2004

TECHNICAL MANUAL
MTB COMPONENTS

ENGLISH






SRAM

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CONTENTS
MTB COMPONENTS

REAR DERAILLEURS



X.0 / X.9 / X.7 / 5.0 / 4.0 / 3.0 3
SRAM ESP 9

FRONT DERAILLEURS



3.0 13

TWIST SHIFTERS

X.0 / X.9 / X.7 / Rocket / Attack 17
5.0 / Centera 20



4.0 Pro / MRX Pro 22
3.0 Comp / MRX Comp 22
3.0 Plus / 3.0 / MRX Plus / MRX 26

TRIGGER SHIFTERS



X.9 / X.7 / Rocket / Attack 28

INTEGRATED BRAKE SHIFTERS



3.0 IBS / MRX IBS 30



CASSETTES 32



POWER CHAINS 36

BRAKES



9.0 / 7.0 / 5.0 Linear Pull Brakes 38



9.0 / 7.0 / 5.0 Brake Levers 40



Two-Axis Brake Levers 42



SMARTBAR 45



SEALS Nightcrawler / Brakecrawler 57

SUPPORT



Who to call / Warranty / Spare Parts 64

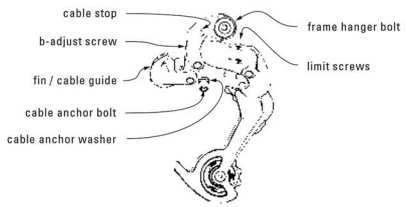
X.0 / X.9 / X.7 / 5.0 / 4.0 / 3.0 · REAR DERAILLEURS
TECHNICAL DATA / ASSEMBLY REQUIREMENTS

1:1

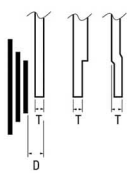
X·0 X·9 X·7 5·0 4·0 3·0

		X.0		X.9 NEW	X.7 NEW	5.0 NEW	4.0	3.0
	Part No.	—	—	—	—	—	—	
	Speeds	9/8		9/8	9/8	9/8/7	9/8/7	
	Shifter Compatibility	SRAM X.0 / 9.0 / 7.0 / 5.0 / 4.0 / 3.0			←	←	←	
Chain Capacity	Total	37 T	45 T	45 T	45 T	45 T	45 T	
Chain Capacity	Cage Length	Medium	Long	Long	Long	Long	Long	
Chain Capacity	Max Sprocket	34 T		34 T	34 T	34 T	34 T	
Chain Capacity	Min Sprocket	11 T		11 T	11 T	11 T	11 T	
Chain Capacity	Front Difference	22 T		22 T	22 T	22 T	22 T	
Design	Parallelogram Spring	Titanium		Steel	Steel	Steel	Steel	
Design	Pulleys	Cartr. bearing, stainless		Cartr. bearing	Bushing, hardened	Bushing, hardened	Bushing	
Design	Cogsets & Chains	SRAM / IG & HG 9/8spd		SRAM / IG & HG 9/8spd	SRAM / IG & HG 9/8/7spd	SRAM / IG & HG 9/8/7spd	SRAM / IG & HG 9/8/7spd	
Design	Direct Mount	Yes		Yes	Yes	Yes	Yes	
Design	Weight	205 g	210 g	270 g	265 g	320 g	285 g	275 g
Design	Upper Knuckle	Forged Aluminum / Anod.		Aluminum	Aluminum	Aluminum	Aluminum	Composite
Design	Outer Link	Forged Aluminum		Alu die-cast / Painted	Alu die-cast / Painted	Grilon Composite	Grilon Composite	
Design	Inner Link	Aluminum / Anodized		Steel / E-coat	Steel / E-coat	Steel / E-coat	Steel / E-coat	
Design	Outer Cage	Forged AL / Anodized		Forged Aluminum	Stamped AL / Anodized	Steel / E-coat	Steel / E-coat	
Design	Inner Cage	Forged AL / Anodized		Forged Aluminum	Steel	Grilon Composite	Grilon Composite	
Design	Hanger Bolt	Aluminum / Anodized		Aluminum / Anodized	Aluminum / Anodized	Steel	Steel	

DERAILLEUR ANATOMY

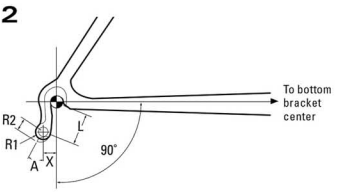


1



12.7 mm ± 1

2



COMPATIBILITY

Shifters	SRAM® X.0, X.9, X.7, 5.0, 4.0, 3.0 shifters ONLY
Cogsets	11-30, 11-32, 12-32, 11-34, 12-34
Chains	SRAM Power Chain and Shimano® HG & IG
Chainrings	22-32-42/44, 24-34-46, 26-36-46/48
Cable	1.1 or 1.2 mm high quality cables
Housing	4 or 5 mm compressionless cable housing with end cap maximum diameter of 5.8 mm.

FRAME DIMENSIONS

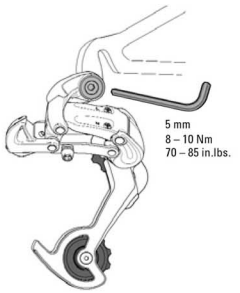
(see figure 1 and 2)

- For optimal ESP rear derailleur performance, the recommended rear derailleur hanger length (L) should be 28 – 30 mm.
- For a given L, use the chart below to determine other ESP rear derailleur hanger specifications.

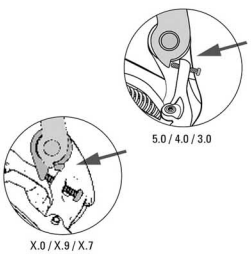
L	X	A	R1	R2	T
28	6 – 10	25° – 30°	8.5 max	11.5 – 13.5	7 – 8
30	7.5 – 10	25° – 30°	8.5 max	11.5 – 13.5	7 – 8

X.0 / X.9 / X.7 / 5.0 / 4.0 / 3.0 · REAR DERAILLEURS ASSEMBLY

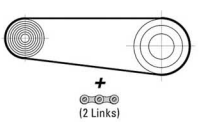
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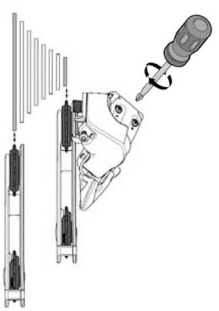
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3



4



ASSEMBLY

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 using a 5 mm hex head wrench ***(Fig. 1).***
- Check that the b-adjust washer tab (b-adjust screw) is clear of the rear derailleur dropout tab ***(Fig. 2).***
- Tighten the 5 mm hex hanger bolt to 8 – 10 Nm (70–85 in.lbs.).

CHAIN LENGTH

A properly measured chain will prevent damage in case of accidentally shifting to the largest chain ring and cog combination. This type of accidental shifting may cause harmful binding or seizure of the chain and potentially cause severe damage.

- Bypassing the rear derailleur, run the chain around the largest cog/large chainring combination ***(Fig. 3).***
  – For rear suspension frames, position the rear suspension for the greatest chain length required.
- Add 2 LINKS or 1 link + Power Link to this length for proper chain length.

LIMIT SCREWS ADJUSTMENT

- View the rear derailleur and pulleys from behind the rear of the bicycle ***(Fig. 4).***
- 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 2,5/3 mm hex wrench, turn the b-adjust screw until the chain gap equals approximately 6 mm ($^1/_4$") from tip of the cog to tip of upper guide pulley ***(Fig. 5).***

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

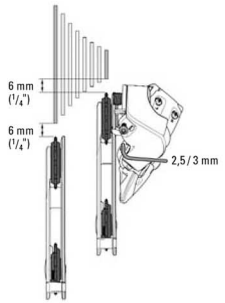
Advice:

- ***Bicycles equipped with an 11-28 cassette may require you to set the chain gap at the smallest cog. This is due to the shallow angle of the cassette in relation to the steeper movement of the 9spd rear derailleur.***
- ***It is best to measure the rear piece of cable housing between the frame and derailleur after the chain gap is determined. See figure and chart for recommended lengths.***
- ***Do not use the b-adjust screw to adjust the rear derailleur to act as a chain-tensioning device or to prevent chain suck. This increases the chain gap causing poor shifting performance.***

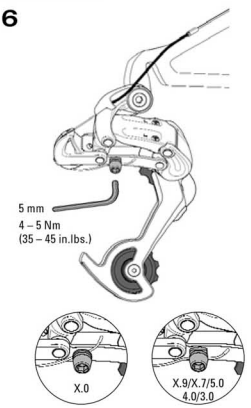
INDEX SHIFTING ADJUSTMENT

- Check that the chain and the rear derailleur are in the smallest cog position.
- Measure and cut the rear piece of cable housing. Make sure that it is not too short or long ***(see figure and chart).***
- 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. 6)***.
- 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.

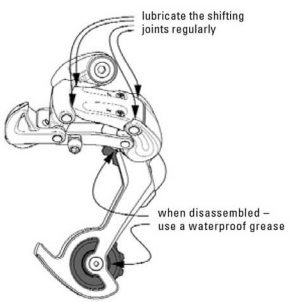
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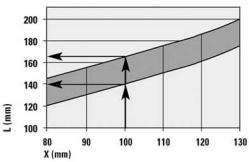
- Repeat the two former steps until shifting and cable tension is accurate.
- While turning the crank, shift the chain up and down the cassette and chain rings several times to ensure that your derailleur is indexing smoothly.

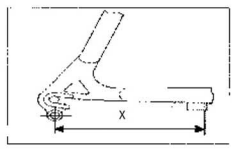
MAINTENANCE

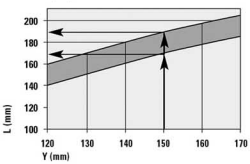
- Do not use solvants or corrosive materials to clean the components.
- Lubricate the shifting joints regularly ***(Fig. 7)***.
- Grease any cable guides (e.g. beneath the bottom bracket).

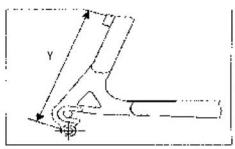
CHART / LENGTH OF CABLE HOUSINGS

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









Caution:
It is imperative to respect the values for the correct length of cable housing.

TROUBLESHOOTING

Problem	Cause	Remedy
Chain jumps from smallest sprocket to frame dropout.	High gear limit screw is not adjusted properly.	Turn in screw H until the guide pulley is aligned with the smallest sprocket.
Difficult or impossible to shift chain onto smallest sprocket.	High gear limit screw is not adjusted properly.	Unscrew screw H until the guide pulley is aligned with the smallest sprocket.
Chain jumps over largest sprocket and falls between the spokes and largest sprocket or inner cage plate scrapes on spokes.	Low gear limit screw is not adjusted properly.	Turn in screw L until the guide pulley is aligned with the largest sprocket.
	Rear derailleur or derailleur hanger is bent.	Straighten or replace.
Delayed shifting.	Clearance between guide pulley / sprocket is too large.	Adjust b-adjust screw by rotating counterclockwise.
Rough shifting behavior.	Clearance between guide pulley / sprocket is too small.	Adjust b-adjust screw by rotating clockwise.
Chain jumps two gears on small sprocket	Shift cable insufficiently tensioned.	Turn barrel adjuster on the shifter counterclockwise.
Delayed shifting onto larger sprocket	Shift cable insufficiently tensioned.	Turn barrel adjuster on the shifter counterclockwise.
Delayed shifting onto smaller sprocket	Shift cable is too tight.	Turn barrel adjuster on the shifter clockwise.
	Excessive cable friction, pinched or poorly routed cable.	Lubricate or replace cable and housing. Check for excessive bending of cable housing.

X.0 · REAR DERAILLEURS MAINTENANCE

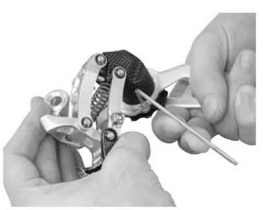
1



2



3



PULLEY MAINTENANCE

Advice:
X.0 pulleys use stainless steel balls and races for exceptional durability and corrosion resistance. When riding in wet, muddy, sandy or dusty conditions, periodic maintenance will insure a very long service life.

- Remove the pulleywheel screws (1, ***Fig. 1)*** using a 2,5 mm allen key.
  Make sure to fully engage the key in the 2,5 mm hex hole.
- Remove the aluminum covers (2) from both sides of the pulleywheels.
- Clean all parts carefully and give the bearings a spin to make sure they run smoothly.
- If not, remove the black rubber seal from one side of the bearing ***(Fig. 2)***, clean the bearing thoroughly and repack with a quality waterproof grease, then replace the rubber seal by pressing it into place.
- When assembling the covers to the pulleywheel, fill the gap between bearing and covers with a quality waterproof grease.
- Tightening torque of the pulleywheel screws is 2,5 Nm.
- If pulleys or bearings are damaged, replace with new SRAM X.0 pulleys, which come complete with new bearings and aluminum covers.

CAGE PIVOT MAINTENANCE / CAGE SPRING TENSION ADJUSTMENT

- Hold the cage in an extended position so you can reach the cage stop screw on the outside of the cage ***(Fig. 3)***.

Advice:
Disassembly and assembly of the cage stop screw are easier if there is a second helping hand!

- Make sure to firmly hold the whole assembly when unthreading the 2,5 mm cage stop screw ***(Fig. 3)***.
- Now slowly unwind the cage (clockwise) one turn to relieve spring tension.
- Remove the cage and spring. The cage must be rotated to the position shown in ***Figure 4*** to remove it from the derailleur body.
- Clean thoroughly the shaft, cage plate, derailleur body and spring.
- Re-grease the shaft, spring tab and spring supports with a quality waterproof grease.
- Reinstall the spring and cage ***(Fig. 5)***. There are several cavities in the derailleur body, but only one is designed for installing the spring tab. Be certain to use the correct cavity.

Advice:
X.0 cage plates have 3 mounting holes (Fig. 6). The lowest spring tension position offers ideal tension for all around XC riding.
Higher spring tension holes are only recommended after extensive use has reduced the spring's stiffness.

- Wind the cage counterclockwise to tension the spring. The cage can not be fully installed into the derailleur body until the cage is at the same position as when it was originally removed ***(Fig. 4)***.
- After the cage is fully installed in the derailleur body, continue to rotate the cage counterclockwise until you can access the cage stop screw hole.
- A helping hand holding the cage makes the installation of the 2,5 mm stop screw easier ***(Fig. 3)***.
  Tightening torque of the cage stop is 1,5 Nm (13 in.lbs.).

4



5



6



TROUBLESHOOTING

Problem	Cause	Remedy
Chain jumps from smallest sprocket to frame dropout.	High gear limit screw is not adjusted properly.	Turn in screw H until the guide pulley is aligned with the smallest sprocket.
Difficult or impossible to shift chain onto smallest sprocket.	High gear limit screw is not adjusted properly.	Unscrew screw H until the guide pulley is aligned with the smallest sprocket.
Chain jumps over largest sprocket and falls between the spokes and largest sprocket or inner cage plate scrapes on spokes.	Low gear limit screw is not adjusted properly.	Turn in screw L until the guide pulley is aligned with the largest sprocket.
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SRAM ESP · REAR DERAILLEURS
TECHNICAL DATA / ASSEMBLY REQUIREMENTS

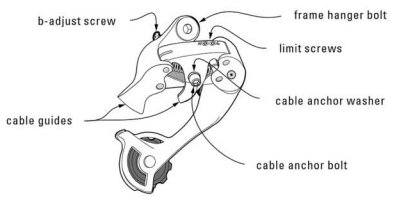
1:1

- 1:1 Actuation Ratio
- Larger Pivots, Links And Cages
- Expanded Gear Range
- Slant Parallelogram Design
- Outward Facing Limit Screws

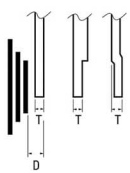
SRAM ESP

		SRAM ESP
	Part No.	—
	Speeds	8 / 7
	Shifter Compatibility	SRAM X.0 / X.9 / X.7 / 5.0 / 4.0 / 3.0
Chain Capacity	Total	45T
Chain Capacity	Cage Length	Long
Chain Capacity	Max Sprocket	34T
Chain Capacity	Min Sprocket	11T
Chain Capacity	Front Difference	22T
	Spring Enhancement	Yes
	Pulleys	Bushing
	Cogsets & Chains	SRAM / IG & HG 8/7spd
	Direct Mount	Yes
	Weight	239 g
Design	Knuckles	Grilon Composite
Design	Outer Link	Grilon Composite
Design	Inner Link	Steel / Zinc Coat
Design	Outer Cage	Grilon Composite
Design	Inner Cage	Grilon Composite
Design	Hanger Bolt	Steel

DERAILLEUR ANATOMY

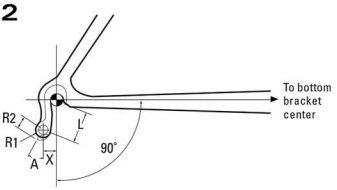


1



12.7 mm ± 1

2



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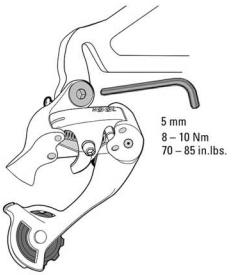
(see figure 1 and 2)

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

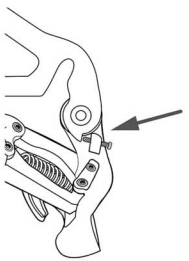
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30	7.5 – 10	25° – 30°	8.5 max	11.5 – 13.5	7 – 8

SRAM ESP · REAR DERAILLEURS ASSEMBLY

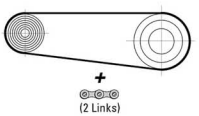
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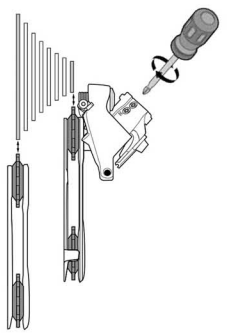
2



3



4



ASSEMBLY

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.

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A properly measured chain will prevent damage in case of accidentally shifting to the largest chain ring and cog combination. This type of accidental shifting may cause harmful binding or seizure of the chain and potentially cause severe damage.

- Bypassing the rear derailleur, run the chain around the largest cog/large chainring combination ***(Fig. 3)***.
  – For rear suspension frames, position the rear suspension for the greatest chain length required.
- Add 2 LINKS or 1 link + Power Link to this length for proper chain length.

LIMIT SCREWS ADJUSTMENT

- View the rear derailleur and pulleys from behind the rear of the bicycle ***(Fig. 4)***.
- Using a small screwdriver, turn the limit screw marked 'H' on the outer link of the derailleur to align the upper guide pulley center with the outboard edge of the smallest cog – clockwise moves the guide pulley inboard towards the wheel.
- While turning the crank, push the rear derailleur towards the larger cogs by hand.
- Align the upper guide pulley under the largest cog, center to center, by turning the limit screw marked 'L' on the outer link – clockwise moves the guide pulley outboard away from the spokes.

CHAIN GAP ADJUSTMENT

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

- Shift chain to the small chain ring.
- While turning the crank, push the rear derailleur inboard by hand to the largest cog.
- Hold the derailleur in this position while making the following adjustment:
- Use a 3 mm hex wrench, turn the b-adjust screw until the chain gap equals approximately 6 mm ($^1/_4$") from tip of the cog to tip of upper guide pulley ***(Fig. 5)***.

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

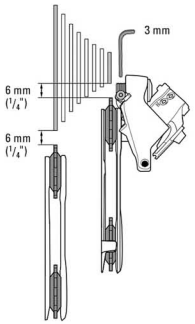
Advice:

- ***Bicycles equipped with an 11–28 or 14–28 cassette may require you to set the chain gap at the smallest cog. This is due to the shallow angle of the cassette in relation to the steeper movement of the rear derailleur.***
- ***Precision index shifting may require small changes of the b-adjustment while setting the proper cable tension.***
- ***Do not use the b-adjust screw to adjust the rear derailleur to act as a chain-tensioning device or to prevent chain suck. This increases the chain gap causing poor shifting performance.***

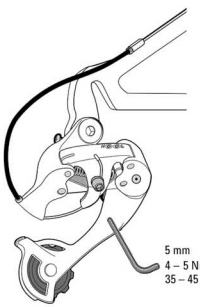
INDEX SHIFTING ADJUSTMENT

- Check that the chain and the rear derailleur are in the smallest cog position.
- Measure and cut the rear piece of cable housing. Make sure that it is not too short or long.
- 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.
- Thread the rear derailleur cable through the rear derailleur-housing stop and through the cable guide on the fin ***(Fig. 6)***.
- Pull the cable tight and position it under the cable anchor washer ***(Fig. 6)***.
- 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.

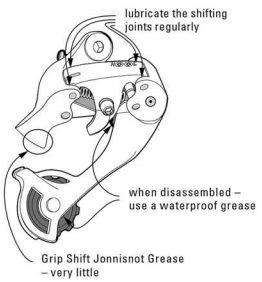
5



6



7



- 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.

MAINTENANCE

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

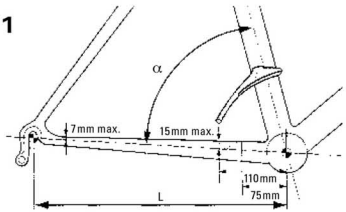
TROUBLESHOOTING

Problem	Cause	Remedy
Chain jumps from smallest sprocket to frame dropout.	High gear limit screw is not adjusted properly.	Turn in screw H until the guide pulley is aligned with the smallest sprocket.
Difficult or impossible to shift chain onto smallest sprocket.	High gear limit screw is not adjusted properly.	Unscrew screw H until the guide pulley is aligned with the smallest sprocket.
Chain jumps over largest sprocket and falls between the spokes and largest sprocket or inner cage plate scrapes on spokes.	Low gear limit screw is not adjusted properly.	Turn in screw L until the guide pulley is aligned with the largest sprocket.
	Rear derailleur or derailleur hanger is bent.	Straighten or replace.
Delayed shifting.	Clearance between guide pulley / sprocket is too large.	Adjust b-adjust screw by rotating counterclockwise.
Rough shifting behavior.	Clearance between guide pulley / sprocket is too small.	Adjust b-adjust screw by rotating clockwise.
Chain jumps two gears on small sprocket	Shift cable insufficiently tensioned.	Turn barrel adjuster on the shifter counterclockwise.
Delayed shifting onto larger sprocket	Shift cable insufficiently tensioned.	Turn barrel adjuster on the shifter counterclockwise.
Delayed shifting onto smaller sprocket	Shift cable is too tight.	Turn barrel adjuster on the shifter clockwise.
	Excessive cable friction, pinched or poorly routed cable.	Lubricate or replace cable and housing. Check for excessive bending of cable housing.

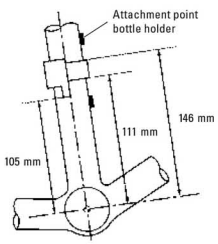
3.0

		3.0	
Clamp Size	28.6 mm	●	●
	31.8 mm	●	●
	34.9 mm	●	●
	Cable Routing	Top Pull	Bottom Pull
	Cage Size	Compact	Compact
	Top Gear	44/42T	44/42T
	Large - Small Capacity	22T	22T
	Large - Middle Capacity	min. 10T	min. 10T
	Chainstay Angle	66-69°	66-69°
Shifter	SRAM Micro adj.	●	●
	SRAM Indexing	●	●
	Shim. Rapidf. Plus	●	●
	Cable Housing	4 or 5 mm, compressionl., 5.8 mm end caps diam.	
	Weight	123 g	123 g
Design	Outer Link	Steel / Grilon Composite	Steel / Grilon Composite
	Inner Link	Steel	Steel
	Chain Cage	Steel / Chrome Plated	Steel / Chrome Plated
	Clamp	Steel	Steel
	Band Clamp	●	●

1



2



FRAME DIMENSIONS
(see Fig. 1)
- The seat tube should be positioned in the center of the bottom bracket shell.

Length of chainsty:
- MTB/Trekking L > 420 mm.
- Rear frame alignment must be symmetrical.

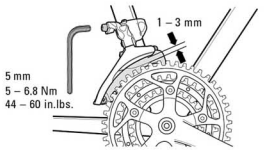
Chainstay angle:
α = 66° – 69°.

Chainline:
47.5 – 50 mm.
(Measurement from the center of the bracket to the center of middle chainring.)

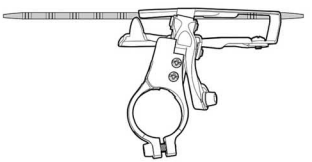
Necessary clearance:
(see Fig. 2)
- Attachment point bottle holder.
- Be sure to leave enough clearance between bottle cage holes and clamp location.

3.0 · FRONT DERAILLEURS ASSEMBLY / MAINTENANCE

1



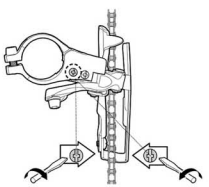
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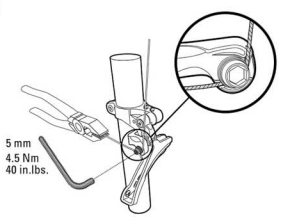
3



4



5



ASSEMBLY

SRAM 3.0 front derailleurs are designed to work with both compact chainwheels and full size chainwheels. Please note your chainwheel specific adjustment instructions below.

- Attach the front derailleur to the seat tube.
- Adjust the position along the seat tube so that clearance between the front derailleur cage and the large chainring is 1 – 3 mm ***(Fig. 1)***.
  At the same time, align the front derailleur cage outerplate to be parallel with the chainrings ***(Fig. 2)***.
- Tighten the 5 mm hex clamp bolt to 5 – 6.8 Nm (44 – 60 in.lbs.).
- If a set plug is present, remove it at this time ***(Fig. 3)***.

LOW LIMIT ADJUSTMENT

(see Fig. 4)

- Set the chain to the largest rear cog and the smallest front chainring.
- Adjust the low limit screw so that clearance between the front derailleur cage inner plate and the chain is:
  Compact 0 – 0.5 mm
  Full size 0 – 0.5 mm (46T Largest Chainr.)
  1 – 1.5 mm (48T Largest Chainr.)

CONNECTING CABLE

- Check that the chain and the front derailleur are in the smallest chainring position.
- Rotate the front shifter so the indicator mark is aligned with the '1' mark.
- Turn the front shifter barrel adjuster clockwise fully into the shifter, then turn counterclockwise 1 full turn.
- Feed the front shifter cable through the cable housing and stops.
- Run the cable under the cable anchor washer and hold taut.
  – Top pull ***(Fig. 5)***.
  – Bottom pull ***(Fig. 6)***.
- Tighten the 5 mm hex cable anchor bolt to 4.5 Nm (40 in.lbs.). Be careful not to crush or deform the cable.
- Shift the chain up and down the chainrings several times.

HIGH LIMIT ADJUSTMENT

(see Fig. 8)

- Set the chain to the smallest rear cog and the largest front chainring.
- Adjust the high limit screw so that clearance between the front derailleur cage outer plate and the chain is 0 – 0.5 mm.

INDEX SHIFTING ADJUSTMENT

(see Fig. 7)

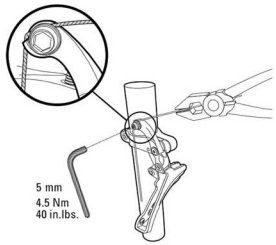
For SRAM indexing shifter models only (not micro adjust shifter):

- Set the chain to the largest rear cog and the middle front chainring.
- Adjust the front shifter barrel adjuster so that clearance between the front derailleur cage inner plate and the chain is 0 – 0.5 mm.

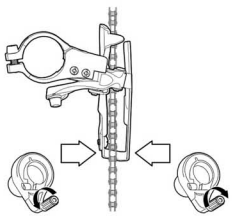
MAINTENANCE

- Do not use solvants or corrosive materials to clean the components.
- Lubricate the shifting joints regularly ***(Fig. 9)***.
- Grease any cable guides (e.g. beneath the bottom bracket).

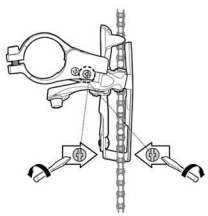
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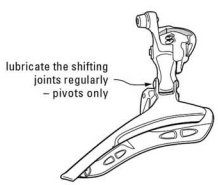
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8



9



TROUBLESHOOTING

Problem	Cause	Remedy
Shifter actuated, chain fails to change chainring.	Shift cable incorrectly clamped.	Check shift cable and correct as necessary (cable clamp; cable housing stops; cable recess in shifter; cable tension).
	High / low limit screw poorly adjusted.	Correct limit screws.
	Clearance between cage and large chainring is too big / small.	Correct position (1 – 3 mm).
Chain falls over large / small chainring.	High / low limit screw poorly adjusted.	Correct limit screws.
Chain is on middle chainring and scrapes against the cage when the largest or smallest sprocket is selected.	Precise adjustment of cable tension is incorrect.	Readjust shifter barrel adjuster.
Force required to actuate gears is too high.	Excessive cable friction, pinched or poorly routed cable.	Lubricate or replace cable and housing. Check for excessive bending of cable housing.
Crank collides with front derailleur.	High gear limit screw incorrectly adjusted.	Correct high limit screw.
	Cage not parallel with chainring.	Correct the front derailleur position.

X.0 / X.9 / X.7 / ROCKET / ATTACK · TWIST SHIFTERS
TECHNICAL DATA / ASSEMBLY REQUIREMENTS



X·0 X·9

		X.0			X.9 NEW	
	Version	Shorty	Shorty	Shorty	Shorty	Shorty
	Shifter Type	Front / Micro adjust	Front / Index	Rear 1:1 / ESP	Front / Micro adjust	Front / Index
	Speeds		3	9 8		3
Compatibility	Derailleur	SRAM & Shimano	SRAM & Shimano	SRAM X.0 / X.9 / X.7 / 5.0	SRAM & Shimano	SRAM & Shimano
Compatibility	Crankset	Shimano	Shimano		Shimano	Shimano
	Cable Pull Release	SRS	SRS	SRS	SRS	SRS
	Cable	Stainless Steel	←	←	Stainless Steel	←
	Gear Indication	Window	Window	Window	Window	Window
	Barrel Adjuster	Indexing	Indexing	Indexing	Indexing	Indexing
	Clamping Diameter	22.3 mm	22.3 mm	22.3 mm	22.3 mm	22.3 mm
	Shifter Length	70 mm	←	←	70 mm	←

X·9 X·7 ROCKET

		X.9 NEW		X.7 NEW			Rocket
	Version	Shorty		Shorty	Shorty	Shorty	Shorty
	Shifter Type	Rear 1:1 / ESP		Front / Micro adjust	Front / Index	Rear 1:1 / ESP	Front / Micro adjust
	Speeds	9	8		3	9 8	
Compatibility	Derailleur	SRAM X.0 / X.9 / X.7 / 5.0		SRAM & Shimano	SRAM & Shimano	SRAM X.0 / X.9 / X.7 / 5.0	SRAM & Shimano
Compatibility	Crankset			Shimano	Shimano		Shimano
	Cable Pull Release	SRS		SRS	SRS	SRS	SRS
	Cable	Stainless Steel		Stainless Steel	←	←	Stainless Steel
	Gear Indication	Window		Window	Window	Window	Window
	Barrel Adjuster	Indexing		Indexing	Indexing	Indexing	Indexing
	Clamping Diameter	22.3 mm		22.3 mm	22.3 mm	22.3 mm	22.3 mm
	Shifter Length	70 mm		70 mm	←	←	70 mm

ROCKET ATTACK

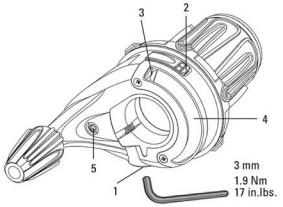
		Rocket			Attack			
	Version	Shorty	Shorty		Shorty	Shorty	Shorty	
	Shifter Type	Front / Index	Rear 2:1		Front / Micro adjust	Front / Index	Rear 2:1	
	Speeds	3	9	8		3	9	8
Compatibility	Derailleur	SRAM & Shimano	Shimano		SRAM & Shimano	SRAM & Shimano	Shimano	
Compatibility	Crankset	Shimano			Shimano	Shimano		
	Cable Pull Release	SRS	SRS		SRS	SRS	SRS	
	Cable	Stainless Steel	←		Stainless Steel	←	←	
	Gear Indication	Window	Window		Window	Window	Window	
	Barrel Adjuster	Indexing	Indexing		Indexing	Indexing	Indexing	
	Clamping Diameter	22.3 mm	22.3 mm		22.3 mm	22.3 mm	22.3 mm	
	Shifter Length	70 mm	←		70 mm	←	←	

CABLE HOUSING

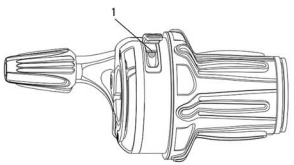
- Use only new high quality cable and compressionless cable housing with end caps.
- When choosing cable housing lengths, be sure to allow enough housing for an extreme turn of the handlebars in both directions.
- Note also, that different stem lengths and cable stop positions effects cable housing length.

X.0 / X.9 / X.7 / ROCKET / ATTACK · TWIST SHIFTERS ASSEMBLY / MAINTENANCE

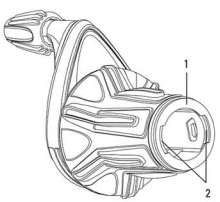
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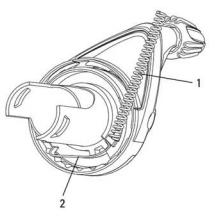
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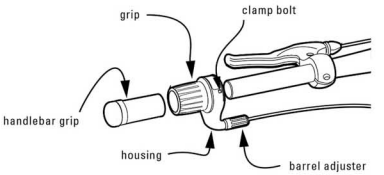
3



4



SHIFTER ANATOMY



ASSEMBLY

Front and Rear:

- Slide the shifter onto the handlebar.
  – If necessary, move the brake lever to allow for shifter and handlebar grip.
  – Bar end users – don't forget to leave room for the bar end.
- Rotate the shifter until the barrel adjuster is beneath (but out of the way of) the brake lever.
- Tighten the 3 mm hex clamp bolt (1, ***Fig. 1)*** to 1.9 Nm (17 in.lbs.).
- Slide the handlebar grip onto the handlebar.
  Caution:
  Never use lubricants or solvents to install handlebar grips. Handlebar grips provide safety function.
  For this reason, they should be mounted in such a way as to make sure they do not slip off handlebar!
- Feed the cable through the cable housing and stops.
- Attach cable to the derailleur.
- Adjust indexing per derailleur instruction.

Caution:

- ***Always check the front and rear brake levers for proper operation.***
- ***If there is interference between shifters and brake levers, re-adjust lever and shifter placement.***
- ***Check again for proper operation!***

CABLE CHANGE

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.***

Front and Rear:

- Detach the cable from the derailleur.
- Cut cable off 15 cm (6") from shifter barrel adjuster. Discard old cable and cable housing.
- From the edge (2, ***Fig. 1)***, pull open the cable change hatch. The hinge of the hatch should remain attached to the shifter.
- Rotate the shifter fully in the cable release direction (3). (Gear "1" on the front shifter, gear "9" on the rear shifter.)
- Look for cable head entry ***(Fig. 2)***.
- Using a small flat head screw driver, push back the tab (1, ***Fig. 2)*** covering the cable head.
- Push cable up/out of the shifter and discard.
- Feed the new cable through the cable entry and out the barrel adjuster.
- Pull cable snug to seat cable head under tab.
- Replace cable change hatch.
- Feed the cable through the new cable housing and frame stops.
- Attach cable to the derailleur.
- Adjust indexing per derailleur instruction.

GRIP REPLACEMENT

Advice:

Do not remove the triangular housing cover to make the change.

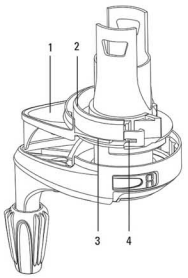
Removal:

- Rotate the shifter fully in the cable release direction (3, ***Fig. 1)***. (Gear "1" on the front shifter, gear "9" on the rear shifter.)
- Using a 3 mm hex wrench (1, ***Fig. 1)***, remove shifter from the handlebar.
- While holding shifter housing and grip together in one hand, remove axial fixture ring (1, ***Fig. 3)*** by squeezing together housing tabs (2).
- While pushing/rotating the grip lightly forward (release direction), slowly move the grip outward away from housing.
  – Pulling the grip quickly may cause the coil spring (1, ***Fig. 4)*** to move out of position.

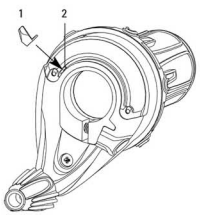
Replacement:

- Replace front end of coil spring (1, ***Fig. 4)*** on to tab in groove if necessary.
- While sliding grip up towards the housing, align spring tab so that it catches the open end of the coil spring.
- Rotate grip forward slightly compressing the coil spring and engage grip and tab into the housing.
- Replace axial fixture ring (1, ***Fig. 3)*** over housing tabs (2).

5



6



INTERNAL CLEANING

Advice:

When shifting performance is compromised, try replacing the cable and housing before you disassemble the shifter for cleaning.

Disassembly:

- Follow "GRIP REPLACEMENT/Removal".
- Remove lens cover (4, ***Fig. 1)***.
- Remove gear indicator needle (3) by pulling straight out.
- Remove the spool's coil spring (1, ***Fig. 4)***.
- Using small pliers, pull leaf spring (2) straight out. Take note of the shape of the spring so that you can replace it in the correct direction.
- Remove housing cover screw (5, ***Fig. 1)***. Slide housing cover (1, ***Fig. 5)*** and spool (2) out at the same time being careful not to break the tab (3) on the cover.
- Clean all parts with soapy water only.
- Using only Grip Shift Jonnisnot, grease housing tube, detentes and cable track at housing bend.

Reassembly:

- Slip tab (3, ***Fig. 5)*** on housing cover into groove (4) on spool.
- Slide spool and cover into housing and install cover screw (5, ***Fig. 1)***.
- Place leaf spring (2, ***Fig. 4)*** into spool. Push down slightly on opposite end of spring, then seat spring completely into spool and housing.
- Follow "GRIP REPLACEMENT/Replacement".
- Rotate shifter to full release position.
- Install gear indication needle (1, ***Fig. 6)*** in slot (2).
- Replace gear indicator lens (4, ***Fig. 1)*** and screws.
- Install shifter on to bars and check for proper function.

5.0 / CENTERA · TWIST SHIFTERS
TECHNICAL DATA / ASSEMBLY REQUIREMENTS

5.0

		5.0			
	Version	—	—	—	—
	Shifter Type	Front / Micro adjust	Front / Index	Rear 1:1 / ESP	Rear 1:1 / ESP
	Speeds		3	9	8
Compatibility	Derailleur	SRAM & Shimano	SRAM & Shimano	SRAM 9.0 / 7.0 / 5.0	SRAM 9.0 / 7.0 / 5.0 / 4.0
Compatibility	Crankset	Shimano	Shimano		
	Cable Pull Release	FFS	FFS	Standard	Standard
	Cable	Stainless Steel	←	←	←
	Gear Indication	Printed	Printed	Printed	Printed
	Barrel Adjuster	Indexing	Indexing	Indexing	Indexing
	Clamping Diameter	22.3mm	22.3mm	22.3mm	22.3mm
	Shifter Length	65 mm	←	←	←
	Weight	N/A	N/A	N/A	N/A

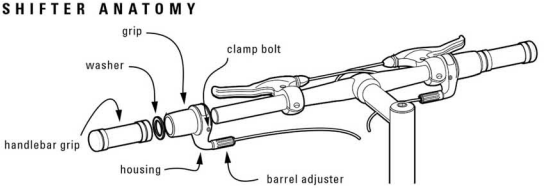
CENTERA

		Centera		
	Shifter Type	Front / Micro adjust	Front / Index	Rear 2:1
	Speeds		3	8
Compatibility	Derailleur	SRAM & Shimano	SRAM & Shimano	Shimano
Compatibility	Crankset	Shimano	Shimano	
	Cable Pull Release	FFS	FFS	Standard
	Cable	Stainless Steel	←	←
	Gear Indication	Printed	Printed	Printed
	Barrel Adjuster	Indexing	Indexing	Indexing
	Clamping Diameter	22.3mm	22.3mm	22.3mm
	Shifter Length	65 mm	←	←
	Weight	N/A	N/A	N/A

CABLE HOUSING

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

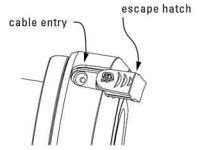
SHIFTER ANATOMY



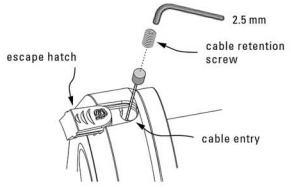
5.0 / CENTERA · TWIST SHIFTERS
ASSEMBLY / MAINTENANCE

1:1
2:1

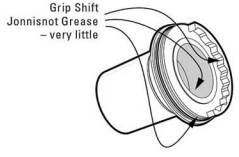
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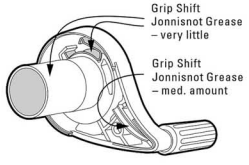


2



3





ASSEMBLY

Front and Rear:

- Slide the shifter onto the handlebar.
  - If necessary, move the brake lever to allow for shifter and handlebar grip.
  - Bar end users – don't forget to leave room for the bar end.
- Rotate the shifter until the barrel adjuster is beneath (but out of the way of) the brake lever.
- Tighten the 3 mm hex clamp bolt to 1.9 Nm (17 in.lbs.).
- Slide the plastic washer onto the handlebar.
- Slide the handlebar grip onto the handlebar.
  - **Solvents, lubricants or hair spray may damage the handlebar grips!**
  - Use **only** compressed air or water to aid installation.
- Feed the cable through the cable housing and stops.
- Attach the shifter cable to the derailleur.
- Adjust indexing per derailleur instructions.

Caution:

- ***Always check the front and rear brake levers for proper operation.***
- ***If there is interference between shifters and brake levers, re-adjust lever and shifter placement.***
- ***Check again for proper operation!***

CABLE CHANGE

Front and 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.***

- Detach the cable from the derailleur.
- Cut the cable off 15 cm (6") from shifter barrel adjuster. Discard old cable and cable housing.
- Remove the escape hatch ***(Fig. 1)***.
- Rotate the shifter so the indicator mark is aligned with the highlighted number. Look for the cable entry.
- **Only Rear shifter:** remove the 2.5 mm hex cable retention screw ***(Fig. 2)***.
- Remove and discard the rest of the old cable.
- Feed the new cable through the cable entry and out the barrel adjuster. Pull the cable snug.
- **Only Rear shifter:** replace the cable retention screw – be sure to turn until the screw contacts the cable head.
- Replace the escape hatch.
- Feed the cable through the new cable housing and stops.
- Attach the cable to the derailleur and adjust indexing per derailleur instruction.

MAINTENANCE

- ***Clean all shifter parts using only water and mild soap.***
- ***Use only Grip Shift Jonnisnot Grease for any shifter lubrication.***
- ***After proper cleaning relubricate the areas shown in Fig. 3.***

4.0 PRO / MRX PRO · TWIST SHIFTERS
TECHNICAL DATA / ASSEMBLY REQUIREMENTS

4.0 PRO

		4.0 Pro				
	Version	Half Pipe	Half Pipe	Half Pipe	Half Pipe	Half Pipe
	Shifter Type	Front / Micro adjust	Front / Index	Rear 1:1 / ESP	Rear 1:1 / ESP	Rear 1:1 / ESP
	Speeds		3	9 NEW	8	7
Compatibility	Derailleur	SRAM & Shimano	SRAM & Shimano	SRAM X.0/X.9/X.7/5.0/4.0/3.0		
Compatibility	Crankset	Shimano	Shimano			
	Cable Pull Release	SRS	SRS	SRS	SRS	SRS
	Cable	Standard Steel	←	←	←	←
	Gear Indication	Window	Window	Window	Window	Window
	Barrel Adjuster	Friction	Friction	Friction	Friction	Friction
	Clamping Diameter	22.3 mm	22.3 mm	22.3 mm	22.3 mm	22.3 mm
	Shifter Length	86 mm	←	←	←	←
	Weight	87 g	87 g	87 g	87 g	87 g

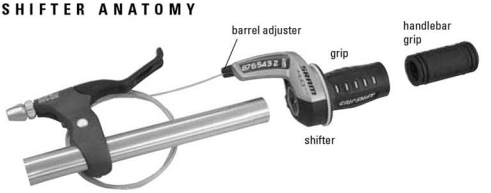
MRX PRO

		MRX Pro							
	Version	Half Pipe	Half Pipe	Half Pipe	Half Pipe	Half Pipe	Half Pipe	Half Pipe	Half Pipe
	Shifter Type	Front / Micro adjust	Front / Index	Rear 2:1			Rear Shimano Rapid Rise		
	Speeds		3	9 NEW	8	7	9 NEW	8	7
Compatibility	Derailleur	SRAM & Shimano	SRAM & Shimano	Shimano			Shimano Rapid Rise		
Compatibility	Crankset	Shimano	Shimano						
	Cable Pull Release	SRS	SRS	SRS			SRS		
	Cable	Standard Steel	←	←			←		
	Gear Indication	Window	Window	Window			Window		
	Barrel Adjuster	Friction	Friction	Friction			Friction		
	Clamping Diameter	22.3 mm	22.3 mm	22.3 mm			22.3 mm		
	Shifter Length	86 mm	←	←			←		
	Weight	87 g	87 g	87 g			87 g		

CABLE HOUSING

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

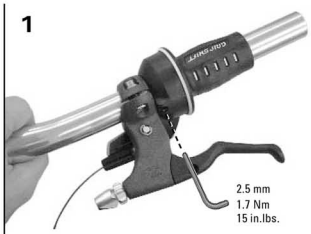
SHIFTER ANATOMY



4.0 PRO / MRX PRO · TWIST SHIFTERS ASSEMBLY / MAINTENANCE

1:1
2:1

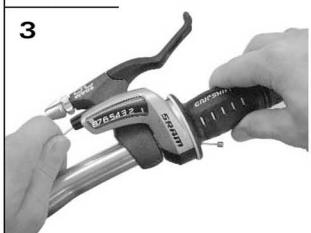
1



2



3



4



ASSEMBLY

Front and Rear:

- Slide the shifter onto the handlebar.
  – If necessary, move the brake lever to allow for shifter and handlebar grip.
  – Bar end users – don't forget to leave room for the bar end.
- Rotate the shifter until the barrel adjuster is above (but out of the way of) the brake lever and the gear indication is clearly visible from the riding position.
- Tighten the 2.5 mm hex clamp bolt ***(Fig. 1)*** to 1.7 Nm (15 in.lbs.).
- Slide the handlebar grip onto bar ***(Fig. 2)***.
  Caution:
  Never use lubricants or solvents to install handlebar grips. Handlebar grips provide safety function.
  For this reason, they should be mounted in such a way as to make sure they do not slip off handlebar!
- Feed the cable through the cable housing and frame stops.
- Attach cable to the derailleur.
- Adjust indexing per derailleur instructions.

Not recommended for use on thin walled alluminum handlebars such as Hyperlite® type handlebars.

Caution:

- ***Always check the front and rear brake levers for proper operation.***
  If there is interference between shifters and brake levers, re-adjust lever and shifter placement.
- ***Check again for proper operation!***

CABLE CHANGE

Caution:

- ***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 endcaps.***

- Detach the cable from the derailleur.
- Cut the cable off 6" (15 cm) from the shifter barrel adjuster.
- Discard the old cable and cable housing.
- Line up the "1" (front) or HIGHEST gear number (rear) mark with the indicator mark (MRX Pro Shimano Rapid Rise® Gear number "1" for front and rear). Look for the cable entry.
- Push cable up/out of the shifter and discard ***(Fig. 3)***.
- Feed the new cable through the cable entry and out the barrel adjuster ***(Fig. 4)***.
- Pull the cable snug.
- Feed the cable through the new cable housing and stops.
- Attach the cable to the derailleur and adjust indexing per the derailleur instructions.

MAINTENANCE

Clean all shifter parts using only water and mild soap.

3.0 COMP / MRX COMP · TWIST SHIFTERS
TECHNICAL DATA / ASSEMBLY REQUIREMENTS

3.0 COMP

NEW		3.0 Comp				
	Version	Shorty	Shorty	Shorty	Shorty	Shorty
	Shifter Type	Front / Micro adjust	Front / Index	Rear 1:1 / ESP	Rear 1:1 / ESP	Rear 1:1 / ESP
	Speeds		3	8	7	6
Compatibility	Derailleur	SRAM & Shimano	SRAM & Shimano	SRAM X.0/X.9/X.7/5.0/4.0/3.0		
Compatibility	Crankset	Shimano	Shimano			
	Cable Pull Release	SRS	SRS	SRS	SRS	SRS
	Cable	Standard Steel	←	←	←	←
	Gear Indication	Printed	Printed	Printed	Printed	Printed
	Barrel Adjuster	Friction	Friction	Friction	Friction	Friction
	Clamping Diameter	22.3 mm	22.3 mm	22.3 mm	22.3 mm	22.3 mm
	Shifter Length	67 mm	←	←	←	←
	Weight	67 g	67 g	67 g	67 g	67 g

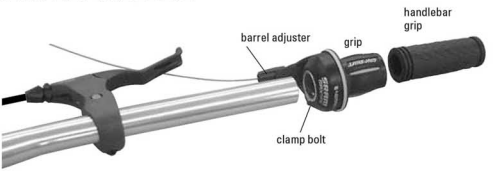
MRX COMP

NEW		MRX Comp								
	Version	Shorty	Shorty	Shorty	Shorty	Shorty	Shorty	Shorty	Shorty	
	Shifter Type	Front / Micro adjust	Front / Index	Rear 2:1				Rear Shimano Rapid Rise		
	Speeds		3	8	7	6	5	8	7	6
Compatibility	Derailleur	SRAM & Shimano	SRAM & Shimano	Shimano				Shimano Rapid Rise		
Compatibility	Crankset	Shimano	Shimano							
	Cable Pull Release	SRS	SRS	SRS				SRS		
	Cable	Standard Steel	←	←				←		
	Gear Indication	Printed	Printed	Printed				Printed		
	Barrel Adjuster	Friction	Friction	Friction				Friction		
	Clamping Diameter	22.3 mm	22.3 mm	22.3 mm				22.3 mm		
	Shifter Length	67 mm	←	←				←		
	Weight	67 g	67 g	67 g				67 g		

CABLE HOUSING

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

SHIFTER ANATOMY



3.0 COMP / MRX COMP · TWIST SHIFTERS ASSEMBLY / MAINTENANCE

1:1
2:1











ASSEMBLY

- Slide the shifter onto the handlebar ***(Fig. 1)***.
  – If necessary, move the brake lever to allow for shifter and stationary grip.
  – Bar end users – don't forget to leave room for the bar end.
- Rotate the shifter until the barrel adjuster is beneath (but out of the way of) the brake lever.
- Tighten the 2.5 mm hex clamp bolt ***(Fig. 2)*** to 1.7 Nm (15 in.lbs.).
- Slide the stationary grip onto the handlebar ***(Fig. 3)***.
  Caution:
  Never use lubricants or solvents to install handlebar grips. Handlebar grips provide safety function.
  For this reason, they should be mounted in such a way as to make sure they do not slip off handlebar!
- Feed the cable through the cable housing and stops.
- Attach the front/rear shifter cable to the front/rear derailleur.
- Adjust indexing per derailleur instructions.

Not recommended for use on thin walled alluminum handlebars such as Hyperlite® type handlebars.

Caution:

- ***Always check the front and rear brake levers for proper operation.***
  If there is interference between shifters and brake levers, re-adjust lever and shifter placement.
- ***Check again for proper operation!***

CABLE CHANGE

Caution:

- ***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 endcaps.***

- Detach the cable from the derailleur.
- Cut the cable off 6" (15 cm) from the shifter barrel adjuster.
- Discard the old cable and cable housing.
- Line up the "1" (front) or HIGHEST gear number (rear) mark with the indicator mark (MRX Pro Shimano Rapid Rise® Gear number "1" for front and rear). Look for the cable entry.
- Push cable up/out of the shifter and discard ***(Fig. 4)***.
- Feed the new cable through the cable entry and out the barrel adjuster ***(Fig. 5)***.
- Pull the cable snug.
- Feed the cable through the new cable housing and stops.
- Attach the cable to the derailleur and adjust indexing per the derailleur instructions.

MAINTENANCE

Clean the shifter using only water and mild soap.

3.0 PLUS / 3.0 / MRX PLUS / MRX · TWIST SHIFTERS TECHNICAL DATA / ASSEMBLY REQUIREMENTS

3.0 PLUS & 3.0

		3.0 Plus Half Pipe / 3.0 Shorty							
	Version	3.0 Plus	3.0	3.0 Plus	3.0	3.0 Plus	3.0	3.0 Plus	3.0
	Shifter Type	Front / Micro adjust		Front / Index		Rear 1:1 / ESP		Rear 1:1 / ESP	
	Speeds			3		8		7	
Compatibility	Derailleur	SRAM & Shimano		SRAM & Shimano		SRAM 7.0/5.0/4.0/3.0		SRAM 7.0/5.0/4.0/3.0	
Compatibility	Crankset	Shimano		Shimano					
	Cable Pull Release	FFS		FFS		Standard		Standard	
	Cable	Die Drawn Steel		←		←		←	
	Gear Indication	Printed		Printed		Printed		Printed	
	Barrel Adjuster	Indexing		Indexing		Indexing		Indexing	
	Clamping Diameter	22.3 mm		22.3 mm		22.3 mm		22.3 mm	
	Shifter Length	96 mm	64 mm	96 mm	64 mm	96 mm	64 mm	96 mm	64 mm
	Weight	N/A	58 g	N/A	58 g	N/A	58 g	N/A	58 g

MRX PLUS

		MRX Plus					
	Version	Half Pipe		Half Pipe		Half Pipe	
	Shifter Type	Front / Micro adjust		Front / Index		Rear Shimano Rapid Rise	
	Speeds			3		8	7
Compatibility	Derailleur	SRAM & Shimano		SRAM & Shimano		Shimano	
Compatibility	Crankset	Shimano		Shimano			
	Cable Pull Release	FFS direct		FFS direct		Standard	
	Cable	Die Drawn Steel		←		←	
	Gear Indication	Printed		Printed		Printed	
	Barrel Adjuster	Indexing		Indexing		Indexing	
	Clamping Diameter	22.3 mm		22.3 mm		22.3 mm	
	Shifter Length	96 mm		←		←	
	Weight	N/A		N/A		N/A	

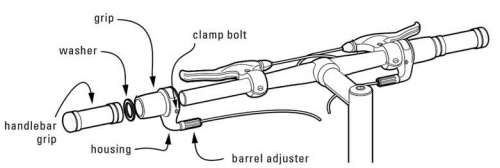
MRX

		MRX								
	Version	Shorty		Shorty				Shorty		
	Shifter Type	Front / Micro adjust		Front / Index				Rear Shimano Rapid Rise		
	Speeds			3		8	7	6	5	8	7	6
Compatibility	Derailleur	SRAM & Shimano		SRAM & Shimano		Shimano				Shimano Rapid Rise		
Compatibility	Crankset	Shimano		Shimano								
	Cable Pull Release	FFS		FFS		Standard				Standard		
	Cable	Standard Steel		←		←				←		
	Gear Indication	Printed		Printed		Printed				Printed		
	Barrel Adjuster	Indexing		Indexing		Indexing				Indexing		
	Clamping Diameter	22.3 mm		22.3 mm		22.3 mm				22.3 mm		
	Shifter Length	64 mm		←		←				←		
	Weight	58 g		58 g		58 g				58 g		

CABLE HOUSING

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

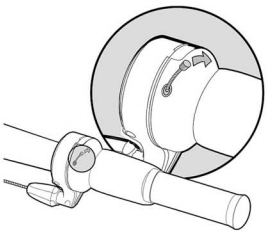
SHIFTER ANATOMY



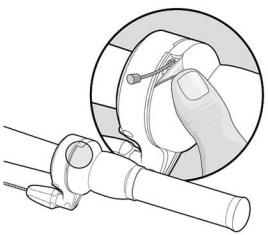
3.0 PLUS / 3.0 / MRX PLUS / MRX · TWIST SHIFTERS ASSEMBLY / MAINTENANCE

1:1
2:1

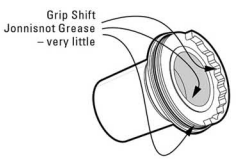
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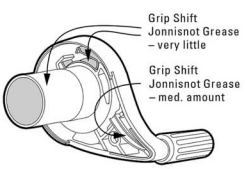


2



3





ASSEMBLY

Front and Rear:

- Slide the shifter onto the handlebar.
  – If necessary, move the brake lever to allow for shifter and handlebar grip.
  – Bar end users – don't forget to leave room for the bar end.
- Rotate the shifter until the barrel adjuster is beneath (but out of the way of) the brake lever.
- Tighten the 2.5 mm hex clamp bolt to 1.7 Nm (15 in.lbs.).
- Slide the plastic washer onto the handlebar.
- Slide the handlebar grip onto bar.
  – **Solvents, lubricants or hair spray may damage handlebar grips!**
  – Use **only** compressed air or water to aid installation.
- Feed the cable through the cable housing and frame stops.
- Attach cable to the derailleur.
- Adjust indexing per derailleur instructions.

Not recommended for use on thin walled alluminum handlebars such as Hyperlite® type handlebars.

Advice:

- ***Always check the front and rear brake levers for proper operation.***
- ***If there is interference between shifters and brake levers, re-adjust lever and shifter placement.***
- ***Check again for proper operation!***

CABLE CHANGE

Caution:

- ***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 endcaps.***

See Figure 1 (3.0 Plus / MRX Plus) or Figure 2 (3.0 / MRX)

- Detach the cable from the derailleur.
- Cut the cable off 15 cm (6") from shifter barrel adjuster. Discard old cable and cable housing.
- Rotate the shifter until the cable entry is visible.
- 3.0 / MRX only: Carefully peel back the corner of the grip cover shown in ***Fig. 2***. Use your fingernail or a small screwdriver.
- Remove and discard the rest of the old 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.
- Attach the cable to the derailleur and adjust indexing per derailleur instruction.

MAINTENANCE

- ***Clean all shifter parts using only water and mild soap.***
- ***Use only Grip Shift Jonnisnot Grease for any shifter lubrication.***
- ***After proper cleaning relubricate the areas shown in Fig. 3.***

X.9 / X.7 / ROCKET / ATTACK · TRIGGER SHIFTERS
TECHNICAL DATA / ASSEMBLY REQUIREMENTS

X·9 X·7

NEW		X.9		X.7	
	Part No.	—	—	—	—
	Shifter Type	Front / Index	Rear 1:1 / ESP	Front / Index	Rear 1:1 / ESP
	Speeds	3	9	3	9
Compatibility	Derailleur	SRAM & Shimano	SRAM X.0 / X.9 / X.7	SRAM & Shimano	SRAM X.0 / X.9 / X.7
Compatibility	Crankset	Shimano		Shimano	
	Cable Pull Release	Impulse Technologie	←	Impulse Technologie	←
	Cable	Stainless Steel	←	Stainless Steel	←
	Gear Indication	Window	Window	Window	Window
	Barrel Adjuster	Indexing, Aluminum	Indexing, Aluminum	Indexing	Indexing
	Clamping Diameter	22.3 mm	22.3 mm	22.3 mm	22.3 mm
	Shifter Length	26 mm	←	26 mm	←
	Weight	262 g	262 g	260 g	260 g

ROCKET ATTACK

NEW		Rocket		Attack	
	Part No.	—	—	—	—
	Shifter Type	Front / Index	Rear 2:1	Front / Index	Rear 2:1
	Speeds	3	9	3	9
Compatibility	Derailleur	SRAM & Shimano	SRAM 2:1 & Shimano	SRAM & Shimano	SRAM 2:1 & Shimano
Compatibility	Crankset	Shimano		Shimano	
	Cable Pull Release	Impulse Technologie	←	Impulse Technologie	←
	Cable	Stainless Steel	←	Stainless Steel	←
	Gear Indication	Window	Window	Window	Window
	Barrel Adjuster	Indexing, Aluminum	Indexing, Aluminum	Indexing	Indexing
	Clamping Diameter	22.3 mm	22.3 mm	22.3 mm	22.3 mm
	Shifter Length	26 mm	←	26 mm	←
	Weight	262 g	262 g	260 g	260 g

CABLE HOUSING

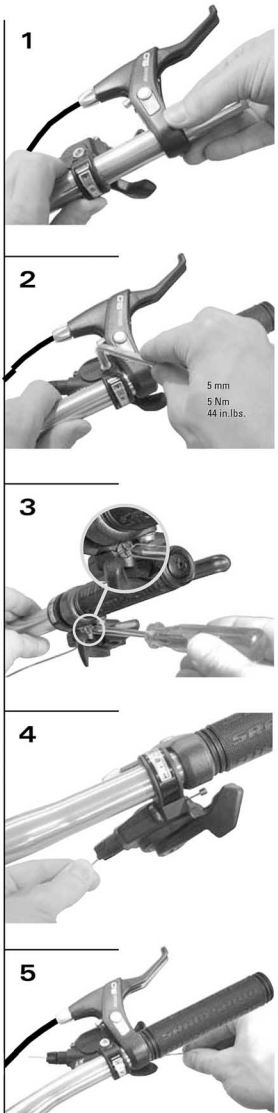
- Use only new high quality cable and compressionless cable housing with end caps.
- When choosing cable housing lengths, be sure to allow enough housing for an extreme turn of the handlebars in both directions.
- Note also, that different stem lengths and cable stop positions effects cable housing length.

SHIFTER ANATOMY



X.9 / X.7 / ROCKET / ATTACK · TRIGGER SHIFTERS ASSEMBLY / MAINTENANCE

1:1
2:1



ASSEMBLY

- Slide first shifter then brake lever onto handlebar ***(Fig. 1)***.
  Bar end users – don't forget to leave room for the bar end.
- Slide the handlebar grip onto the handlebar.
  Caution:
  Never use lubricants or solvents to install handlebar grips. Handlebar grips provide safety function.
  For this reason, they should be mounted in such a way as to make sure they do not slip off handlebar!
- Tighten the 5 mm hex clamp bolt to 44 in.lbs. (5 Nm) ***(Fig. 2)***.
- Feed the cable through the cable housing and stops. Make sure the shifter is in gear position "1" (front shifter) and "9" (rear shifter).
- Attach the shifter cable to the derailleur.
- Adjust indexing per derailleur instructions.

Caution:

- ***Always check the front and rear brake levers for proper operation.***
- ***If there is interference between shifters and brake levers, re-adjust lever and shifter placement.***
- ***Check for proper brake lever operation again!***

CABLE CHANGE

Caution:

- ***Leave the shifter on the handlebar.***
- ***The shifter does not need to be opened.***
- ***Use only new high quality cable and compressionless cable housing with endcaps.***

- Make sure the shifter is in gear position "1" (front shifter) and "9" (rear shifter).
- Detach the cable from the derailleur.
- Cut the cable off 6" (15 cm) from the shifter barrel adjuster. Discard the old cable and cable housing.
- Carefully unscrew cable change cap from cable entry with a screwdriver ***(Fig. 3)***.
- Push cable out of the cable entry with rotating movement ***(Fig. 4)***.
- Feed the new cable through the cable entry and out the barrel adjuster ***(Fig. 5)***. It may be helpful to remove the barrel adjuster for better visibility.
- Replace cable change cap.
- Feed the cable through the new cable housing and cable stops.
- Attach the cable to the derailleur and adjust indexing per derailleur instructions.

MAINTENANCE

Clean the shifter using only water and mild soap.

3.0 IBS / MRX IBS · INTEGRATED BRAKE SHIFTERS TECHNICAL DATA / ASSEMBLY REQUIREMENTS

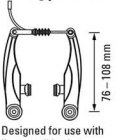
3.0 IBS

		3.0 IBS			
	Version	Shorty	Shorty	Shorty	Shorty
	Shifter Type	Front / Micro adjust	Front / Index	Rear 1:1 / ESP	Rear 1:1 / ESP
	Speeds		3	8	7
Compati-bility	Derailleur	SRAM or Shimano	SRAM or Shimano	SRAM X.0/X.9/X.7/5.0/4.0/3.0	
Compati-bility	Crankset	Shimano	Shimano		
Compati-bility	Brake Compatib.	Linear Pull	←	←	←
	Cable Pull Release	FFS	FFS	Standard	Standard
	Cable	Die Drawn Steel	←	←	←
	Gear Indication	Printed	Printed	Printed	Printed
	Barrel Adjuster	Indexing	Indexing	Indexing	Indexing
	Clamping Diameter	22.3 mm	22.3 mm	22.3 mm	22.3 mm
	Shifter Length	75 mm	←	←	←
Brake	Lever Size	3 Finger	←	←	←
Brake	Cable Pull	24 mm	←	←	←
Brake	Leverage Adjust	Single Position	←	←	←
Brake	Reach Adjust	Yes	Yes	Yes	Yes
Brake	Barrel Adjuster	Lock Ring	Lock Ring	Lock Ring	Lock Ring
	Weight	N/A	N/A	N/A	N/A

MRX IBS

		MRX IBS				
	Version	Shorty	Shorty	Shorty		
	Shifter Type	Front / Micro adjust	Front / Index	Rear 2:1		
	Speeds		3	8	7	6
Compati-bility	Derailleur	SRAM or Shimano	SRAM or Shimano	Shimano		
Compati-bility	Crankset	Shimano	Shimano			
Compati-bility	Brake Compatib.	Linear Pull	←	←		
	Cable Pull Release	FFS	FFS	Standard		
	Cable	Standard Steel	←	←		
	Gear Indication	Printed	Printed	Printed		
	Barrel Adjuster	Indexing	Indexing	Indexing		
	Clamping Diameter	22.3 mm	22.3 mm	22.3 mm		
	Shifter Length	75 mm	←	←		
Brake	Lever Size	3 Finger	←	←		
Brake	Cable Pull	24 mm	←	←		
Brake	Leverage Adjust	Single Position	←	←		
Brake	Reach Adjust	Yes	Yes	Yes		
Brake	Barrel Adjuster	Lock Ring	Lock Ring	Lock Ring		
	Weight	N/A	N/A	N/A		

Caution:
SRAM Integrated Brake Shifters are designed for use with linear-pull brakes. Do not use SRAM Integrated Brake Shifters with conventional cantilever brakes (those with arms measuring less than 76 mm and utilizing a non-linear straddle cable). Use of SRAM Integrated Brake Shifters with conventional cantilever brakesets will result in faulty braking performance.



Designed for use with linear-pull brakes.


Do not use conventional cantilever brakes.

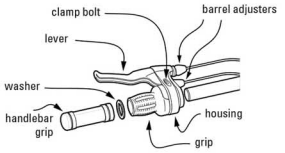
CABLE HOUSING

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

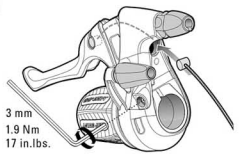
3.0 IBS / MRX IBS · INTEGRATED BRAKE SHIFTERS ASSEMBLY / MAINTENANCE

1:1
2:1

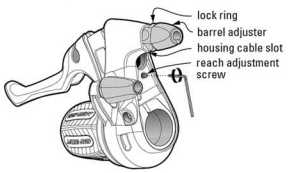
SHIFTER ANATOMY



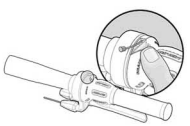
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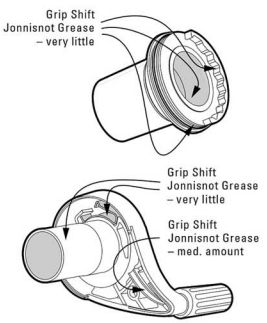
2



3



4



ASSEMBLY

Front and Rear:

- Slide the shifter onto the handlebar.
  – Leave room for the handlebar grip.
  – Bar end users – don't forget to leave room for the bar end.
- Tighten the 3 mm hex clamp bolt to 1.9 Nm (17 in.lbs.) ***(Fig. 1)***.
- Slide the plastic washer onto the handlebar.
- Slide the handlebar grip onto the handlebar.
  – **Solvents, lubricants or hair spray may damage handlebar grips!**
  – Use **only** compressed air or water to aid installation.

Shifter:

- Feed the shifter cable through the shifter cable housing and stops.
- Attach the cable to the derailleur.
- Adjust indexing per derailleur instructions.

Brake lever:

- Line up the brake lever barrel adjuster, lock ring and housing cable slots ***(Fig. 2)***.
- Pull on the lever and push the brake cable head through the opening in the brake lever housing ***(Fig. 1)***.
- Install the cable head into the cable socket in the lever.
- Set up the brakes and brake pads per brake instructions.
- Actuate each brake lever 5–10 times.
  – **Check that all brake system components are functioning properly.**

Reach adjustment:

- Using a 2 mm hex wrench ***(Fig. 2)***.
- Turn the reach adjustment screw clockwise to bring the lever closer to the handlebars.
- Turn the screw counterclockwise to move the lever further away.

Caution:

- ***Do not turn reach adjust screw past flush with the housing!***
- ***After any ajustment to the reach, always check the brake cable tension to ensure proper braker system performance. Re-adjust the cable tension if necessary.***
- ***Always check the front and rear brake levers for proper operation.***

CABLE CHANGE

Front and 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.***
- 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 "1" (front) or HIGHEST gear number (rear) mark with the indicator mark.
- Carefully peel back the corner of the grip cover shown in ***Fig. 3***. Use your fingernail or a small screwdriver.
- Remove and discard the rest of the old 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.
- Attach the cable to the derailleur and adjust indexing per derailleur instruction.

MAINTENANCE

- ***Clean all shifter parts using only water and mild soap.***
- ***Use only Grip Shift Jonnisnot Grease for any shifter lubrication.***
- ***After proper cleaning relubricate the areas shown in Fig. 4.***

PG 990/PG 970/PG 950/PG 850/PG 830/PG 730 · CASSETTES TECHNICAL DATA/ASSEMBLY REQUIREMENTS

PG 990

		PG 990 NEW (formerly 9.0)				
	Application	MTB	MTB			
	Technology	Power Glide II	Power Glide II			
	Largest Cog	34 T	32 T			
Compatibility	Speeds	9	9			
Compatibility	Chains	SRAM / Shimano	SRAM / Shimano			
Compatibility	Hubs	Shimano	Shimano			
Compatibility	Cogs	11/12/14/16/18/21/24/28/34	11/12/14/16/18/21/24/28/32			
	Lockring torque	40 Nm	40 Nm			
	Weight	300 g	290 g			
Design	Cogs	SAPH 440 steel	SAPH 440 steel			
Design	Spider	Grilon Composite	Grilon Composite			
Design	Lockring	Forged Steel	Forged Steel			
Design	Rivets	Stainless Steel	Stainless Steel			
Design	Finish	Matte Ni-Chrome Plated	Matte Ni-Chrome Plated			

PG 970

		PG 970 NEW (formerly 7.0)				
	Application	MTB	MTB	Road	Road	Road
	Technology	Power Glide II	Power Glide II	Power Glide II	Power Glide II	Power Glide II
	Largest Cog	34 T	32 T	26 T	23 T	23 T
Compatibility	Speeds	9	9	9	9	9
Compatibility	Chains	SRAM / Shimano	SRAM / Shimano	SRAM / Shimano / Campa.	SRAM / Shimano / Campa.	SRAM / Shimano / Campa.
Compatibility	Hubs	Shimano	Shimano	Shimano	Shimano	Shimano
Compatibility	Cogs	11/12/14/16/18/21/24/28/34	11/12/14/16/18/21/24/28/32	12/13/14/15/17/19/21/23/26	12/13/14/15/16/17/19/21/23	11/12/13/14/15/17/19/21/23
	Lockring torque	40 Nm	40 Nm	40 Nm	40 Nm	40 Nm
	Weight	340 g	330 g	230 g	210 g	210 g
Design	Cogs	SAPH 440 steel	SAPH 440 steel	SAPH 440 steel	SAPH 440 steel	SAPH 440 steel
Design	Lockring	Forged Steel	Forged Steel	Aluminum	Aluminum	Aluminum
Design	Screws	Steel / Zinc Coat	Steel / Zinc Coat	Steel / Zinc Coat	Steel / Zinc Coat	Steel / Zinc Coat
Design	Finish	Matte Ni-Chrome Plated	Matte Ni-Chrome Plated	Nickel-Chrome Plated	Nickel-Chrome Plated	Nickel-Chrome Plated

PG 970 PG 950

		PG 970 NEW	PG 950 NEW			
	Application	Road	MTB	MTB	Road	Road
	Technology	Power Glide II	Power Glide II	Power Glide II	Power Glide II	Power Glide II
	Largest Cog	21 T	34 T	32 T	26 T	26 T
Compatibility	Speeds	9	9	9	9	9
Compatibility	Chains	SRAM / Shimano / Campa.	Shimano	Shimano	SRAM / Shimano / Campa.	SRAM / Shimano / Campa.
Compatibility	Hubs	Shimano	Shimano	Shimano	Shimano	Shimano
Compatibility	Cogs	11/12/13/14/15/16/17/19/21	11/12/14/16/18/21/24/28/34	11/12/14/16/18/21/24/28/32	12/13/14/15/17/19/21/23/26	12/13/14/15/16/17/19/21/23
	Lockring torque	40 Nm	40 Nm	40 Nm	40 Nm	40 Nm
	Weight	200 g	390 g	380 g	240 g	220 g
Design	Cogs	SAPH 440 steel	Steel	Steel	SAPH 440	SAPH 440 steel
Design	Lockring	Aluminum	Forged Steel	Forged Steel	Forged Steel	Forged Steel
Design	Screw	Steel / Zinc Coat	Steel / Zinc Coat	Steel / Zinc Coat	Steel / Zinc Coat	Steel / Zinc Coat
Design	Finish	Nickel-Chrome Plated	Nickel-Chrome Plated	Nickel-Chrome Plated	Nickel-Chrome Plated	Nickel-Chrome Plated

PG 990/PG 970/PG 950/PG 850/PG 830/PG 730 · CASSETTES TECHNICAL DATA/ASSEMBLY REQUIREMENTS

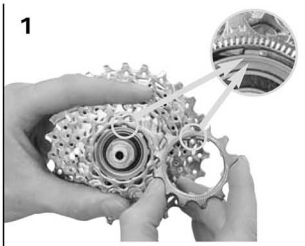
PG 850

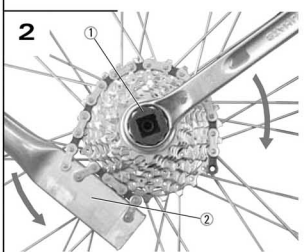
		PG 850 NEW (formerly 5.0)				
	Application	MTB	MTB	Road	Road	
	Technology	Power Glide II	Power Glide II	Power Glide II	Power Glide II	
	Largest Cog	32 T	28 T	26 T	23 T	
Compatibility	Speeds	8	8	8	8	
Compatibility	Chains	SRAM / Shimano	SRAM / Shimano	SRAM / Shimano / Campa.	SRAM / Shimano / Campa.	
Compatibility	Hubs	Shimano	Shimano	Shimano	Shimano	
	Cogs	11/12/14/16/18/21/26/32	11/12/14/16/18/21/24/28	12/13/15/17/19/21/23/26	12/13/14/15/17/19/21/23	
	Lockring torque	40 Nm	40 Nm	40 Nm	40 Nm	
	Weight	280 g	250 g	230 g	220 g	
Design	Cogs	SAPH 440 steel	SAPH 440 steel	SAPH 440 steel	SAPH 440 steel	
Design	Lockring	Forged Steel	Forged Steel	Forged Steel	Forged Steel	
Design	Screw	Steel / Zinc Coat	Steel / Zinc Coat	Steel / Zinc Coat	Steel / Zinc Coat	
Design	Finish	Ni-Chrome Plated	Ni-Chrome Plated	Ni-Chrome Plated	Ni-Chrome Plated	

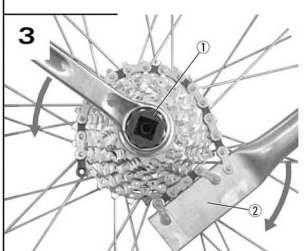
PG 830 PG 730

		PG 830 NEW (formerly 3.0)		PG 730 NEW		
	Application	MTB	MTB	MTB		
	Technology	Power Glide II	Power Glide II	Power Glide II		
	Largest Cog	32 T	28 T	32 T		
Compatibility	Speeds	8	8	7		
Compatibility	Chains	SRAM / Shimano	SRAM / Shimano	SRAM / Shimano		
Compatibility	Hubs	Shimano	Shimano	Shimano		
	Cogs	11/12/14/16/18/21/26/32	11/12/14/16/18/21/24/28	12/14/16/18/21/26/32		
	Lockring torque	40 Nm	40 Nm	40 Nm		
	Weight	320 g	280 g	310 g		
Design	Cogs	SAPH 440 steel	SAPH 440 steel	SAPH 440 steel		
Design	Lockring	Forged Steel	Forged Steel	Forged Steel		
Design	Screw	Steel / Zinc Coat	Steel / Zinc Coat	Steel / Zinc Coat		
Design	Finish	Nickel-Chrome Plated	Ni-Chrome Plated	Ni-Chrome Plated		

PG 990/PG 970/PG 950/PG 850/PG 830/PG 730 · CASSETTES ASSEMBLY / MAINTENANCE







ASSEMBLY

- Position the cassette cluster and individuel sprockets on the cassette body by aligning the spline pattern ***(Fig. 1)***.
- Screw the lockring in to the cassette body and tighten it to 40 Nm (350 in.lbs.) by using a cassette tool (1, ***Fig. 2)*** like the Park Tool® FR-5 or Shimano® and a chain wrench (2).
- Adjust the rear derailleur according to the installation advice from the derailleur manufacturer.

Advice:
Due to the optimized stability of the rear wheel, there is less space between the right spoke flange and the sprocket cassette. This means that not all spoke protector discs available on the market will fit. Please carry out a trial assembly run before specifying spoke protector discs (spoke protector discs must not rub against the sprocket cassette).

MAINTENANCE

Advice:

- ***The only maintenance necessary on the cassette is to replace worn sprockets.***
- ***If the chain jumps repeatedly on a sprocket with correct derailleur setting it might be sufficient to replace only the chain.***
  If the new chain also jumps on the sprocket the sprocket is worn out and should be replaced.
- ***Always put on a new chain when you replace worn sprockets.***

To replace the sprocket do as follows:

- Remove the lockring by using cassette tool (1, ***Fig. 3)*** and a chain wrench (2) to hold the cassette.
- Disassemble the sprocket cluster by unscrewing the small bolt on the backside of the cassette.
- Replace worn or damaged sprocket and re-assemble sprockets and spacers in the correct order and re-install the bolt.
- Make sure that all the splines on the cogs are aligned to each other and the cassette body pattern.
- Tighten the cassette with 40 Nm (350 in.lbs.) as described in the assembly instructions.

POWER CHAINS
TECHNICAL DATA / ASSEMBLY REQUIREMENTS

POWER CHAINS

		PC 99	Holow Pin[1]	PC 89R	Holow Pin[1]	PC 69	PC 59	PC 49
	Part No.	—	—	—		—	—	—
	Application	MTB		Road		MTB / Road	MTB / Road	MTB / Road
	Compatibility Front	HG / EXA-Drive		HG / EXA-Drive		HG / EXA-Drive	HG / EXA-Drive	HG / EXA-Drive
	Compatibility Rear	HG / EXA-Drive		HG / EXA-Drive		HG / EXA-Drive	HG / EXA-Drive	HG / EXA-Drive
	Max. No. of sprockets	9 only		9 only		9 only	9 only	9 only
	Dimension	1/2" x 11/128"		1/2" x 11/128"		1/2" x 11/128"	1/2" x 11/128"	1/2" x 11/128"
Pin	Length	6.8 mm	6.35 mm	6.8 mm	6.15 mm	6.8 mm	6.8 mm	6.8 mm
Pin	Riveting	Cross Step	Cylindrical	Step	Cylindrical	Step	Step	Step
Pin	Chrome Hardened	Yes		Yes		Yes	Yes	Yes
Pin	Push Power	2000 N / 450 lbs.		1500 N / 340 lbs.		1500 N / 340 lbs.	1500 N / 340 lbs.	1500 N / 340 lbs.
	Min. Tensile Strength	9000 N / 2023 lbs.		9000 N / 2023 lbs.		9000 N / 2023 lbs.	9000 N / 2023 lbs.	9000 N / 2023 lbs.
	Weight (114 links)	297 g	284 g	290 g	271 g	297 g	297 g	297 g
Design	External Pin Plate	Silver / Nickel Plated		Silver / Nickel Plated		Nickel Plated	Nickel Plated	Grey
Design	Internal Pin Plate	Silver / Nickel Plated		Silver / Nickel Plated		Nickel Plated	Grey	Grey
Design	Weight Reduced		Yes	Yes	Yes			
	Connecting Method	Power Link Gold		Power Link Gold or Pin[1]		Power Link Gold or Pin	Power Link Gold or Pin	Power Link Gold or Pin

[1] ***Caution:*** Holow Pin chain connecting method: with Power Link Gold only

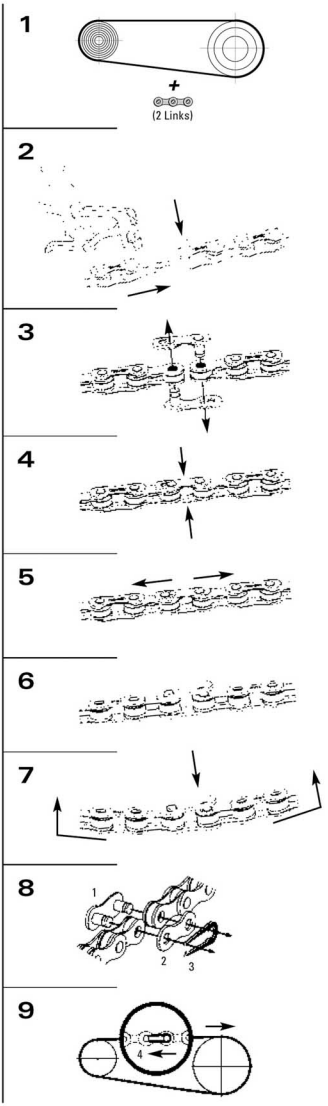
POWER CHAINS

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

POWER CHAINS

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

POWER CHAINS
ASSEMBLY / MAINTENANCE



PC 99 / PC 89R / PC 69 / PC 68 / PC 59 / PC 58 / PC 49 / PC 48 / PC 38 / PC 10 ($^{1}/_{2}$" x $^{3}/_{32}$" AND $^{1}/_{2}$" x $^{11}/_{128}$")

Chain length:

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

SRAM derailleurs:

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

Closing standard version with clamping pin:

- Fit chain, bring the two ends together and press pin ***(Fig. 2)*** through with assembly tool. **The pin must extend by the same amount at both outer plates. It must be possible to move the connecting link slightly.**
- The use of the SRAM assembly plier (Part No. 00 2799 980 001) is recommended for PC 68, PC 58, PC 48 and PC 38.

Power Link connecting links:

Caution:

- ***Use only as specified, to avoid material damage or the rider to fall off his bicycle resulting in injury.***
- ***Use only Power Link Gold for closing Holow Pin chain versions (no pin).***

Power Link Grey	grey coloured
	for PC 10
Power Link Silver	silver coloured
	for PC 68, PC 58, PC 48, PC 38
Power Link Gold	gold coloured
	for PC 99, PC 89R, PC 69, PC 59, PC 49

Closing:

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

Opening:

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

Caution:

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

PC 1 ($^{1}/_{2}$" x $^{1}/_{8}$")

Closing chain with Snap Lock:

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

Caution:

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

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.

9.0 / 7.0 / 5.0 LINEAR PULL BRAKES
TECHNICAL DATA / ASSEMBLY REQUIREMENTS

- Low Flex Truss Arm Design
- Forged Alloy Arms
- Brakecrawler Seal Quick Release
- Easy Adjust Spring Tension
- Single Bolt Pad Adjustment

9.0

		9.0			
	Part No.	—	—	—	—
	Brake	Front	Rear	Front	Rear
	Brake Type	Linear Pull			
	Washer Setup	Inside Thick		Inside Thin	
	Brake Shoe	Cartridge		Cartridge	
	Pad Post Type	Threaded		Threaded	
	Brake Boss Bolt Length	16 mm	25 mm	16 mm	25 mm
	Weight	N/A			
Design	Arm	Forged AL / Anodized		←	
Design	Pad Holder	Forged AL / Anodized		←	

7.0

		7.0			
	Part No.	—	—	—	—
	Brake	Front	Rear	Front	Rear
	Brake Type	Linear Pull			
	Washer Setup	Inside Thick		Inside Thin	
	Brake Shoe	Low Profile – 70 mm		Low Profile – 70 mm	
	Pad Post Type	Threaded		Threaded	
	Brake Boss Bolt Length	16 mm	25 mm	16 mm	25 mm
	Weight	N/A			
Design	Arm	Forged AL / Anodized		←	
Design	Pad Holder	Steel		←	

5.0

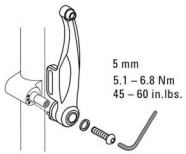
		5.0			
	Part No.	—	—	—	—
	Brake	Front	Rear	Front	Rear
	Brake Type	Linear Pull			
	Washer Setup	Inside Thick		Inside Thin	
	Brake Shoe	Low Profile – 60 mm		Low Profile – 60 mm	
	Pad Post Type	Threaded		Threaded	
	Brake Boss Bolt Length	16 mm	25 mm	16 mm	25 mm
	Weight	198 g			
Design	Arm	Forged AL / Anodized		←	
Design	Pad Holder	Steel		←	

CABLE HOUSING

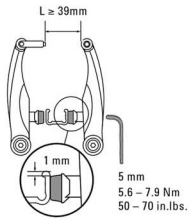
- Use only new brake cable and cable housing.
- When choosing cable housing lengths, be sure to allow enough housing for an extreme turn of the handlebars in both directions.
- Note also, that different stem lengths and cable stop positions effects cable housing length.

9.0 / 7.0 / 5.0 LINEAR PULL BRAKES ASSEMBLY

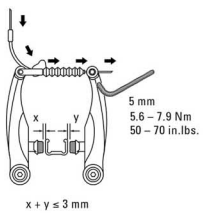
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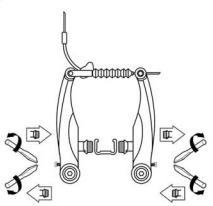
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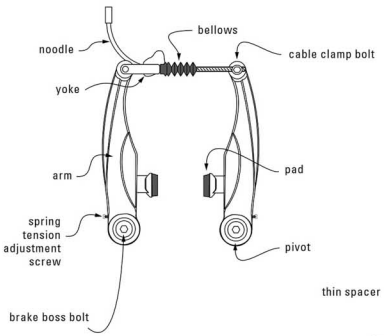
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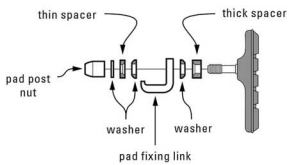


4



LINEAR PULL BRAKE ANATOMY





INSTALLATION

(5.0 Linear-Pull Brakes only:
Do not remove the plastic 'plug' in the pivot. The plug will pop free when the arm is installed onto the brake boss. You may discard the plug!)

- Slide the right linear-pull brake arm ***(Fig. 1)*** onto the right brake boss.
- Align the stopper pin with the center-spring hole.
- Using a 5 mm hex wrench, tighten the brake boss bolt to 5.1–6.8 Nm (45–60 in.lbs.).
- Repeat the former 3 steps for the left arm.
- Arrange the thick and thin spacers – for each pad – so when the pads are pushed against the rim, **L** is at least 39 mm ***(Fig. 2)***.

Caution:
Too small dimension L will not allow the brake pads to come into full contact with the rims. The brakes will not work.

- Hold one pad against the rim using the arm ***(Fig. 2)***.
- Using a 5 mm hex wrench, tighten the pad post nut to 5.6 – 7.9 Nm (50 – 70 in.lbs.).
- Repeat the former 2 steps for the other pad.

Be sure to leave about 1 mm between the top of the brake pad and the top of the rim! (Fig. 2)
Use only new brake cable and cable housing.

- Run the brake cable through the noodle and the bellows ***(Fig. 3)***.
- Using a 5 mm hex wrench, tighten the cable clamp bolt to 5.6 – 7.9 Nm (50 – 70 in.lbs.).
  Leave a total clearance of 3mm (maximum) between the brake pads and the rim!
- Using a small screw driver, turn the spring tension adjustment screws to balance the arms and equalize the pad offsets ***(Fig. 4)***.
  – turn the spring tension adjustment screw clockwise to pull the pad away from the rim.
  – turn the spring tension adjustment screw counterclockwise to push the pad closer to the rim.
- Pull each brake lever – hard – at least 5 – 10 times.

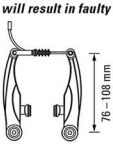
Caution:
Check that all the brake system components are functioning properly!

9.0 / 7.0 / 5.0 BRAKE LEVERS
TECHNICAL DATA / ASSEMBLY REQUIREMENTS

		9.0		7.0	
	Part No.	—	—	—	
	Brake Lever	Left	Right	Left	Right
	Lever Size	2.5 Finger	←	2.5 Finger	
	Brake Compatibility	Linear Pull / Cable Actuated Disc		Linear Pull / Cable Actuated Disc	
	Leverage Adjust	Infinite Adjust	←	3 Position	
	Cable Pull	N/A	←	26.0/24.3/22.4	
	Pivot Bushing	I-Glide	←	Acetal	
	Reach Adjust	Yes	Yes	Yes	Yes
	Barrel Adjuster	Indexing	Indexing	Lock Ring	Lock Ring
	Clamping Diameter	22.3 mm	22.3 mm	22.3 mm	22.3 mm
	Weight	77 g	77 g	70g	70g
Design	Housing	Grilon Composite	←	Grilon Composite	←
Design	Lever	Grilon Composite	←	Grilon Composite	←

		5.0	
	Part No.	—	—
	Brake Lever	Left	Right
	Lever Size	2.5 Finger	←
	Brake Compatibility	Linear Pull	←
	Leverage Adjust	Single Position	←
	Cable Pull	N/A	←
	Pivot Bushing	Acetal	←
	Reach Adjust	Yes	Yes
	Barrel Adjuster	Lock Ring	Lock Ring
	Clamping Diameter	22.3 mm	22.3 mm
	Weight	80 g	80 g
Design	Housing	Grilon Composite	←
Design	Lever	Grilon Composite	←

Caution:
SRAM Brake Levers are designed for use with linear-pull brakes. Do not use SRAM Brake Levers with conventional cantilever brakes (those with arms measuring less than 76 mm and utilizing a non-linear straddle cable). Use of SRAM Brake Levers with conventional cantilever brakesets, drum brakes or roller brakes will result in faulty braking performance.



Designed for use with linear-pull brakes.

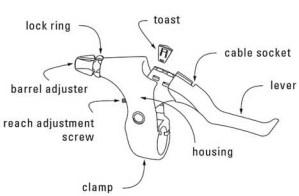


Do not use conventional cantilever brakes.

CABLE HOUSING

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

7.0 BRAKE LEVER ANATOMY

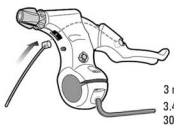


9.0 / 7.0 / 5.0 BRAKE LEVERS ASSEMBLY / MAINTENANCE

1



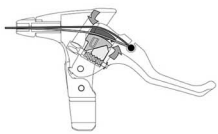
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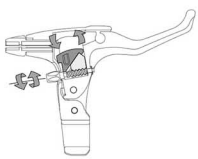
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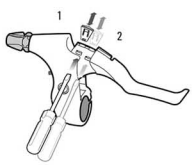
4



5



6



INSTALLATION

- When sliding the brake lever onto the handlebar, allow enough room for the shifter, the handlebar grip, and the bar end.
- Using a 3 mm hex wrench, tighten the clamp bolt to 3.4 Nm (30 in.lbs.) ***(Fig. 1/2)***. ***Be careful not to over tighten!***
- Line up the barrel adjuster, the lock ring, and the brake lever housing cable slots.
- Pull on the lever and push the brake cable head through the opening in the brake lever housing ***(Fig. 2)***. ***Use only new cable and cable housing.***
- Install the brake cable head into the cable socket in the lever.
- Set up the brakes and brake pads per brake instructions.
- Actuate each brake lever 5 – 10 times.

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

REACH ADJUSTMENT

Using a 2 mm hex wrench ***(Fig. 3)***:

- Turn the reach adjustment screw clockwise to bring the lever closer to the handlebars.
- Turn the screw counterclockwise to move the lever further away.

Caution:
Do NOT turn the screw past flush with the housing!
After any adjustment to the reach always check the brake cable tension to ensure proper brake system performance. Readjust the cable tension if necessary.

LEVERAGE ADJUSTMENT

9.0 Brake Levers only:
To view the leverage setting ***(Fig. 4)***: Pull the brake lever toward the handlebar to expose the leverage indication window from under the housing. The position of the red indicator shows the brake leverage settings.

- The **+** sign indicates the highest leverage. Moving the adjuster toward this position increases system leverage. This position has the greatest stopping power for a given amount effort.
- The **-** sign indicates the lowest leverage. Moving the adjuster toward this position decreases system leverage. This position is the standard configuration for most braking conditions.

To adjust the leverage setting ***(Fig. 5)***: Use the Control Cam adjuster knob to fine-tune the feel of your levers. The adjuster knob may be positioned at **+**, **-** or anywhere in between ...

- Turn the adjuster knob **counter clockwise** to **increase** leverage. This adjustment moves the red indicator toward the **+** sign and gives increased leverage and increased stopping power.
- Turn the adjuster knob **clockwise** to **decrease** leverage. This adjustment moves the red indicator toward the **-** sign and returns the lever to standard leverage and standard stopping power.

There is positive stop at both ends of the leverage adjustment. Use only hand force to adjust the knob. Do not force the adjustment knob past these stops!

7.0 Brake Levers only *(Fig. 6)*:

- STANDARD LEVERAGE OPTION – The brake lever is packaged with the toast installed in position 1. This option is the standard configuration for most braking conditions.
- MID LEVERAGE OPTION – Moving the toast to position 2 gives you greater brake system leverage. This option increases your stopping power for a given amount of effort.
- HIGH LEVERAGE OPTION – Removing the toast results in the highest brake system leverage. This option has the greatest stopping power for a given amount of effort.

Removing the toast:
1. Remove the brake cable.
2. Insert a small screw driver into the adjuster window.
3. Depress the tab and push the toast out.

Installing the toast:

- Remove the brake cable.
- Determine which option fits your riding needs.
- Align the runner on the toast with the curved track in the lever.
- Press the toast into the slot until it clicks.

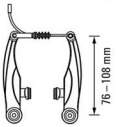
Caution:
After any adjustment to the reach or leverage, always check the brake cable tension to insure proper brake system performance. Readjust the cable tension if necessary.

TWO-AXIS BRAKE LEVERS
TECHNICAL DATA / ASSEMBLY REQUIREMENTS

TWO-AXIS

		Two-Axis	
	Part No.	—	—
	Brake Lever	Left	Right
	Lever Size	4 Finger	←
	Brake Compatibility	Linear Pull	←
	Leverage Adjust	Single Position	←
	Cable Pull	28 mm	←
	Pivot Bushing	I-Glide	←
	Reach Adjust	Yes	Yes
	Barrel Adjuster	Ergonomic Indexing	Ergonomic Indexing
	Clamping Diameter	22.3 mm	22.3 mm
	Weight	155 g	155 g
Design	Housing	Grilon Composite	←
	Lever	Forged Aluminum	←

Caution:
SRAM Brake Levers are designed for use with linear-pull brakes. Do not use SRAM Brake Levers with conventional cantilever brakes (those with arms measuring less than 76 mm and utilizing a non-linear straddle cable). Use of SRAM Brake Levers with conventional cantilever brakesets, drum brakes or roller brakes will result in faulty braking performance.



Designed for use with linear-pull brakes.

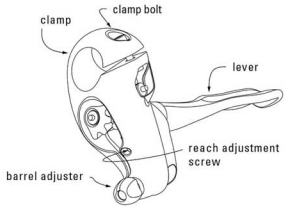

Do not use conventional cantilever brakes.

CABLE HOUSING

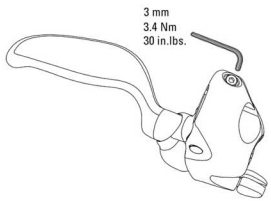
- Use only new brake cable and cable housing.
- When choosing cable housing lengths, be sure to allow enough housing for an extreme turn of the handlebars in both directions.
- Note also, that different stem lengths and cable stop positions effects cable housing length.

TWO-AXIS BRAKE LEVERS ASSEMBLY / MAINTENANCE

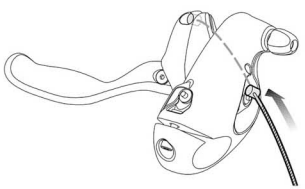
BRAKE LEVER ANATOMY



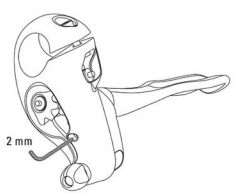
1



2



3



INSTALLATION

- When sliding the brake lever onto the handlebar, allow enough room for the shifter, the handlebar grip, and the bar end.
- Using a 3 mm hex wrench, tighten the clamp bolt to 3.4 Nm (30 in.lbs.) ***(Fig. 1)***. ***Be careful not to over tighten!***
- Line up the barrel adjuster and the brake lever housing cable slots.
- Pull on the lever and push the brake cable head through the opening in the brake lever housing ***(Fig. 2)***.
- Install the brake cable head into the cable socket in the lever.
- Set up the brakes and brake pads per brake instructions.
- Actuate each brake lever 5 – 10 times.

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

REACH ADJUSTMENT

Using a 2 mm hex wrench ***(Fig. 3)***:

- Turn the reach adjustment screw clockwise to bring the lever closer to the handlebars.
- Turn the screw counterclockwise to move the lever further away.

Caution:
After any adjustment to the reach always check the brake cable tension to ensure proper brake system performance. Readjust the cable tension if necessary.

SMARTBAR
TECHNICAL DATA / ASSEMBLY REQUIREMENTS

- New Style
- ErgoFit – allows for height, reach, and rise adjustment
- ErgoFunction – improved control, enhanced ergonomics and safety
- Upgradeable – full suite of integrated accessories



QUILL

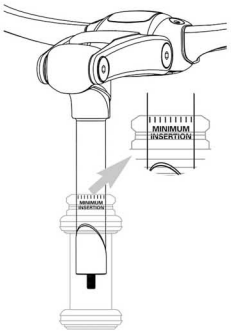
		SmartBar Quill Stem							
	Part No.	—	—	—	—	—	—	—	—
	Stem diameter 1"	●	●	●	●				
	Stem diameter 1 1/8"					●	●	●	●
	Brake Compatibility	2:1 (linear pull) leverage only	←	←	←	←	←	←	←
Shifter	Rear, 9spd ESP	●	●			●	●		
Shifter	Rear, 8spd ESP			●	●			●	●
Shifter	Front, Micro Adjust	●		●		●		●	
Shifter	Front, Index		●		●		●		●

CLAMP

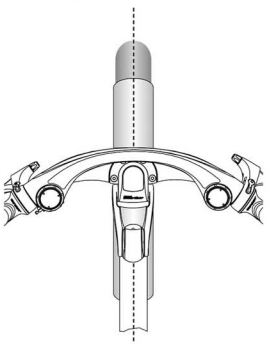
		SmartBar Clamp-On Stem							
	Part No.	—	—	—	—	—	—	—	—
	Stem diameter 1"	●	●	●	●				
	Stem diameter 1 1/8"					●	●	●	●
	Brake Compatibility	2:1 (linear pull) leverage only	←	←	←	←	←	←	←
Shifter	Rear, 9spd ESP	●	●			●	●		
Shifter	Rear, 8spd ESP			●	●			●	●
Shifter	Front, Micro Adjust	●		●		●		●	
Shifter	Front, Index		●		●		●		●

SMARTBAR
ASSEMBLY ERGOFIT STEM (QUILL STEM)

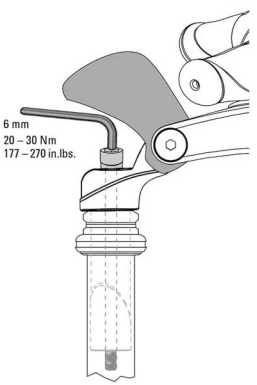
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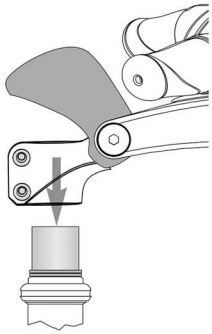


Caution:
The SmartBar requires a knowledgeable and trained bicycle mechanic for proper installation and adjustment.
To ensure rider safety, all stem adjustments should be made by a trained mechanic using a calibrated torque wrench to verify required tightening torque.

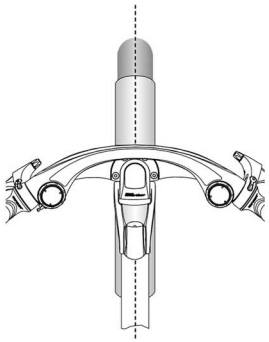
- Lightly grease the outside of the stem quill tube below the MINIMUM INSERTION mark before assembly.
- Slide the stem into the steerer tube of the front fork making sure that it is inserted past the "MINIMUM INSERTION" mark on the stem quill ***(Fig. 1)***.
- Align the SmartBar assembly so that the stem centerline is in line with the centerline of the front wheel ***(Fig. 2)***.
- Rotate the elastomer quill cover upward to allow access to the 6 mm hex wedge bolt ***(Fig. 3)***.
- Tighten the 6 mm hex wedge bolt to 20 – 30 Nm (177 – 270 in.lbs).

Caution:
- ***Always check that the stem cannot slip up/down or rotate in/on the steerer tube when the handlebars are turned.***
- ***If the handlebars can be turned so that the stem does not line up with the front wheel, check and re-tighten the hex wedge bolt.***
- ***Re-tighten and check again for proper attachment and operation!***

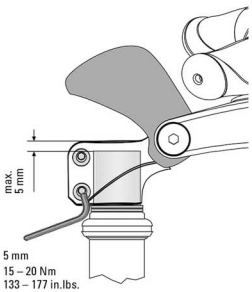
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5



6



Caution:
The SmartBar requires a knowledgeable and trained bicycle mechanic for proper installation and adjustment.
To ensure rider safety, all stem adjustments should be made by a trained mechanic using a calibrated torque wrench to verify required tightening torque.

- Make sure that there is at least 37 mm of threadless steerer tube above the headset (and spacers) for clamping the stem.

Advice:
Use several headset spacers between the headset and stem to allow for more height adjustment.

- Slide the stem over the steerer tube of the front fork ***(Fig. 4)***.

- Make sure that the top of the stem clamp is no more than 5 mm above the top of the steerer tube ***(Fig. 6)***.

- Align the SmartBar assembly so that the stem centerline is in line with the centerline of the front wheel ***(Fig. 5)***.

- Rotate the elastomer quill cover upward to allow installation of the headset top cap and access to the two 5 mm hex clamp bolts ***(Fig. 6)***.

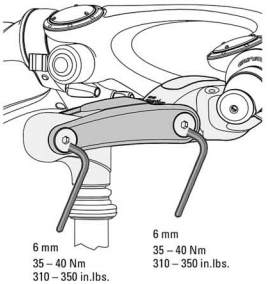
Advice:
Adjust the headset bearings and top cap tension following the headset manufacturers' recommendations.

- Tighten the two 5 mm hex clamp bolts to 15 – 20 Nm (133 – 177 in.lbs) ***(Fig. 6)***.

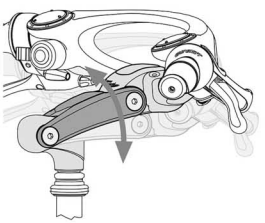
Caution:
- ***Always check that the stem cannot slip up/down or rotate in/on the steerer tube when the handlebars are turned.***
- ***If the handlebars can be turned so that the stem does not line up with the front wheel, check and re-tighten the hex clamp bolts.***
- ***Re-tighten and check again for proper attachment and operation!***

SMARTBAR
ADJUSTMENT ERGOFIT STEM (REACH ADJUSTMENT)

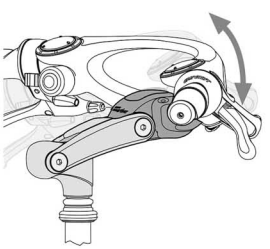
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8



9



The ErgoFit stem has two rotating adjustment bolts and a "Flip-Flop" design that allow for a very wide range of adjustments.

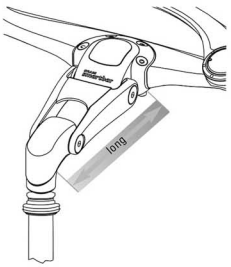
FORE-AFT POSITION

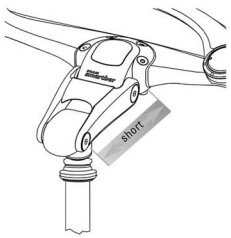
- To fine-tune the fore-aft position of the handgrips adjust the Ergo-Fit rotation adjustments ***(Fig. 7)***.
- Loosen the two 6 mm hex adjustment bolts just enough that the links can be rotated freely.
- Rotate the main structure and links forward and down or backward and up until the desired fore-aft position is achieved. Choose any one of the locking positions that are evenly spaced in 15-degree increments ***(Fig. 8)***.
- Tighten the 6 mm hex **rear** adjustment bolt just enough to hold the desired position.
- Rotate the main structure and grips so that lower flat section of the main structure is nearly level with the ground and the gear indicators are clearly visible from the riding position. Locking positions are evenly spaced in 15-degree increments ***(Fig. 9)***.
- Tighten the 6 mm hex **front** adjustment bolt to 35 – 40 Nm (310 – 350 in.lbs) ***(Fig. 7)***.
- Tighten the 6 mm hex **rear** adjustment bolt to 35 – 40 Nm (310 – 350 in.lbs).

Caution:

- ***Always check that the stem rotation adjustments cannot be rotated up or down after tightening.***
- ***If the handlebars can be moved up or down or rotated forward or backward after tightening the adjustment bolts, check and re-tighten both the adjustment bolts making sure that they are in one of the locking positions.***
- ***Re-tighten and check again for proper attachment and operation!***

10





FLIP-FLOP POSITION

- To make a large change to the fore-aft position adjust the "Flip-Flop" position to **long** or **short** adjustment ***(Fig. 10)***:
- Loosen the 6 mm hex wedge bolt or the two 5 mm hex clamp bolts to allow the stem to rotate freely on the steerer tube ***(Fig. 3 / Fig. 6)***.
- Loosen the two 6 mm hex adjustment bolts just enough that the links can be rotated freely ***(Fig. 11)***.
- Loosen the 6 mm hex **rear** adjustment bolt and **remove** the bolt completely.

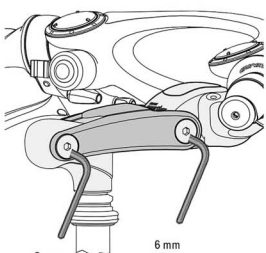
Advice:
You will have to support the main structure while you make this change.

- Change the Flip-Flop stem quill or stem clamp 180 degrees to the desired short or long position.
- Re-insert the 6 mm hex **rear** adjustment bolt and tighten just enough to hold the desired position.
- Follow the prior instructions to fine-tune the fore-aft position.
- Tighten the 6 mm hex **front** adjustment bolt to 35 – 40 Nm (310 – 350 in.lbs).
- Tighten the 6 mm hex **rear** adjustment bolt to 35 – 40 Nm (310 – 350 in.lbs).
- Align the SmartBar assembly so that the stem centerline is in line with the centerline of the front wheel ***(Fig. 2 / Fig. 5)***.
- Quill stem: Tighten the 6 mm hex wedge bolt to 20 – 30 Nm (177 – 270 in.lbs) ***(Fig. 3)***.
- Clamp-On stem: Tighten the two 5 mm hex clamp bolts to 15 – 20 Nm (133 – 177 in.lbs) ***(Fig. 6)***.

Caution:

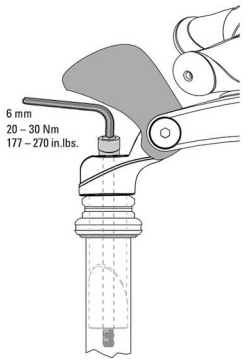
- ***Always check that the stem rotation adjustments cannot be rotated up or down after tightening.***
- ***If the handlebars can be moved up or down or rotated forward or backward after tightening the adjustment bolts, check and re-tighten both the adjustment bolts making sure that they are in one of the locking positions.***
- ***Re-tighten and check again for proper attachment and operation!***

11

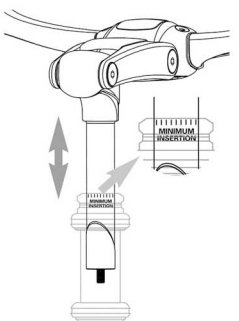


SMARTBAR
ADJUSTMENT ERGOFIT STEM (HEIGHT ADJUSTMENT)

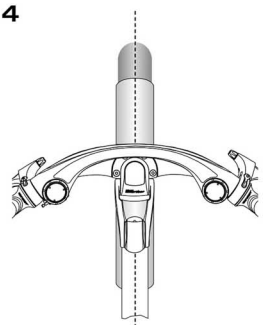
12



13



14



To fine tune the up-down position of the handgrips of a quillstem SmartBar adjust the stem up or down on the steerer tube.

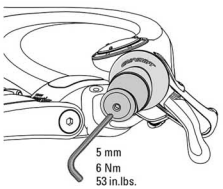
- Loosen the 6 mm hex wedge bolt ***(Fig. 12)***.
- Move the stem to the desired position up or down making sure that it is inserted past the "MINIMUM INSERTION" mark on the stem quill ***(Fig. 13)***.
- Align the SmartBar assembly so that the stem centerline is in line with the centerline of the front wheel ***(Fig. 14)***.
- Tighten the 6 mm hex wedge bolt to 20 – 30 Nm (177 – 270 in.lbs) ***(Fig. 12)***.

Caution:

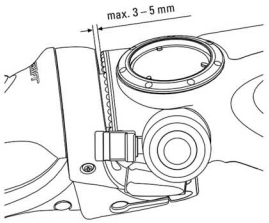
- ***Always check that the stem cannot slip up/ down or rotate in/on the steerer tube when the handlebars are turned.***
- ***If the handlebars can be turned so that the stem does not line up with the front wheel, check and re-tighten the hex wedge bolt or hex clamp bolts.***
- ***Re-tighten and check again for proper attachment and operation!***

SMARTBAR
ADJUSTMENT CONTROL POD

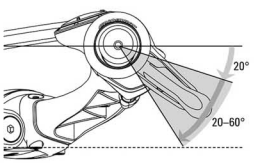
15



16



17



Verify that the rotational position of the brake levers is desired as assembled.

If no position change is required:

- Insert a 5 mm hex wrench into the hole in the end of the handgrip. Tighten the 5 mm hex bolt to 6 Nm (53 in.lbs) ***(Fig. 15)***.

If a different position is desired:

- Insert a 5 mm hex wrench into the hole in the end of the handgrip ***(Fig. 15)***. Loosen the bolt five complete turns. This is enough to allow the control pod to be pulled a few millimeters away from the main structure without disassembly of the control pod unit.

Caution:
Do NOT disassemble the control pod!
The gear indication cables are set at the factory, and improper disassembly will damage the gear indication cables and function.

- Pull the control pod slightly away (3 – 5 mm) from the main structure and rotate to the desired position ***(Fig. 16)***.

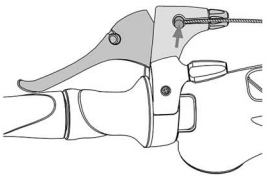
Caution:

- ***Do NOT rotate the control pod assembly outside of the allowed adjustment range of 20 – 60 degrees down from horizontal (Fig. 17)!***
- ***Rotating the pods beyond their allowed adjustment range will damage the gear indication cables and function.***

- The pods can be adjusted in increments of 10 degrees within the range of 20 – 60 degrees down from horizontal.
- Once desired position is determined tighten the 5 mm hex bolt to 6 Nm (53 in.lbs) ***(Fig. 15)***.

SMARTBAR
ASSEMBLY BRAKE CABLE / BRAKE COMPATIBILITY

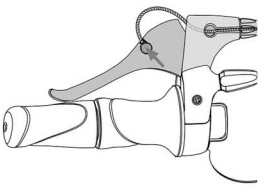
18



- Line up the barrel adjuster with the slot in the underside of the control pod housing.
- Pull on the brake lever and push the cable head through the opening in the brake lever housing ***(Fig. 18)***.
  Use only new cable and housing.
- Install the cable head into the cable socket in the brake lever ***(Fig. 19)***.
- Set up the brakes and brake pads per brake instructions.
- Actuate each brake lever 5 – 10 times and ensure proper operation.

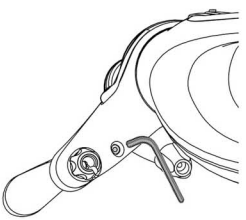
Caution:
All SmartBars are equipped to actuate two brakes with 2:1 (linear pull) leverage only.

19



SMARTBAR
BRAKE LEVER REACH ADJUSTMENT

20

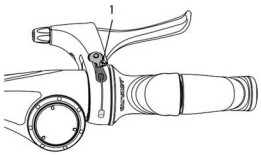


Using a 2 mm hex wrench.

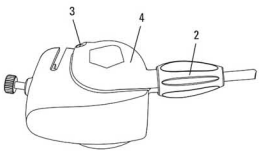
- Turn the reach adjustment screw clockwise to bring the lever closer to the handgrip ***(Fig. 20)***.
- Turn the screw counterclockwise to move the lever further away.
- Actuate each brake lever 5 – 10 times and ensure proper operation.

Caution:
- ***Do NOT force the screw past its normal stop!***
- ***After any adjustment to the reach always check the brake cable tension to ensure proper brake system performance.***
- ***Readjust the cable tension if necessary.***

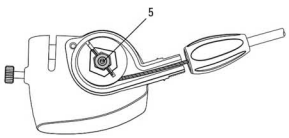
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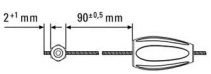
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28



29



24SPD & 27SPD ESP SYSTEMS

Removal

- Detach the cable from the derailleur.
- Cut cable off 15 cm (6") from shifter arrel adjuster. Discard old cable and housing.
- From the top edge pull open the cable change hatch (1, ***Fig. 26)***.
- Rotate the shifter fully in the cable release direction. (Gear "1" on the front shifter, gear "8" on the 8spd shifter, and gear "9" on the 9spd shifter.)
- Look for cable head and push cable up / out of the shifter and discard ***(Fig. 26)***.

Replacement

- Feed the new cable through the cable entry and out the barrel adjuster. Be sure to thread the cable through the small hole in the spool.
- Pull the cable snug to seat the cable head in the shifter.
- Replace the cable change hatch.
- Feed the cable through the new cable housing and frame stops.
- Attach the cable to the derailleur.
- Adjust indexing per derailleur instructions.

7 SPEED SRAM S7 GEARHUBSYSTEMS

Removal

- Rotate the shifter fully in the cable release direction. Gear position "1".
- Do not remove the Clickbox from the axle end.
- Unscrew the barrel adjuster (2, ***Fig. 27)*** completely.
- Unscrew bolt (3, ***Fig. 27)***, remove cap (4).
- Withdraw shifter cable and clamping bolt (5, ***Fig. 28)*** upwards, loosen clamp and pull clamping piece from the cable.
- From the top edge pull open the cable change hatch (1, ***Fig. 26)***
- Look for cable head and push cable up / out of the shifter and discard.

Replacement

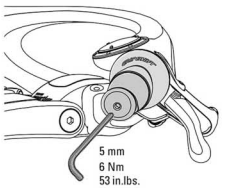
- Feed the new cable through the cable entry and out the barrel adjuster.
- Pull the cable snug to seat cable head in the shifter.
- Replace the cable change hatch.
- Feed the cable through the new cable housing and adjusting barrel.
- Position clamping bolt at a distance of 90 mm, tighten to 1.5 Nm (13 in.lbs.) and cut off cable end to 2 – 3 mm ***(Fig. 29)***.
- Locate clamping bolt (5, ***Fig. 28)*** (screw head not visible) and place shifter cable around carrier cylinder (counter-clock-wise winding).
- Position cap (4, ***Fig. 27)*** and tighten with bolt (3), torque 0.35 – 0.45 Nm (3.1– 4.0 in.lbs.).
- Screw the barrel adjuster (2) completely onto the clickbox.
- CLICKBOX INSTALLATION AND ADJUSTMENT per Technical Manual Gear Hub Systems / SRAM S7.

CLEANING

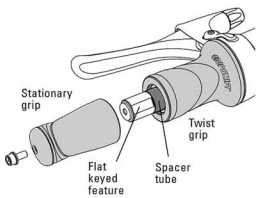
- Clean all parts with soapy water only.
- It is recommended that you clean the bike in a upright position, this allows the water to drain out correctly.
- After cleaning, if moisture does impair the clarity of the gear indication lens cap it is not recommended to remove the lens, instead leave your bike in a warm dry room, until the moisture disappears from the lens.

SMARTBAR
GRIP REPLACEMENT

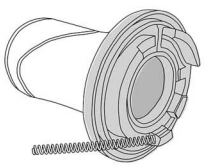
23



24



25



STATIONARY GRIP:

Removal

- Rotate the shifter fully in the cable release direction. (Gear "1" on the front shifter, gear "1" on the SRAM S7 7spd shifter, gear "8" on the 8spd shifter, and gear "9" on the 9spd shifter).

Caution:
Do NOT disassemble the control pod!

- The gear indication cables are set at the factory, and improper disassembly will damage the gear indication cables and function.

- Insert a 5 mm hex wrench into the hole in the end of the handgrip ***(Fig. 23)***.

- While pressing the twist grip toward the center of the handlebar, unscrew the bolt completely until the stationary grip can be pulled straight off ***(Fig. 24)***.

Replacement

- Align the flat keyed feature on the new stationary grip assembly with the flat keyed feature on the end of the SmartBar and push the grip assembly onto the SmartBar until it makes contact with the spacer tube ***(Fig. 24)***.

- Tighten the 5 mm hex bolt to 6 Nm (53 in.lbs) ***(Fig. 23)***.

TWIST GRIP:

Removal

- Remove stationary grip, see left.

- Pull the spacer tube straight off the SmartBar ***(Fig. 24)***.

- Next, while pressing the control pod housing toward the center of the handlebar, slowly pull the twist grip straight off, taking care to keep the coil spring from falling out.

Replacement

- Slide new twist grip over SmartBar.

- Slide the spacer tube back onto the SmartBar and part way through the new grip, making sure that the flange is on the outboard side toward the stationary grip ***(Fig. 24)***.

- Replace rear end of coil spring onto spring tab of new grip ***(Fig. 25)***.

- While sliding the grip towards the housing, align the free end of the spring into the spring cavity in the spool (already in the housing).

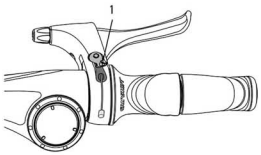
- Push the spacer tube all the way into the grip assembly.

- Rotate grip forward slightly compressing the coil spring and push the grip towards the housing until there is no gap between the housing and grip.

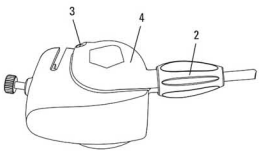
- Align the flat keyed feature on the stationary grip assembly with the flat keyed feature on the end of the SmartBar and push the grip assembly onto the SmartBar until it makes contact with the spacer tube ***(Fig. 24)***.

- Tighten the 5 mm hex bolt to 6 Nm (53 in.lbs) ***(Fig. 23)***.

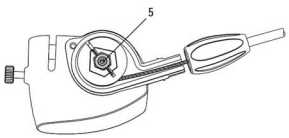
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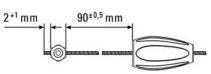
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24SPD & 27SPD ESP SYSTEMS

Removal

- Detach the cable from the derailleur.
- Cut cable off 15 cm (6") from shifter arrel adjuster. Discard old cable and housing.
- From the top edge pull open the cable change hatch (1, ***Fig. 26)***.
- Rotate the shifter fully in the cable release direction. (Gear "1" on the front shifter, gear "8" on the 8spd shifter, and gear "9" on the 9spd shifter.)
- Look for cable head and push cable up / out of the shifter and discard ***(Fig. 26)***.

Replacement

- Feed the new cable through the cable entry and out the barrel adjuster. Be sure to thread the cable through the small hole in the spool.
- Pull the cable snug to seat the cable head in the shifter.
- Replace the cable change hatch.
- Feed the cable through the new cable housing and frame stops.
- Attach the cable to the derailleur.
- Adjust indexing per derailleur instructions.

7 SPEED SRAM S7 GEARHUBSYSTEMS

Removal

- Rotate the shifter fully in the cable release direction. Gear position "1".
- Do not remove the Clickbox from the axle end.
- Unscrew the barrel adjuster (2, ***Fig. 27)*** completely.
- Unscrew bolt (3, ***Fig. 27)***, remove cap (4).
- Withdraw shifter cable and clamping bolt (5, ***Fig. 28)*** upwards, loosen clamp and pull clamping piece from the cable.
- From the top edge pull open the cable change hatch (1, ***Fig. 26)***
- Look for cable head and push cable up / out of the shifter and discard.

Replacement

- Feed the new cable through the cable entry and out the barrel adjuster.
- Pull the cable snug to seat cable head in the shifter.
- Replace the cable change hatch.
- Feed the cable through the new cable housing and adjusting barrel.
- Position clamping bolt at a distance of 90 mm, tighten to 1.5 Nm (13 in.lbs.) and cut off cable end to 2 – 3 mm ***(Fig. 29)***.
- Locate clamping bolt (5, ***Fig. 28)*** (screw head not visible) and place shifter cable around carrier cylinder (counter-clock-wise winding).
- Position cap (4, ***Fig. 27)*** and tighten with bolt (3), torque 0.35 – 0.45 Nm (3.1– 4.0 in.lbs.).
- Screw the barrel adjuster (2) completely onto the clickbox.
- CLICKBOX INSTALLATION AND ADJUSTMENT per Technical Manual Gear Hub Systems / SRAM S7.

CLEANING

- Clean all parts with soapy water only.
- It is recommended that you clean the bike in a upright position, this allows the water to drain out correctly.
- After cleaning, if moisture does impair the clarity of the gear indication lens cap it is not recommended to remove the lens, instead leave your bike in a warm dry room, until the moisture disappears from the lens.

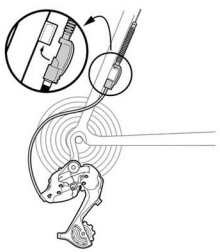
NIGHTCRAWLER / BRAKECRAWLER TECHNICAL DATA / ASSEMBLY REQUIREMENTS

SEALS

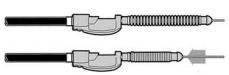
		Nightcrawler	Brakecrawler			
	Part No.	—	—	—	—	—
	Type	Cable Seal	Sealing Quick Release	←	←	←
	Cable Type	Derailleur Cables Only	Brake Cables Only	←	←	←
	Cable Size	1.1 mm / 1.2 mm	1.6 mm	←	←	←
	Housing	Compressionless	Compressionless or Standard Brake Housing		←	←
	Housing Ferrule/Max.	5.8 mm	5.8 mm	←	←	←
	Cable Stop/Slit Minim.	2.1 mm	2.2 mm	←	←	←
	Guide Pipe		Chrome Plated	←	Stainless Steel	←
	Bend		90°	130°	90°	130°
	Weight	6 g	N/A		N/A	
Design	Rigger	Acetal	Acetal	Acetal	Acetal	Acetal
	Bellows	Silicon	Silicon	Silicon	Silicon	Silicon

NIGHTCRAWLER

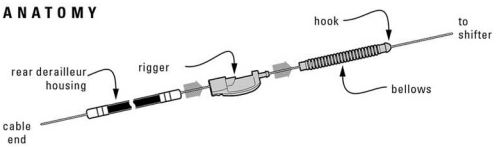
1



2



ANATOMY



COMPATIBILITY
- Fits most frames
- Use with derailleur cables ONLY

SETUP
- No tools needed
- Cable detached from the rear derailleur
- Rigger separate from the bellows

INSTALLATION
(see figure 1)
- Feed the cable through the bellows – hook end first.
- Feed the cable through the rigger – bellows end first.
- Join the rigger to the bellows.
- Feed the cable through the rear derailleur housing.
- Seat the rear derailleur housing into the rigger.
- Slide the rigger into the rear derailleur cable stop.
- Re-attach the cable to the rear derailleur.
- Check that the chain is on the smallest cog.
- Using your fingers, slide the hook end of the bellows towards the rigger until fully compressed ***(fig. 2)***.

BRAKECRAWLER

1



Features and Benefits:
- Complete cable sealing.
- Maintains smooth braking performance in all conditions.
- Easy to grab quick release finger tab: allows for easy wheel removal.
- Integrated bellows design: bellows stays attached even during wheel removal and replacement.

Detailed specifications:
- Fits SRAM, Shimano and most other linear pull brakes.
- Replaces existing noodle guide tube and bellows.
- Stainless steel or Chrome plated.
- 90 degree or 130 degree bend.

NOTICES

NOTICES

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SUPPORT
WHO TO CALL / WARRANTY / SPARE PARTS

WHO TO CALL

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

NORTH AMERICA

Dealer Helpdesk Number:

(800)-346-2928

EUROPE

Please contact your local distributor.

WARRANTY

1. SRAM settles warranty claims according to the legal EU regulations effective as of 01.01.2002, alternatively according to the legal regulations of the respective country.
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, sprockets, shifter cables, handlebar grips 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 resp. not authorized by SRAM for use with SRAM components.
5. 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 2004 · Publ. Number 8504.

SRAM ORIGINAL PARTS

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

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