

Sturmey ***Archer***

**Technical Information
and Parts List**

**Three Speed Hub Gear
Type S-RF3**



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

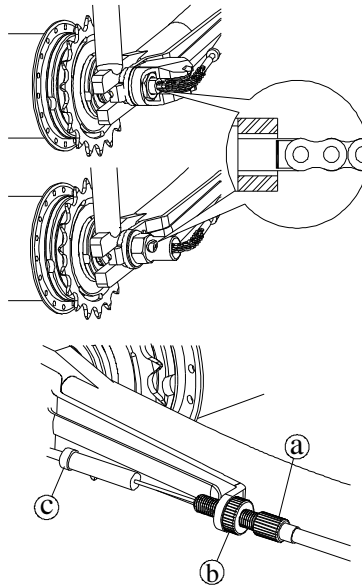
The overall drive ratio can be altered by changing the size of the sprocket. A range of sprockets from 13 to 22 teeth is available, suitable for 1/2" X 1/8" Chain.

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.
2. Select 2nd 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 3rd gear position, rotate the pedal crank, change back to 2nd 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.
2. 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

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).

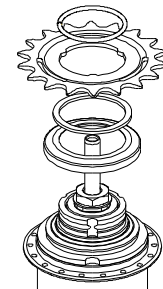


Fig 1

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.

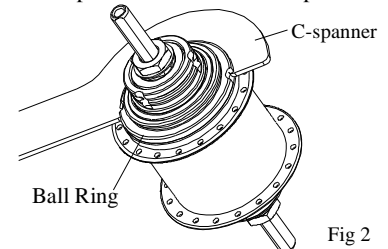


Fig 2

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.
2. Remove the Right Hand Cone Locknut, Cone, Spring Cap and Clutch Spring.

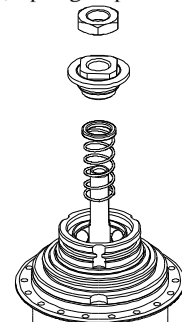


Fig 3

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.

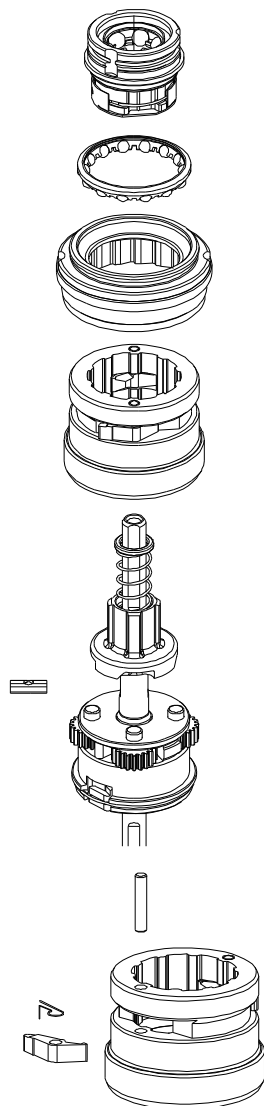


Fig.4

3. Examine all gear teeth for signs of wear and chipping.
4. 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 following Sturmey-Archer 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

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 in Section 2.1.

Fig.5

1. Remove the Planet Pinion Pins and Pinions.

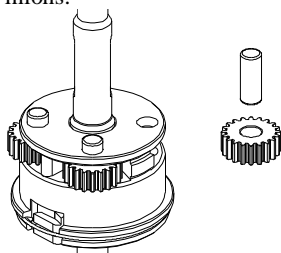


Fig. 5

2. Lift the Planet Cage off the Axle.

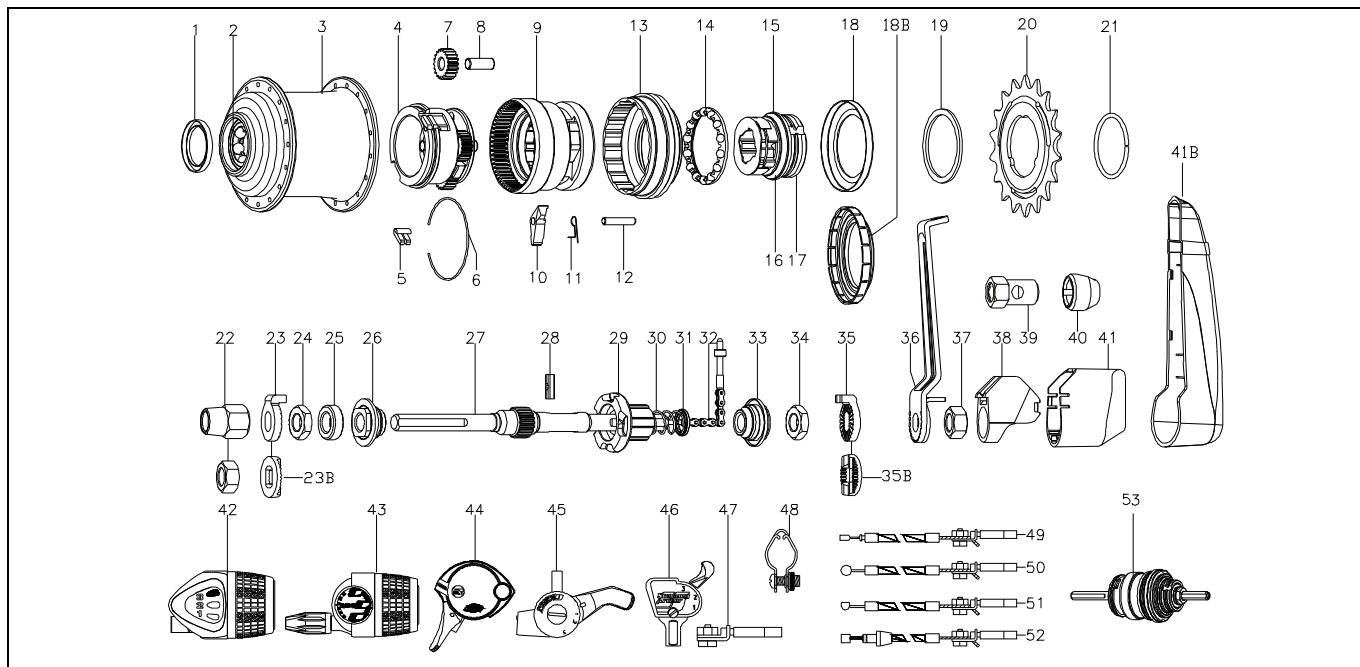
1.2 Inspection of the Internal Parts

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

| Use this chart only if a fault persists after attention to gear adjustment, bearing adjustment and lubrication. (See Parts 1 and 2) | | |
|---|---|--|
| SYMPTOM | FAULT | REMEDY |
| Slipping in 1st gear | <ol style="list-style-type: none"> 1. Worn clutch 2. Worn low gear pawls 3. Weak low gear pawls springs 4. Incorrect right hand cone adjustment 5. Kinks in control wire 6. Twisted indicator chain | <ol style="list-style-type: none"> 1. Replace 2. Replace 3. Replace 4. Re-adjust 5. Replace 6. Replace |
| Self changing between 1st and 2nd Gear | <ol style="list-style-type: none"> 1. Wron gear ring pawls | <ol style="list-style-type: none"> 1. Replace |
| Slipping in 2nd gear | <ol style="list-style-type: none"> 1. Gear ring dogs and/or clutch worn | <ol style="list-style-type: none"> 1. Replace |
| Slipping in 3rd gear | <ol style="list-style-type: none"> 1. Pinion pins and/or clutch worn 2. Weak or distorted clutch spring 3. Incorrect right hand cone adjustment | <ol style="list-style-type: none"> 1. Replace 2. Replace 3. Re-adjust |
| Hub runs stiffly Drag on pedals | <ol style="list-style-type: none"> 1. Chainslay ends not parallel 2. Corrosion 3. Distorted dust caps | <ol style="list-style-type: none"> 1. Re-adjust 2. Clean and lubricate 3. Replace |
| Sluggish gear change | <ol style="list-style-type: none"> 1. Distorted Clutch Spring 2. Bent axle 3. Damaged indicator chain 4. Frayed gear cable wire | <ol style="list-style-type: none"> 1. Replace 2. Replace 3. Replace 4. Replace |



| 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) | 37 | HMN 128 | Axle Nut R.H. | | |
| 2 | HSA 284 | Ball Cage Assembly L.H. 6.4mm Ball | HSL 834 | Sprocket 20T(Chrome) | 38 | HSA 488 | Gear Selector Guide Assembly | | |
| 3 | HSA 599 | Hub shell Assembly 28 Holes | HSL 832 | Sprocket 21T(Chrome) | 39 | HMN 129 | 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 Items 5, 1 off Item 6) | 21 | HSL 721 | Sprocket Circlip | 41 | HSA 507 | Gear Selector Guide Cover | |
| 5 | HSA 573 | Pawl for Planet Cage | 22 | HMN 128 | Axle Nut L.H. | 41B | HSA620 | Gear Selector Guide Full Cover | |
| 6 | HSA 435 | Circlip | HMN 388 | Dome Nut New - SA logo | 42 | HSJ 907 | TSS32 Shifter W/2000mm Cable | | |
| 7 | HSA 292 | Planet Pinion | 23 | HMW 518 | Lockwasher 4.0t - 9.5mm Slot | 43 | HSJ 927 | TSS31 Shifter W/2000mm Cable | |
| 8 | HSA 436 | Pinion Pin | HMW515 | Lockwasher 1.8t - 9.5mm Slot | 44 | HSJ 865 | Orion Control | | |
| 9 | HSA 443 | Gear Ring Assembly (includes 2 Off Items 10, 11 and 12) | 23B | HMW494 | Serrated Lockwasher - 9.5mm Slot | 45 | HSJ 823 | Nimbus Control 22.2mm Clip | |
| 10 | HSA 119 | Pawl for Gear Ring | 24 | HMN 405 | Cone Locknut | 46 | HSJ 762 | Trigger Control 22.2mm Clip | |
| 11 | HSA 120 | Pawl Spring | 25 | HMW 146 | Spacing Washer 1.6mm | 47 | HSL 759 | Cable Anchorage | |
| 12 | HSA 415 | Pawl Pin | HMW 129 | Spacing Washer 3.2mm | 48 | HSJ 553 | Chainstay Fulcrum Clip φ15.9mm | | |
| 13 | HSA 584 | Ball Ring | HMW 483 | Spacing Washer 4.8mm | | HSJ 548 | Chainstay Fulcrum Clip φ17.9mm | | |
| 14 | HSA 438 | Ball Cage Assembly | HMW 484 | Spacing Washer 6.4mm | | HSJ 753 | Chainstay Fulcrum Clip φ19.1mm | | |
| 15 | HSA 439 | Driver Assembly Complete (includes 1 off Items 16 and 17) | 26 | HSA 101 | Cone L.H. with Dust Cap | 49 | HSJ 101 | Trigger Cable with Anchorage 550 x 1550mm Black | |
| 16 | HSA 284 | Ball Cage Assembly R.H. 6.4mm Ball | 27 | HSA 440 | Axle - 163mm with Sun Pinion | | HSJ 102 | Trigger Cable with Anchorage 1450 x 1600mm Black | |
| 17 | HSA 102 | Outer Dust Cap | | HSA 621 | Axle - 148mm with Sun Pinion | | 50 | HSJ 802 | Nimbus Cable with Anchorage 1400 x 1550mm Black |
| 18 | HSL 701 | Sprocket Dustcap | 28 | HSA 295 | Axle Key | | 51 | HSJ 882 | Twistgrip Cable with Anchorage 1450 x 1600mm Black |
| 18B | HSL 871 | Plastic Sprocket Dustcap | 29 | HSA 536 | Clutch | | 52 | HSJ 883 | Orion Cable with Anchorage 1450 x 1600mm Black |
| 19 | HMW 127 | Sprocket Spacing Washer 1.6mm | 30 | HSA 128 | Clutch Spring | | 53 | HSX 143 | AW Internal Replacement Unit 163mm Axle |
| 20 | HSL 854 | Sprocket 13T(Chrome) | 31 | HSA 129 | Clutch Spring Cap | | HSX 144 | AW Internal Replacement Unit 148mm Axle | |
| | HSL 852 | Sprocket 14T(Chrome) | 32 | HSA 315 | Gear Indicator (3 Mark, 163mm Axle) | | | | |
| | HSL 850 | Sprocket 15T(Chrome) | | HSA 126 | Gear Indicator (2 Mark, 148mm Axle) | | | | |
| | HSL 848 | Sprocket 16T(Chrome) | 33 | HSA 101 | Cone R.H. with Dust Cap | | | | |
| | HSL 846 | Sprocket 17T(Chrome) | 34 | HMN 405 | Cone Locknut | | | | |
| | HSL 844 | Sprocket 18T(Chrome) | 35 | HMW 518 | Lockwasher 4.0t - 9.5mm Slot | | | | |
| | | | | HMW515 | Lockwasher 1.8t - 9.5mm Slot | | | | |
| | | | 35B | HMW494 | Serrated Lockwasher - 9.5mm Slot | | | | |
| | | | 36 | HSJ 905 | Axle Fulcrum Lever Assembly | | | | |

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