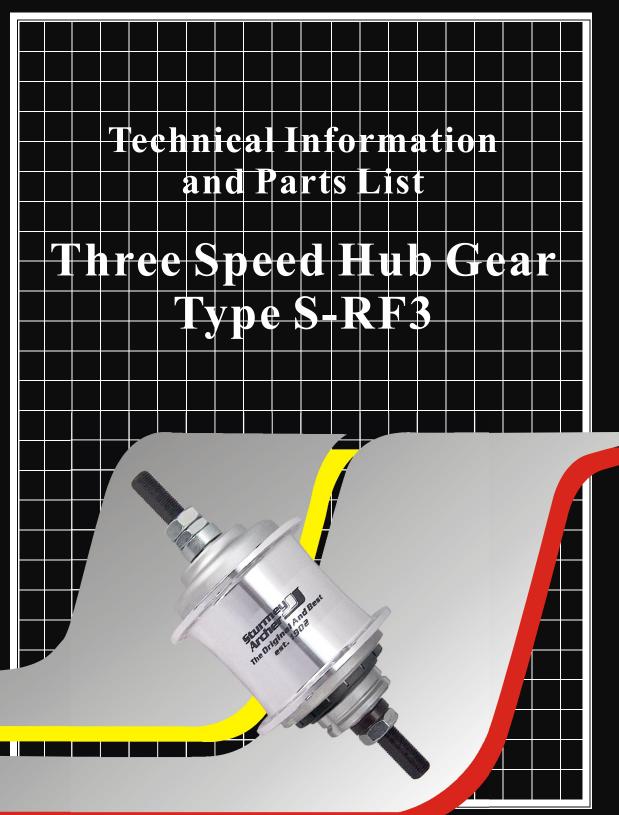
# Sturmey Archer





## **Technical Information - S-RF3 Three Speed Hub**

#### Part 1 GENERAL INFORMATION

#### 1.1 Scope of this leaflet

This leaflet refers to the Sturmey-Archer SRF3 Three Speed Hub Gear, and associated controls, cables and fittings. The hub model can be identified from the markings on the hub shell.

#### 1.2 Lubrication

No routine lubrication is required. However, during assembly/disassembly the hub greases should be replenished (See Section 3). Grease types meeting the following

Sturmey-Archer Technical Standards Should be used:

For Bearing - SA103B

For all other internal parts - SA103A Please contact Sturmey-Archer for information on the availability of these greases.

#### 1.3 Gear Change

Gear change is simple and smooth with the proven Sturmey - Archer indexed control system. Continue Pedaling, but ease pressure on the pedals, and select the gear required. If stationary, simply select gear required.

#### 1.4 Gear Ratios

The AW hub has three gears:

1st gear - Decrease of 25% 2nd gear - Direct drive 3rd gear - Increase of 33 1/3%

#### 1.5 Sprockets

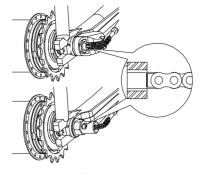
The overall drive ratio can be altered by changing the size of the sprocket. A range of sprockets from 13 to 22 teeth is available, suitable for 1/2" X 1/8" Chain.

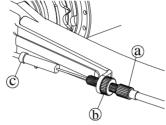
#### Part 2 ROUTINE MAINTENANCE

When service problems arise they usually occur outside the hub, and the following checks must be made before removing the wheel from the bicycle:

#### 2.1 Gear Adjustment

- 1. Ensure that no more **2.5mm** of axle protrudes from the axle nut.
- Select 2<sup>nd</sup> gear and rotate the pedal crank to ensure the gear is engaged.
   Turn the Cable Adjuster (a) until the center of the end of the Indicator Rod is level with the end of the Axle, as show in diagram.
- 3. Tighten the Cable-Adjusting Nut (b) and Indicator Locknut (c) to locate the gear changing system.





- 4. Select 3<sup>rd</sup> gear position, rotate the pedal crank, change back to 2<sup>nd</sup> gear and check adjustment. Retry the stages description above when the gear changing is not correct.
- ▲ WARNING: The hub must not be ridden out of adjustment as this may damage the internal parts and cause the hub to malfunction.

#### 2.2 Hub Bearing Adjustment

If for any reason the bearing adjustment is altered, the cones must be reset correctly before using the hub. The right-hand cone is pre-set at the factory and should only be disturbed at major service intervals. The left - hand cone is used to adjust the bearings in the hub.

## Left Hand Cone:

- 1. Loosen the Cone Locknut.
- Adjust the Left Hand Cone until very slight side play can be felt at the wheel rim, and none at the hub.
- 3. Tighten the Cone Locknut.

#### Right Hand Cone:

- 1. Loosen the Left Hand Cone Locknut and Cone.
- 2. Loosen the Right Hand Cone Locknut.
- 3. Screw down the Right Hand Cone finger tight.
- 4. Unscrew the Right Hand Cone by half a turn.
- 5. Tighten the Right Hand Cone Locknut.
- 6. Tighten the Left Hand Cone Locknut and adjust as above.

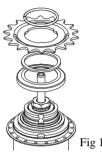
## Part 3 ASSEMBLY/DISASSEMBLY INSTRUCTIONS

When service problems occur which cannot be corrected by attention to external maintenance, a close inspection of the working parts inside the hub will be necessary.

#### 3.1 Disassembly

#### Fig.1

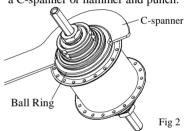
- Remove the Indicator Rod, Axle Nuts and Spacing Washers from both ends of the Axle.
- 2. Use a screwdriver to release the Sprocket Circlip from the Driver, then remove the Spacer, Sprocket and Dust-Cap (note the order of these parts).



3. Unscrew the Left Hand Cone Locknut, Spacing Washer and Cone.

#### Fig.2

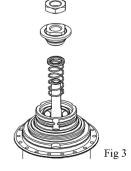
1. Loosen the Right Hand Ball Ring with a C-spanner or hammer and punch.



2. Unscrew the Ball Ring to release the Internal Assembly from the Hub Shell.

#### Fig.3

- 1. Clamp the left hand end of the Axle in a vice.
- Remove the Right Hand Cone Locknut, Cone, Spring Cap and Clutch Spring.

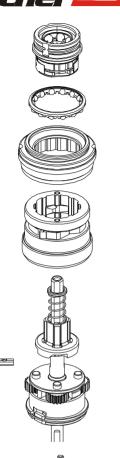


#### Fig.4

- 1. Lift off the Driver, Ball Cage, Ball Ring, Gear Ring, Clutch and Axle Key.
- 2. Remove the Gear Ring Pawls, Pawl Pins and Springs.



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- 3. Examine all gear teeth for signs of wear and chipping.
- Check all bearing surfaces for wear and pitting.
- 5. Check the ends of the Planet Pinion Pins and the edges of the Gear Ring splines for roundness and chipping.
- 6. Check the Pawls and Ratchets for signs of wear. Always fit new Pawl Springs on re-assembly.
- 7. Check the condition of the Indicator Threads, Chain and Axle Key.

#### 1.3 Assembly

NB The hub greases must be replenished during assembly using lubricants to the Sturmey-Archer following Technical Standards.

For Bearings internal parts-SA103B For all other internal parts-SA103A If a replacement gear internal assembly complete is to be fitted, assembly commences at Fig.2, point3.

#### Fig.5

- 1. Clamp the left hand end of the Axle in a vice with its axle slot uppermost.
- 2. Locate the Planet Pinions and Pins.

#### Fig.4

Fig.4

- 1. Fit the Clutch and Axle Key.
- 2. Take the Gear Ring and fit the Pawls, Pawl Pins and Springs.
- 3. Fit the Gear Ring onto the Planet Cage.
- 4. Fit the Ball Ring and Ball Cage assembly - ensuring that the balls face downwards.
- 5. Fit the Driver and ensure that the driver splines engage with the Clutch.

#### Fig.3

- 1. Slide the Clutch Spring, Clutch and Spring Cap (with its flat face uppermost) over the Axle.
- 2. Screw down the Right Hand Cone finger tight. Slacken the Cone off by half a turn and lock it in this position with the Locknut.

NB Under no circumstances must the cone be unscrewed by more than 5/8 of a turn as this could adversely affect the gear alignment.

#### Fig.2

- 1. Liberally grease the working parts particularly the Planet Pinions, Pinion Pins, Sun Pinion and Gear Ring.
- 2. Insert the unit into the Hub Shell, and tighten the Ball Ring.

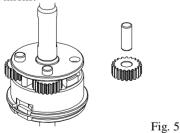
#### Fig.1

- 1. Fit the Left Hand Cone, Spacing Washer(s) and Locknut, and adjust the bearings as instructed in Section 2.2.
- 2. Assemble the Sprocket with its Dust Cap and Spacers.

NB Fit the Spacing Washers in their original position if different from the diagram.

3. Assemble the wheel into the bicycle and fit Washers and Axle Nuts. Tighten Axle Nuts to 24-26 Nm torque. Check correct Indicator is fitted and adjust gears as instructed is Section 2.1.





#### 2. Lift the Planet Cage off the Axle.

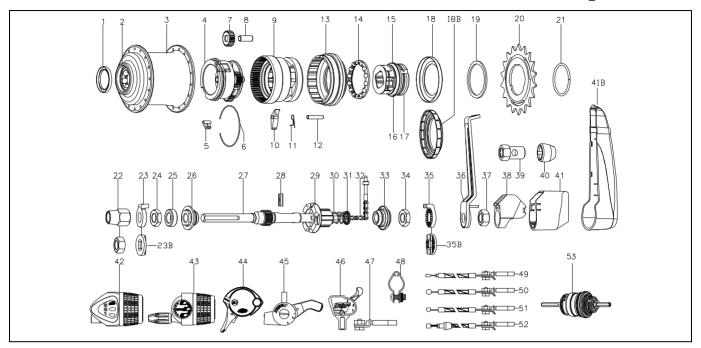
- 1.2 Inspection of the Internal Parts Thoroughly clean all the internal parts, and replace any which are damaged or worn. In particular, check the following:
- 1. The Clutch must slide easily in the driver. Its corners must not be rounded, and the splines in the Driver should be free from damage.
- 2. Check the Axle for straightness and the Axle Slot and threads for damage.

#### Part 4 FAULT DIAGNOSIS CHART

SYMPTOM	FAULT	REMEDY		
Slipping in 1st gear	1. Worn clutch	1. Replace		
	2. Worn low gear pawls	2. Replace		
	Weak low gear pawls springs	3. Replace		
	4. Incorrect right hand cone adjustment	4. Re-adjust		
	5. Kinks in control wire	5. Replace		
	6. Twisted indicator chain	6. Replace		
Self changing between 1st and 2nd Gear	1. Wron gear ring pawls	1. Replace		
Slipping in 2nd gear	1. Gear ring dogs and/or clutch worn	1. Replace		
Slipping in 3rd gear	1. Pinion pins and/or clutch worn	1. Replace		
	2. Weak or distorted clutch spring	2. Replace		
	3. Incorrect right hand cone adjustment	3. Re-adjust		
Hub runs stiffly	Chainstay ends not parallel	1. Re-adjust		
Drag on pedals	2. Corrosion	2. Clean and lubricate		
8 3	3. Distorted dust caps	3. Replace		
Sluggish gear change	1. Distorted Clutch Spring	1. Replace		
	2. Bent axle	2. Replace		
	3. Damaged indicator chain	3. Replace		
	4. Frayed gear cable wire	4. Replace		



# **Technical Information - S-RF3 Three Speed Hub**



Item No.	Sales No.	Description	Item No.	Sales No.	Description	Item No.	Sales No.	Description
1	HSA 102	Outer Dust Cap		HSL 836	Sprocket 19T(Chrome)			Axle Nut R.H.
2	HSA 284	Ball Cage Assembly L.H. 6.4mm Ball		HSL 834	Sprocket 20T(Chrome)	Chrome) 38 HSA 488 Gear Selector Guide Asse		Gear Selector Guide Assembly
3	HSA 599	Hub shell Assembly 28 Holes		HSL 832	Sprocket 21T(Chrome)	39 HMN 129 R.H. Axle Nut		R.H. Axle Nut
	HSA 600	Hub shell Assembly 36 Holes		HSL 830	Sprocket 22T(Chrome)	40	HSL 711	Indicator Guard
4	HSA 583	Planet Cage Assy (includes 2 off	21	HSL 721	Sprocket Circlip	41	HSA 507	Gear Selector Guide Cover
		Items 5, 1 off Item 6)	22	HMN 128	Axle Nut L.H.	41B	HSA620	Gear Selector Guide Full Cover
5	HSA 573	Pawl for Planet Cage		HMN 388	Dome Nut New - SA logo	42	HSJ 907	TSS32 Shifter W/2000mm Cable
6	HSA 435	Circlip	23	HMW 518	Lockwasher 4.0t - 9.5mm Slot	43	HSJ 927	TSS31 Shifter W/2000mm Cable
7	HSA 292	Planet Pinion		HMW515	Lockwahser 1.8t - 9.5mm Slot	44	HSJ 865	Orion Control
8	HSA 436	Pinion Pin	23B	HMW494	Serrated Lockwasher - 9.5mm Slot	45	HSJ 823	Nimbus Control 22.2mm Clip
9	HSA 443	Gear Ring Assembly (includes 2	24	HMN 405	Cone Locknut 46 HSJ 762 Trigger Contr		Trigger Control 22.2mm Clip	
		Off Items 10, 11 and 12)	25	HMW 146	Spacing Washer 1.6mm	cing Washer 1.6mm 47 HSL 759 Cable		Cable Anchorage
10	HSA 119	Pawl for Gear Ring		HMW 129	Spacing Washer 3.2mm	48	HSJ 553	Chainstay Fulcrum Clip $\phi 15.9 mm$
11	HSA 120	Pawl Spring		HMW 483	Spacing Washer 4.8mm		HSJ 548	Chainstay Fulcrum Clip $\phi 17.9 mm$
12	HSA 415	Pawl Pin		HMW 484	Spacing Washer 6.4mm		HSJ 753	Chainstay Fulcrum Clip $\phi$ 19.1mm
13	HSA 584	Ball Ring	26	HSA 101	Cone L.H. with Dust Cap	49	HSJ 101	Trigger Cable with Anchorage
14	HSA 438	Ball Cage Assembly	27	HSA 440	Axle - 163mm with Sun Pinion	550		550 x 1550mm Black
15	HSA 439	Driver Assembly Complete		HSA 621	Axle - 148mm with Sun Pinion			Trigger Cable with Anchorage
		(includes 1 off Items 16 and 17)	28	HSA 295	Axle Key			1450 x 1600mm Black
16	HSA 284	Ball Cage Assembly R.H. 6.4mm Ball	29	HSA 536	Clutch	50	HSJ 802	Nimbus Cable with Anchorage
17	HSA 102	Outer Dust Cap	30	HSA 128	Clutch Spring			1400 x 1550mm Black
18	HSL 701	Sprocket Dustcap	31	HSA 129	Clutch Spring Cap	51	HSJ 882	Twistgrip Cable with Anchorage
18B	HSL 871	Plastic Sprocket Dustcap	32	HSA 315	Gear Indicator (3 Mark, 163mm Axle)			1450 x 1600mm Black
19	HMW 127	Sprocket Spacing Washer 1.6mm		HSA 126	Gear Indicator (2 Mark, 148mm Axle)	52	HSJ 883	Orion Cable with Anchorage
20	HSL 854	Sprocket 13T(Chrome)	33	HSA 101	Cone R.H. with Dust Cap			1450 x 1600mm Black
	HSL 852	Sprocket 14T(Chrome)	34	HMN 405	Cone Locknut	53	HSX 143	AW Internal Replacement Unit
	HSL 850	Sprocket 15T(Chrome)	35	HMW 518	Lockwasher 4.0t - 9.5mm Slot			163mm Axle
	HSL 848	Sprocket 16T(Chrome)		HMW515	494 Serrated Lockwasher – 9.5mm Slot 148mm		HSX 144	AW Internal Replacement Unit
	HSL 846	Sprocket 17T(Chrome)	35B	HMW494				148mm Axle
	HSL 844	Sprocket 18T(Chrome)	36	HSJ 905				

#### Sun Race Sturmey-Archer Inc.

No.51. Hai-Shan-Jung St., Hai-Hu Village, Lu-Ju City, Taoyuan County 338, Taiwan Tel: +886(3)354-4979, Fax: +886(3)354-2858  $http: /\!/\underline{www.sunrace.com}\;; \quad \underline{www.sturmey\!\text{-}archer.com}$ 

## E-mail: info@sunrace.com

Sun Race Sturmey-Archer Europe Keienbergweg 79, 1101 GE Amsterdam Z.O., The Netherlands Tel: +31(0)20-60 90 221. Fax: +31(0)20-60 90 211 http://www.sunrace.com; www.sturmey-archer.com

E-mail: info@sunrace.nl

Sun Race Sturmey-Archer USA 3212 Jefferson Street #409 Napa, CA 94558-3436 USA Tel: +1(707)259-6700, Fax: +1(707)259-6710 http://www.sunrace.com; www.sturmey-archer.com

E-mail: info@sunrace.com

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