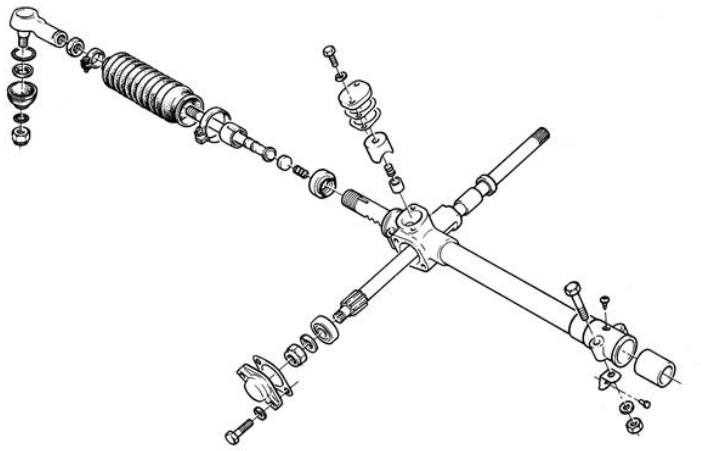


Overhauling the steering rack on an MGB

Jim Livingstone feels the steering rack is one of the most durable and reliable mechanical components fitted to the MGB and the rack on his MGBGTV8 bears testament to the design and manufacturing quality of the original Cam Gears product that it survived unserviced for over 45 years. Here he describes how he overhauled his steering rack and found no major rework was necessary so it gives added confidence that the steering system is fit for a further 45 years.

Introduction

The steering rack is one of the most durable and reliable mechanical components fitted to the MGB. In the author's case there was no obvious play or noises from his 46 year old rack but a small oil leak was evident from the offside gaiter and there was a split in the seal of the left track rod end. The appropriate parts together with a selection of UNF self-locking nuts were purchased in advance. At the time of writing (2020) oil seals and gaiters are available as are the rack bushing, pinion bearing and internal ball joint lock nut. The internal ball joints and the pinion to rack clearances are adjustable so the effects of limited wear in these parts can be eliminated. No special tools are required but a large set of pipe gripping pliers would prove invaluable when adjusting the inner ball joints. Accurate alignment of the upper steering column and the rack input shaft is required to avoid excessive loading of the column and rack bearings. This is achieved by ensuring that the projected axes of both shafts intersect and this can be confirmed using a simple alignment tool. In essence, the components of the tool simulate the universal joint with alignment points at its centre of articulation. Moss at www.moss-europe.co.uk sell a suitable kit under part number 453-622.

Procedure

1. Disconnect the battery.
2. Chock the rear wheels, raise the front of the car and secure on axle stands.
3. Remove the front road wheels.
4. Loosen the nuts on the track rod end to steering arm joints and release the tapers.
5. Prize out the horn push and mark up the relative orientation of steering wheel, nut and shaft to assist reassembly. See **Image 1**.
6. Remove the steering wheel by loosening the centre nut and with a suitable puller release the taper between the wheel and shaft. See **Image 2**.

Note: care must be taken to avoid heavy impact loads on the column during removal and fitting. The V8 column has a collapsible element which might be irreparably damaged by impact.

Image 1: steering wheel markings

Image 2: removing the steering wheel

7. Remove the steering column cowl (four screws).
8. Remove the leads from the column and ignition switches and remove the column switches noting their positions and the routing of the leads.
9. Mark its position on the shaft and remove the indicator striker.

10. Remove the four bolts securing the rack to the front suspension crossmember.
    Note: set aside any loose spacers between rack and brackets. The original spacers are pop rivetted to the brackets but these may have been replaced by loose washers.
11. Insert the ignition key and release the steering lock.

Image 3: universal joint and bolts

12. Allow the steering shaft to slide through the column sufficiently far to give access to the upper universal joint nut and bolt. See **Image 3**. Support the rack temporarily with reusable ties.
13. Mark the relative orientation of shafts and joint to aid reassembly.

Image 4: pinion bearing housing and cover

14. Remove both bolts from the universal joint and release it from the shafts. Overhaul the joint if there are signs of stiffness or wear.
    Note: the joint may be difficult to remove. Soak the splines in penetrating oil and prize open the joint but on no account subject the upper shaft to impact loads. See step 6.
15. Extract the rack forward and downwards, clean and place on a bench in preparation for disassembly.
16. Drain the oil from the assembly by removing the pinion cover. See **Image 4**.
    Note: the condition of the oil is a useful indication of the state of the internal components. In the author's case the volume removed was much less than the 200cc specified and the oil was badly discoloured but free from water or solid particles.
17. Undo the lock nuts and ball joints from the track rods noting their orientation and number of turns required to remove.
18. Loosen the gaiter clips and remove both gaiters.
19. Examine both pinion and rack teeth. Excessive wear on either will necessitate replacement with a new assembly.
20. Secure the rack housing vertically and measure the force required to articulate the tie rod ball joints. A Workmate and luggage weighing device will prove useful for this.
    Note: The workshop manual specifies a torque of 32 – 52 lb in which equates to a force of 3 – 5 lb at the track rod end.

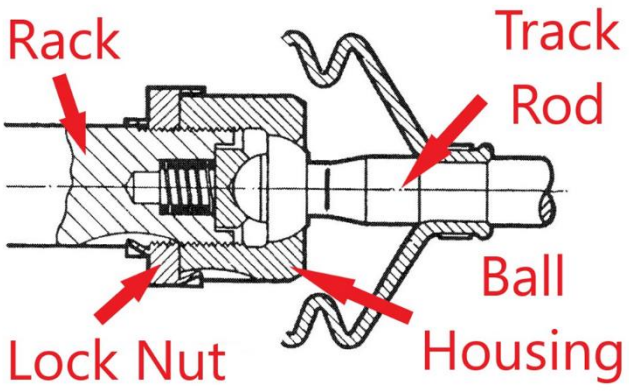


Image 5: rack inner ball joint sectioned view

21. If the load requires adjustment loosen the staking on the ball joint lock nut, back off the lock nut using a vice and large pliers, adjust the ball housing until a satisfactory figure is achieved, retighten the lock nut and restake. See **Images 5 & 6**

Image 6: rack inner ball joint showing staking

22. Remove the rack damper cover, gasket and shims followed by the yoke, damper pad and spring. See **Images 7 & 8**

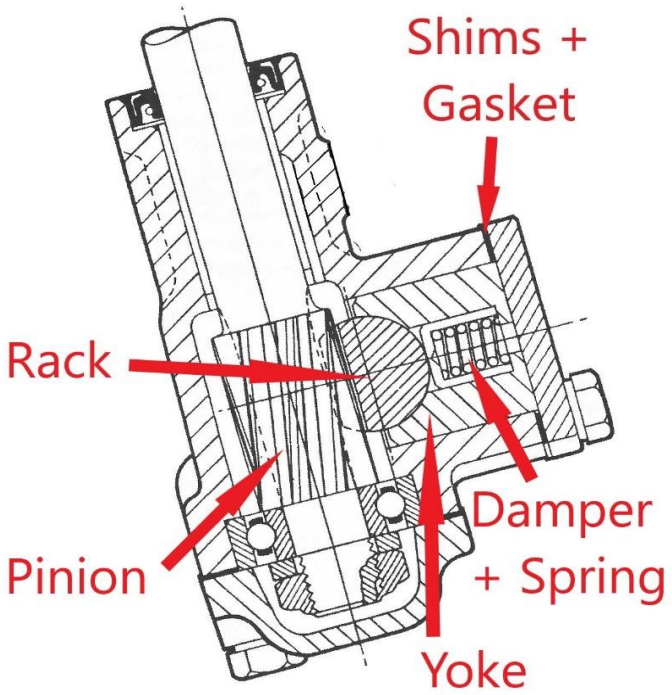


Image 7: rack & pinion sectioned view

23. Replace the yoke without damper, spring, shims or gasket and tighten the cover until it is just possible to pull the rack through the housing. Measure and record the clearance between the cover and flange with feeler gauges. Select shims that together with a new gasket are 0.001 to 0.003 in excess of this measurement.
24. Liberally oil and reassemble the yoke, damper and spring. Coat the shims and gasket with a thin jointing compound and refit the cover. Check that the rack moves freely for the full extent of its travel.

Image 8: rack damper housing with yoke and cover

25. Fit a new non pinion side gaiter and clips, secure the rack with the pinion side uppermost and pour 200 cc of EP90 oil into the housing. Fit a new pinion side gaiter and clips.
26. Refit the lock nuts and track rod ends in their original positions and tighten.
27. Exercise the assembly several times from lock to lock to check freedom of movement and oil tightness.
    Note: the author found the pinion seal leaking after reassembly to the vehicle, a condition not apparent previously due to the low oil level in the rack. The seal is easily removed by driving in a couple of self-tapping screws and levering out. As the input shaft is long and splined a sleeve of reversed adhesive tape is required to avoid damaging the sealing lip on the new seal.
28. If there is any doubt about the alignment of the rack and column shafts then it is recommended that this is checked before final assembly. Adjustment of the upper column is achieved by using the clearances in the mounting clamps while the pinion shaft is adjusted by shimming the rack mounts. See **Images 9 & 10**.

Image 9: aligning upper and lower shafts

29. Refit the rack and universal joint.
    Note; Access to the upper U/J bolt is facilitated if assembly of the rack to its mountings on the crossmember is left until last. See **Image 11**.
30. Reassemble the steering column fittings in the reverse order of dismantling noting the orientation marks.

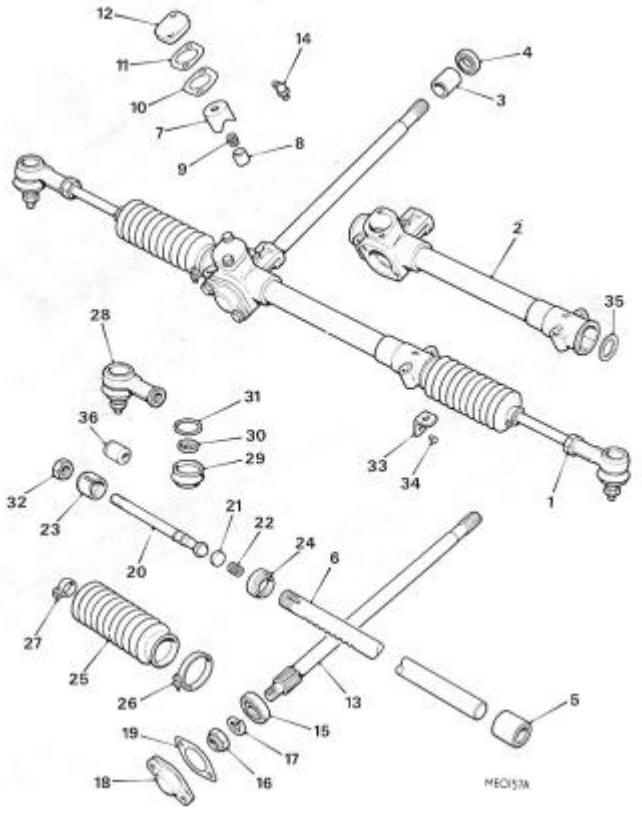
Image 10: steering rack shim

Image 11: universal joint upper bolt

Conclusions

It bears testament to the design and manufacturing quality of the original Cam Gears product that it survived unserviced for over 45 years. Though no major rework was necessary it gives added confidence that the steering system is fit for a further 45 years.

Extract from the MGB Parts Catalogue AKM0039



Above, Page 108-E1

MGB-TOURER,GT AND V8-UPTO SEPTEMBER 1976

Ill. No.	Part No.	DESCRIPTION	Qty.	Change Point	REMARKS
		STEERING RACK.			
		RACK ASSEMBLY-STEERING			
1	AHH 6091	RHD $	1	Use prior to BHH 1597	Not V8.
	AHH 6121	LHD $	1	Use prior to BHH 1598	
1	BHH 868	RHD $	1	Use prior to BHH 1597	V8.
1	BHH 1597	RHD $	1	(C)G-HN5-360301 TO 410000. (C)G-HD5-361001 TO 410000. (C)G-D2D1-2101 TO 2903.	
	BHH 1598	LHD $	1		
2	17H 6588	HOUSING ASSEMBLY-RHD $	1		
	17H 6589	HOUSING ASSEMBLY-LHD $	1		
3	17H 6579	Bush-pinion $	1		
4	17H 6560	Seal-oil $	1		
5	17H 8664	Bearing-racket-support end $	1		
	PTZ 603	Screw	1		
35	17H 8711	Disc-backing	1		V8.
6	17H 6570	Rack $	1		
7	17H 6582	Yoke-rack support $	1		
8	ACA 5244	Pad-damper $	1		
9	17H 6583	Spring-pad $	1		
		SHIM COVER PLATE			
10	17H 6566	.0609mm(.0024")$	A/R		
10	17H 6567	.127mm(.005")$	A/R		
10	17H 6568	.254mm(.010")$	A/R		
11	17H 6584	Gasket-cover plate $	1		
12	17H 6580	Plate-yoke cover $	1		
	ZCS 507	Bolt	2		
	WL 600051	Washer-spring	2		
		PINION			
13	17H 6575	RHD	1	Use prior to 37H 8769 RHD	Not V8.
	17H 6612	LHD $	1	37H 8770 LHD	
13	37H 8042	RHD $	1	(C)G-HN5-360301 TO 410000. (C)G-HD5-361001 TO 410000. (C)G-D2D1-2101 TO 2903.	V8.
13	37H 8769	RHD $	1		
	37H 8770	LHD $	1		
14	UHN 205	Lubricator-pinion shaft-RHD	1		Not V8.
	UHN 305	Lubricator-pinion shaft-LHD	1		
15	6K 803	Bearing-pinion $	1		
16	17H 6562	Nut-bearing retaining $	1		
17	27H 5915	Washer-plain	1		
18	17H 6563	Cover-end $	NLA		
19	17H 6564	Gasket-end cover $	1		
	WL 600051	Washer-spring	2		
		STEERING RACK-continued			
20	17H 8713	Tie-rod $	2		
21	17H 6571	Seat-ball $	2		
22	CCA 13	Spring-thrust-ball seat $	2		
23	17H 6573	Housing-ball $	2		
24	17H 6574	Locknut-ball housing $	2		
25	17H 6569	Seal-rack $	2		
26	ADG 1682	Clip-seal-inner $	2		
27	3H 2963	Clip-seal-outer $	2		Not V8
27	37H 8044	Clip-seal-outer $	1		V8
36	37H 8045	Cap-end $	1		
28	18G 8043	SOCKET ASSEMBLY-BALL $	2		
29	17H 3501	Boot $	2		Alternatives
29	27H 6320	Boot $	2		
30	17H 3502	Retainer-boot $	2		
31	17H 3503	Spring-garter $	2		Alternatives
31	17H 9170	Spring-garter $	2		
	LNZ 207	Nut	2		
32	53K 320	Locknut	2		
33	AHH 6007	Shim-rack to bracket $	A/R		
34	DAP 829	Rivet-shim	A/R		
	HBZ 516	Bolt	4		
	LNZ 205	Nut	2		
	WL 600051	Washer-spring	2		

Alongside, pages 108-E2 and 108-E4