



Technical Information  
and Parts List

# Elite Alloy Hub Brakes

VT - ST - AT3



## Part 1 GENERAL INFORMATION

The information contained in this manual relates specifically to the full service and maintenance of the Elite VT, Elite ST and Elite AT3 (manufactured from 10.95). Please contact your local approved dealer if you experience any problems with this product. For earlier models please refer to leaflet LTE 121/3.

### 1.1 Lubrication

No routine lubrication is required. However, during assembly/disassembly the hub greases should be replenished. Grease types meeting the following Sturmey-Archer Technical Standards should be used:

For bearings - SA103B

For all other internal parts - SA103A

**WARNING: Under no circumstances should any lubricant be applied to the Brake Drum or Brake Shoes as this may prevent the brake from functioning.**

### 1.2 Gear Changing

Continue pedalling, but ease pressure on the pedals, and select the gear required. If stationary, simply select gear required.

### 1.3 Gear Ratios

The three gears are as follows:

1st gear - Decrease of 25%

2nd gear - Direct drive

3rd gear - Increase of 33.3%

### 1.4 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.

**NB.** Always maintain at least a 2:1 ratio between the numbers of teeth on the chainwheel and those of the sprocket.

## Part 2 ROUTINE MAINTENANCE

### 2.1 Gear Adjustment (Fig. 1)

1. Check that the fulcrum clip, if fitted, is secured tightly to the frame tube, and that the indicator rod is screwed correctly into the axle.
2. Select third gear position at the control and loosely connect the cable adjuster (1) to the indicator coupling.
3. Select second gear. Looking through the 'window' in the right hand nut, turn the cable adjuster until the end of the indicator rod is exactly level with the end of the axle (3).
4. Tighten the locknut (2) against the adjuster. If correct adjustment cannot be achieved, the fulcrum clip must be moved in the appropriate direction along the frame tube. Re-tighten the clip and adjust as described above.

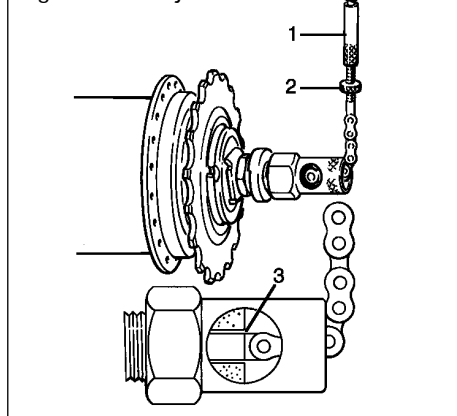
**WARNING: The hub must not be ridden out of adjustment as this may damage the internal parts and cause the hub to malfunction.**

### 2.2 Hub Bearing Adjustment - AT3

The right hand cone is preset at the Sturmey-Archer factory and should only be disturbed during a major service. The left-hand cone only is used for normal bearing adjustment.

1. Loosen left-hand cone locknut.
2. Adjust the cone using the slotted cone

Fig. 1 - Gear Adjustment



adjuster until very slight side play can be felt at the wheel rim and none at the hub, giving a free running hub.

3. Tighten the cone locknut (Torque 7-10 Nm).

## Part 3 ASSEMBLY/DISASSEMBLY INSTRUCTIONS - AT3

If any service problems occur always refer to the fault diagnosis chart. Problems are usually corrected by routine external maintenance described in Part 2. If the problem persists a close inspection of the working parts inside the hub will be necessary.

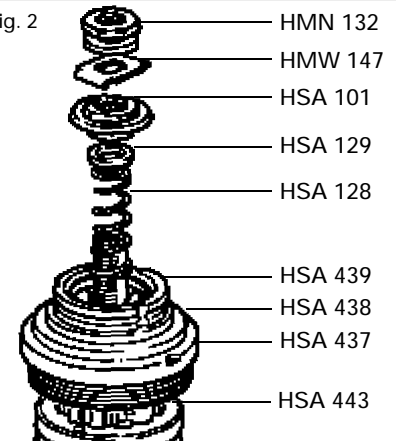
### 3.1 Disassembly

1. Remove the indicator rod, axle nuts and spacing washers from both ends of the axle. Remove wheel from the bicycle.
2. Use a screwdriver to release the sprocket circlip from the driver, then remove the sprocket, sprocket spacer and outer dustcap (note the order of these parts to facilitate reassembly).
3. Clamp right hand end of axle in a vice. Unscrew the left hand cone locknut. Remove the spacing washer (if fitted) and cone adjuster.
4. Remove the brake plate assembly.
5. Unscrew the left hand cone. Remove the hub from vice.
6. Loosen the right hand ball ring with a C-spanner (R.H. thread) or hammer and suitable punch and unscrew the ball ring to release the internal assembly from the hub shell.

**NB:** If a replacement gear internal assembly is to be fitted, no further disassembly is required.

7. (See Fig. 2.) Clamp the left hand end of the axle in a vice and remove the right hand cone locknut, lockwasher, cone and spring with cap. Lift off the ball cage assembly and ball ring together with the driver assembly. Separate driver assembly from the ball ring by compressing pawls and extracting the driver assembly through ball ring.
8. (See Fig. 3.) Lift off the gear ring assembly, clutch and remove the axle key. Remove the gear ring support plate, pinion pins and pinions from planet cage. Slide out the sun pinion pin and remove the axle and planet cage assembly from the vice. Reclamp right hand end of the axle, remove circlip using circlip pliers and discard. Slide off the planet cage and then the sun pinion from the axle.

Fig. 2



SALES NO.	DESCRIPTION
HMN 132	Cone Locknut
HMW 147	Cone Lockwasher
HSA 101	R.H. Cone
HSA 129	Clutch Spring Cap
HSA 128	Clutch Spring
HSA 439	Driver Assembly
HSA 438	Ball Cage Assembly
HSA 437	Ball Ring
HSA 443	Gear Ring Assembly

### 3.2 Inspection and Repair of Internal Parts

Thoroughly clean all the parts and replace any which are damaged or worn. Specific items to be checked are:

1. Axle: Straightness and condition of threads.
2. Pinions: Condition of teeth.
3. Pinion Pins: Squareness of ends, wear.
4. Planet Cage Assembly: Condition of pawls.
5. Gear Ring Assembly: Condition of splines and gear teeth. Condition of pawls and pawl springs.
6. Clutch: Squareness of corners, condition of splines. The clutch must slide easily in the driver assembly and along the axle.
7. Driver Assembly: Worn or chipped pawls, free movement of pawl actuator. Condition of pawl actuator. Condition and correct number (7) of balls.

**NB:** It is recommended that this assembly is not dismantled, but if necessary replaced with a factory assembled replacement unit.

8. Hub Shell: Condition of threads and L.H. balltrack. Check braking surface for ingress of dirt.

9. Brake Shoes: Check for wear.

**NB:** It is recommended that the brake shoe assembly is not dismantled, but if necessary replaced with a factory assembled replacement unit.

### 3.3 Assembly

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

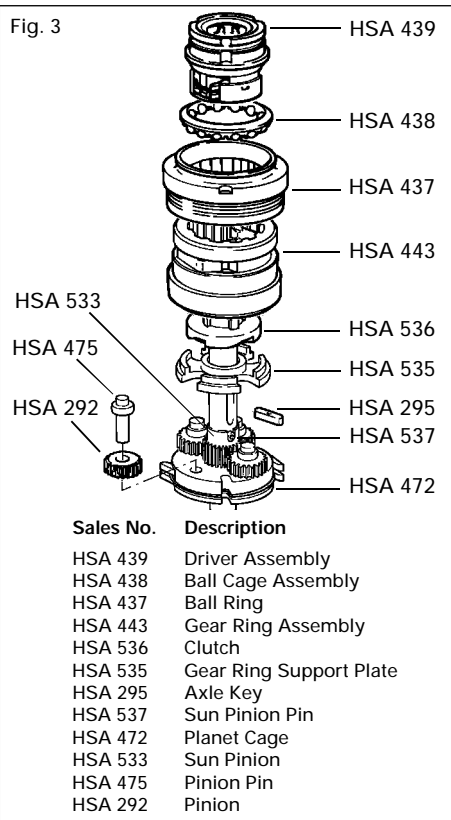
For bearings - SA103B

For all other internal parts - SA103A

If a complete replacement gear internal assembly is to be fitted, assembly commences at point 9 below.

1. Clamp the right hand end of the axle in the vice, circlip groove uppermost. Locate the sun pinion over the axle with the slot facing downwards. Locate the planet cage over the axle, pawls

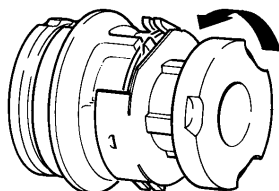
Fig. 3



uppermost and pointing anti-clockwise. Fit a new circlip and locate it in the circlip groove, ensuring sharp corners are uppermost.

- NB. Take care not to overstress the circlip.**
- Remove the axle from the vice and re-clamp left hand end of the axle in the vice, fit the sun pinion pin into the axle, locking the sun pinion. Fit the planet pinions and pinion pins (See Fig. 3) and then the gear ring support plate with the flat face downwards. Ensure the plate fits over the sun pinion and the large head diameter of the planet pinion pins. Fit the axle key such that the threaded hole runs vertically. Locate the key centrally in the axle slot with a spot of SA103A grease.
  - Locate the clutch onto the heads of the pinion pins, then locate the gear ring assembly over the pinions. Fit the ball ring by compressing the planet cage pawls.
  - Place the ball cage assembly on the ball ring - ensuring that the balls face downwards.
  - Rotate the actuator to compress driver pawls (See Fig. 4).
  - With actuator held in this position, fit the driver assembly, rotating to ensure that the driver engages with the clutch splines.
  - Fit clutch spring and cap (with flat uppermost).

Fig. 4



- Screw down the right-hand cone finger tight. Unscrew the cone by half a turn. Fit the cone lockwasher. If the washer will not engage with the cone, unscrew the cone slightly. Fit locknut and tighten to 7Nm.

**NB:** Under no circumstances must the right hand cone be unscrewed more than 225° (5/8 of a turn).

- Insert gear internal assembly into hub shell, turning anti-clockwise initially to ensure that the planet cage pawls engage in the ball cup teeth. Tighten the ball ring with a C-spanner or hammer and punch.
- Clamp right hand end of axle in vice. Fit the left hand cone, brake plate assembly, cone adjuster, spacing washer (if fitted) and locknut. Adjust hub as described in Part 2.2.
- Assemble dustcap, spacer, sprocket and circlip in reverse order to disassembly.

### Part 4 HUB/FRAME ASSEMBLY

- Fit the hub into the front or rear forkends and position the wheel centrally in the frame.
- Fit axle nuts and washers on the AT3. These must include the correct size anti-rotation washers, ensuring lugs engage in chainstay slots. **DO NOT** tighten the axle nuts at this stage or misalignment of the brake plate may occur. (**N.B.** The VT, ST and AT3 should be assembled with the brake on the left hand (non chain) side of the bicycle.)
- AT3/ST**  
Select a suitable brake arm clip to clamp the brake arm loosely to the bicycle frame. With the wheel centralised and the chain tensioned correctly, tighten the axle nuts to a torque of 24 - 26Nm AT3 or 22 - 22.5Nm ST  
**VT**  
Select a suitable brake arm clip to clamp the brake arm loosely to the front fork. With the wheel centralised, tighten the axle nuts to a torque of 22 - 22.5Nm
- Tighten the brake arm clip firmly in this position to either 7Nm - 10Nm torque for the AT3/ST or 2 Nm torque for the VT.

### Brake Cable Fitting - Closed End Cables

- Attach the cable to the handlebar brake lever.
- Locate the brake adjusting spigot in the slot of the Brake arm.
- Fit the cable nipple into the hub brake lever assembly.

### Brake Cable Fitting - Pinch Bolt

- Attach the cable to the handlebar brake lever.
- Locate brake adjusting spigot into slot on the brake arm. Push the cable inner wire through the hole in the pinch bolt nut and locate this into the cradle in the brake lever. Pull the inner wire through the pinch bolt until taut.
- Set adjuster (2) so that there is approximately 5mm of thread showing above the locknut (1). (See Fig. 5).
- Holding the brake lever in the 'brake on' position with the inner cable taut, hold the pinch bolt 'nut' on the inside of the brake arm with a spanner and tighten pinch bolt

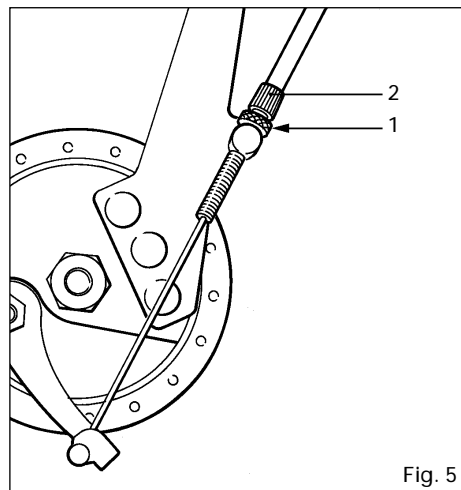


Fig. 5

'screw' on the outside arm (2 - 3 Nm).

### Brake Adjustment

- Slacken the brake adjuster locknut (1)
- Turn the adjuster (2) until the brake is applied.
- Slacken the adjuster until the wheel can just be turned freely.
- Tighten the locknut (1).  
**N.B.** To maintain maximum braking efficiency avoid sharp bends and kinks in the cable.

### Part 5 BRAKE SHOE SERVICE

The asbestos free linings in Sturmey Archer hub brakes are long lasting and should only need replacement at major service intervals. A complete brake replacement unit is available for this purpose. Before replacing this unit, check for mal-adjustment and excessive cable stretch.

#### 5.1 Brake Unit Removal

- Remove the brake cable, (and gear cable on AT3), brake arm clip and axle nuts from the hub and take the wheel out of the bicycle.
- Take off the brake plate locknut, washer(s) and cone adjusting washer to release the brake plate assembly.

#### 5.2 Brake Unit Replacement

- Wipe the inside of the brake drum surface to remove grease and dirt.
- Fit the replacement unit into the hub over the left hand cone and re-assemble the cone adjuster, washer(s) and locknut.
- Apply the brake lever to centralise the shoes and tighten the locknut to 7Nm max. Assemble the wheel in the bicycle following the instructions given in Part 4.  
**NB:** For cone adjustment refer to Section 2.2

### Part 6 BEARING/AXLE SERVICE - ST/VT

The bearings in the ELITE VT and ST hub brakes have precision deep groove ball races which are permanently sealed and lubricated. Under normal operating conditions they should last for the life of the hub. If the axle or bearings require replacement for any reason an axle replacement unit is available. Ideally a bench press should be used for this operation.

DO NOT attempt to refit used bearings once they have been removed from the hub.

## 6.1 Bearing/Axle Removal

1. Remove the wheel from the bicycle and the brake plate assembly from the hub as described in Part 5.1
2. Lift off the brake plate bush and using a suitable drift, drive the axle and right hand bearing out of the hub shell. When applying pressure to the left hand axle end ensure that the hub shell is being supported by the right hand bearing housing, and not by the hub flange.  
**NB** Carefully note the 'left-right' orientation of the axle since the replacement axle must be fitted in the

hub the same way round.

3. With the axle assembly removed, invert the hub shell and drive out the left hand bearing with an 11-12 mm drift.
4. Discard the axle and bearings.

## 6.2 Bearing/Axle Replacement

1. Thoroughly clean the bearing unit housings and brake drum with a clean, dry cloth.
2. Using a suitable cylindrical punch, press a bearing unit into the right hand bearing housing. Pressure should be exerted across the full face of the unit.
3. Having noted the correct orientation of the axle, insert it in place from the left hand side of the hub until the axle's

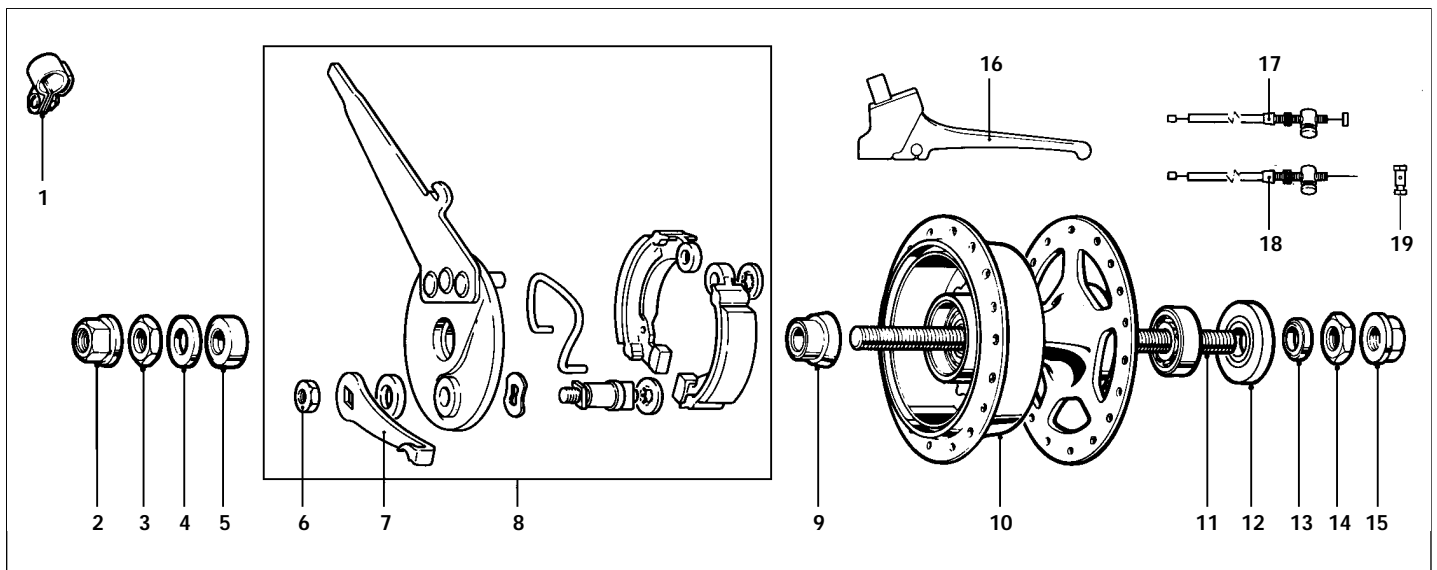
'shoulder' butts up against the bearing unit.

4. Slide the left hand bearing unit into place and press home using a suitable punch exerting pressure across the full face of the bearing unit whilst supporting the right hand bearing across the full face.  
**NB** Bearings are a sliding fit on the axle and an interference fit in the shell.
5. Fit axle end components as appropriate and fit the brake plate bush and assemble the brake plate onto the hub as detailed in Part 5.2.

Refer to Part 4 for hub/frame assembly instructions.

### Part 7 FAULT DIAGNOSIS CHART

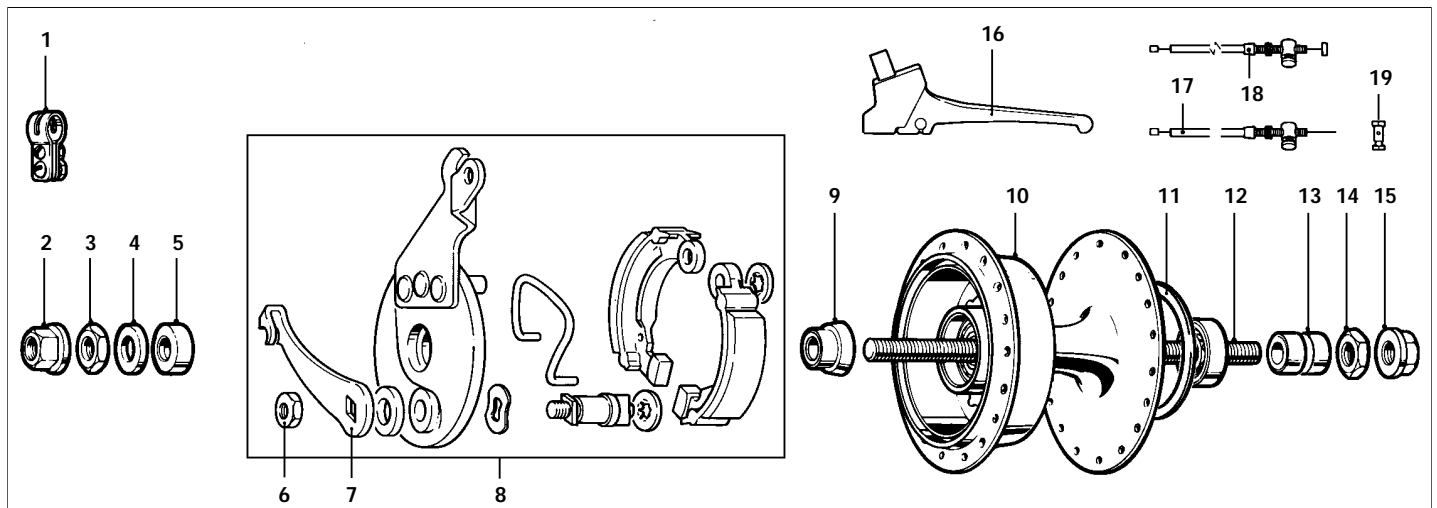
NB: Always check gear adjustment, condition of indicator, cable, control and tightness of fulcrum clip before referring to this chart.		
SYMPTOM	FAULT	REMEDY
1. Difficult to change gear	- Damaged indicator - Damaged cable - Damaged control - Worn/damaged clutch spring - Wrong Indicator	Replace Replace Replace Replace Replace
2. Different gear engaged to that selected	- Gear adjustment - Bearing adjustment - Wrong indicator - Worn clutch spring - Worn gear ring pawls	Adjust Adjust Replace Replace Replace pawls and spring
3. Drive jolts/slips in first gear	- Worn pawls in driver - Worn pawls in planet cage	Replace driver assembly Replace pawls and spring
4. Drive jolts/slips in second gear	- Worn pawls in driver - Worn gear ring pawls	Replace driver assembly Replace pawls and spring
5. Drive jolts/slips in top gear	- Worn clutch - Worn planet pinion pins - Worn gear ring pawls	Replace Replace Replace pawls and spring
6. Inefficient braking	- Worn brake shoes	Fit brake replacement unit (See Section 5)



Item No.	Sales No.	Description	Item No.	Sales No.	Description	Item No.	Sales No.	Description
1	*HSL 702	Brake Arm Clip 17.4mm	9	HSA 373	Brake Plate Bush	16	*PKL 205	DELTRIN Brake Lever RH/LH 22.2mm Clip
	*HSL 703	Brake Arm Clip 18.3mm	10	HSB 301	Hub Shell 36H		*PKL 206	DELTRIN Brake Lever RH/LH 23.8mm Clip
2	HMN 376	Axle Nut	11	HSB 396	Replacement Axle Unit 136mm N.B.: This assembly includes hub bearings and 1 off items 2, 3, 4, 5, 9, 12, 13, 14, 15.	17	*HSK 711	Cable Complete Black - c/end
3	HMN 377	Locknut				18	*HSK 712	Cable Complete Black - o/end
4	*HMW 146	Washer 1.6mm	12	HSA 398	Spacer	19	*HSK 715	Pinch Bolt
5	HSA 372	Brake Plate Spacer	13	HSA376	Spacer			
6	HMN 139	Brake Lever Nut	14	HMN 377	Locknut			
7	HSB 408	Brake Lever	15	HMN 376	Axle Nut			
8	HSB 430	Brake Replacement Unit NB: Brake Replacement Unit includes 1 off items 6 and 7						

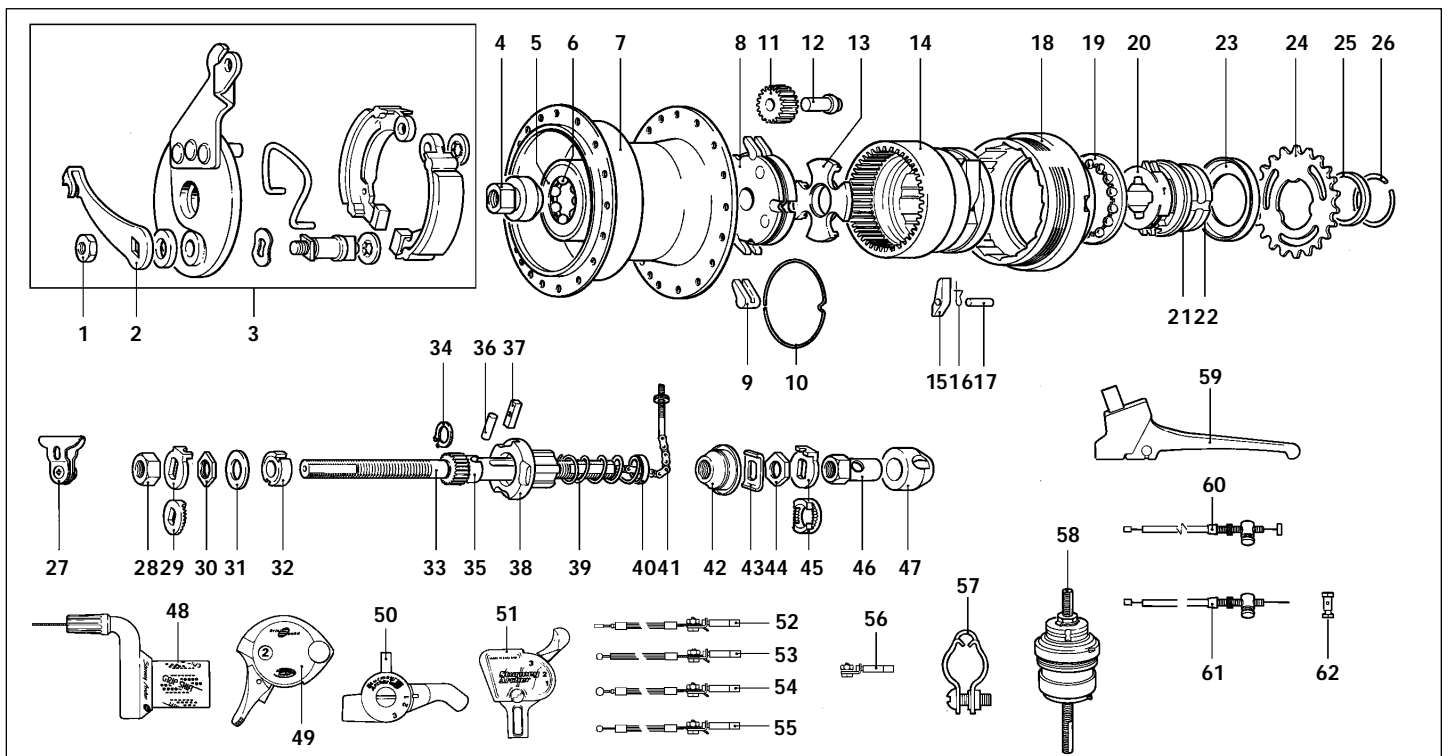
\* Optional Fitment

## Parts List - ST Rear Hub Brake



Item No.	Sales No.	Description	Item No.	Sales No.	Description	Item No.	Sales No.	Description
1	*HCB 101	Brake Arm Clip Assembly 15.9mm	9	HSA 373	Brake Plate Bush	17	*HSK 714	Cable Complete Black - o/end
	*HCB 103	Brake Arm Clip Assembly 18.3mm	10	HSB 299	Hub Shell 36H	18	*HSK 713	Cable Complete Black - c/end
	*HSL 761	Brake Arm Clip Assembly 19.1mm	11	HMW 127	Sprocket Spacing Washer	19	HSK 715	Pinch Bolt
	*HSL 767	Brake Arm Clip Assembly 15.5mm	12	HSB 433	Replacement Axle Unit N.B.: This assembly includes hub bearings and 1 off items 2, 3, 4, 5, 9, 13, 14, 15.			
	*HSL 768	Brake Arm Clip Assembly 15.9mm						
2	HMN 376	Axle Nut	13	*HSB 428	Axle Spacer - 2 off			
3	HMN 377	Locknut	14	HMN 377	Locknut			
4	*HMW 146	Washer 1.6mm	15	HMN 376	Axle Nut			
5	HSA 372	Brake Plate Spacer	16	*PKL 205	DELTRIN Brake Lever RH/LH 22.2mm Clip			
6	HMN 139	Brake Lever Nut		*PKL 206	DELTRIN Brake Lever RH/LH 23.8mm Clip			
7	HSB 406	Brake Lever						
8	HSB 429	Brake Replacement Unit NB: Brake Replacement Unit includes 1 off items 6 and 7						

\* Optional Fitment



Item No.	Sales No.	Description	Item No.	Sales No.	Description	Item No.	Sales No.	Description
1	HMN 139	Brake Lever Nut	24	*HSL 719	Sprocket 19 Teeth	47	*HSL 711	Indicator Guard
2	HSB 406	Brake Lever		*HSL 720	Sprocket 20 Teeth	48	*HSJ 880	Twistgrip Control c/w inner wire
3	HSB 429	Brake Replacement Unit NB. Brake Replacement Unit includes 1 off Items 1 and 2		*HSL 747	Sprocket 21 Teeth	49	*HSJ 865A	Orion Control
4	HSA 234	L.H. Cone		*HSL 722	Sprocket 22 Teeth	50	*HSJ 823	NIMBUS Control 22.2mm Clip
5	HSA 241	Cone Dustcover	25	HMW 127	Sprocket Spacing Washer 1.6 mm	51	*HSJ 762	Black Trigger Control 22.2 mm Clip
6	HSA 284	Ball Cage Assembly - 6.4mm Ball	26	HSL 721	Sprocket Circlip		*HSJ 765	Black Trigger Control 23.8 mm Clip
7	HSB 425	Hub Shell Assembly 36 holes N.B. - Hub Shell Assemblies include 1 off items 6 and 7	27	*HCB 101	Brake Arm Clip Assembly 15.9mm		*HSJ 821	White Trigger Control 22.2 mm Clip
8	HSA 472	Planet Cage Assembly (includes 2 off Item 9, 1 off Item 10)		*HCB 103	Brake Arm Clip Assembly 18.3mm		*HSJ 822	White Trigger Control 23.8 mm Clip
9	HSH 482	Pawl for Planet Cage		*HSL 761	Brake Arm Clip Assembly 19.1mm	52	*HSJ 101	Trigger Cable with Anchorage 530mm x 1520mm Black
10	HSA 450	Circlip		*HSL 767	Brake Arm Clip Assembly 15.5mm		*HSJ 102	Trigger Cable with Anchorage 1420mm x 1570mm Black
11	HSA 292	Planet Pinion	28	HMN 128	Axle Nut L.H.	53	*HSJ 884	NIMBUS Cable with Anchorage 1420mm x 1570mm Black
12	HSA 475	Pinion Pin	29	*HMW 155	Serrated Lockwasher 7.9 mm Slot	54	*HSJ 882	Twistgrip Cable with Anchorage 1420mm x 1570mm Black
13	HSA 535	Gear Ring Support Plate		*HMW 494	Serrated Lockwasher 9.5 mm Slot	55	*HSJ 883	Orion Cable with Anchorage 1420mm x 1570mm Black
14	HSA 443	Gear Ring Assembly (includes 2 off Items 15, 16, 17)		*HMW 515	K48 Lipwasher 9.5mm Slot	56	*HSL 759	Cable Anchorage
15	HSA 119	Pawl for Gear Ring	30	HMN 132	Cone Locknut	57	*HSJ 607	Chainstay Fulcrum Clip 12.7 mm ø
16	HSA 120	Pawl Spring	31	*HMW 146	Spacing Washer 1.6 mm		*HSJ 553	Chainstay Fulcrum Clip 15.9 mm ø
17	HSA 415	Pawl Pin		*HMW 129	Spacing Washer 3.2 mm		*HSJ 548	Chainstay Fulcrum Clip 17.9 mm ø
18	HSA 437	Ball Ring		*HMW 483	Spacing Washer 4.8mm		*HSJ 753	Chainstay Fulcrum Clip 19.1 mm ø
19	HSA 438	Ball Cage Assembly		*HMW 484	Spacing Washer 6.4 mm	58	*HSX 135	Gear Internal Assembly Complete
20	HSA 439	Driver Assembly Complete (includes 1 off Items 21 and 22)	32	HSA 371	Cone Adjuster	59	*PKL 205	DELTRIN Brake Lever Assembly RH/LH 22.2mm Clip
21	HSA 284	Ball Cage Assembly - R.H. 6.4 mm Ball	33	HSA 534	Axle 163mm		*PKL 206	DELTRIN Brake Lever Assembly RH/LH 23.8mm Clip
22	HSA 102	Outer Dust Cap	34	HSL 729	Circlip	60	HSK 713	Cable Complete Black - 1570mm c/end
23	HSL 701	Sprocket Dust Cap	35	HSA 533	Sun Pinion	61	*HSK 714	Cable Complete Black - 1600mm/1820mm o/end
24	*HSL 714	Sprocket 14 Teeth	36	HSA 537	Sun Pinion Pin	62	HSK 715	Pinch Bolt
	*HSL 715	Sprocket 15 Teeth	37	HSA 295	Axle Key			
	*HSL 716	Sprocket 16 Teeth	38	HSA 536	Clutch			
	*HSL 717	Sprocket 17 Teeth	39	HSA 128	Clutch Spring			
	*HSL 718	Sprocket 18 Teeth	40	HSA 129	Cap for Clutch Spring			
			41	HSA 315	Gear Indicator (3 Mark)			
			42	HSA 101	R.H. Cone			
			43	HMW 147	Cone Lockwasher			
			44	HMN 132	Cone Locknut			
			45	*HMW 155	Serrated Lockwasher 7.9 mm Slot			
				*HMW 494	Serrated Lockwasher 9.5 mm Slot			
				*HMW 515	K48 Lipwasher 9.5mm Slot			
			46	HMN 129	Axle Nut R.H.			

\* Optional Fitment

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