

Part 1 GENERAL INFORMATION

The Five Speed Hub is a precision made unit which will give reliable trouble free service for many years provided that the recommended procedures for gear change, gear adjustment and lubrication are carried out at regular intervals. When service problems do occur they usually lie outside the hub and can be corrected by attention to routine maintenance.

1.1 Lubrication

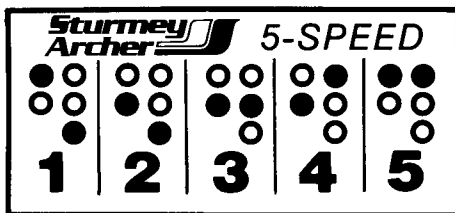
A new hub must be oiled before use through the oiler on the hub shell. Thereafter lubricate once every three months (or as necessary) with a few drops of Sturmey-Archer oil (SAE 30). Do not use thick oil or grease.

1.2 Gear Changing

Gear changing is quick and easy. Continue pedalling, but ease pressure on the pedals when changing. Should it be necessary to change gear whilst stationary, the pedals must be rotated backwards slightly to allow the internal parts to align themselves correctly.

An adhesive handlebar label is provided to denote gear lever positions.

Gear	Left Lever	Right Lever
1	Forward	Backward
2	Backward	Backward
3	Backward	Central
4	Backward	Forward
5	Forward	Forward



1.3 Gear Ratios

The Hub has five gears:

- 1st gear – Decrease of 33.3%
- 2nd gear – Decrease of 21.1%
- 3rd gear – Direct Drive
- 4th gear – Increase of 26.6%
- 5th gear – Increase of 50%

1.4 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.

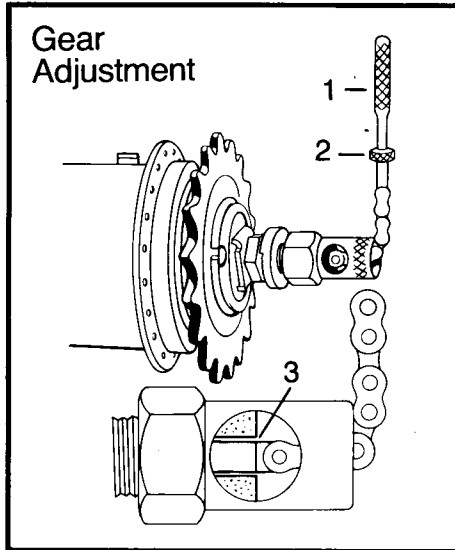
Part 2 ROUTINE MAINTENANCE

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. Check that the fulcrum clips are secured tightly to the frame tubes, and that the indicator rods are screwed correctly into the ends of the axle.
2. Screw the cable adjusters (1) onto the indicator couplings.
3. Select 3rd gear (left hand lever in backward position, right hand lever in central position) and turn the cable adjusters

Gear Adjustment



until the ends of the indicator rods are level with the ends of the axle. This can be seen through the round windows in the left and right hand axle nuts (3).

4. Tighten the locknuts (2) against the adjusters. If the correct adjustment cannot be achieved, the fulcrum clip(s) must be moved in the appropriate direction along the frame tube(s).

Re-tighten the clip(s) and adjust as described above.

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.

Right Hand Cone:

1. Loosen the left hand cone locknut and cone.
2. Screw down the right hand cone finger tight.
3. Unscrew the right hand cone by half a turn.
4. Fit the cone lockwasher. If the washer will not engage with the cone, unscrew the cone slightly.

NB Under no circumstances must the right hand cone be unscrewed more than 5/8 of a turn.

5. Fit the cone locknut to secure the lockwasher and cone in position.

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.

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. Refer to the Fault Diagnosis chart before commencing disassembly.

3.1 Disassembly

Fig. 1

1. Remove the indicator rods, 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. Note the position of spacing washers (if any) between cone and locknut.

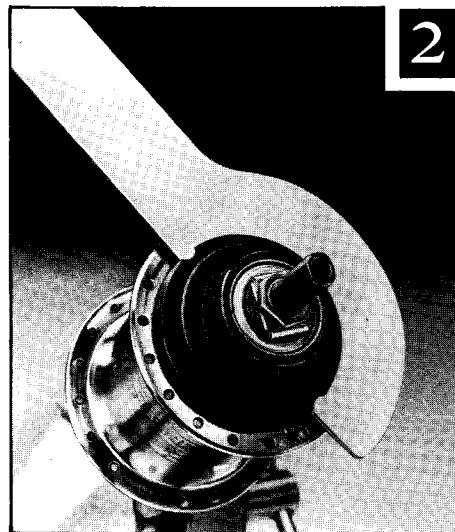
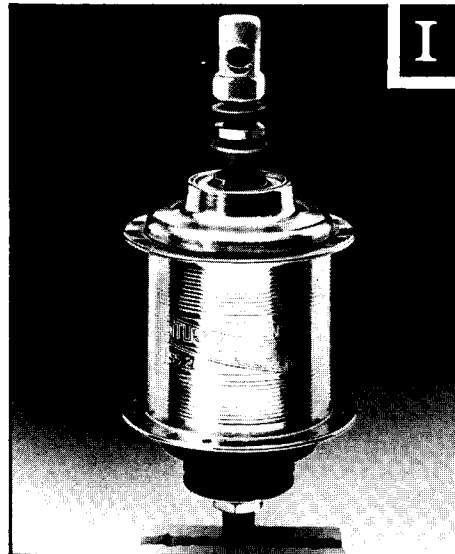
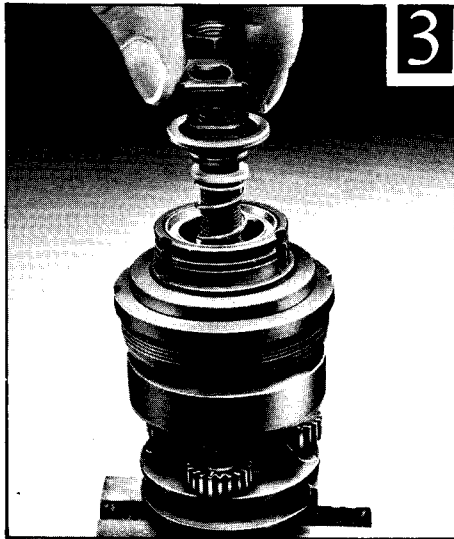


Fig. 2

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.

Fig. 3

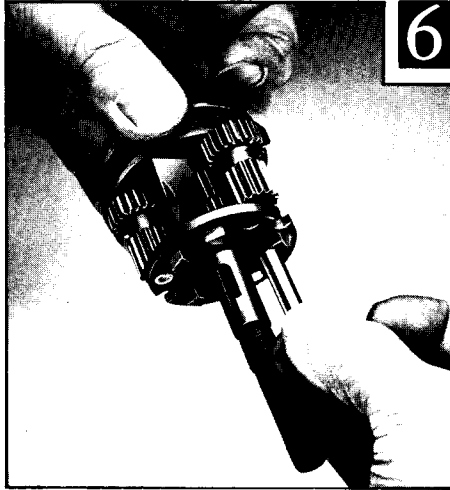
Clamp the left hand end of the axle in a vice, and remove the right hand cone locknut, lockwasher, cone, spring cap and clutch spring.



3

Fig. 6

1. Take the axle from the vice and remove the planet pinion pins and planet pinions.
2. Remove the planet cage from the axle.



6

Fig. 4

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



4

Fig. 7

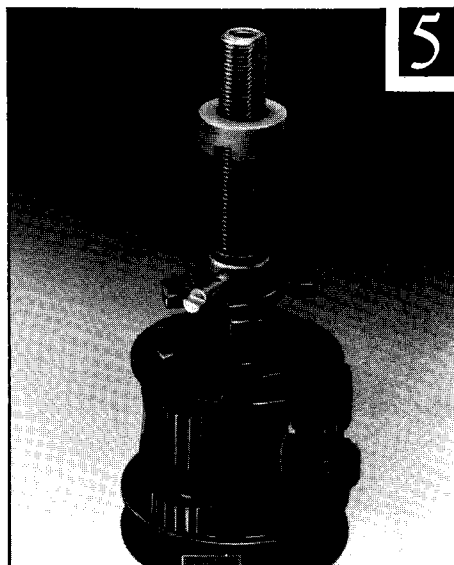
1. Using circlip pliers, remove and discard the circlip.
2. Lift off the dog ring and sun pinion return spring.



7

Fig. 5

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



5

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. It's 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 threads for damage. Examine the axle dogs for signs of roundness or chipping.
3. Check all gear teeth for signs of wear or chipping, and inspect the primary sun pinion dogs for roundness.
4. Check all bearing surfaces for wear and pitting.
5. Check the edges of the planet cage dogs and gear ring splines for chipping and roundness.
6. Check pawls, pawl pins and ratchets for wear. Always replace pawl springs on re-assembly.
7. Check the condition of the indicator threads, chains and axle keys.

3.3 Assembly

Fig. 8

1. Take the axle by its right hand end (circlip groove uppermost) and fit the low gear spring, primary and secondary sun pinions.
2. Compress the spring to engage the axle dogs with the primary sun pinion and locate the low gear axle key in the axle slot.
3. Fit the pinion return washer.

Fig. 7

1. Fit the sun pinion return spring and locate the dog ring on the axle flats.
2. Take a new circlip, and locate it in the circlip groove.

NB Ensure that the circlip is fitted in the groove adjacent to the dog ring flats, and not in the undercut behind the axle threads.

Fig. 6

1. Take the planet cage and fit new pawl springs as indicated in Diagram A.
2. Locate the planet cage on the axle and fit the planet pinions with their timing marks pointing radially outwards.

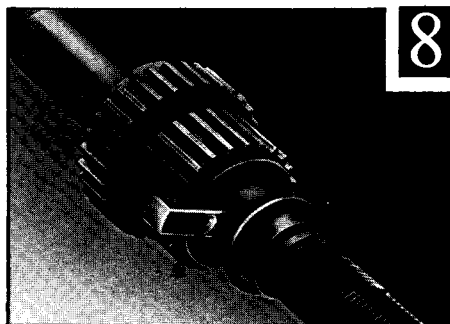
IMPORTANT See Diagram B for pinion timing. Each pinion has a timing mark stamped on one of its bigger diameter pinion teeth.

Fig. 5

Clamp the left hand axle end in the vice and fit the clutch sleeve, clutch, axle key (with flats uppermost) and thrust ring. Ensure that the axle key flats engage in the thrust ring grooves.

Fig. 4

1. Take the gear ring and fit the pawls, pawl pins and springs as indicated in Diagram C.
2. Locate the gear ring over the planet cage.
3. Fit the right hand ball ring complete with inner dust cap and 24 ball bearings only - 4.8 mm ($\frac{3}{16}$ ") \varnothing .



8

Fig. 8

1. Pull the sun pinions back into mesh with the axle dogs, and tap the axle to release the return spring washer and low gear axle key from the secondary sun pinion.
2. Remove the two sun pinions and low gear spring from the axle.

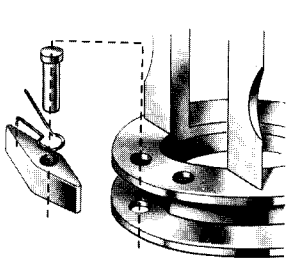


Diagram A

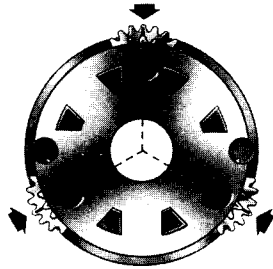


Diagram B

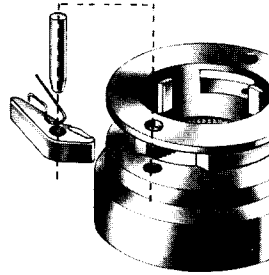


Diagram C

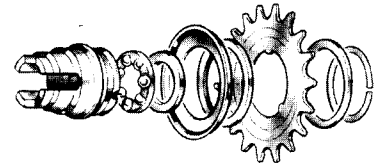


Diagram D

4. Fit the driver complete with ball cage and outer dust cap. Ensure that the driver splines engage with the clutch.

NB Lubricate the bearings with high quality lithium based grease.

Fig. 3

- Slide the clutch spring and clutch spring cap (with its flat face uppermost) over the axle.
- 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 gear alignment.

Fig. 2

- Remove the assembly from the vice and liberally oil the working parts – particularly the planet pinions, pinion pins, sun pinions and gear ring.
- Insert the assembly in the hub shell and tighten the ball ring.

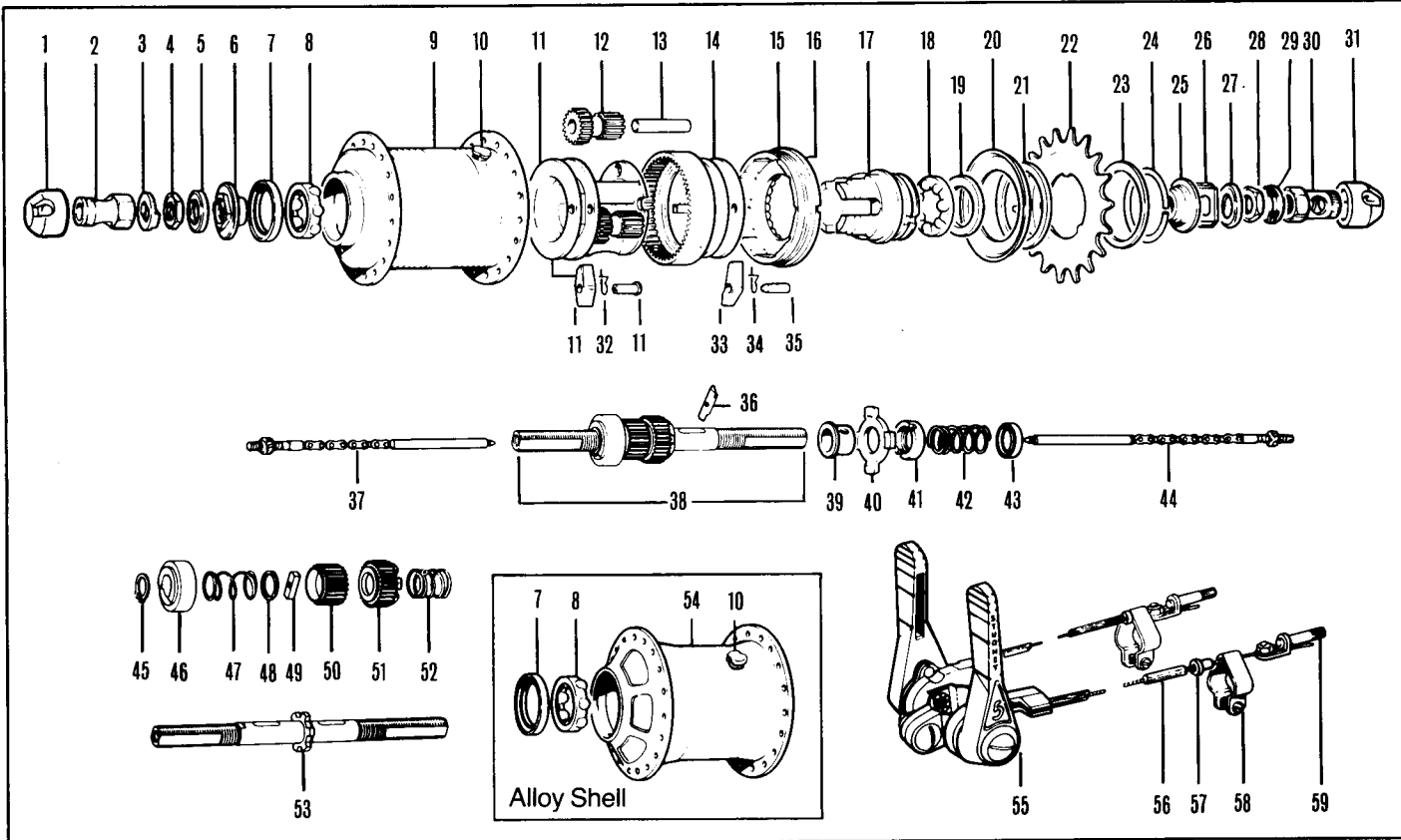
Fig. 1

- Fit the left hand cone, spacing washer(s) and locknut, and adjust the bearings as instructed in Section 2.2.
 - Assemble the sprocket with its dust cap and spacers as indicated in Diagram D.
- NB** Fit the spacing washers in their original position if different from the diagram.
- Fit the axle nuts and spacing washers and screw in the indicator rods.
 - Assemble the wheel into the bicycle and adjust the 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.	<ol style="list-style-type: none"> Worn clutch. Kinked or stiff gear cables. Worn primary sun pinion or axle dogs. Worn low gear pawls. Weak low gear pawl springs. Twisted indicator chains. Indicators not screwed in fully. 	<ol style="list-style-type: none"> Replace clutch. Replace or lubricate cables. Replace sun pinion or axle. Fit new planet cage assembly. Fit new springs. Replace indicators. Screw in fully.
Self changing between 1st or 2nd and 3rd gear.	<ol style="list-style-type: none"> Worn clutch. Worn gear ring pawls. 	<ol style="list-style-type: none"> Replace clutch. Fit new pawls and springs.
Slipping in 2nd, 3rd and 4th gears.	<ol style="list-style-type: none"> Dog ring circlip loose. Worn dog ring teeth. Worn secondary sun pinion. 	<ol style="list-style-type: none"> Refit dog ring with a new circlip. Replace dog ring and circlip. Replace secondary sun pinion.
Slipping in 3rd gear.	<ol style="list-style-type: none"> Worn clutch. Worn gear ring splines. 	<ol style="list-style-type: none"> Fit new clutch. Replace gear ring.
Slipping in 3rd, 4th and 5th gears.	<ol style="list-style-type: none"> Worn gear ring pawls. Weak or sticking gear ring pawl springs. Worn right hand ball ring ratchet teeth. 	<ol style="list-style-type: none"> Replace pawls and springs. Clean the hub, lubricate and/or replace pawl springs. Replace ball ring.
Slipping in 4th and 5th gears.	<ol style="list-style-type: none"> Worn clutch. Worn planet cage dogs. Tight or weak clutch spring. Incorrect right hand cone adjustment. 	<ol style="list-style-type: none"> Fit new clutch. Replace planet cage. Clean the hub and fit new spring. Re-adjust the hub. (See Part 2).
Hub runs stiffly, drag on pedals when free-wheeling.	<ol style="list-style-type: none"> Planet pinions are not timed correctly. Too many balls in the ball ring. Incorrect cone adjustment. Chainstay ends not parallel. Corrosion due to lack of lubrication. Distorted dust caps. 	<ol style="list-style-type: none"> Check and re-time the pinions. (See Diagram B.) Fit 24 balls only – 4.8 mm ($\frac{3}{16}$") \varnothing. Re-adjust both cones. (See Section 2.2). Re-align chainstay ends (unparallel chainstay ends can cause axle bending). Clean hub thoroughly and oil. Ensure planet pinions and pins are adequately lubricated. Check dust caps and replace if distorted.
No gears at all.	<ol style="list-style-type: none"> Pawls stuck. 	<ol style="list-style-type: none"> Lubricate with S.A. oil (SAE 30).
Sluggish gear change.	<ol style="list-style-type: none"> Distorted axle spring. Bent axle. Worn gear indicator chain(s). Rusty or frayed gear cables. 	<ol style="list-style-type: none"> Replace spring. Fit new axle. Replace indicator coupling(s). Replace cables.



Item No.	Sales No.	Description	Item No.	Sales No.	Description	Item No.	Sales No.	Description
1	*HSL 711	Indicator Guard	22	*HSL 713	Sprocket 13 Teeth	40	HSA 117	Clutch
2	HMN 129	Axle Nut	23	*HSL 714	Sprocket 14 Teeth	41	HSA 283	Thrust Ring
3	*HMW 155	Serrated Lockwasher 7.9 mm Slot (5/16")	24	*HSL 715	Sprocket 15 Teeth	42	HSA 128	Clutch Spring
	*HMW 494	Serrated Lockwasher 9.5 mm Slot (3/8")	25	*HSL 716	Sprocket 16 Teeth	43	HSA 129	Cap for Clutch Spring
4	HMN 132	Cone Locknut	26	*HSL 717	Sprocket 17 Teeth	44	*HSA 125	Gear Indicator R.H. for 149.2 mm Axle (57/8")
5	*HMW 129	Spacing Washer 3.2 mm (1/8")	27	*HSL 718	Sprocket 18 Teeth		*HSA 126	Gear Indicator R.H. for 155.6 mm Axle (61/8") and 161.9 mm Axle (63/8")
	*HMW 146	Spacing Washer 1.6 mm (1/16")	28	*HSL 719	Sprocket 19 Teeth			Gear Indicator L.H. for 149.2 mm Axle (57/8") and 155.6 mm Axle (61/8")
	*HMW 483	Spacing Washer 4.8 mm (3/16")	29	*HSL 720	Sprocket 20 Teeth			
	*HMW 484	Spacing Washer 6.4 mm (1/4")	24	*HSL 721	Sprocket 21 Teeth	45	HSL 729	Circlip Retainer
6	HSA 101	Cone with Dust Cap L.H.	25	HSA 101	Sprocket 22 Teeth	46	HSA 343	Dog Ring
7	HSA 102	Outer Dust Cap	26	HMW 147	Sprocket Spacing Washer 1.6 mm (1/16")	47	HSA 346	Pinion Return Spring
8	HSA 284	Ball Cage (with ball bearings 6.4 mm (1/4"))	27	*HMW 129	Spacing Washer 3.2 mm (1/8")	48	HMW 488	Washer for Pinion Return Spring
9	*HSA 333	Hub Shell Assembly - 28 hole (Chrome)	28	*HMW 146	Spacing Washer 1.6 mm (1/16")	49	HSA 342	Low Gear Axle Key
	*HSA 334	Hub Shell Assembly - 36 hole (Chrome)	29	*HMW 483	Spacing Washer 4.8 mm (3/16")	50	HSA 344	Secondary Sun Pinion
		NB Hub Shell Assemblies include items 7, 8 and 10.	28	*HMW 484	Spacing Washer 6.4 mm (1/4")	51	HSA 345	Primary Sun Pinion
10	HSA 106	Lubricator	29	*HMW 484	Spacing Washer 6.4 mm (1/4")	52	HSA 347	Low Gear Spring
11	HSA 354	Planet Cage with Pawls, Pawl Pins and Springs	30	HMN 129	Cone Locknut	53	*HSA 339	Axle 149.2 mm (57/8")
12	HSA 134	Planet Pinion	31	*HMW 155	Serrated Lockwasher 7.9 mm Slot (5/16")	54	*HSA 340	Axle 155.6 mm (61/8")
13	HSA 135	Pinion Pin	32	*HMW 494	Serrated Lockwasher 9.5 mm Slot (3/8")	55	*HSA 341	Axle 161.9 mm (63/8")
14	HSA 118	Gear Ring	33	HMN 129	Axle Nut	56	HSA 337	Hub Shell Assembly - 36 hole (Alloy) with items 7, 8 and 10
15	HSA 121	Ball Ring R.H.	34	*HSL 711	Indicator Guard	57	HSJ 776	Dual Lever - Alloy - Stem fitting with cables
16	HSA 122	Inner Dust Cap	35	HSA 120	Pawl Spring	58	HSJ 777	Cable complete with Anchorage - 1346 x 1194 mm (53" x 47") for Stem Fitting Alloy Levers
17	HSA 123	Driver	36	HSA 119	Pawl for Gear Ring	57	HSJ 515	Fulcrum Sleeve
18	HSA 284	Ball Cage (with ball bearings 6.4 mm (1/4"))	37	HSA 120	Pawl Spring	58	HSJ 775	Universal Fulcrum Clip 15.9 mm Ø Chainstay (5/8")
19	HSA 102	Outer Dust Cap	38	HSA 112	Pawl Pin for Gear Ring	59	HSL 759	Cable Anchorage
20	HSL 701	Sprocket Dust Cap	39	HSA 124	Axle Key			
21	HMW 127	Sprocket Spacing Washer 1.6 mm (1/16")		*HSA 126	Axle Assembly 149.2 mm (57/8") and 155.6 mm Axle (61/8")			
					Axle Assembly 155.6 mm (61/8") and 161.9 mm Axle (63/8")			
					Gear Indicator R.H. for 155.6 mm Axle (61/8") and 161.9 mm Axle (63/8")			
					Gear Indicator L.H. for 161.9 mm Axle (63/8")			
					*HSA 316			
					*HSA 329			
					*HSA 330			
					*HSA 331			
					HSA 116			

*Optional Fitment

*Optional Fitment

	Axle Length	Marking		Sales No.
Five Speed Hub Gear Indicators (Actual Size)	149.2 mm (5 ⁷ / ₈ ")		(Right side)	HSA 125
			(Left side)	HSA 126
	155.6 mm (6 ¹ / ₈ ")		(Right side)	HSA 126
			(Left side)	HSA 126
	161.9 mm (6 ³ / ₈ ")		(Right side)	HSA 126
			(Left side)	HSA 316

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