 mm	89 mm		75 mm
	Flange Dist. to 1/2 OLD	F ₁ = 33 mm / F ₂ = 34 mm	F ₁ = 34.8 mm / F ₂ = 35.7 mm		F ₁ = 34 mm / F ₂ = 34.8 mm
Gear Hub Ratio	Totally	303 %	←		←
	Speed 1	57 %	←		←
	Speed 2	68 %	←		←
	Speed 3	81 %	←		←
	Speed 4	100 %	←		←
	Speed 5	124 %	←		←
	Speed 6	148 %	←		←
	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"
	Line, C/D/E	54/51/48 mm	55.5/52.5/49.5 mm		54/51/48 mm
	Ratio	24", 26", 28" = 1.83 – 1.90 / 20" = 1.83 – 2.00	←		←
Shifter Compatib.	Shifter Compatib.	Spectro Grip 7 / Spectro Bandix 7	←		←
	Clickbox Compatib.	Clickbox S7	←		←
	Tandem Compatib.	—	—		—
	Weight	1714 g	1737 g		1556 g
Finish	Hub Shell Material	Steel	Aluminum		Steel
	Finish	Matt Chrome Plated	Clear Coat		Matt Chrome Plated

SPECTRO S7

TECHNICAL DATA / ASSEMBLY REQUIREMENTS

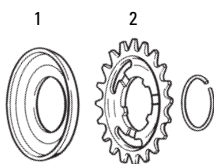
SHIFTERS

	Part No.	Spectro Grip 7 (for adults)					Spectro Bandix 7 (for kids)		
		—	—	—	—	—	—	—	—
Design	Shifter Type	Twist Shifter					Twist Shifter		
	Cable	1400 mm	1500 mm	1600 mm	1700 mm	2100 mm	1200 mm	1300 mm	1400 mm
	Gear Indication	Window					Window		
	Clamping Diameter	22.2 mm					22.2 mm		
	Handlebar, Straight Area	Minimum length = 150 mm					Minimum length = 125 mm		
	Weight	70 g					70 g		
	Housing	Glass filled PBT					Glass filled PBT		
Design	Grip	POM					POM		
	Grip Cover	Thermoplastic elastomer, Overmolded					Thermoplastic elastomer, Overmolded		
	Clamping Collar	6060 Aluminum					6060 Aluminum		

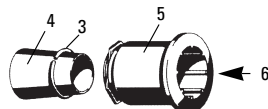
SPECTRO S7

ASSEMBLY

1

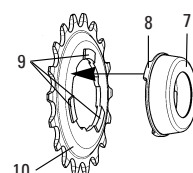


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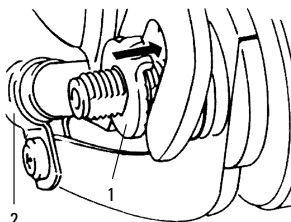


Mounting Tool
Part No. 0582 104 000

3



4



ASSEMBLY HUB

- Spoke the hub 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.
 - Mount the chain.
 - After positioning the wheel in the rear fork fit non-turn washer (1, **Fig. 4**) to the outside of the dropout (hub side opposite the sprocket). The serrations must bear against the dropout and the lug must engage in the dropout slot.
 - On the sprocket side fit the protective bracket (2, **Fig. 5**) directly below the fixing nut. Tightening torque on acorn or hex nuts 30 – 40 Nm (266 – 350 in.lbs.).
 - Fit brake lever tube clamp (2, **Fig. 4**). Tightening torque: 2 – 3 Nm (18 – 27 in.lbs.).
- Caution:**
The clamp must be seated on the frame without play.

Spoke length table:

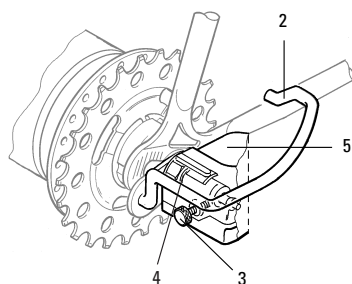
Tire Size	Cross	Length MH 7215/7205	Length MH 7225
47–406 20" x 1.75 x 2	3 x	181 mm	179 mm
37–490 22" x 1 3/8	3 x	225 mm	222 mm
47–507 24" x 1.75 x 2	3 x	232 mm	229 mm
37–540 24" x 1 3/8	3 x	251 mm	248 mm
47–559 26" x 1.75 x 2	3 x	259 mm	256 mm
37–590 26" x 1 3/8	3 x	275 mm	272 mm
47–622 28" x 1.75	3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

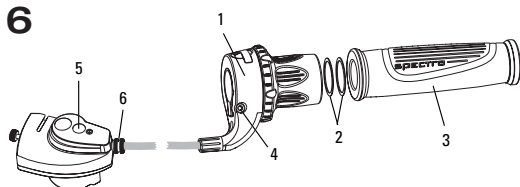
SPECTRO S7 ASSEMBLY



5

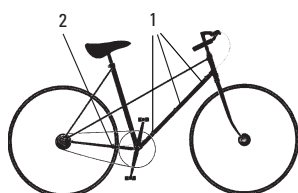


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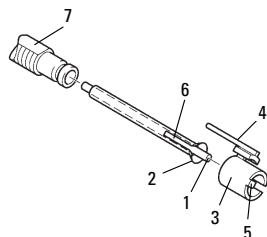


NEW

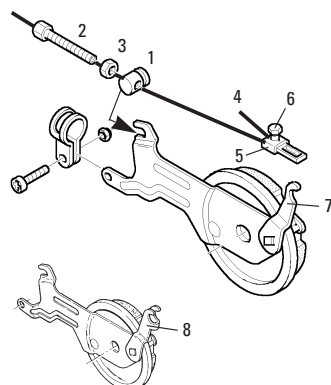
7



8



9



Advice:

- If a different protective bracket is used the thickness of the attachment plate must be max. 3 mm.
- Do not use additional washers.
- A minimum of 1 thread turn (4, Fig. 5) must be visible in front of the axle nut!

ASSEMBLY SHIFTERS

- Slide shifter (1, Fig. 6) onto handlebar.
- Add 2 thrust washers (2).
- Mount fixed grip (3) onto end of handlebar.
- Without applying pressure, slide shifter against fixed grip.
- Adjust shifter on handlebar and tighten with bolt (4) with a torque of 1.5 Nm (13 in.lbs.).

Caution:

- Check that the shifter and brake lever function properly and are unobstructed (realign if necessary).
- 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.
- Never use lubricants or solvents to install fixed grips.
- 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 (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 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.
- Push on Clickbox (5, 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. Assembly can be performed independently of the gear setting but it is best done at shifter position "1".

ADJUSTMENT

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

CONNECTING DRUM BRAKE

Caution:

Only use brake levers with a cable moving distance of at least 15 mm and a minimum leverage of 3.8.

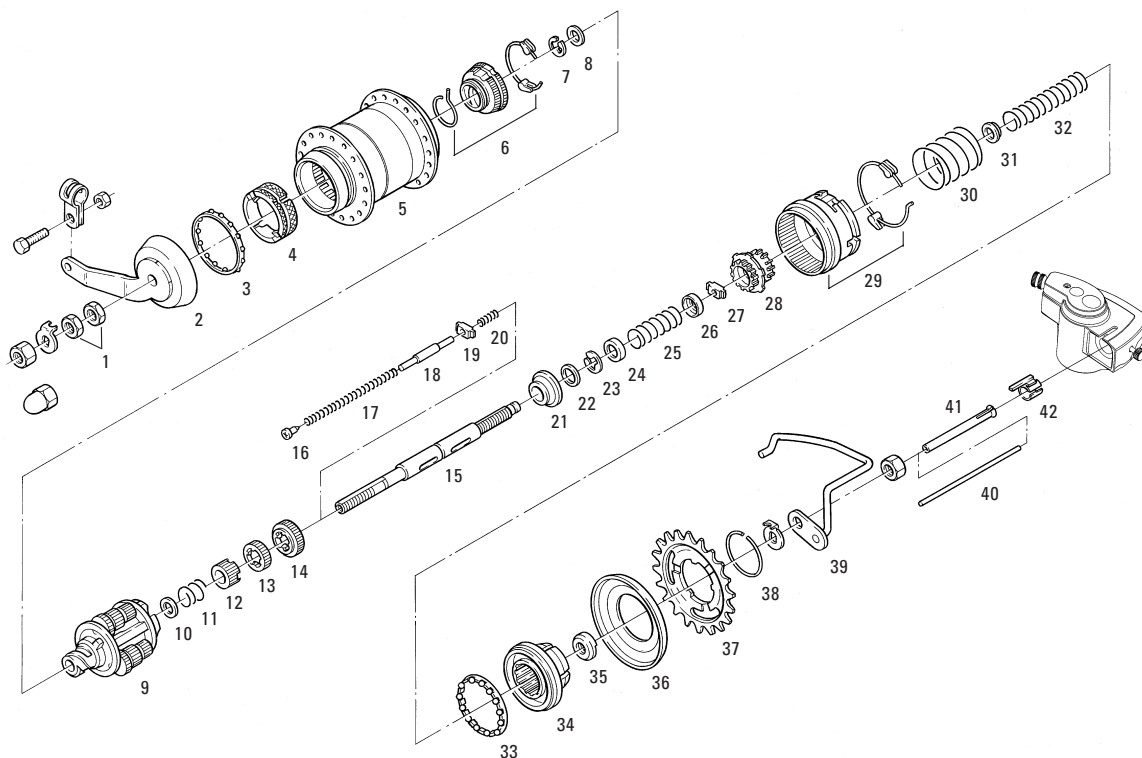
- Fit cable stop (1, Fig. 9) with adjusting bolt (2) and nut (3) and insert into the slot on the brake anchor plate.
- Turn adjusting bolt down by approx. $\frac{2}{3}$ and route the brake cable from the brake handle.
- Push lower brake cable end through adjusting bolt (2) and insert lower cable housing 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).
- 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

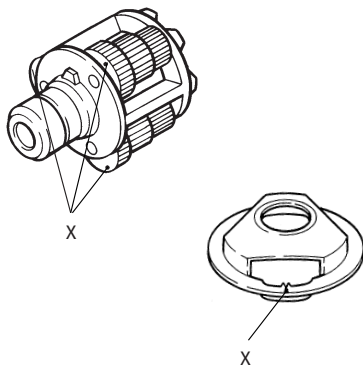
- Unscrew adjusting screw (2, Fig. 9) until the brake pads drag lightly.
- Actuate the hand brake lever forcefully several times and then, if necessary, turn the adjusting screw further so that the brake once again brushes the wheel as it turns.
- Lock hex nut (3).

SPECTRO S7 MAINTENANCE

1



2



REMOVE WHEEL

- Loosen the knurled screw and pull the Clickbox off the axle.
- Disengage the location sleeve and pull it off. Remove shift rod/tube out of the axle bore.
- Remove wheel.

DISMANTLING HUB

see Fig. 1

- Remove circlip (38) (Fig. 11), sprocket (37) and dust cap (36) as normal.
- Withdraw locating sleeve (42) (latched)
- Take out shift rod/tube (40/41).
- Clamp hub by the axle between aluminum jaws with sprocket side facing downwards.
- Unscrew both locknuts (1).
- Remove lever cone (2) ball retainer (3) and brake shell (4).
- Withdraw hub sleeve (5) upwards.
- Unscrew brake cone (6) from flat thread.
- Take out retaining washer (7) and thrust washer (8).
- Remove planetary gear carrier (9), washer (10) compression spring (11) and the three sun gears (12, 13, 14).
- Reclamp hub by the axle.
- Unscrew fixed cone (35).
- Remove driver (34), compression spring (32) with conical cap (31), large compression spring (30), ball retainer (33), ring gear (29) and coupling gear (28).
- Press spring (25) together and remove thrust block (27).

- Remove conical cap (26), spring (25) and conical cap (24).
- Dismantle crescent-shaped retaining washer (23).
- Remove thrust washer (22) and plastic profile washer (21).
- Unscrew grub screw (16) (Caution: It is subject to spring pressure) – and dismantle the long compression spring (17) guide pin (18), thrust block (19) and the short compression spring (20).

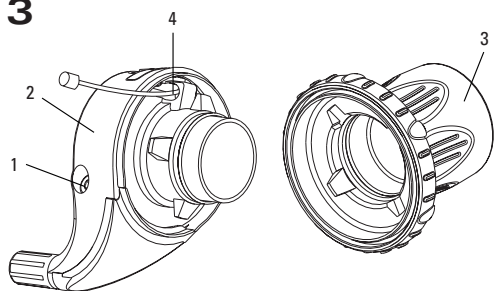
REASSEMBLY HUB

see Fig. 1

Lubrication see "MAINTENANCE/ LUBRICATION", page 8.

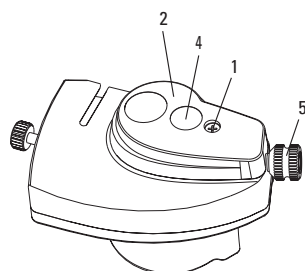
- Insert into the axle (on the side with the internal thread) one after the other:
- Short compression spring (20).
- Thrust block (19) – it is the same both sides.
- Guide rod (18) – it is the same both sides.
- Long compression spring (17).
- Press spring together and fit grub screw (16).
- Clamp axle with crank for clickbox facing upwards.
- Fit plastic profile washer (21) with its large diameter upwards.
- Fit thrust washer (22) and crescent-shaped retaining washer (23).
- Locate conical cap (24), compression spring (25) with 7 turns, conical cap (26, insides to the spring).

3



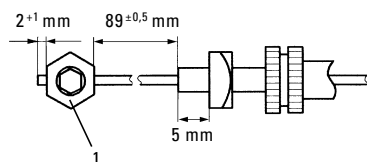
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4



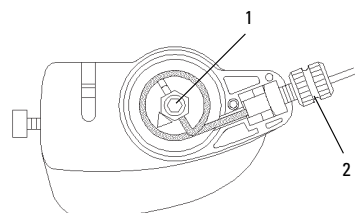
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5



NEW

6



- Press spring together and position thrust block (27) – it is the same both sides – centrally in the axle.
- Reclamp axle (with crank downwards).
- Fit large sun gear (14), with deflector bevels upwards.
- Position medium sun gear (13), with deflector bevels upwards.
- Fit small sun gear (12) – with recesses in front, thrust block engages in the slots.
- Position smallest compression spring (11).
- Fit 1 mm thick washer (10).
- Fit planetary gear carrier (9).
- 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 (8) and retaining washer (7) in the undercut.
Only now should you remove the mounting aid.

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

- Reclamp axle (Clickbox crank facing upwards again)
- Fit coupling gear (28) with carrier plate downwards
- Push ring gear (29) over the coupling gear.
- Locate large spring (30).
- Fit largest ball retainer (33) with balls underneath.
- Fit conical cap (31, inside to the spring).
- Assemble the compression spring (32) with 12 turns.
- Position driver (34) – push it down – and screw on fixed cone (35) to the stop, tightening torque 20 Nm (177 in.lbs.).
- Reclamp axle (Clickbox crank facing downwards again).
- Screw brake cone (6) onto the flat thread.
- Assemble hub sleeve – with a slight counter-clockwise movement over the pawl ratchet.
- Insert brake shell (4) – retaining lugs upwards, thereby the friction spring on the brake cone must engage in the slot on the brake shell.
- Locate ball retainer (3) (balls underneath), position lever cone (2), thereby turn it clockwise until the retaining lugs engage.
- Screw on locknuts (1), adjust bearing so that there is no play and lock nuts together with 15 – 20 Nm (133 – 177 in.lbs.).

Advice:

The dismantling and reassembly of the hub types MH 7205 / MH 7225 should be carried out in the same way. Differences: Instead of brake shell/cone a click-and-pawl carrier is installed on the planetary gear carrier here. Without flat thread – fixed with a retaining washer.

CABLE CHANGE

Dismantling shifter cable:

- Place shifter in gear position "1".
- Loosen clamping bolt (1, Fig. 3) on the shifter and slide the complete shifter inwards towards the middle of handlebar 20 mm or more. (It may be necessary to loosen and move brake lever.)
- Separate housing (2) from turning grip (3).
- Unscrew bolt (1, Fig. 4), remove cap (3).
- Withdraw shifter cable and clamping bolt (1, Fig. 6) upwards, loosen clamp and pull clamping piece from the cable.
- Remove the old cable (4, Fig. 3).

Assembly shifter cable:

- Route **new** cable through shifter housing and pull cable to seat cable head completely into cable recess.
- Reassemble shifter by aligning four tabs on shifter housing with matching recesses on turning grip and snap together (Fig. 3).
- Feed the cable through the **new** cable housing and adjusting screw.
- Position clamping bolt (1, Fig. 5) at a distance of 89 mm, tighten up with 1.5 Nm (13 in.lbs.) and cut off cable ends to 2 – 3 mm.
- Locate clamping bolt (1, Fig. 6) (screw head not visible) and place shifter cable around the carrier cylinder (counter-clockwise winding).
- Insert the square nut of the adjusting bolt (2) in the housing and completely screw in the knurled bolt.
- Position cap (3) and tighten up with bolt.

Advice:

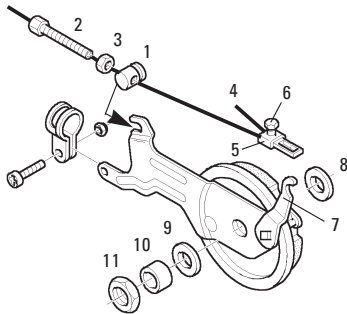
To set the clamping bolt – adjusting screw distance a new setting piece can be used. (Part No. 65 0324 105 001)

ADJUSTMENT

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

SPECTRO S7 MAINTENANCE

7



DRUM BRAKE

Instal brake anchor plate (or exchange it):

- Place thrust washer (8, Fig. 7) 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. 7) 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 (3).

Caution:

Check that all the brake system components are functioning properly!

MAINTENANCE / LUBRICATION

The Spectro S7 is 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 brake shell should be lubricated with a special grease (Part No. 0369 135 101).

Cleaning of parts:

- All parts – except for the planetary gear carrier – can be decreased 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:

- 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.
- Regrease ball retainer, line ball bearing running tracks with grease.
- Fill lever cone with grease reserves for brakes

Advice:

- **Do not use high-pressure water when cleaning the hub gear unit (e.g. strong water jets, high-pressure cleaners etc.) – if water penetrates the unit it could lead to functional problems.**
- **If the cycle is not used for a lengthy period, set shifting lever to gear position "1" so that the system is not strained.**

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	Axle end must protrude by min. 1 thread turn
Pedals are carried forward when free-wheeling	Bearings set too tight	Re-adjust bearings
	Loose lock nuts	Tighten lock nuts (15 – 20 Nm)
	Chain is over-tensioned	Reduce chain tension
Hub locks when braking (coaster brake)	Brake shell has run dry	Wash out hub sleeve, repolish and relubricate brake cylinder, renew brake shell



SPECTRO P5

TECHNICAL DATA / ASSEMBLY REQUIREMENTS



- Comfort Action Shifting
- Improved Ergonomics
- Short Rotation
- Optimal Gear Ratio
- Spectro Design
- Matte Chrome Finish
- Improved Brake Performance
- Most Efficient Hub In Its Class

Available in versions:

With coaster brake, Type MH 5215

With drum brake, Type MH 5225

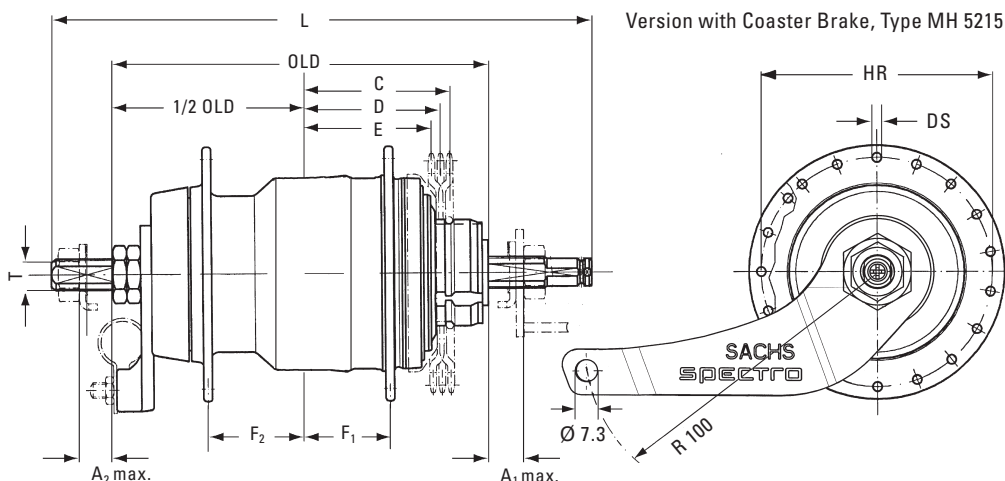
Without brake, Type MH 5205

Advice:

Only the Spectro P5 hub without brake (Type MH 5205) is suitable for tandem use.

Cycle frame:

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



HUBS

		MH 5215		MH 5225			MH 5205	
Part. No.		—		—			—	
Brake		Coaster		Drum „D“ „NL“ „NL“			None	
Over Locknut Dim., OLD		122 mm		126 mm			122 mm	
Length, L		175 mm		179 mm			175 mm	
Axle	Ends Diameter, T	FG 10.5		FG 10.5			FG 10.5	
	Dropout Width Dim.	A ₁ max. = 11.5 mm / A ₂ max. = 11.5 mm		A ₁ max. = 11.5 mm / A ₂ max. = 12.5 mm			A ₁ max. = 11.5 mm / A ₂ max. = 10.5 mm	
Holes		36		36			36	
Spoke	Hole Diameter, DS	3.0 mm		2.9 mm			3.0 mm	
	Hole Ref. ø, HR	75 mm		89 mm			75 mm	
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			F ₁ = 29 mm / F ₂ = 29 mm	
Gear Hub Ratio	Totally	249 %		←			←	
	Speed 1	63 %		←			←	
	Speed 2	78 %		←			←	
	Speed 3	100 %		←			←	
	Speed 4	128 %		←			←	
	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"	
	Line, C/D/E	49/45.5/43 mm		51.5/48.5/45.5 mm			49/45.5/43 mm	
	Ratio	24", 26", 28" = 1.8 – 1.9 / 20" = 1.8 – 2.0		←			←	
Shifter Compatib.		Spectro Grip 5/Spectro Bandix 5		←			←	
Clickbox Compatib.		Clickbox P5		←			←	
Tandem Compatib.		—		—			●	
Weight		1495 g		1536 g			1330 g	
Finish	Hub Shell Material	Steel		Aluminum			Steel	
	Finish	Matt Chrome Plated		Clear Coat Clear Coat Black Painted			Matt Chrome Plated	

SPECTRO P5

TECHNICAL DATA / ASSEMBLY REQUIREMENTS

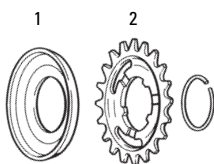
SHIFTERS

	Spectro Grip 5 (for adults)							Spectro Bandix 5 (for kids)		
	Part. No.	—	—	—	—	—	—	—	—	—
Design	Shifter Type	Twist Shifter							Twist Shifter	
	Cable ¹	1400 mm	1500 mm	1600 mm	1700 mm	1800 mm	2000 mm	2300 mm	1200 mm	1300 mm 1400 mm
	Gear Indication	Window							Window	
	Clamping Diameter	22.2 mm							22.2 mm	
	Handlebar, Straight Area	Minimum length = 150 mm							Minimum length = 125 mm	
	Weight	70 g							70 g	
	Housing	Glass filled PBT							Glass filled PBT	
Design	Grip	POM							POM	
	Grip Cover	Thermoplastic elastomer, Overmolded							Thermoplastic elastomer, Overmolded	
	Clamping Collar	6060 Aluminum							6060 Aluminum	

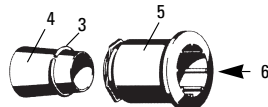
SPECTRO P5

ASSEMBLY

1

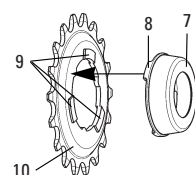


2

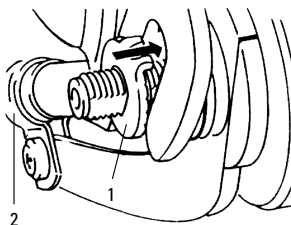


Mounting Tool
Part No. 0582 104 000

3



4



ASSEMBLY HUB

- Spoke the hub 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.

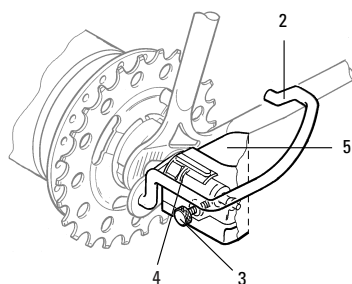
- Placing the wheel in the rear frame.
 - Mount the chain.
 - After positioning the wheel in the rear fork fit non-turn washer (1, **Fig. 4**) to the outside of the dropout (hub side opposite the sprocket). The serrations must bear against the dropout and the lug must engage in the dropout slot.
 - On the sprocket side fit the protective bracket (2, **Fig. 5**) directly below the fixing nut. Tightening torque on acorn or hex nuts 30 – 40 Nm (266 – 350 in.lbs.).
 - Fit brake lever tube clamp (2, **Fig. 4**). Tightening torque: 2 – 3 Nm (18 – 27 in.lbs.).
- Caution:**
The clamp must be seated on the frame without play.

Spoke length table:

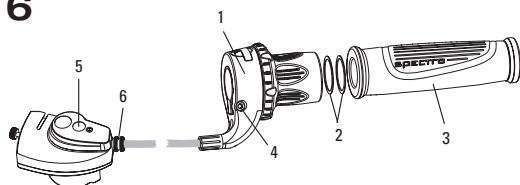
Tire Size	Cross	Length MH 5215/5205	Length MH 5225
47–406 20" x 1.75 x 2	3 x	181 mm	179 mm
37–490 22" x 1 3/8	3 x	225 mm	222 mm
47–507 24" x 1.75 x 2	3 x	232 mm	229 mm
37–540 24" x 1 3/8	3 x	251 mm	248 mm
47–559 26" x 1.75 x 2	3 x	259 mm	256 mm
37–590 26" x 1 3/8	3 x	275 mm	272 mm
47–622 28" x 1.75	3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

5

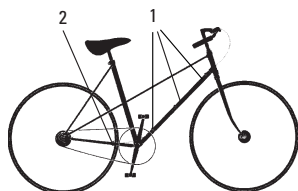


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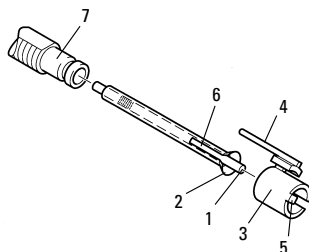


NEW

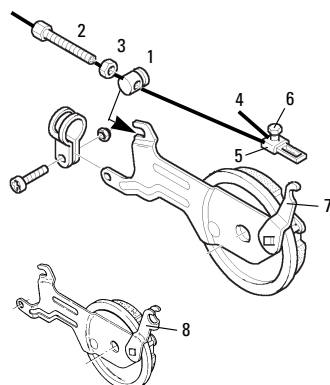
7



8



9



Advice:

- If a different protective bracket is used the thickness of the attachment plate must be max. 3 mm.
- Do not use additional washers.
- A minimum of 1 thread turn (4, Fig. 5) must be visible in front of the axle nut!

ASSEMBLY SHIFTERS

- Slide shifter (1, Fig. 6) onto handlebar.
- Add 2 thrust washers (2).
- Mount fixed grip (3) onto end of handlebar.
- Without applying pressure, slide shifter against fixed grip.
- Adjust shifter on handlebar and tighten with bolt (4) with a torque of 1.5 Nm (13 in.lbs.).

Caution:

- Check that the shifter and brake lever function properly and are unobstructed (realign if necessary).
- 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.
- Never use lubricants or solvents to install fixed grips.
- 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 (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 the copper colored shift rod with threads (1, Fig. 8) in shift tube (2) (oil parts lightly) and then push into axle bore as far as the stop. 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.
- 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.
- Push on clickbox (5, 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. Assembly can be performed independently of the gear setting but it is best done at shifter position "2".

ADJUSTMENT

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

CONNECTING DRUM BRAKE

Caution:

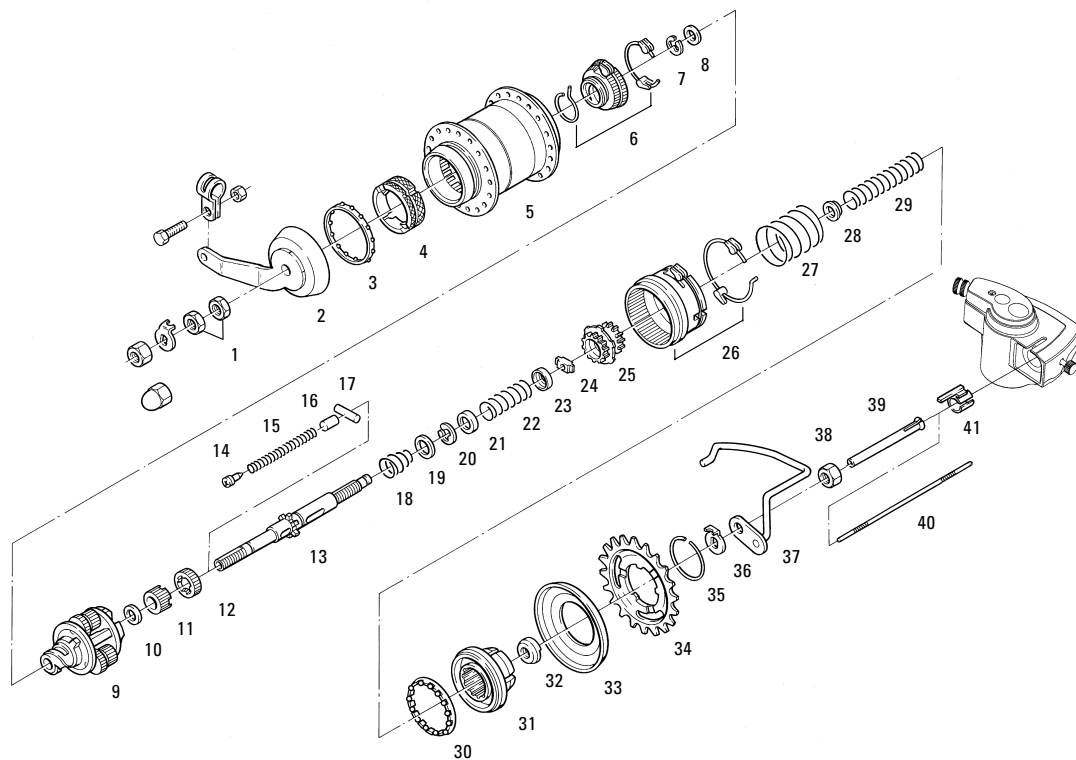
- Only use brake levers with a cable moving distance of at least 15 mm and a minimum leverage of 3.8.
- Fit cable stop (1, Fig. 9) with adjusting bolt (2) and nut (3) and insert into the slot on the brake anchor plate.
- Turn adjusting bolt down by approx. $\frac{2}{3}$ and route the brake cable from 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).
- 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

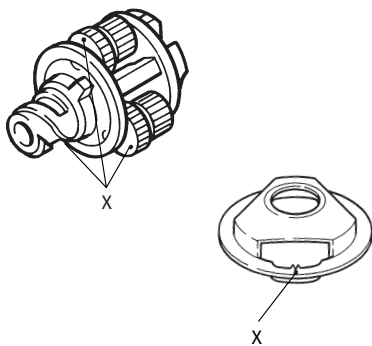
- Unscrew adjusting screw (2, Fig. 9) until the brake pads drag lightly.
- Actuate the hand brake lever forcefully several times and then, if necessary, turn the adjusting screw further so that the brake once again brushes the wheel as it turns.
- Lock hex nut (3).

SPECTRO P5 MAINTENANCE

1



2



REMOVE WHEEL

- Loosen the knurled screw and pull the Clickbox off the axle.
- Disengage the location sleeve and pull it off. To remove shift rod/tube, pull shift rod outwards and unscrew in a counter-clockwise direction.
- Remove wheel.

DISMANTLING HUB

see Fig. 1

- Remove circlip (35), sprocket (34) and dust cap (33).
- Clamp hub with sprocket side facing downwards with the two axle flats.
- Unscrew the two locknuts (1).
- Remove lever cone (2), ball retainer (3) and brake shell (4).
- Withdraw hub sleeve upwards.
- Unscrew brake cone (6) from flat thread.
- Remove retaining washer (7), thrust washer (8).
- Remove planetary gear carrier (9) and thrust washer (10).
- After this clamp hub in a vise.
- Unscrew fixed cone (32).
- Remove driver (31), compression spring (29), large compression spring (27) and ball retainer (30). – Withdraw ring gear (26) and coupling gear (25) and then remove conical cap (23) from the coupling gear.

- Take out thrust block (24), (to do this press the spring together). Remove spring (22) and the two conical caps (23/21).
- Dismantle retaining washer (20), washer (19), conical compression spring (18), and the large sun gear (12). Reclamp axle, (thrust block visible).
- Unscrew grub screw (14) – Dismantle spring (15), guide bolt (16) and thrust block (17).
- Remove small sun gear (11).

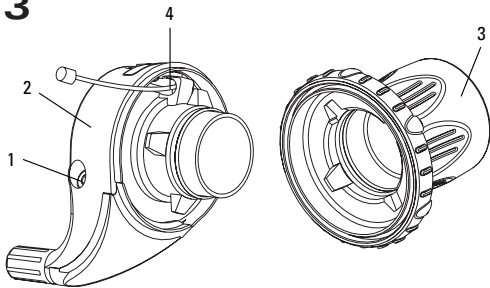
REASSEMBLY HUB

see Fig. 1

Lubrication see "MAINTENANCE/ LUBRICATION", page 16.

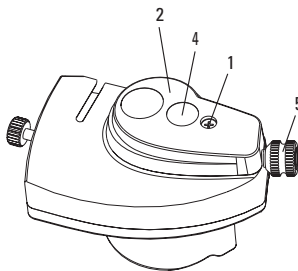
- Clamp axle with internal thread upwards.
- Position small sun gear (11) with crown gears to the front.
- Position thrust block (17) in the slotted hole (is laterally guided when the sun gear is screwed in).
- Locate bolt (16), then spring (15) in the axle and screw in grub screw (14) until it is flush with the axle.
- Reclamp axle. Fit large sun gear (12) (it is the same both sides). Position conical compression spring (18), with the large diameter first. Press spring together and fit washer (19) and retaining washer (20).

3



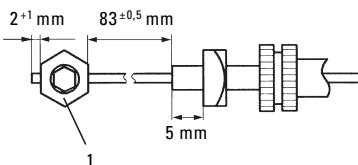
NEW

4



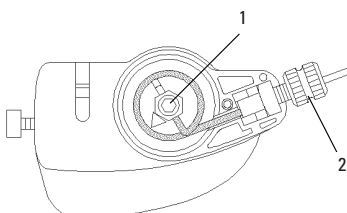
NEW

5



NEW

6



- Assemble conical cap (21), compression spring with 7 turns (22) and the second conical cap (23, insides to the spring).
 - Press spring together 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 conical cap (28, inside to the spring) for compression spring.
 - Position ring gear (26) over the teeth of the coupling gear.
 - Place ball retainer (30), with balls below on the ring gear.
 - Position large compression spring (27) on ring gear.
 - Mount compression spring with 13 turns (29) on the axle. (Is supported in the coupling wheel by the conical cap).
 - Locate driver (31), press it down and screw on fixed cone (32) as far as the stop. Tightening torque 20 Nm. (Then reclamp hub in vise).
 - Push on thrust washer (10) and fit planetary gear carrier (9). In doing this: Position mounting aid (Fig. 2) on the planetary gear carrier so that the (X) markings on the threeplanetary gears match with the mounting aid.
 - Insert planetary gear carrier, place thrust washer (8) on it and mount retaining washer (7) in recess.
- Only now should you 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. For lubrication of the hub see "MAINTENANCE/LUBRICATION".

- Screw brake cone (8) onto flat threads.
- Mount hub sleeve (5), with a slight counter-clockwise turn over the pawl.
- Locate brake shell (4) – with retaining lugs uppermost –, then the friction spring on the brake cone must engage with the slot on the brake shell.
- Insert ball retainer (3) – with balls below.
- Position lever cone (2) – in doing this turn it clockwise until the retaining lugs engage.
- Screw on counter nuts (1), adjust bearings to be free of play and tighten lock nuts. Tightening torque 15 – 20 Nm (133 – 177 in.lbs.).

Advice:

The dismantly and reassembly of the hub types MH 5205 / MH 5225 should be carried out in the same way. Differences: Instead of brake shell/cone a click-and-pawl carrier is installed on the planetary gear carrier here. Without flat thread – fixed with a retaining washer.

CABLE CHANGE

Dismantling shifter cable:

- Place shifter in gear position "1".
- Loosen clamping bolt (1, Fig. 3) on the shifter and slide the complete shifter inwards towards the middle of handle-bar 20 mm or more. (It may be necessary to loosen and move brake lever.)
- Separate housing (2) from turning grip (3).
- Unscrew bolt (1, Fig. 4), remove cap (2).
- Withdraw shifter cable and clamping bolt (1, Fig. 6) upwards, loosen clamp and pull clamping piece from the cable.
- Remove the old cable (4, Fig. 3).

Assembly shifter cable:

- Route **new** cable through shifter housing and pull cable to seat cable head completely into cable recess.
- Reassemble shifter by aligning four tabs on shifter housing with matching recesses on turning grip and snap together (Fig. 3).
- Feed the cable through the **new** cable housing and adjusting screw.
- Position clamping bolt (1, Fig. 5) at a distance of 83 mm, tighten up with 1.5 Nm (13 in.lbs.) and cut off cable ends to 2 – 3 mm.
- Locate clamping bolt (1, Fig. 6) (screw head not visible) and place shifter cable around the carrier cylinder (counter-clockwise winding).
- Insert the square nut of the adjusting bolt (2) in the housing and completely screw in the knurled bolt.
- Position cap (2, Fig. 4) and tighten up with bolt.

Advice:

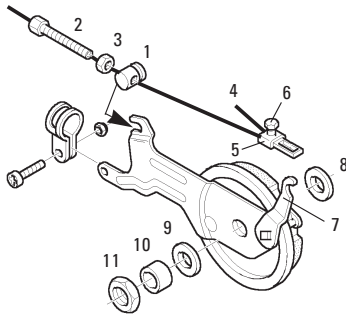
To set the clamping bolt / adjusting screw distance a new setting piece can be used. (Part No. 65 0324 105 001)

ADJUSTMENT

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

SPECTRO P5 MAINTENANCE

7



DRUM BRAKE

Instal brake anchor plate (or exchange it):

- Place thrust washer (8, Fig. 7) 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. 7) 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 (3).

Caution:

Check that all the brake system components are functioning properly!

MAINTENANCE / LUBRICATION

The Spectro P5 is 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 brake shell should be lubricated with a special grease (Part No. 0369 135 101).

Cleaning of parts:

- All parts – except for the planetary gear carrier – can be decreased 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:

- 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.
- Regrease ball retainer, line ball bearing running tracks with grease.
- Fill lever cone with grease reserves for brakes

Advice:

- **The Spectro P5 hubs complete with shifting component have been modified in such a way that the shifting forces are considerably lower than was previously the case.**
The new shifting component (shifter / Clickbox) is shown in Fig. 6, page 13.
Identification of the new hubs: red grub screw (14, Fig. 1) in the left axle end and new spring (15) in the axle.
In order to achieve the maximum reduction in shifting forces with a combination of new shifting component / old hub, the new spring (15) and the red grub screw (14) should be installed in the hub axle (see description "REASSEMBLY HUB").
- **Do not use high-pressure water when cleaning the hub gear unit (e.g. strong water jets, high-pressure cleaners etc.) – if water penetrates the unit it could lead to functional problems.**
- **If the cycle is not used for a lengthy period, set shifting lever to gear position "2" so that the system is not strained.**

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	Axle end must protrude by min. 1 thread turn
Pedals are carried forward when free-wheeling	Bearings set too tight	Re-adjust bearings
	Loose lock nuts	Tighten lock nuts (15 – 20 Nm)
	Chain is over-tensioned	Reduce chain tension
Hub locks when braking (coaster brake)	Brake shell has run dry	Wash out hub sleeve, repolish and relubricate brake cylinder, renew brake shell



SPECTRO T3

TECHNICAL DATA / ASSEMBLY REQUIREMENTS



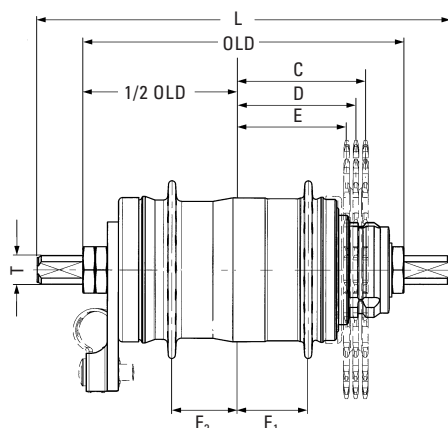
- Comfort Action Shifting
- Easy Adjust
- Superior Quality
- Spectro Design
- Matte Chrome Finish
- Improved Brake Performance
- Most Efficient Hub In Its Class

Available in versions:

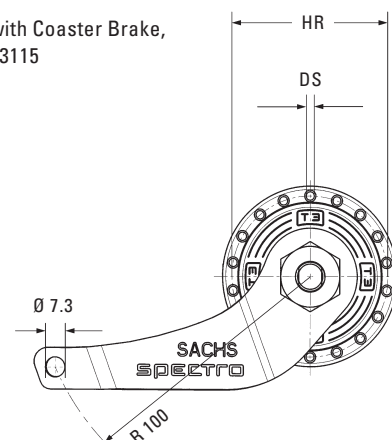
With coaster brake, Type MH 3115

With drum brake, Type MH 3125

Without brake, Type MH 3105



Version with Coaster Brake,
Type MH 3115



Advice:

Spectro T3 hubs are not suitable for tandem use.

Cycle frame:

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

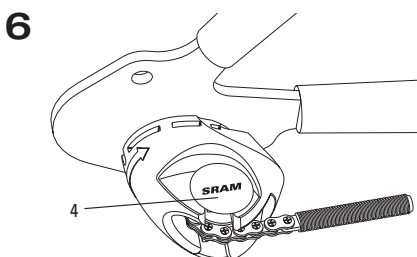
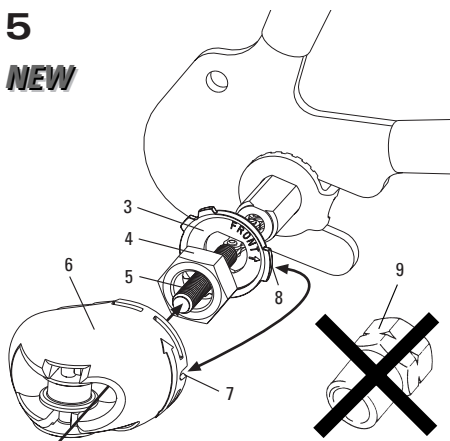
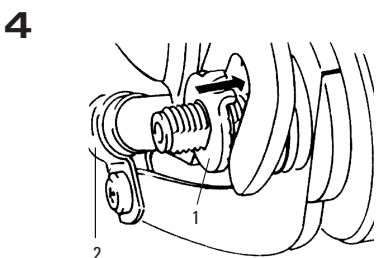
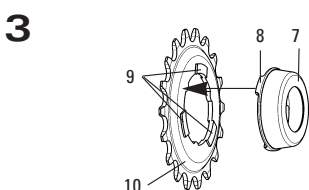
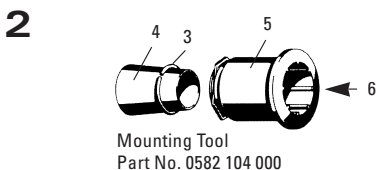
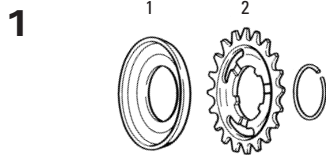
HUBS

	MH 3115		MH 3125		MH 3105	
Part No.	—		—		—	
Brake	Coaster		Drum „D“		„NL“	
Over Locknut Dim., OLD	118 mm		118 mm		117 mm	
Length, L	152 / 164 mm		164 mm		152 mm	
Ends Diameter, T	FG 10.5		FG 10.5		FG 10.5	
Holes	36		36		36	
Hole Diameter, DS	3.0 mm		2.8 mm		3.0 mm	
Hole Ref. ø, HR	58 mm		89 mm		58 mm	
Flange Dist. to 1/2 OLD	F ₁ = 24.5 mm / F ₂ = 25.5 mm		F ₁ = 25.5 mm / F ₂ = 32.5 mm		F ₁ = 24.5 mm / F ₂ = 25.5 mm	
Totally	186 %		←		←	
Speed 1	73 %		←		←	
Speed 2	100 %		←		←	
Speed 3	136 %		←		←	
Line, C/D/E	44.5 / 41.5 / 38.5 mm		44.5 / 41.5 / 38.5 mm		44 / 41 / 38 mm	
Ratio	24", 26", 28" = 2.0 – 2.4 / 20" = 2.0 – 2.5		←		←	
Shifter Compatib.	Spectro Click 3 / Spectro Grip 3 / Spectro Bandix 3		←		←	
Tandem Compatib.	—		—		—	
Weight	1182 g		1270 g		911 g	
Hub Shell Material	Steel		Aluminum		Steel	
Finish	Matt Chrome Plated		Silver Painted		Matt Chrome Plated	

SHIFTERS

	Spectro Grip 3 (for adults)			Spectro Click 3 (for adults)			Spectro Bandix 3 (for kids)		
Part No.	—			—			—		
Shifter Type	Twist Shifter			Thumb Shifter			Twist Shifter		
Cable	ø 1.2 mm	2000 mm	2200 mm	ø 1.2 mm	2000 mm	2200 mm	ø 1.2 mm		
Comp. Cable Housing	Capped, Compressionless with Resin Liner inside			←			←		
Gear Indication	Printed			Printed			Printed		
Barrel Adjuster	Indexing			—			Indexing		
Clamping Diameter	22.2 mm			22.2 mm			22.2 mm		
Handlebar, Straight Area	Minimum length = 145 mm			—			Minimum length = 125 mm		
Weight	58 g			23 g			58 g		
Housing	Nylon			Glass filled Resin			Nylon		
Grip	Nylon			Lever:			Nylon		
Grip Cover	Thermoplastic elastomer			Glass filled Resin			Thermoplastic elastomer		
Clamping Collar	6061 T6 Aluminum			6060 Aluminum			6061 T6 Aluminum		

SPECTRO T3 ASSEMBLY



ASSEMBLY HUB

- Spoke the hub 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.
- Mount the chain.
- After positioning the wheel in the rear fork fit non-turn washer (1, Fig. 4) to the outside of the dropout (hub side opposite the sprocket). The serrations must bear against the dropout and the lug must engage in the dropout slot.
- Fit backing plate (3, Fig. 5) to right axle end so that the word „FRONT“ is visible and the arrow or lug without notch points towards the front of the bicycle.
- Tighten up axle nuts (3). Tightening torque 30 – 40 Nm (266 – 350 in.lbs.).
- Guide tension chain (5) through deflection pulley (6). Bring recess (7) and lug (8, without notch) on the backing plate into alignment and engage. Turn deflection pulley until the yellow area is at the top (4, Fig. 6) (bayonet catch is locked).

Caution:

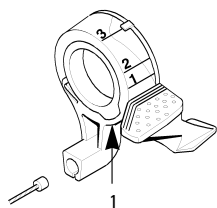
- **The Spectro T3 hubs have been modified for the series launch of the new deflection pulley.**
 - **Identification: yellow counter nut on the driving end of the axle and modified compression spring (14, Fig. 1 / page 22).**
 - **In order to prevent malfunctions, these modified hubs may no longer be combined with the chain guide nut (9, Fig. 5).**
 - **The deflection pulley can also be used for the previous hub version (silver-coloured counter nut on the axle). In order to achieve the maximum reduction in shifting forces with this combination, the new, modified compression spring should be installed (description see "REASSEMBLY HUB", page 23).**
 - **Only install additional axle attachments (e.g. struts) between backing plate and retaining washer.**
 - **Cable stop bracket: dimensions see Fig. 11.**
 - **Axle end must protrude by min. 1 mm to max. 4 mm beyond the nut.**
 - Fit brake lever tube clamp (2, Fig. 4). Tightening torque: 2 – 3 Nm (18 – 27 in.lbs.).
- Caution:**
The clamp must be seated on the frame without play.

Spoke length table:

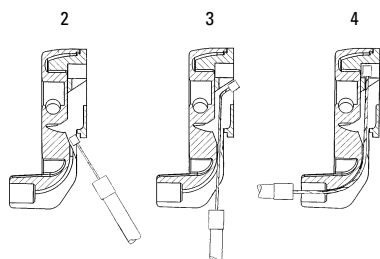
Tire Size	Cross 28 / 36 Holes	Length MH 3115/3105	
		28 / 36 Holes	Length MH 3125 36 Holes
47–406 20" x 1.75 x 2	2 x / 3 x	182 mm / 184 mm	—
37–490 22" x 1 3/8	— / 3 x	— / 228 mm	—
47–507 24" x 1.75 x 2	2 x / 3 x	234 mm / 235 mm	—
37–540 24" x 1 3/8	— / 3 x	— / 254 mm	—
47–559 26" x 1.75 x 2	2 x / 3 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.

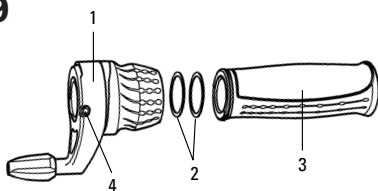
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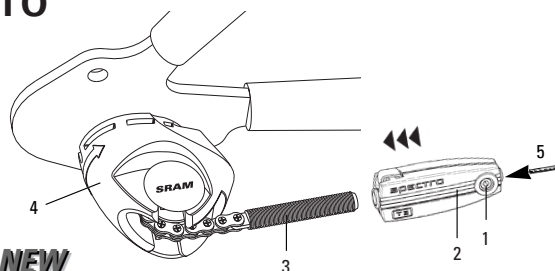
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9

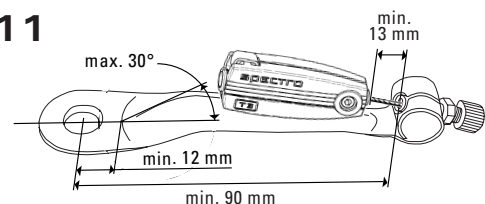


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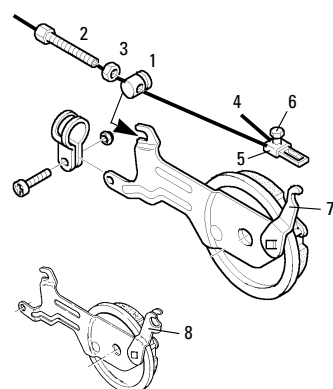


NEW

11



12



ASSEMBLY SHIFTERS

Spectro Click 3:

- Slide shifter (Fig. 7) onto handlebar.
- Mount fixed grip onto end of handlebar (external diameter of the fixed grip must not exceed 33 mm in the area of the shifter).
- Align the shifter on the handlebar and tighten screw (1, Fig. 7). Allan key 2.5 mm, torque 2 Nm (18 in.lbs.).
- Align the brake lever on the handlebar and secure.
- Check that the shifter and brake lever function properly and are unobstructed (realign if necessary).

Mounting shift cable:

- Guide the cable head (Ø 3 mm) of the shifting cable into the side opening (2, Fig. 8), push through shifter body the cable head (3). Insert the shifter cable in the groove and place the end of the cable housing in the recess (4).

Spectro Grip 3 / Spectro Bandix 3:

- Slide shifter (1, Fig. 9) onto handlebar.
- Add 2 thrust washers (2).
- Mount fixed grip (3) onto end of handlebar.
- Without applying pressure, slide shifter against fixed grip.
- Adjust shifter on handlebar and tighten with bolt (4), allen key 2.5 mm (Bandix: allen key 3 mm), torque 1.7 Nm (15 in.lbs.).
- Spectro Grip 3: Not recommended for use on thin walled aluminum handlebars such as Hyperlite® type handlebars.

Caution:

- Check that the shifter and brake lever function properly and are unobstructed (realign if necessary).
- 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.
- Never use lubricants or solvents to install fixed grips.
- 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 (1, Fig. 8) and cable pully clamp (2) on the down tube or seat tube.
- Secure the lubricated shift cable at equidistant intervals on the frame (in case of continuous cable housing).
- Feed the control cable into the locating sleeve (5, Fig. 10), fix at the appropriate length using the clamping bolt (1). Cable stop bracket: dimensions see Fig. 11. Shorten any cable which is sticking out.

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. 10) 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).

CONNECTING DRUM BRAKE

Caution:

Only use brake levers with a cable moving distance of at least 15 mm and a minimum leverage of 3.8.

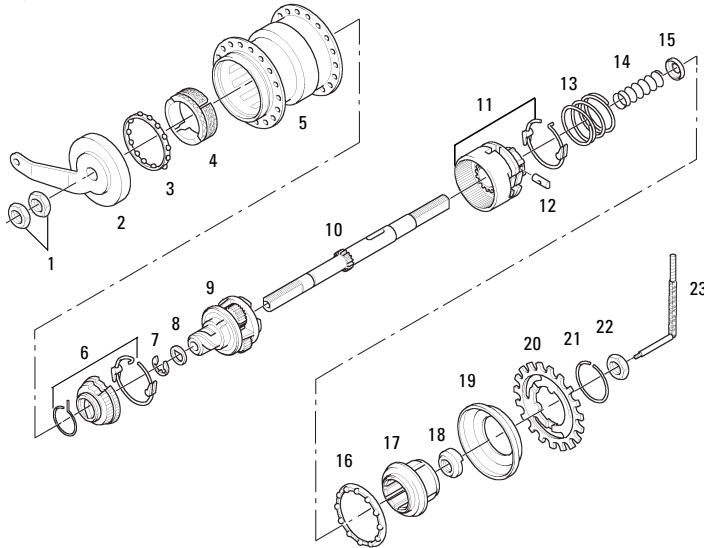
- Fit cable stop (1, Fig. 12) with adjusting bolt (2) and nut (3) and insert into the slot on the brake anchor plate.
- Turn adjusting bolt down by approx. 2/3 and route the brake cable from the brake handle.
- Push lower brake cable end through adjusting bolt (2) and insert lower cable housing end into 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).
- 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

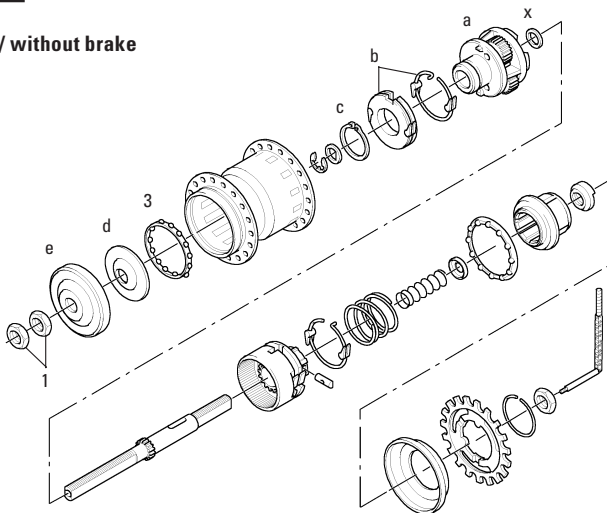
- Unscrew adjusting screw (2, Fig. 12) until the brake pads drag lightly.
- Actuate the hand brake lever forcefully several times and then, if necessary, turn the adjusting screw further so that the brake once again brushes the wheel as it turns.
- Lock hex nut (3).

SPECTRO T3 MAINTENANCE

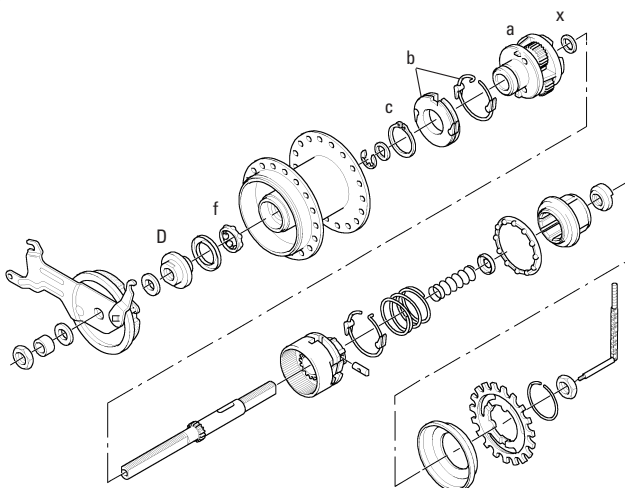
1 MH 3115 / Coaster brake



2 MH 3105 / without brake



3 MH 3125 / Drum brake



REMOVE WHEEL

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

DISMANTLING HUB

see Fig. 1

- Unscrew indicator chain (23) (right-hand thread), remove circlip (21), sprocket (20), dust cap (19) and hub 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 complete with brake cone (6). Unscrew the brake cone from the planet carrier (9).
- Turn hub over.
- Loosen the lock nut (22) and fixed cone (18) and remove.
- Remove driver (17), spring cover (15), 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 ring gear (11) from the axle.

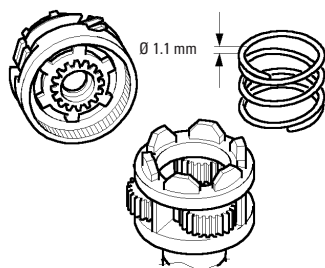
Advice:

The dismantly and reassembly of the hub types MH 3105 / MH 3125 should be carried out in the same way.

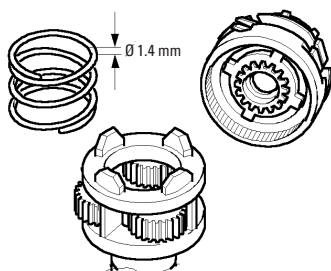
Differences

- 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.

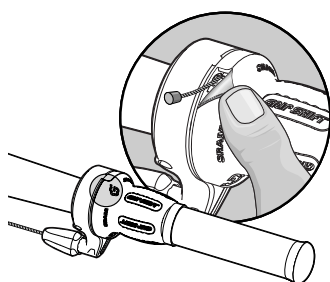
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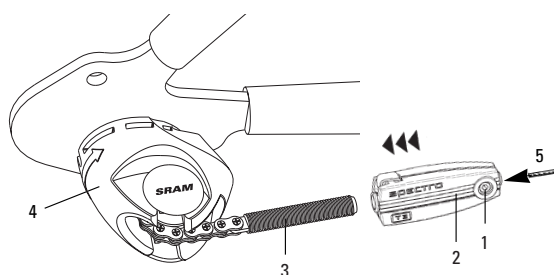
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6



7



NEW

REASSEMBLY HUB

see Fig. 1

Lubrication see "MAINTENANCE/
LUBRICATION", page 24.

- 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) followed by the spring cover (15).
- 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 to and fro 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. For notes on fitting the brake carrier, please refer to mounting drum brake.

CABLE CHANGE

Spectro Grip 3 / Spectro Bandix 3 (Fig. 6):

Dismantling shifter cable:

- Leave the shifter on the handlebar.
- No need to move other components.
- **The shifter does not need to be opened.**
- 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 '1' gear number mark with the indicator mark.
- Carefully peel back the corner of the grip cover shown in **Figure 6**. Use your fingernail or a small screw driver.
- Remove and discard the rest of the old cable.

Assembly shifter cable:

- Feed the **new** cable through the cable entry in the grip and out through the barrel adjuster.
- Feed the cable through the **new** cable housing and stops.
- Place the shifter in gear position "3".
- Feed the control 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).

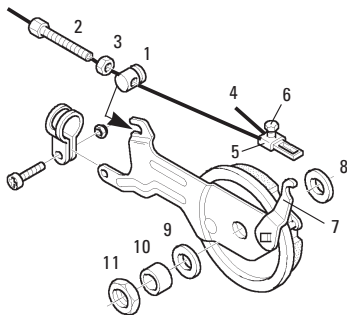
ADJUSTMENT

- 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

Instal 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 so that the brake once again brushes the wheel as it turns.
- 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.

A change with of the new or converted hubs:

- When braking in third gear, the tension chain moves out of the deflection pulley by approx. one chain link – after braking, the tension chain returns immediately to its normal position.

The Spectro hubs are equipped with permanent lubrication and are maintenance-free under normal conditions. For type MH 3111, however, particularly high loading of the coaster brake can cause it to overcompensate. In this case, apply special grease (Part No. 0369 135 101) to the brake sleeve or replace it.

Cleaning of parts:

- All parts – except for the planetary gear carrier – can be decreased 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:

- 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.
- Regrease ball retainer, line ball bearing running tracks with grease.
- Fill lever cone with grease reserves for brakes

Advice:

- **Do not use high-pressure water when cleaning the hub gear unit (e.g. strong water jets, high-pressure cleaners etc.) – if water penetrates the unit it could lead to functional problems.**
- **If the cycle is not used for a lengthy period, set shifting lever to gear position "3" so that the system is not strained.**

SPECTRO T3 MAINTENANCE



TROUBLESHOOTING

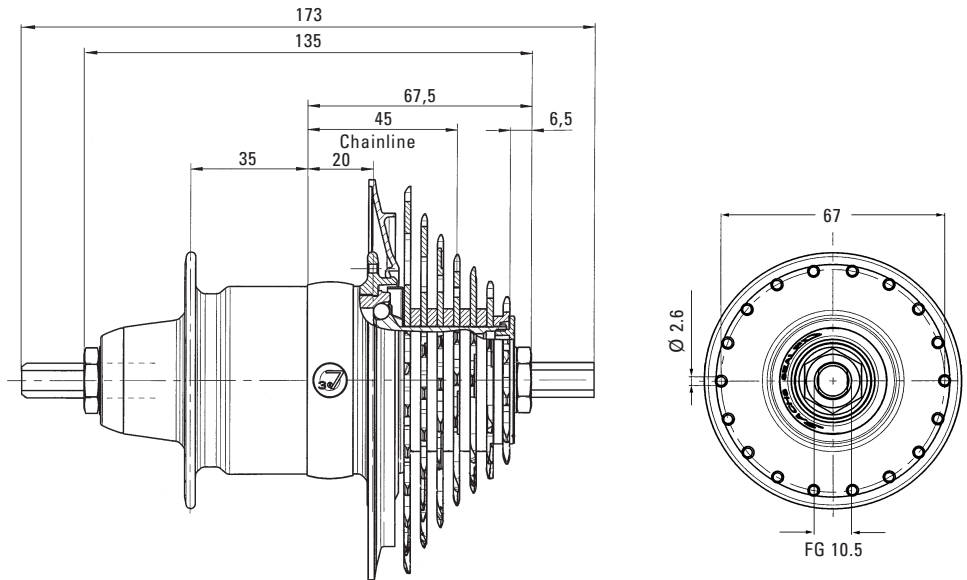
Problem	Cause	Remedy
Shifting difficulties	Incorrect gear setting	Adjust shifting system, oil control cable, check that cable stop is fastened correctly.
Pedals are carried forward when freewheeling	Bearings set too tight	Re-adjust bearing
	Loose lock nuts	Tighten lock nuts (15 – 20 Nm)
	Chain is overtensioned	Reduce chain tension
Type MH 3115 (coaster 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

SPECTRO 3X7

TECHNICAL DATA / ASSEMBLY REQUIREMENTS



- ESP 1:1 Actuation Ratio Technology
- Ergonomic Hex-Profile Shifter Cover
- 21 Speed without A Front Derailleur
- Improved Hub Snd System Design
- Logical Left And Right Hand Shifting
- Gear Hub Can Be Operated As The Bike Stands
- Single Front Chainring
- Higher Gear Ratio
- Most Efficient Hub In Its Class



Advice:

Spectro 3x7 hub is not suitable for tandem use.

HUB

		Spectro 3x7 hub
Axle	Part No.	—
	Brake	None
	Over Locknut Dim.	135 mm
Spoke	Length	173 mm
	Ends Diameter	FG 10.5
	Holes	36
Ratio	Hole Diameter	2.6 mm
	Hole Reference ø	67 mm
	Flange Dist. to 1/2 OLD	20 mm / 35 mm
Ratio	Totally	434 %
	Totally Hub	186 %
	Speed 1	73 %
	Speed 2	100 %
	Speed 3	137 %
	Chain Line	45 mm
	Crankset	33 Teeth ¹
Ratio	Cogset	7 speed, 12/28 Teeth ¹
	Cogset Compatib.	Power Glide / Hyperglide
	Shifter Compatib.	Spectro Grip 3x7
	Sealing	Extra sealed
	Tandem Compatib.	—
Ratio	Weight	900 g
	Hub Shell Material	Aluminum Turned

¹ Other combinations may cause malfunctions.

DERAILLEUR

		Spectro 3x7 Derailleur, 1:1 Actuation Ratio NEW
Design	Part No.	—
	Speeds	7
	Shifter Compatibility	Spectro Grip 3x7, 1:1 Actuation Ratio
	Spring Enhancement	●
	Pulleys	Bushing
	Direct Mount	●
	Weight	318 g
	Knuckles	SRAM Composite
	Outer Link	SRAM Composite
	Inner Link	Steel / E-coat
Design	Outer Cage	Steel / E-coat
	Inner Cage	SRAM Composite
	Hanger Bolt	Steel

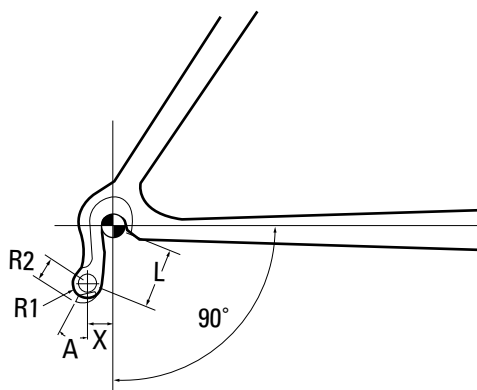
SHIFTERS

		Spectro Grip 3x7 NEW
Compa-tibility	Part No.	—
	Shifter Type	Gear Hub Derailleur
	Speeds	3 7
	Derailleur	— Spectro 3x7 Derailleur, 1:1
	Gear Hub	Spectro 3x7 —
	Cable	Stainless Steel Stainless Steel
	Gear Indication	Printed Printed
	Barrel Adjuster	Indexing Indexing
	Clamping Diameter	22.2 mm 22.2 mm
	Weight	95 g 95 g
Design	Housing	Glass filled Nylon ←
	Grip	Nylon ←
	Grip Cover	Thermoplastic elastomer ←
	Clamping Collar	6061 T6 Aluminum ←

SPECTRO 3X7

TECHNICAL DATA / ASSEMBLY REQUIREMENTS

1



Dropout:

Dropouts which are downward opening are permitted.

For optimal rear derailleur performance, the recommended rear derailleur hanger length *L* (**Fig. 1**) should be between 28 – 30 mm.

For a given *L*, use the chart below to determine other rear derailleur hanger specifications.

Dropout dimensions (mm):

L	X	A	R1	R2	T
28	6–10	25°–30°	8.5 max	11.5–13.5	7–8
30	7.5–10	25°–30°	8.5 max	11.5–13.5	7–8

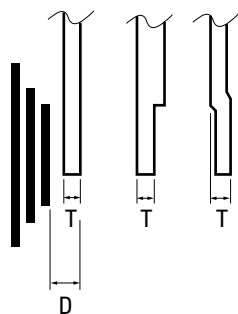
The distance *D* between the smallest sprocket and the bearing surface of the gear unit on the dropout must be 12.7 ± 1 mm (**Fig. 2**).

The geometry of the seat tube strut and the rear wheel fork in connection with the choice of the smallest sprocket must correspond with the dimensions shown in (**Fig. 3**).

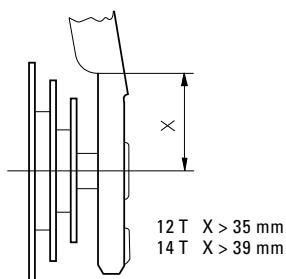
Chain guide fork (optional):

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

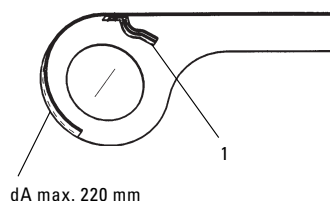
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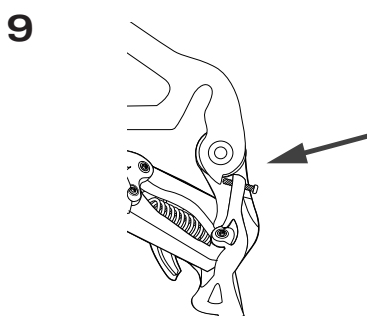
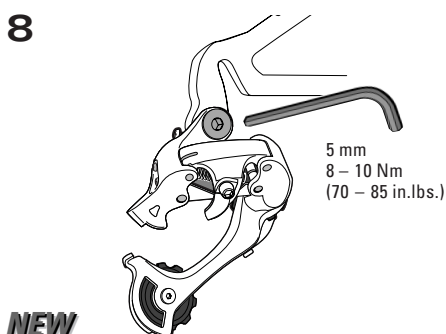
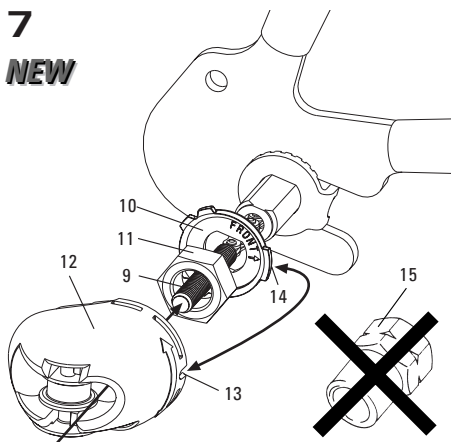
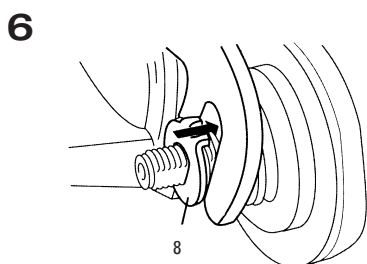
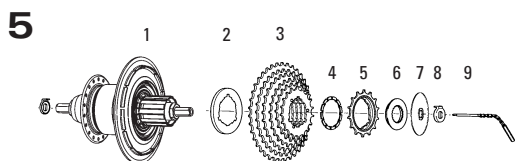
3



4



SPECTRO 3X7 ASSEMBLY



ASSEMBLY HUB

- Spoke the hub as normal. See spoke length table.
- Place spoke protector disc (1, **Fig. 5**) on shoulder of hub, mount dust cover (2), push sprocket cassette (3) onto driver, fit spacing washer (4) and the smallest sprocket (5) with its shoulder foremost. Screw in ring (6) and tighten up, screw small pull rod (9) into the hub axle. If provided push cone disc (7) onto the axle end on the sprocket side.
- Fit wheel in dropouts and align.
- Place non-turn washers (8, **Fig. 6**) on both sides of the axle – the serrations must bear against the dropout – and the lug must engage in the dropout slot.
- Fit backing plate (10, **Fig. 7**) to right axle end so that the word „FRONT“ is visible and the arrow or lug without notch points towards the front of the bicycle. (The arrow should point upwards if the dropout opening is at the bottom.)
- Tighten up axle nuts (11). Tightening torque 30 – 40 Nm (266 – 350 in.lbs.).
- Guide tension chain (9) trough deflection pulley (12). Bring recess (13) and lug (14, without notch) on the backing plate into alignment and engage. Turn deflection pulley until the yellow area is at the top (4, **Fig. 14**) (bayonet catch is locked).

Caution:

- **The Spectro 3x7 hubs have been modified for the series launch of the new deflection pulley.**
- **Identification: yellow counter nut on the driving end of the axle and modified compression spring (14, **Fig. 1** / page 22).**
- **In order to prevent malfunctions, these modified hubs may no longer be combined with the chain guide nut (15, **Fig. 7**).**

- **The deflection pulley can also be used for the previous hub version (silver-coloured counter nut on the axle). In order to achieve the maximum reduction in shifting forces with this combination, the new, modified compression spring should be installed (description see Spectro T3 hubs “REASSEMBLY HUB”, page 23).**
- **Only install additional axle attachments (e.g. struts) between backing plate and retaining washer.**
- **Axle end must protrude by min. 1 mm to max. 4 mm beyond the nut.**

ASSEMBLY DERAILLEUR

Advice:

Check the rear derailleur hanger alignment. A bent rear derailleur hanger will result in inaccurate index shifting. Outboard side impacts are the most common causes of this type of damage.

- Attach the rear derailleur to the frame’s rear derailleur hanger (**Fig. 8**).
- Check that the b-adjust screw (**Fig. 9**) is clear of the rear derailleur dropout tab.
- Tighten the 5 mm hex hanger bolt to 8 – 10 Nm (70 – 88 in.lbs.) (**Fig. 8**).

Chain Length:

- Bypassing the rear derailleur, run the chain around the largest cog/large chainring combination (**Fig. 10**).
– For rear suspension frames, position the rear suspension for the greatest chain length required.
- Add 2 LINKS of chain to this length for proper chain length.

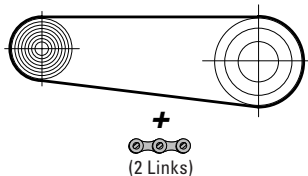
Spoke length table:

Tire Size	Cross	Length	
47–406 20" x 1.75 x 2	3 x	185 mm	182 mm
37–490 22" x 1 3/8	3 x	226 mm	224 mm
47–507 24" x 1.75 x 2	3 x	234 mm	232 mm
37–540 24" x 1 3/8	3 x	251 mm	249 mm
47–559 26" x 1.75 x 2	3 x	261 mm	259 mm
37–590 26" x 1 3/8	3 x	275 mm	273 mm
47–622 28" x 1.75	3 x	291 mm	289 mm
37–622 28" x 1 3/8 x 1 5/8	3 x	291 mm	289 mm
28–622 28" x 1 1/8	3 x	291 mm	289 mm
32–622 28" x 1 5/8 x 1 1/4	3 x	291 mm	289 mm
28–630 27" x 1 1/4 fifty	3 x	295 mm	293 mm
32–630 27" x 1 1/4	3 x	295 mm	293 mm

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

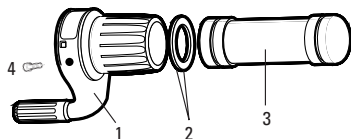
SPECTRO 3X7 ASSEMBLY

10

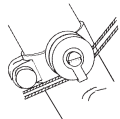


11

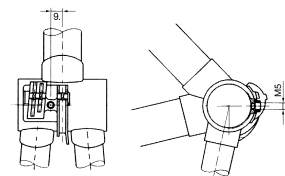
NEW



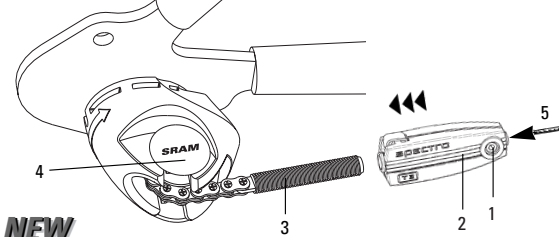
12



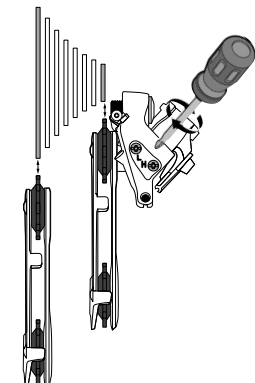
13



14



15



ASSEMBLY SHIFTERS

- Slide shifter (1, **Fig. 11**) onto handlebar.
- Add 2 thrust washers (2).
- Mount fixed grip (3) onto end of handlebar.
- Without applying pressure, slide shifter against fixed grip.
- Adjust shifter on handlebar and tighten with 3 mm hex clamp bolt (4), torque 2 Nm (18 in.lbs.).

Caution:

- **Check that the shifter and brake lever function properly and are unobstructed (realign if necessary).**
- **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.**
- **Never use lubricants or solvents to install fixed grips.**
- **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

- Feed the control cables through the cable housings and the double outer stops. In doing this ensure that the cable housings are located properly into the bottom of the adjuster barrels and the outer stops and that these are tightly screwed to the down tube.
- Fit the double pulley clip directly above the bottom bracket on the seat tube and feed the shifter cable over the pulleys to the rear (**Fig. 12**).
- If a cable guide is fitted beneath the bottom bracket, press the shifter cables in the pregreased pulley guides and route them to the rear – **please do not use open designs**, otherwise the shifter cable could slip out when loose. For assembly a hole is bored in the bottom bracket housing and the cable guide is screwed tight (**Fig. 13**).

CONNECT CABLE WITH HUB

- Feed the control cable into the locating sleeve (5, **Fig. 14**), 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) loosely onto small pull rod (3).

ADJUSTMENT HUB

- 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. 14**) 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).

DERAILLEUR ADJUSTMENT

Limit screw adjustment:

- View the rear derailleur and pulleys from behind the rear of the bicycle (**Fig. 15**).
- 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.

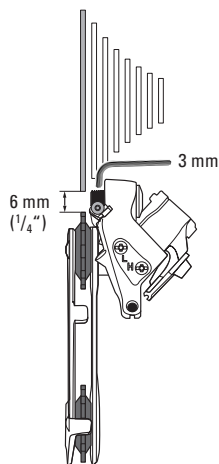
- Shift chain to the small chain ring.
- While turning the crank, push the rear derailleur inboard by hand to the largest cog.
- Hold the derailleur in this position while making the following adjustment.
- Use a 3 mm hex wrench, turn the b-adjust screw until the chain gap equals approximately 6 mm ($\frac{1}{4}$ ") from tip of the cog to tip of upper guide pulley (**Fig. 16**).

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

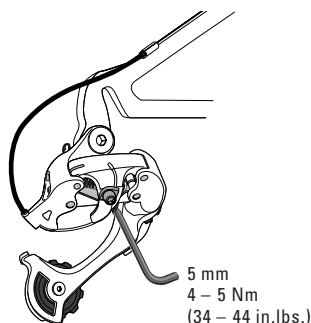
Advice:

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.

16



17



Index shifting adjustment:

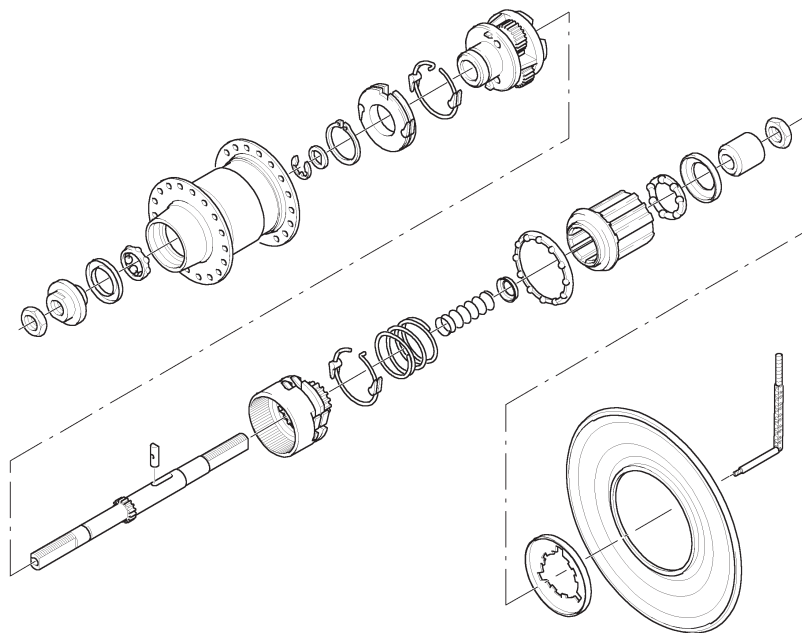
- Check that the chain and the rear derailleur are in the smallest cog position.
- Rotate the rear shifter until the largest number and gear indication tab/dash line up.
- Turn the rear shifter barrel adjust clockwise fully into the shifter, then turn counterclockwise 1 full turn.
- Feed the rear shifter 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. 17**).
- Tighten the 5 mm hex cable anchor bolt to 4 – 5 Nm (35–45 in.lbs.).
– Be careful not to crush or deform the cable.
- 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.

Advice:

Cable and housing components may settle under compression. It may be necessary to readjust the rear derailleur cable tension using the shifter barrel adjuster after an initial “break in period”.

SPECTRO 3X7 MAINTENANCE

1



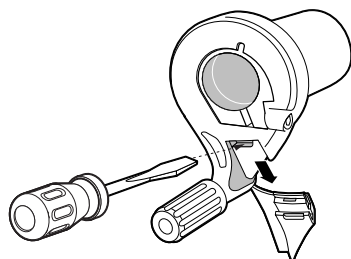
- Remove and discard the rest of the old cable.
- Feed the new cable through the cable entry in the grip and then directly through the barrel adjuster.
- Line up the "1" mark with the indicator mark.
- While pulling the cable snug, snap the grip and the housing back together (**Fig. 3**). Make sure the cable is lying in the cable track before snapping the shifter closed.
- Snap the cover back into place.
- Check for proper assembly by rotating the grip and listening for the clicks.
- Feed the cable through the new cable housing and stops.
- Attach the cable to the hub.
See **"CONNECT CABLE WITH HUB"** (Page 30).

Rear:

Advice:

- **Leave the shifter on the handlebar.**
- **No need to move other components.**
The shifter does not need to be opened.
- **Use only new high quality cable and compressionless cable housing with end caps.**

2



REMOVE WHEEL

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

DISMANTLING AND REASSEMBLY HUB

See Spectro T3 hub without brake, Type MH 3105 (Page 22).

The exploded view (**Fig. 1**) shows the exact installation position and direction of the individual parts.

CABLE CHANGE

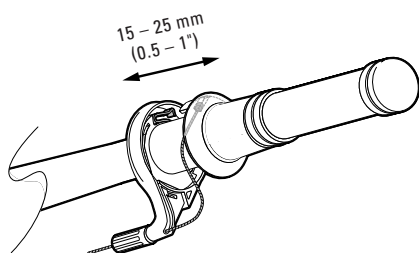
Front:

Advice:

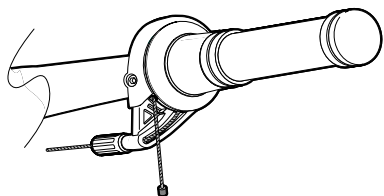
- **Leave the shifter on the handlebar.**
- **Allow for 15 – 25 mm (0.5 – 1") of working space around the shifter.**
- **Use only new high quality cable and compressionless cable housing with end caps.**
- Detach the cable from the derailleur.
- Cut the cable off 15 cm (6") from shifter barrel adjuster. Discard old cable and cable housing.
- Use a small screwdriver to pop off the cover (**Fig. 2**).
- Carefully pull the grip and the housing apart only until the cable head is exposed. Be careful not to lose the spring.

- Detach the cable from the derailleur.
- Cut the cable off 15 cm (6") from shifter barrel adjuster. Discard old cable and cable housing.
- Line up the "CC" mark with the indicator mark.
- Use a small screwdriver to pop off the cover. Do not pull apart the shifter (**Fig. 2**).
- Push the old cable into the shifter to expose the cable head (**Fig. 4**).
- Remove and discard the rest of the old cable.
- Feed the 1 cm new cable into the cable entry (**Fig. 5**).
- Bending the cable away from the cable track, continue to push the cable completely through the shifter. This causes a slight bowing of the cable which aids in the installation (**Fig. 6**).
- Feed the cable through the barrel adjuster and pull the cable snug.
- Check that the cable is lying in the cable track. Snap the cover back into place.
- Check for proper assembly by rotating the grip and listening for the clicks.
- Feed the cable through the new cable housing and stops.
- Attach the cable to the derailleur and adjust indexing. See **"DERAILLEUR ADJUSTMENT / Index shifting adjustment"** (Page 30).

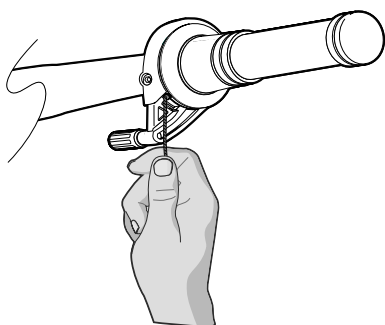
3



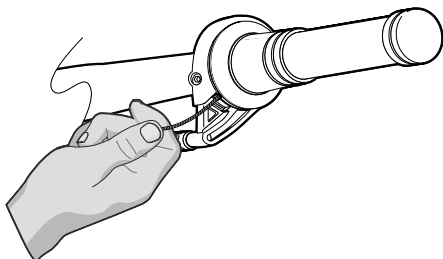
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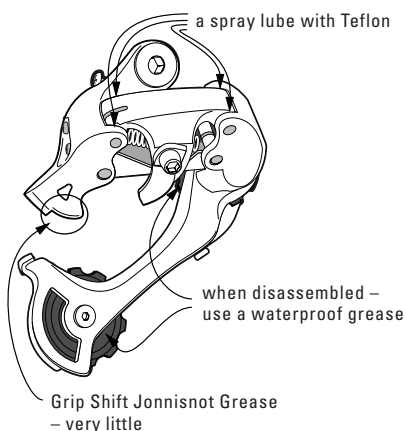
5



6



7



MAINTENANCE / LUBRICATION

Hub Spectro 3x7:

See Spectro T3 hub without brake,
Type MH 3105 „**MAINTENANCE / LUBRICATI-
ON**“ (Page 24).

Derailleur Spectro 3x7:

- Do not use solvents or corrosive materials to clean the components.
- Lubricate the shifting joints regularly (Fig. 7).
- Grease any cable guides (e.g. beneath the bottom bracket).

TROUBLESHOOTING

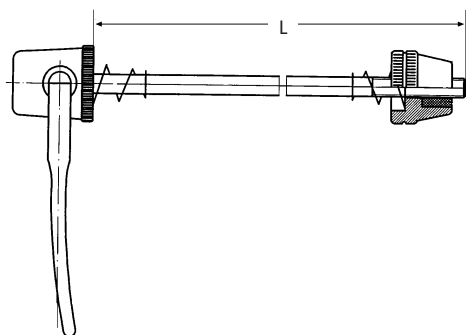
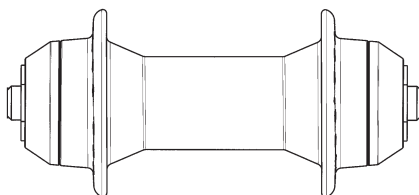
Problem	Cause	Remedy
Hub: Shifting difficulties	Incorrect gear setting	Adjust shifting system, oil control cable, check that cable stop is fastened correctly.
Pedals are carried forward when freewheeling	Bearings set too tight	Re-adjust bearing
	Loose lock nuts	Tighten lock nuts (15 – 20 Nm, 133 – 177 in.lbs.)
Derailleur: Chain shifts beyond smallest rear sprocket against the frame stays.	Limit screw H is not screwed in far enough.	Screw in limit screw until the upper pulley is aligned with the smallest sprocket.
Chain shifts poorly or not at all onto the smallest sprocket.	Limit screw H is screwed too far.	Screw out bolt until upper pulley is aligned with the smallest sprocket.
	Shifter cable is too tight.	Screw in the adjusting barrel at the right hand shifter until chain shifts down with ease.
	Shifter cable does not slide correctly.	Check shifter cable and lubricate if necessary. Clean or replace cable and housing.
	Shifter cable housing is too short.	Mount a longer cable housing.
Chain shifts beyond largest rear sprocket and drops against the spokes, or the cage plate runs into the spokes.	Limit screw L is not screwed in far enough.	Screw in limit screw L until upper pulley is aligned with the largest sprocket.
	Rear derailleur or derailleur hanger are bent.	Realign or replace.
Chain shifts poorly to larger sprocket, but easily to smaller sprocket.	Shifter cable is not taut enough.	Turn adjusting barrel counter-clockwise at right hand shifter until the chain performs downshifts easily.
Chain shifts easily to larger sprocket, but poorly to smaller sprocket.	Shifter cable is too taut.	Turn adjusting barrel clockwise at right hand shifter until the chain performs downshifts easily.
	Shifter cable does not slide correctly.	Check shifter cable and lubricate if necessary. Clean or replace cable and housing.
	Shifter cable housing is too short.	Mount a longer cable housing.

SPECTRO FRONT HUBS / QUICK RELEASES

TECHNICAL DATA



- Hub Caps And Improved Sealing
- Matched System Design
- Bearing Protection For Longer Life



FRONT
HUBS

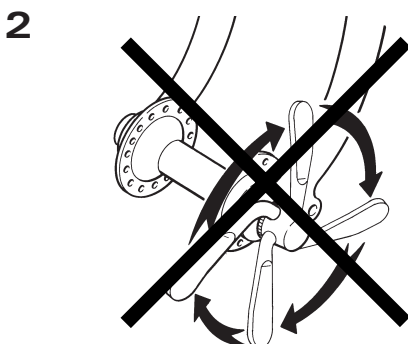
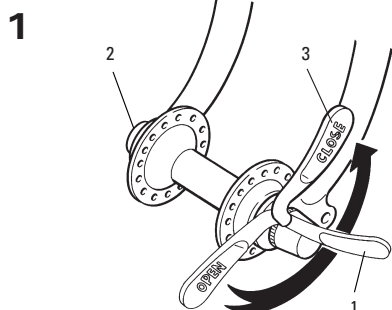
		Hub – Hollow Axle	Hub – Solid Axle
Axle	Part No.	—	—
	Over Locknut Dim.	100 mm	100 mm
	Length	107 mm	136 mm
	Type	Hollow / for Quick Rel.	Solid
	Material	Steel	Steel
Spoke	Ends Diameter	9 mm	M9x1
	Holes	36	36
	Hole Diameter	2.5 mm	2.5 mm
	Hole Reference ø	39 mm	39 mm
	Flange Dist. to 1/2 OLD	29.6 mm	29.6 mm
	Bearing	Cone	Cone
	Sealing	Labyrinth	Labyrinth
	Weight	180g	210g
	Finish	Aluminum Turned	Aluminum Turned

Q.
R.

	Spectro Quick Releases	
Part No.	—	—
Type	Front	←
Over Locknut Dim.	100	←
Axle Length, L	124 mm	128 mm
Frame Dropout	3.5 – 6.5 mm	5.0 – 8.0 mm
Usable for Suspension	●	●
Weight	90 g	←
Lever Material	Steel	←

SPECTRO FRONT HUBS / QUICK RELEASES

ASSEMBLY



- Fit wheel into dropouts and align.
- Fastening wheel/solid axle:
- Slide washers onto axle ends.
- Fit axle nuts: Torque 30 – 40 Nm (265 – 350 in.lbs.).

Fastening wheel/quick release (Fig. 1):

- Only use quick release devices with the correct length.
- Turn release lever (1) outwards until it is at least at a right angle to the bike.
- Tighten adjusting nut (2) as much as possible by hand.
- Turn release lever (1) to the closed position (3) (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 (2) 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:

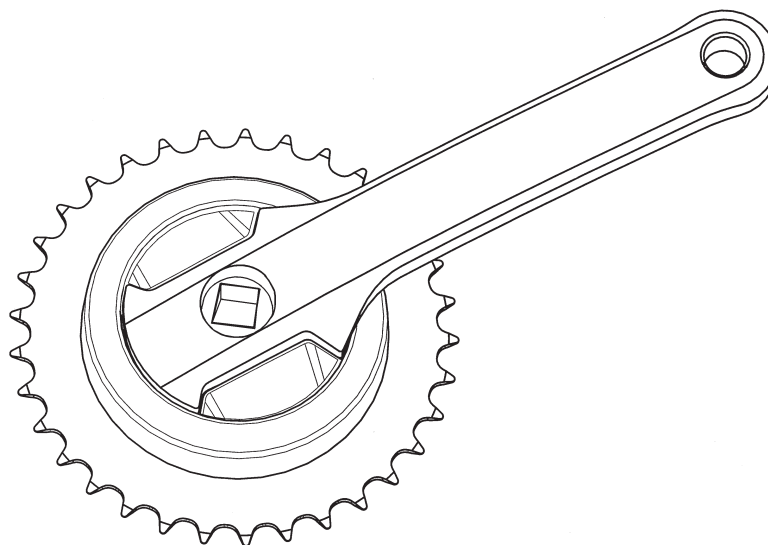
- **Do not tighten wheel by turning the quick release device right round (Fig. 2)!**
- **Only use hand force with the skewer.**
- **By incorrectly mounting the skewer or the wheel in the dropout, or by wrongly adjusting the closing force, the wheel may come loose and fall off during the ride. This may lead to severe rider injury or death.**

SPECTRO CRANKSET

TECHNICAL DATA / ASSEMBLY REQUIREMENTS



- Cold Forged Aluminum
- Improved Design
- Even And Smooth Surface



CRANKSET

Crankset – Compact Drive	
Part No.	—
Number of Teeth	33
For Chain Type	$\frac{1}{2}'' \times \frac{1}{8}''$ or $\frac{1}{2}'' \times \frac{3}{32}''$
Chain Line	44.5 mm
Crank Length	170 mm
BB Spindle Length	120 mm symmetric
BB Spindle Taper	JIS
Combatibility	Spectro 3x7/S7/P5/T3
Chain Guard Ring	Without
Low Profile	●
Weight	710g
Material Crank	Aluminum
Material Chainring	Steel
Finish Crank	Polished
Finish Chainring	Matt Chrome Plated

SPECTRO CRANKSET

ASSEMBLY

- Slide pedal crank onto spindle taper of bottom bracket axle.
Do not grease or oil spindle taper!
- Tighten screw of pedal crank/bottom bracket axle connection.
Torque 40 Nm (350 in.lbs.).

SPECTRO VT 5000 / 3000

TECHNICAL DATA / ASSEMBLY REQUIREMENTS

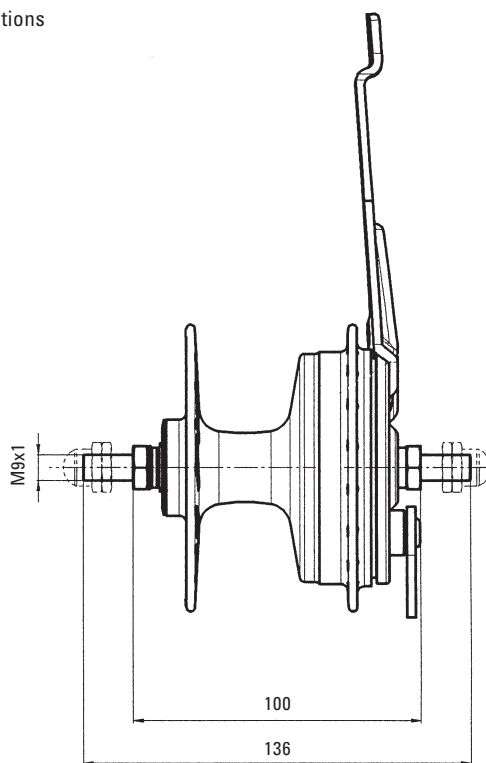
- Excellent Stopping Power In All Weather Conditions
- Practically Maintenance Free
- Highly Responsive Front Wheel Drum Brake

Front fork:

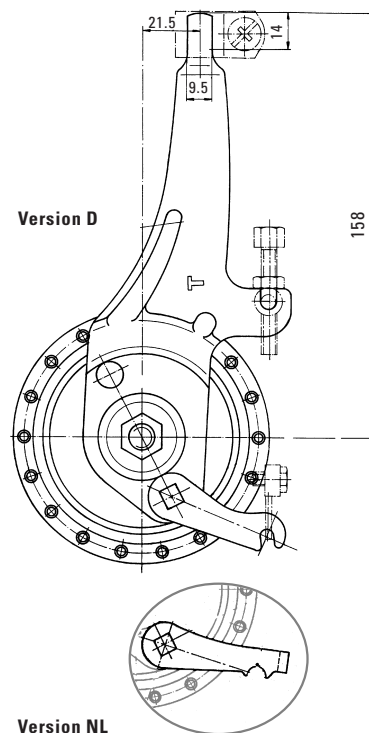
The strength must be such that with a maximum torque of 300 Nm (2700 in.lbs.) on the wheel no residual deformation can occur on the front fork.

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

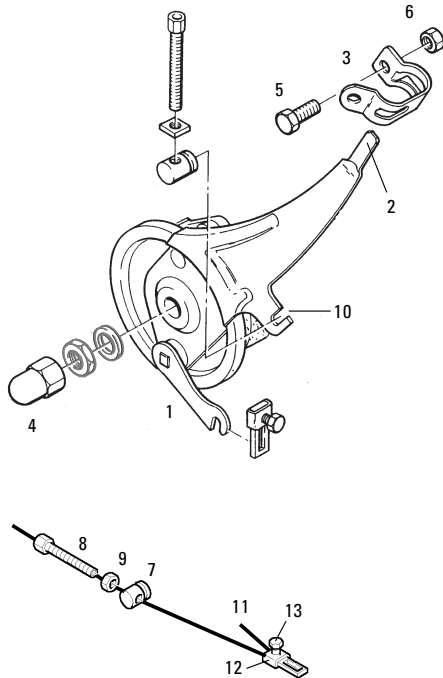


DRUM BRAKE

		VT 5000			VT 3000			
	Part No.	—	—	—	—	—	—	—
	Brake anchor plate	Version D	Version D	Version NL	Version D	Version NL		
	Over Locknut Dim.	100 mm	100 mm	100 mm	100 mm	100 mm		
	Length	135 mm	135 mm	145 mm	135 mm	135 mm		
Axle	Type	Solid	Solid	Solid	Solid	Solid		
	Material	Steel	Steel	Steel	Steel	Steel		
Spoke	Ends Diameter	M9x1	M9x1	M9x1	M9x1	M9x1		
	Holes	36	36	36	36	36		
	Hole Diameter	2.9 mm	2.9 mm	2.9 mm	3/3.3 mm	3/3.3 mm		
	Hole Reference ø	89 mm	89 mm	89 mm	86 mm	86 mm		
	Bearing	Cartridge	Cone	Cone	Cone	Cone		
	Sealing	Lip Seal	Dust Cap	Dust Cap	Dust Cap	Dust Cap		
Finish	Weight	750 g	750 g	750 g	770 g	770 g		
	Hub Shell Material	Aluminum	←	←	Aluminum/galvan. Steel	←		
	Finish	Clear Coat	←	←	Aluminum/Silver	Silver	Silver	Black



1



FITTING WHEEL IN FRONT FORK

- Spoke the hub 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 minimum leverage of 3.8.

- 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. $\frac{2}{3}$ 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).
- 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)

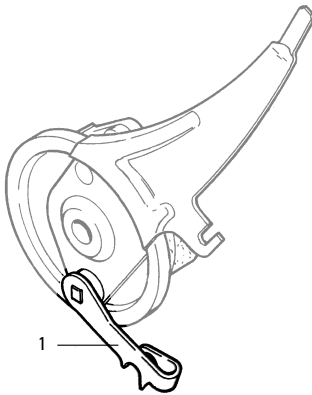
ADJUSTMENT DRUM BRAKE

- 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!

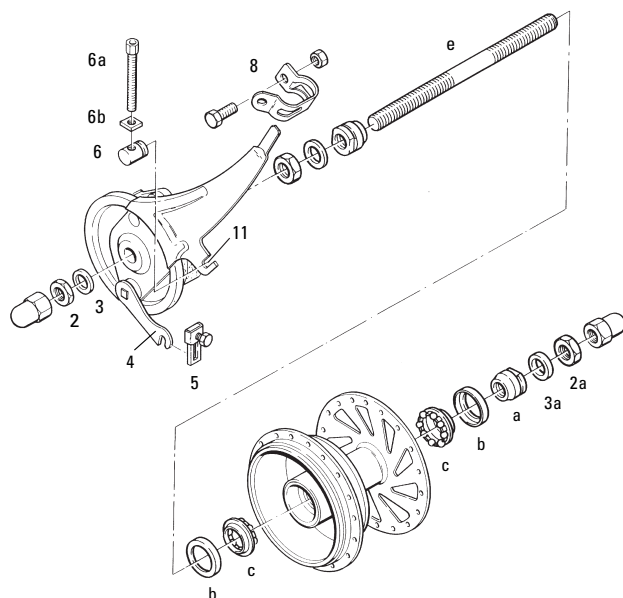
2



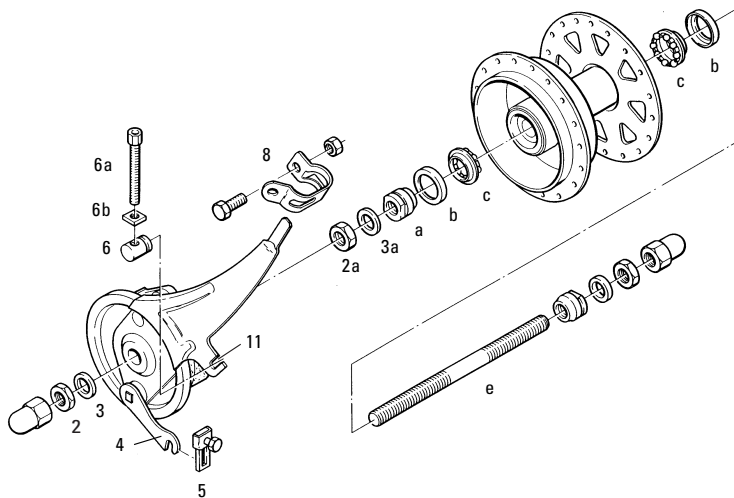
SPECTRO VT 5000 / 3000

MAINTENANCE

1 VT 5000



2 VT 3000



REMOVE FRONT WHEEL

- Detach cable at brake lever (if necessary, screw in adjusting bolt).
- Screw off both axle nuts.
- Remove wheel from front fork.

DISMANTLING HUB

see Fig. 1 + 2

- Unscrew lock nut (2) and remove complete brake anchor plate.
- Unscrew lock nut (2a, wrench 15 mm across flats) while counter-holding the adjusting cone (a) with a 14 mm hexagon wrench. Remove washer (3a).
- Unscrew adjusting cone (a) and remove axle (e) from the hub shell.
- Clean parts and check for wear.

REASSEMBLY HUB

see Fig. 1 + 2

- Grease ball retainer (c) and insert in the bearing shells with the balls first. Press in dust cap (b) flush with the hub shell.
- Insert axle (e), screw on adjusting cone (a) and adjust bearing plate. **The mounting must be free from play, but the bearings must not be under pressure.**
- Fit washer (3a), screw on lock nut (2a), hold adjusting cone (a) in place and tighten nut to a torque of 15 – 20 Nm (133 – 177 in.lbs.).
- Insert brake anchor plate. Pull brake lever (4, Fig. 1 + 2) to the limit position and hold in place to align (centre) the brake shoes in the brake drum.
- Fit washer (3) and tighten lock nut (2) to a torque of 15 – 20 Nm (133 – 177 in.lbs.).

FITTING WHEEL IN FRONT FORK

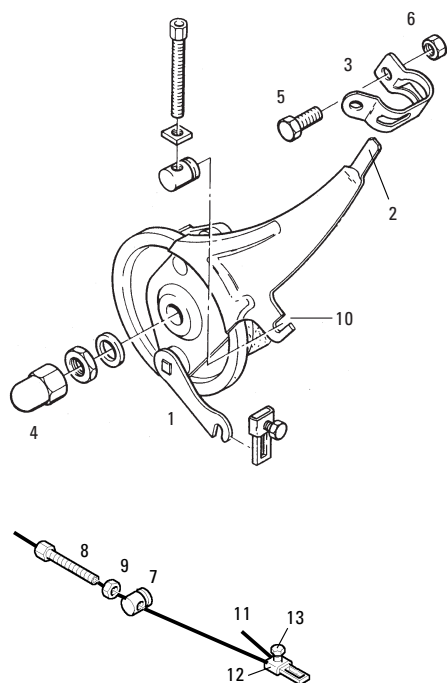
- Spoke the hub as normal.
- Placing the wheel in front fork. The brake lever (1, Fig. 1) goes on the left side viewed from behind the rear of the bicycle. Guide the top end of brake anchor plate (2) into the brazing part of the fork if fitted. If there is no brazing part, use VT pipe clamp (3).
- Slide 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:

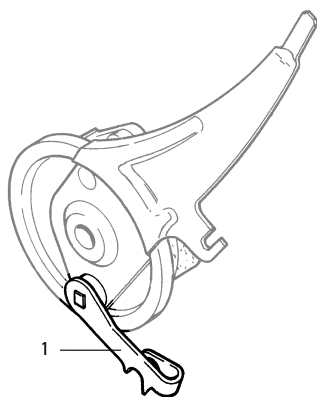
The clamp must be seated on the fork with no play.



3



4



CONNECTING DRUM BRAKE

Caution:

Only use brake levers with a cable moving distance of at least 15 mm and a minimum leverage of 3.8.

- 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. $\frac{2}{3}$ 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).
- 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)

OPERATION

- The drum brake can be controlled very precisely and provides very effective braking deceleration compared with conventional bicycles brakes. However, the drum brake only reaches maximum braking power after a certain breaking-in period.
- 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, surface rust 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 surface rust. This will prevent the brake from locking suddenly**
- **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!**

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!

MAINTENANCE

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

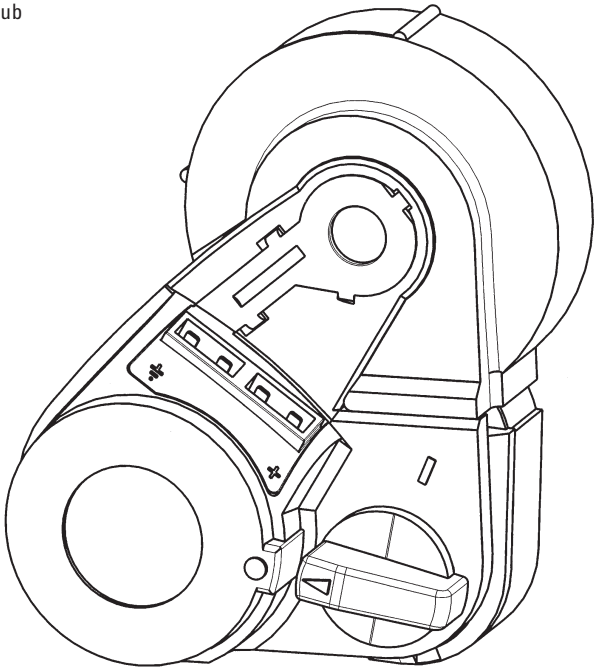
The brake anchor plate must be replaced if oil or other substances containing grease get into the brake pads. Oily brake pads reduce braking effect and cause the brake to fail completely. This may result in accidents with extremely serious injuries.

SPECTROLUX V6

TECHNICAL DATA / ASSEMBLY REQUIREMENTS

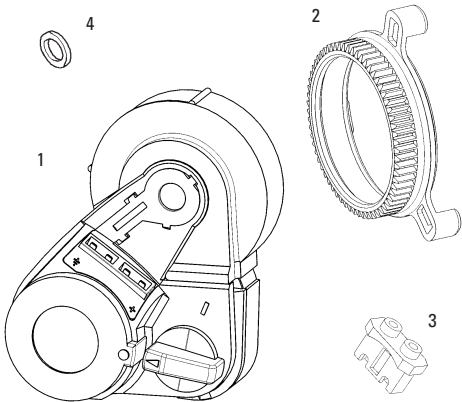
- Defined Interaction Between Generator And Rear Hub
- Attaches To The Rear Hub
- High Efficiency Generator And Transmitting
- Easy On/Off
- No Welded On Adapter Pieces Necessary
- 1 Adapter Ring For Use On Multiple Size Hubs
- Compatible With Other Accessories
- Grounded On The Frame
- Secure Cable Plugs
- Second Cable Position Option

Suitable for Spectro Hubs S7 and P5, versions with coaster brake and without brake.



SYSTEM COMPONENTS

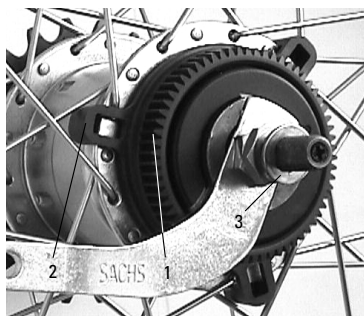
- Generator (1) with dust cover
- Adapter (2)
- Cable plug (3), 2x
- Washer (4), for hubs with coaster brake



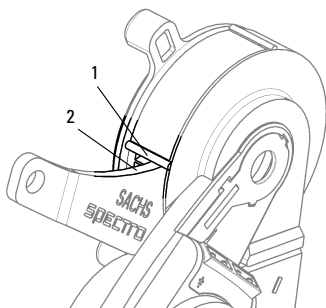
SPECTROLUX	Compatibility		Spectrolux V6
		Part No.	—
		Voltage	6V
		Output	3W
		Drive	via toothed adapter on rear hub
		Wheel Sizes	24" and larger
		Spokes	36
		Suitable for hub	Spectro P5 with coaster brake
			Spectro P5 without brake
			Spectro S7 with coaster brake
			Spectro S7 without brake
		Weight	230 g
		Finish	Grey



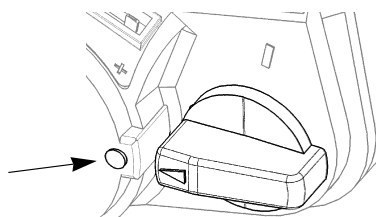
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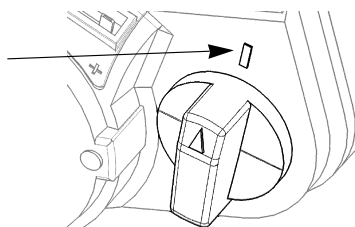
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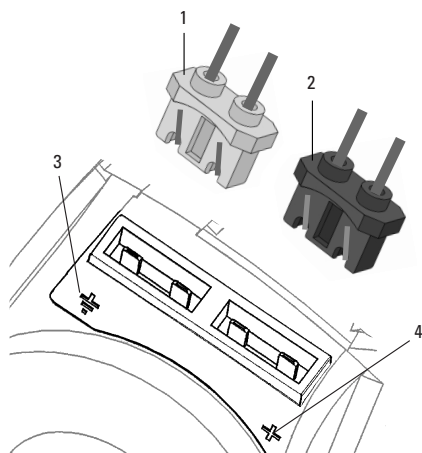
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4



5



INSTALLING GENERATOR

Snap on toothed adapter (1, **Fig. 1**) with the 3 lugs (2) directly over the spoke flange, **not** over crossed spokes.

Only for versions with coaster brake:

- Fit a washer 1.5 mm thick (3) to the axle between hub and generator.
- Fit generator while control knob is in position "●" (OFF) (**Fig. 3**) onto the hub axle as far as the limit position, fit wheel as usual and screw on axle nuts by hand.
- After fitting the wheel, turn generator counter-clockwise until the edge of the housing (1, **Fig. 2**) is resting on the top edge of the brake lever (2). Hold generator in this position and then tighten the axle nuts. Tightening torque approx. 35 Nm (310 in.lbs.).

Only for versions without brake:

- Fit generator while control knob is in position "●" (OFF) (**Fig. 3**) onto the hub axle as far as the limit position, fit wheel as usual and screw on axle nuts by hand.
- The position of the generator can be varied. However, it should not collide with frame or add-on parts. We recommend a position in which the control knob is almost vertical in position "I" (ON) (**Fig. 4**).
- Tighten axle nuts, torque approx. 35 Nm (310 in.lbs.).

Caution:

- **The axle projecting at the dropout (regardless of axle attachments, e.g. mudguard strut) must have a supporting thread length of approx. 8 mm for the axle nut.**
- **Do not grease or oil toothing.**

ROUTING CABLES

Route 2-pin cables for front and rear lights along the frame and connect.

Advice:

The generator is normally earthed via the axle nut – frame connection. For improved operational reliability, however, we recommend that the earth connections are always used.

FITTING DOUBLE PLUG

- Cut double cable from front light and rear light to length (add a few cm for assembly loop) and **strip approx. 10 mm**.
- Insert earth cables from front light and rear light into the grey double plug = earth (1, **Fig. 5**) so that **5 mm** of the stripped cable end can be folded over towards the small slot on the plug.
- Insert positive cables from front light and rear light into the black double plug = positive (2, **Fig. 5**) in the same way and fold over **5 mm**.
- Insert grey plug (1) into socket with symbol (3, earth/⊥) on generator and click into place.
- Insert black plug (2) into socket with + symbol (4, positive/+) on generator in the same way.

Functional check:

- Turn control knob to the "I" (ON) position (gearwheel meshes with toothing on the adapter)
- Spin wheel – check that front and rear lights are working. In case of malfunction, please refer to the troubleshooting guide.

TROUBLESHOOTING

Problem	Cause	Remedy
Only version with brake: Rhythmic knocking noise when cycling.	Insufficient distance between adapter and generator, 1.5 mm washer not fitted.	Fit washer between hub and generator.
Scraping noise when cycling.	Dust cover scraping against adapter toothing.	Fit dust cover in exactly the right position.
Light does not come on.	Generator not switched on.	Switch on generator
	Cable connections at front light, rear light or generator have malfunction (no contact).	Check connections – establish contact (remove corrosion if necessary).
	Earth connections have malfunction (no contact).	Check connections – establish contact (remove corrosion if necessary).
	Earth and positive connections reversed.	Ensure correct plug position on front light, rear light and generator.
	Bulb missing or faulty.	Fit bulb or check that it is working.
	Cable damaged – interruption.	Check cable, renew if necessary.

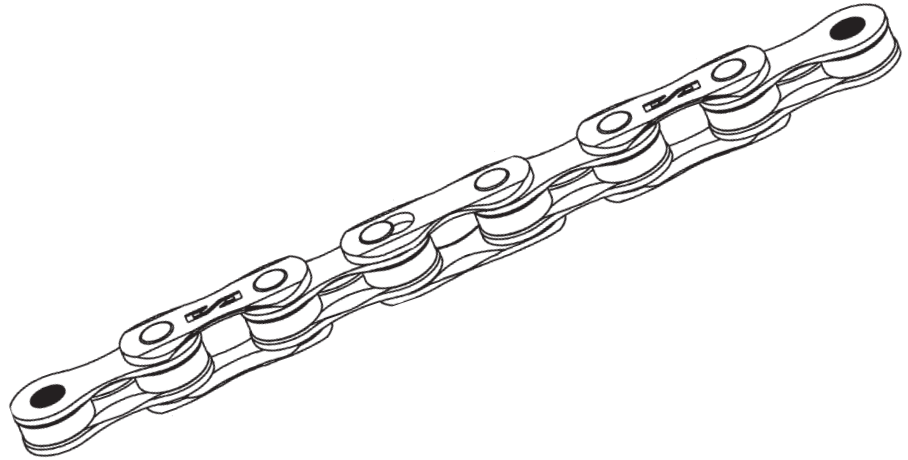
POWER CHAINS

TECHNICAL DATA / ASSEMBLY REQUIREMENTS

- Chamfered Outer And Inner Links
- Narrow Width
- Chrome Hardened Pins
- Power Link
- Stamped Outer Plate (only PC89R)

CHROME HARDENED PINS

The pins of the SRAM Power Chains undergo a special treatment which hardens the pins. At a temperature of 1000 degrees Celcius, a **chromium layer** is applied to the steel pin to make them **exceptionally hard** and to reduce chain wear. Under the same riding conditions, the life span of a chrome hardened chain is many times **longer** than one that is not chrome hardened.



POWER CHAINS

	PC99	PC89R	PC69	PC59	PC68
Part No.	—	—	—	—	—
Application	MTB	Road	MTB	MTB	MTB
Compatibility Front	HG/EXA-Drive	HG/EXA-Drive	HG/EXA-Drive	HG/EXA-Drive	HG/IG/PG/EXA-Drive
Compatibility Rear	HG/EXA-Drive	HG/EXA-Drive	HG/EXA-Drive	HG/EXA-Drive	HG/HG-I/IG/PG/EXA-Drive
Max. No. of sprockets	9 only	9 only	9 only	9 only	max. 8
Dimension	$\frac{1}{2} \times \frac{11}{128}$ "	$\frac{1}{2} \times \frac{11}{128}$ "	$\frac{1}{2} \times \frac{11}{128}$ "	$\frac{1}{2} \times \frac{11}{128}$ "	$\frac{1}{2} \times \frac{3}{32}$ "
Length	6.7 mm	6.7 mm	6.7 mm	6.7 mm	7.1 mm
Riveting	Cross Step	Step	Step	Step	Cross Step
Chrome Hardened	Yes	Yes	Yes	Yes	Yes
Push Power	2000 N / 450 in.lbs.	1500 N / 340 in.lbs.	1500 N / 340 in.lbs.	1500 N / 340 in.lbs.	2000 N / 450 in.lbs.
Tensile Strength	9800 N / 2200 in.lbs.	9800 N / 2200 in.lbs.	9800 N / 2200 in.lbs.	9800 N / 2200 in.lbs.	9800 N / 2200 in.lbs.
Weight (116 links)	300 g	295 g	300 g	300 g	315 g
External Pin Plate	Silver/Nickel Plated	Silver/Nickel Plated	Silver/Nickel Plated	Silver/Nickel Plated	Silver/Nickel Plated
Internal Pin Plate	Silver/Nickel Plated	Silver/Nickel Plated	Silver/Nickel Plated	Grey/Polished	Silver/Nickel Plated
Weight Reduced		Yes			
Connecting Method	Power Link 9SPD	Power Link 9SPD or Pin	Power Link 9SPD or Pin	Power Link 9SPD or Pin	Power Link S or Pin

POWER CHAINS

	PC58	PC48	PC38	PC10	PC1
Part No.	—	—	—	—	—
Application	MTB	MTB	MTB	MTB	Gear Hubs
Compatibility Front	HG/IG/PG/EXA-Drive	HG/IG/PG/EXA-Drive	HG/IG/EXA-Drive	HG	Single
Compatibility Rear	HG/HG-I/IG/PG/EXA-Drive	HG/HG-I/IG/PG/EXA-Drive	HG/HG-I/IG/PG/EXA-Drive	HG	Single
Max. No. of sprockets	max. 8	max. 8	max. 8	max. 7	1
Dimension	$\frac{1}{2} \times \frac{3}{32}$ "	$\frac{1}{2} \times \frac{3}{32}$ "	$\frac{1}{2} \times \frac{3}{32}$ "	$\frac{1}{2} \times \frac{3}{32}$ "	$\frac{1}{2} \times \frac{1}{8}$ "
Length	7.1 mm	6.8 mm	6.9 mm	6.9 mm	7.8 mm
Riveting	Step	Step	Step	Step	Step
Chrome Hardened	Yes	Yes			
Push Power	1500 N / 340 in.lbs.	1500 N / 340 in.lbs.	1100 N / 350 in.lbs.	1000 N / 225 in.lbs.	800 N / 180 in.lbs.
Tensile Strength	9800 N / 2200 in.lbs.	9800 N / 2200 in.lbs.	9800 N / 2200 in.lbs.	9800 N / 2200 in.lbs.	8000 N / 1800 in.lbs.
Weight (116 links)	315 g	305 g	305 g	305 g	350 g
External Pin Plate	Silver/Nickel Plated	Grey/Polished	Grey/Polished	Brown/Annealed	Brown/Annealed
Internal Pin Plate	Grey/Polished	Black/Burnished	Brown/Annealed	Brown/Annealed	Brown/Annealed
Connecting Method	Power Link S or Pin	Power Link S or Pin	Power Link G or Pin	Power Link G or Pin	Snap Lock or Pin

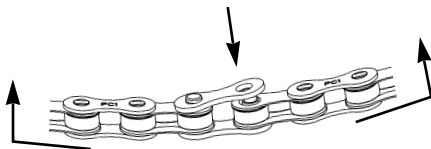


1



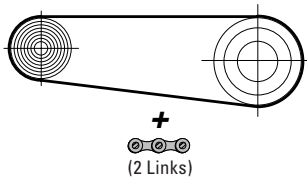
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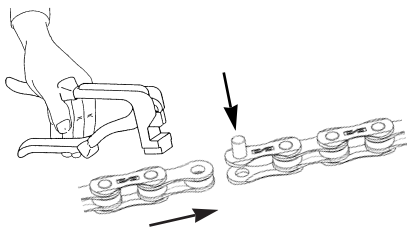
NEW

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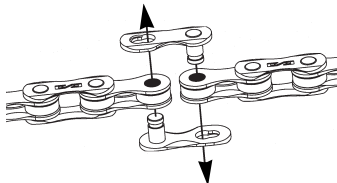


(2 Links)

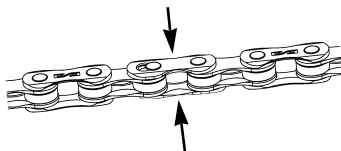
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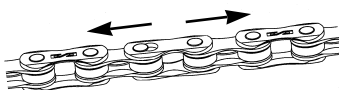
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7



PC 1 $\frac{1}{2}$ " x $\frac{1}{8}$ " (SINGLE AND MULTI- SPEED HUBS)

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. 1).
- Gently flex the chain until the outside connector plate snaps into position over the second pin (Fig. 2).

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.

$\frac{1}{2}$ " x $\frac{3}{32}$ " AND $\frac{1}{2}$ " x $\frac{11}{128}$ " (DERAILLEURS / SINGLE AND MULTI-SPEED HUBS)

Chain length:

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

SRAM derailleurs:

- Place chain over largest front chain-wheel and largest rear sprocket and add 2 links or 1 link + Power Link (Fig. 3).
- 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. 4) 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.
- The use of the SRAM assembly plier (Part No. 00 2799 980 001) is recommended for PC 68, PC 58 and PC 48.

Power Link connecting links:

Caution:

Use only as specified, to avoid material damage or the rider to fall off his bicycle resulting in injury.

Closing:

- Fit chain, bring the ends together and insert both halves of the Power Link into the chain ends. (Fig. 5)
- Press both halves of the Power Link together (Fig. 6) and lock in place by pulling the chain apart. (Fig. 7)

Opening:

- Press both plates of the Power Link together (Fig. 6) 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.

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.

Advice:

Worn sprockets should also be replaced when a new chain is fitted.

Power Link G	grey coloured for PC 38, PC 10
Power Link S	silver coloured for PC 68, PC 58, PC 48
Power Link 9SPD	gold coloured for PC 99, PC 89R, PC 69, PC 59

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Action Bicycle USA
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Carlstadt, NJ, 07072
Ph: +1 800.284.2453

Bicycle Tech International
3201 B Richards Lane
Sante Fe, NM, 87505
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Quality Bicycle Products
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Raleigh Bicycle Co., USA
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POB 1231
53111 Givataim
Ph: +972 5 24 299 05
Fx: +972 35 75 45 29

JAPAN

Kawashima Cycle Supply Corp.
No. 4-2-4 Kushiya-Cho Higashi
Sakai, Osaka 590
Ph: +81-722 381 557

Nichinao Shokai Co., Ltd.
6-16-8 Sotokanda Chiyoda-ku
Tokyo 101
Ph: +81-3 3382 6251

NEW ZEALAND

Cycle Supplies
PO Box 33051
Christchurch
Ph: +64.3.338.6803

H.S. White & Sons
7C Anwen Place, East Tamacki
PO Box 58331 Greemouni
Auckland
Ph: +64.9273.7690

SOUTH AFRICA

Cape Cycle Systems (PTY) LTD.
10/12 Argo Road, Wetton
7780 Cape Town
Ph: +27.21.761.3528

SUPPORT WHO TO CALL / SRAM WARRANTY / SPARE PARTS



WHO TO CALL

For fast SRAM dealer warranty and technical support help, please contact us at the appropriate locations listed hereafter.

(Other Countries: please contact your local distributor.)

NORTH AMERICA

Dealer Helpdesk Number:

(800)-346-2928

EUROPE

Dealer Helpdesk Number for the following countries:

- | | |
|-----------|-------------------|
| • Austria | • The Netherlands |
| • Belgium | • Norway |
| • Denmark | • Portugal |
| • France | • Sweden |
| • Germany | • Switzerland |
| • Italy | • United Kingdom |

(00 800) 77 26 43 57
S R A M H E L P

SRAM 2 YEAR WARRANTY

In addition to standard legal warranty entitlements, SRAM components include a two year full warranty beginning on the date of purchase. This warranty is subject to the following conditions:

1. During the warranty period, SRAM components with material or production defects which as a result adversely affect the proper functioning of such components, shall either be repaired or replaced with a functioning SRAM component free of charge, whereby we are free to determine whether repair or replacement should take place. If a component cannot be replaced or repaired, the purchaser shall receive, free of charge, a component of higher value from the current SRAM product line. Defective components which have been replaced become the sole property of SRAM.
2. Any other warranty claims not included in this statement are void. This especially includes any disassembly or assembly costs (for instance by the dealer), which shall not be covered by SRAM.
3. Warranty claims are only valid upon presentation of a proper proof of purchase.
4. Parts subject to normal wear and tear (for example brake sleeves, brake pads, chains etc.) and damage which is caused by improper use, specifically caused by disregard for our assembly and operating instructions, shall not be covered by this warranty. Furthermore, this warranty shall not cover damages caused by the use of parts of different manufacturers or otherwise which are not compatible or suitable for use with SRAM components.
5. The servicing of a valid warranty claim shall neither extend this warranty nor establish a warranty period.
6. If a defect is discovered, please contact the dealer where the bicycle or the SRAM component in question was purchased.

SPARE PARTS

You can find an extensive spare parts program in SRAM's Spare Parts List Model Year 2000 - Publ. Number 8500.

NOTICES

NOTICES



WORLD HEADQUARTERS
CHICAGO, ILLINOIS U.S.A.

SRAM Corporation
361 West Chestnut Street
Chicago, Illinois 60610
phone: +1-312-664-8800
fax: +1-312-664-8826

ASIA HEADQUARTERS
TAICHUNG, TAIWAN

SRAM Taiwan
No. 1598-8 Chung Shan Road
Shen Kang Hsiang, Taichung County 429
Taiwan R.O.C.
phone: +886-4-561-3678
fax: +886-4-561-3686

EUROPEAN HEADQUARTERS
AMERSFOORT, THE NETHERLANDS

SRAM Europe Sales & Service B.V.
Basicweg 12-05
3821 BR Amersfoort
The Netherlands
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fax: +31-33-457-0200
e-mail: srameurope@sram.com

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