



Technical Information
and Parts List

Three Speed Hub Gear Type AW



Part 1 GENERAL INFORMATION

1.1 Scope of this leaflet

This leaflet refers to the Sturmey-Archer AW 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 Bearings - SA103B

For all other internal parts - SA103A

Please contact Sturmey-Archer for information on the availability of these greases.

1.3 Gear Changing

Gear changing is simple and smooth with the proven Sturmey-Archer indexed control system. Continue pedalling, 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

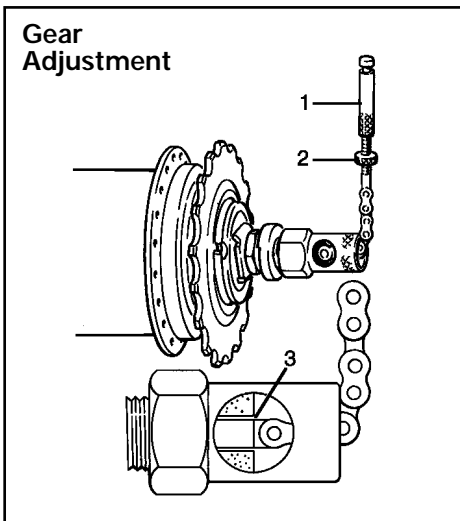
3rd gear - Increase of 33 1/3%

1.5 Sprockets

The overall drive ratio can be altered by changing the size of the sprocket. A range of sprockets from 14 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. Check that the fulcrum clip is secured tightly to the frame tube, and that the indicator rod is screwed correctly into the axle.
2. Select 3rd gear position on the gear control. Screw the cable adjuster (1) onto the indicator coupling.
3. Change down to 2nd gear and turn the cable adjuster until the end of the indicator rod is exactly level with the end

of the axle. This can be seen through the round window in the right hand axle nut (3).

4. Tighten the locknut (2) against the adjuster. Check that all 3 gears are selected correctly. If correct adjustment cannot be achieved, the fulcrum clip must be moved in the appropriate direction along the frame tube. Retighten the clip and adjust as described above.

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. Disengage the cone lockwasher.
3. Screw down the right hand cone figure tight.
4. Unscrew the right hand cone by half a turn.
5. Fit the cone lockwasher. If the washer will not engage with the cone, unscrew the cone slightly.
6. Tighten the right hand cone locknut.
7. 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.



Fig. 1

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 spacing washers, sprocket and outer dustcap (note the order of these parts).
3. Unscrew the left hand cone locknut and cone.



Fig. 2

Fig. 2

1. Loosen the right hand ball ring with a C-spanner or hammer and punch, and unscrew the ball ring to release the internal assembly from the hub shell.
2. Remove the left hand low gear pawls, pins and springs.



Fig. 3

Fig. 3

1. Clamp the left hand end of the axle in a vice.
2. Remove the right hand cone locknut, spacers, lockwasher, cone, spring, cap and clutch spring.

Fig. 4

1. Lift off the driver, ball cage, ball ring and gear ring.
2. Remove the gear ring pawls, pawl pins and springs.

Fig. 5

Lift off the thrust ring, axle key, clutch and clutch sleeve.

Fig. 6

1. Remove the planet pinion pins and pinions.
2. Lift the planet cage off the axle.



Fig. 4



Fig. 5

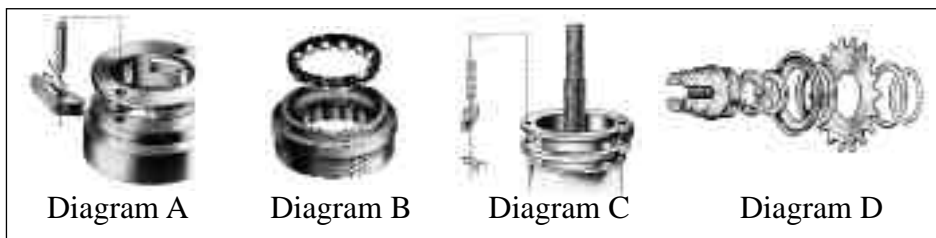


Fig. 6

3.2 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.
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.

3.3 Assembly

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

For Bearings - SA103B

For all other internal parts - SA103A

If a replacement gear internal assembly complete is to be fitted, assembly commences at Fig. 2, point 3.

Fig. 6

1. Clamp the left hand end of the axle in a vice with its axle slot uppermost.
2. Locate the planet cage over the axle, and fit the planet pinions and pins with their small diameter upwards.

Fig. 5

Fit the clutch sleeve, clutch, axle key (with flats uppermost) and thrust ring.

Fig. 4

1. Take the gear ring and fit the pawls, pawl pins and springs as indicated in Diagram A.
2. Fit the gear ring onto the planet cage.
3. See Diagram B. Fit the ball ring and ball cage assembly - ensuring that the balls face downwards.
4. Fit the driver with ball cage and outer dust cap. Ensure that the driver splines engage with the clutch.

Fig. 3

1. Slide the clutch spring and clutch 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 lockwasher and locknut.

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

Fig. 2

1. Insert the assembly in the vice, and fit the low gear pawls, pins and springs into the planet cage as indicated in Diagram C.
2. Remove the assembly from the vice and liberally grease the working parts particularly the planet pinions, pinion pins, sun pinion and gear ring.
3. Insert the unit into the hub shell, and tighten the ball ring.

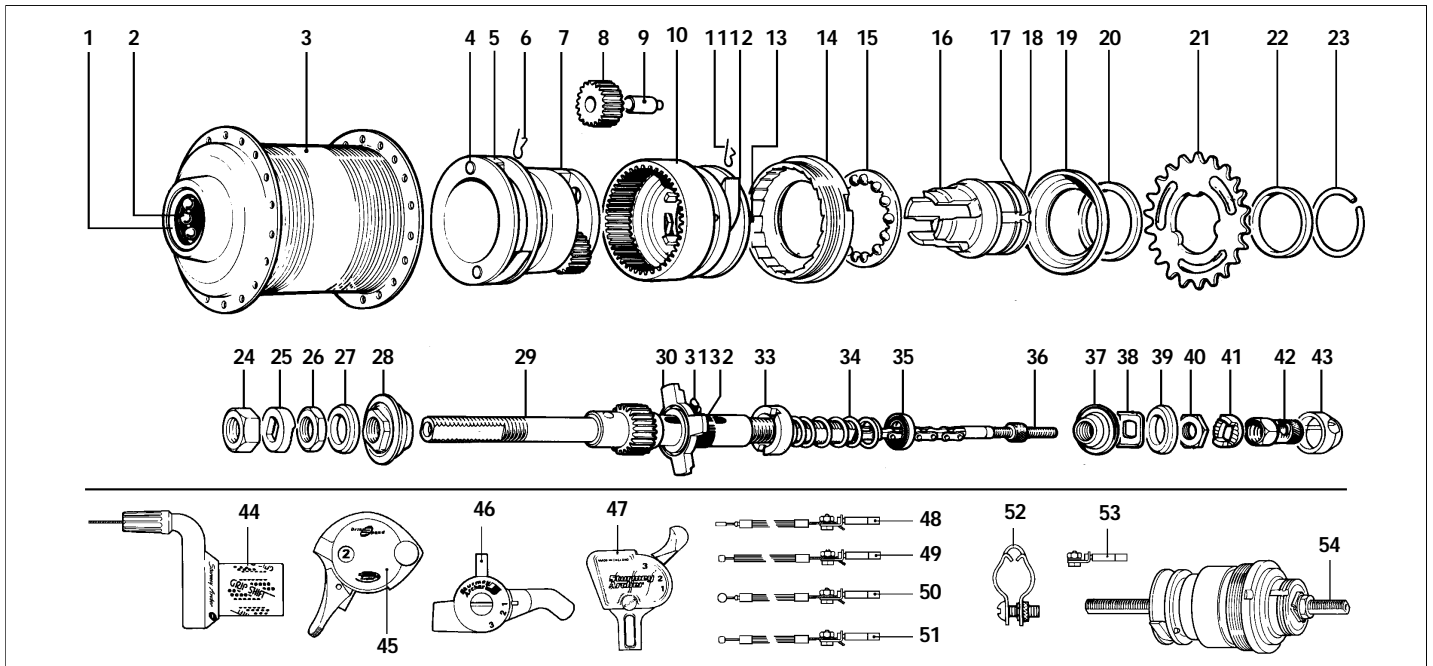
Fig. 1

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 as indicated in Diagram D.
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.

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	1. Worn clutch	1. Replace
	2. Worn low gear pawls	2. Replace
	3. Weak low gear pawl 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. Worn 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 Drag on pedals	1. Chainstay ends not parallel	1. Re-align
	2. Corrosion	2. Clean and lubricate
	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



Item No.	Sales No.	Description	Item No.	Sales No.	Description	Item No.	Sales No.	Description
1	HSA 102	Outer Dust Cap	21	*HSL 718	Sprocket 18 Teeth	39	*HMW146	Spacing Washer 1.6 mm
2	HSA 284	Ball Cage Assembly L.H. 6.4 mm Ball		*HSL 719	Sprocket 19 Teeth		*HMW 129	Spacing Washer 3.2 mm
3	*HSA 239	Hub Shell Assembly 28 holes (chrome)		*HSL 720	Sprocket 20 Teeth		*HMW 483	Spacing Washer 4.8mm
	*HSA 105	Hub Shell Assembly 36 holes (chrome)		*HSL 747	Sprocket 21 Teeth		*HMW 484	Spacing Washer 6.4 mm
	*HSA 104	Hub Shell Assembly 40 holes (chrome) N.B. - Hub Shell Assemblies include 1 off items 1 and 2	22	HMW 127	Sprocket Spacing Washer 1.6 mm	40	HMN 132	Cone Locknut
4	HSA 112	Pawl Pin	23	HSL 721	Sprocket Circlip	41	*HMW 155	Serrated Lockwasher 7.9 mm Slot
5	HSA 111	L.H. Low Gear Pawl	24	HMN 128	Axle Nut L.H.	42	HMN 129	Serrated Lockwasher 9.5 mm Slot
6	HSA 120	Pawl Spring	25	*HMW 155	Serrated Lockwasher 7.9 mm Slot	43	HSL 711	Indicator Guard
7	HSA 113	Planet Cage	26	*HMW 494	Serrated Lockwasher 9.5 mm Slot	44	*HSJ 880	Twistgrip Control c/w inner wire
8	HSA 292	Planet Pinion	27	HMN 132	Cone Locknut	45	*HSJ 865	Orion Control
9	HSA 114	Pinion Pin	28	*HMW 146	Spacing Washer 1.6 mm	46	*HSJ 823	NIMBUS Control 22.2mm Clip
10	HSA 118	Gear Ring	29	*HMW 129	Spacing Washer 3.2 mm	47	*HSJ 762	Trigger Control 22.2mm Clip
11	HSA120	Pawl Spring	30	*HMW 483	Spacing Washer 4.8mm	48	*HSJ 765	Trigger Control 23.8mm Clip
12	HSA 119	R.H. Pawl for Gear Ring	31	*HMW 484	Spacing Washer 6.4 mm	48	*HSJ 101	Trigger Cable with Anchorage 530mm x 1520mm Black
13	HSA 112	Pawl Pin	28	HSA101	Cone L.H. with Dust Cap		*HSJ 102	Trigger Cable with Anchorage 1420mm x 1570mm Black
14	HSA 121	Ball Ring	29	*HSA 107	Axle - 146 mm (5 3/4") with Sun Pinion	49	*HSJ 884	NIMBUS Cable with Anchorage 1420mm x 1570mm Black
15	HSA 438	Ball Cage Assembly		*HSA 370	Axle - 163 mm (6 13/32") with Sun Pinion	50	*HSJ 882	Twistgrip Cable with Anchorage 1420mm x 1570mm Black
16	HSA 394	Driver Assembly Complete (includes 1 off items 17 and 18)	30	HSA 117	Clutch	51	*HSJ 883	Orion Cable with Anchorage 1420mm x 1570mm Black
17	HSA 284	Ball Cage Assembly R.H. 6.4 mm	31	HSA 124	Axle Key	52	*HSJ 607	Chainstay Fulcrum Clip 12.7 mm ø
18	HSA 102	Ball	32	HSA 116	Clutch Sleeve		*HSJ 553	Chainstay Fulcrum Clip 15.9 mm ø
19	HSL 701	Outer Dust Cap	33	HSA 283	Thrust Ring		*HSJ 548	Chainstay Fulcrum Clip 17.9 mm ø
20	HMW 127	Sprocket Dust Cap	34	HSA 128	Clutch Spring		*HSJ 753	Chainstay Fulcrum Clip 19.1 mm ø
21	*HSL 714	Sprocket Spacing Washer 1.6 mm	35	HSA 129	Cap for Clutch Spring	53	*HSL 759	Cable Anchorage
	*HSL 715	Sprocket 14 Teeth	36	*HSA 125	Gear Indicator R.H. for 146 mm (5 3/4") Axle (1 Mark)	54	*HSX 105	AW Internal Replacement Unit 146 mm (5 3/4") Axle
	*HSL 716	Sprocket 15 Teeth	37	HSA 101	Cone R.H. with Dust Cap		*HSX 106	AW Internal Replacement Unit 163 mm (6 13/32") Axle
	*HSL 717	Sprocket 16 Teeth	38	HMW 147	Cone Lockwasher			
		Sprocket 17 Teeth						

* Optional Fitment

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