SPECIFICATIONS AND SPECIAL TOOL KITS

SERVICE INSTRUCTION LEAFLET

ISSUED BY

BENTLEY MOTORS (1931) LTD.

Subject:



BM/B1.

SB/RF.6/SF.

SCHEDULE OF WORKSHOP TOOLS
FOR

FOR BENTLEY CARS. Date of Issue

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IMPORTANT

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All tools shown in this schedule are necessary in the course of repair work on the chassis types produced in the ten year period preceding 1939. These tools are listed in sections according to the unit for which their use is required and the sections are subdivided to show the appropriate tools for each model.

Tools have been classified in groups 'A' and 'M', and are marked with their classification in the column adjoining the Tool No. The groups are as follows:-

- 'A' These tools are necessary for general repair work and maintenance,
- 'M' These tools are for use in more comprehensive repair work including full dismantling of all units.

Information concerning the availability of these tools for purchase or hire, together with cost or hiring charges, may be obtained from the London Service Station.

			ENGI	NE
Tool No		Tool.	3½ Litre	Litre
R 2883	A	Serrated Box Spanner - Crankshaft Damper Retaining Nut.	ж	х
R.2879	A	Extractor - Crankshaft Damper.	x	x
R.2986	A	+ Mandrel " "	х	ж
R.3138	A	Test Bar - " "	х	x
R.3166	A	Serrated Box Spanner - Dynamo Drive Retaining Nut.	x	x
R. 3165	A	" " - Idler Gear Ballrace Retaining Nut.	x	x
R. 3173	A	Extractor - Cambalancer.	x	
R.2955	A	Mandrel - Clutch Centre Plate Alignment.		x
R. 2984	A	" " " " "	x	
R.3181	M	Extractor - Draphragm.	x	X.
	ومالموس	REAL	XA S	LE
R 3019	A	Å. Holding Plock - Pinnon.	×	х
R.2974	A	Servated Box Spanner - Pinion Thrust Race Retaining Nut.	x	X.
R.2962	A	Extractor - Driving Flange.	x	x
R 2963	A	11 11 11	x	x
R.3001	M	" - Differential End Plate.	x	x
R.3030	M	Serrated Box Spanner - Differential Thrust Brg. Retaining Nut.	x	x
R.3033	M	" " " - Differential Thrust Brg. Housing Nut.	х	x
	1	" " - Diff. Housing Roller Race		x
R.3118	M	Retaining Nut.	x	
R.3118	M	Retaining Nut. Setting Tool - Pinion.	x	x

			HU	B 5
rool No.		Tool.	3½ Litre	44 Liter
R.2516	A	* Serrated Box Spanner - Retaining Ring(Front and Rear).	х	Х
R.2849	A	Box Spanner - Axle Shaft and Axle Pivot Nuts.	x	х
R.2831	A	Extractor - Driving Dog.	х	X.
R. 2833	A	+ Three Pin Spanner - Rear Axle Tube Nut.	ж.	
R 2850	A	Extractor - Hub (Front and Rear).	x	X.
R. 2895	M	Cutter - Brake Lining.	x	24.
		STEERING AND SUSPE	NSI	N
R.3189	M	Serrated Box Spanner - Steering Box Felt Washer Retaining Ring,	x	X.
R.3191	A	Split Box Spanner - Steering Wheel Nut.	х	ж
R.3140	A	Extractor - Drop Arm.	x	Х.
R.3195	M	x. " - Steering Box Inner Bush,	х	ж.
R.3637	M	" - Steering Wheel	x	х
2,3199	M	Clamps - Testing Steering Tuhe Poundage.	x	X.
R . 3204	M	Extractor - Shackle Pan Bushes.	х	ă.

^{* ::} Also used on 3½ and 4¼ Libra Rear Axle Tube Nuts.

+ : Used on AE and AH Chassis only. x. Not applicable to MR & MX Chassis.



MAINTENANCE DATA



FOR ROLLS-ROYCE BENTLEY AND CARS

ROLLS-ROYCE

BENTLEY

	PHANTO	DM I	PH II	PH III	20 HP	70/25	25/30	WRAITH	ı SH	ORT WHEE	SILVER VI	LONG W	HEEL BAS	È	SILVER	DAWN		PH IV	SILVER CLOUD	3¦ LITRE	BENTLEY	LITRE	ja disasi	MARK VI	W.	R' TYPE	CONTIN-		CONTIN- ENTAL 'S TYPE
CHASSIS SERIES	UP TO NC-131 O	EF-I NWARDS	ALL CHASSIS	ALL CHASSIS	ALL CHASSIS	ALL CHASSIS	ALL CHASSIS	ALL CHASSIS				ALW-1 TO DLW-172 O				SFC-2 TO SHD-60			SWA-2 ONWARDS	ALL CHASSIS	G TO L SERIES	M SERIES	B-2-AK TO B-601-FU	B-1-GTTO B-401-LH	B-2-MDT0 B-301-PU	B-2-RT TO B-250-ZY	ALL CHASSIS	FROM B-2-AN	FROM BC-I-AF
BORE	44	4	4	34	3	34	34	34	34	34	3	31 or 31	31	31	34	3	3	31	3}	34	34	3‡	34	31	31		31 or 32	ONWARDS	ONWARDS
STROKE	Sį	54	5 1	44	44,	44	44	44.	44	4	44	41	4	44	44	4	44	4	44	4	44	41	4	41	41	41	41	44	44
CAPACITY C.C.	7668	7668	7668	7340	3127	3669	4257	4257	4257	4257	4566	4544 or 4887	4887	4257	4257	4566	4566	5675	4887	3669	4257	4257	4257	4257	4566	4566	4566 or 4887	4887	4887
FIRING ORDER	1 4 2 6	3 5		WWW		1.4.2	6 3 5				1426	3 5			1426	3 5	. 76	6258374	142635	- 1	4 2 6 3	5		142	6 3 5			42635	
	AL HEAD	003 006		HYD. 015 SOLID-010	004	004	-006	900	-006	-006	-006	-006	006	006	006	-006	006	-006	006	004	-004	010	006	-006	006	006	-006	006	006
(COLD) EXHAUST	C.I. HEAD	003 006		HYD. 015 SOLID 010	004	004	006	008	012	-012	012	012	012	012	012	012	-012	012	012	006	-006	010	012	012	012	012	012	012	012
DISTRIBUTOR GAP	018	018	018	030	018	018	018	018	020	020	020	020	020	020	020	-020	020	-020	020	018	018	018	020	020	020	020	020	020	020
MAGNETO GAP	014	014	014	<u> </u>	014	014	_	· -	-	-	-	_			-		-1	_	· · · · · · · · · · · · · · · · · · ·	_	_	_	_		_		-		
SPARKING PLUG GAP	025	025	025	025	025	025	-025	025	025	025	025	025	025	025	025	025	025	025	025	020	020	020	025	025	025	025	-025	025	025
IGNITION TIMING			MA	ARKINGS	ON FL	YWHEEL						MAI	RKINGS	ON FL	YWHEEL								MARK	NGS O	N FLYW	HEEL			
A CRANKSHAFT DAMPER POUNDAGE	12-14	12-14	12-14	20-22	4-6	12-14	12-14	11-12	14-16	1416	1416	14-16	14-16	1416	14-16	14-16	14-16	NON- ADJUSTABLE	14-16	11-12	11-12	11-12	14-16	14-16	14-16	14-16	14-16	14-16	14-16
COLD START CARBURETTER SETTING	В	В (BI	С	B 13	B 13	C	C						-	' <u>-</u> '	-	. — ·	_	_			· _ ·	· , <u>-</u>			-		 	
SERVO ADJUSTMENT	D	D	D	D	D	D	D	D D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
LONG	149-7	149 7	150	142	129	132	132	136	127	127	127	133	133	120	120	120	120	145	123	126	126	126	120	120	120	120	120	123	123
SHORT	143-2	143-2	144																										
TRACK	57 or 5	.0.3	58 5 or 58 75	60 6	54 or 56	30 312	56-312	58 5	56-9		FOR	57.9	57-9	56 7	56.7	56-7	56 7	58-4	58	56	56	56	56-7	56-7	56-7	56-7	56-7	.58	58
REAR	56 or 5	7-6	58 5 or 60 25	62-6	54 or 56	56 or 56-312	56-312	59.5	59 8	/ 30 X II	TYRES	64 0	64-0	58 6	58-6	58-6	58 6	63 2	60	56	56	57	58 6	58-6	58-6	58-6	58-6	60	60
CASTOR ANGLE	2 °	2°	2½°	l°	310	34°	3‡°	l°	·			NEGATIV			ITIVE TO			YERTICAL TO 1° NEG.	E! NEG	4	4 4°	41 °			∮° NEG		CCENCERC	E I° NEG I	E I°NEG
CAMBER	t-	le .	le.	F	212	2 1 °	2 <u>‡</u> °	F	YI 	ERTICAL TO	o io Posi	TIVE (WITH	TWO P	ASSENGERS	IN THE F	RONT SEA	TS)	VERTICAL TO 14° POS.	E	I ^c	l°	P.	VERTICAL		D31114E	N THE FRONT	SEATS)	E	E
PIVOT PIN INCLINATION	6	210	2 ¹ 2°	2¥°	4 1°	4 4°	4 1°	3°	¥°	44°	4 4°	44°	.44°	મું°	4 °	44°	44°	3 4°	G	١٠	l°	ľ	3¼°	44° / INITU	4½° AL SETTING	4½°	44°	G	G
TOE-IN	PARAI	LEL TO			PARA	LLEL TO	के"		4- 4.	(INITIAL	SETTING	WITH	NEW R	UBBER E	BUSHES	ार्ड व	ሴ^)	16"- 32"		\$"- 1 \$ "		18" 3		RUBBER B		☆")	14"−	37
H LONG	55′		55' 10"	48	41	47′ 5″	47' 5"	46' 6"	43′ 5°	43′ 5″	43′ 5″	45' 5"	45' 5"	41′ 2′	41' 2"	41′ 2′	41' 2"	49' 1"	41' 8"	40' 11"	40′ 11′	40' 11"	41′ 2″	41′ 2″	41' 2"	41′ 2″	41′ 2″	41′ 8″	41′8″
TURNING SHORT CIRCLE	53′		53′ 10″																										
DIAMETER LONG	48′	48′	50′ 6″	48'	40'	42′	42'	46' 6"	43′ 5°	43′ 5″	43' 5"	45′ 5°	45′ 5″	41′ 2′	41, 2"	41' 2"	41' 2"	49' 1"	41′ 8″	39′ 7°	39′ 7″	39 7"	41′ 2″	41′ 2″	41' 2"	41′ 2″	41' 2"	41' 8"	41′8″
SHORT	46'	46′	48′ 8″																										
					41.2	41.41															•	,							
STEERING J CROSS	10-12	10-12	10-12	3-31	4,-6	6 1-81	71-9	-	, -		·					-	 .			10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		41	- -	-			_		1.
POUNDAGES K SIDE SIDE STEERING TUBE	<u> </u>					2-3-3-	2-34	-		_	_				M			_ M		71	. T						_		
ADJUSTMENT — REAR END	a 33 x 5 a	- :	7 71	L 	. 33 v 41	L	L.	L	m	, M	. A.FA 1	, ,	17	m		, m		. "			•		• • •	14					
TYRE SIZES	b 33 x 6½ t				a 32 x 4		6 v 10	4.50 × 17		7 a 6 50 x 17	a 6 50 x 1 or b 7 50 x 1	7.50 x 16	7 50 x 16	6 50 x 16	6 50 x 16	6 50 x 16	6 50 x 16	8 x 17	8-20 x 15	5-50 x 18	5-50 x 18	6-50 x 17	6·50 x 16	6 50 ± 16	6-50 × 14	6 50 x 16	6-50 × 14	8 20 × 15	7 60 x 15
TIME SILLS	- 0 33 X 04 C		7 x 19		c 20 x 6		V A 17	V 3V X 1/									<u> </u>		_				_						
		a 55			a 45				_		a 24																		
TYRE FRONT	b 40	ь 40	40	35	b 40	35	30	30	•	24	b 19	20		25	23	23	24	28	19	30	30	23	25	23	23	24	30	19	30
PRESSURES — COLD	a 60	a 60			c 35 a 45						a 35																		
LBS./SQ. INCH. REAR		ь 35	35-40	35	b 35 c 30	35	30	30		35	b 28	37	.	30	30	30	33	36	26	30	30	26	30	30	30	33	35	26	35
																											-		

There are three different adjustments, each depending upon the length of coil springs fitted, therefore whenever a side steering tube is dismantled or adjustment at rear end is disturbed, one of the springs should be measured and its length noted.

If a spring has a free length of 1.500° adjustment is as follows:

Screw in slotted end nut, until ball pads, spring and guide assemblies are choca-bloc. Slacken end-nut back 0.180° to

restore original working clearance of 0.090" between end of each stem of ball pads, and inner end of tube and inner face of end-nut.

If a spring has a free length of 1.225° adjustment is as above with the exception that end-nut is stackened back 0-100° from choca-bloc position to give a working clearance of 0-050°.

If a spring has a free length of 0-875" proceed as below:-

- Remove ball pin from pendulum lever (drop arm).
- With ball pin and its associated parts in position in rear end of side steering tube screw in end-nut until ball pin can just be moved by hand.

Gradually unscrew nut until load on ball pin is as light as possible without any slackness between it and adjacent ball pads.

NOTE: If it is desirable to make steering more positive the load on ball pin may be increased with discretion. Serure end nut.

- The crankshaft damper poundage is measured by means of a spring balance at 17½ from the axial centre line of the assembly with the radial driving springs removed. The figures quoted for Pre-War cars are satisfactory under normal conditions, but a variation of 1 lb. is permissible to suit individual engines. A lower setting can be beneficial in dealing with a low speed period on pick-up, while a higher poundage could damp out periods at engine speeds of 2,000 to 3,000 r.p.m. For Post-War cars, with the exception of the Phantom IV, the minimum acceptable figure is 14 lbs., and the aim should be to obtain a setting between 14-16 lbs. A low setting will invariably result in noticeable torsionable periods at approximately 2,500 r.p.m. and 3,300 r.p.m.
 The Phantom IV engine is fitted with an external rubber-tuned harmonic balancer.

- Number of turns of starting carburetter adjusting screw from fully closed position. Up to and including Phantom I chassis No. 101-AL, the adjusting screw should be turned twice and from Phantom I chassis No. 1-CL and onwards the screw should be turned once.
- C Release throttle stop screw until throttle is entirely closed, and bring screw back until it just makes contact with throttle lever without moving the latter. Next adjust rod connecting strangler to lever mounted on throttle spindle to give '060'—070' gap between stop screw and throttle lever. This figure may be varied slightly in accordance with individual engine requirements in order to obtain a satisfactory fast idling speed for cold starting.
- On Pre-War cars the clearance between friction linings and friction drum is set by means of the hexagon headed nut on servo shaft. This nut is locked by rounded serrations formed on its face which engage similar serrations on an adjacent washer. To adjust servo, apply a bar to flange of friction drum and while pushing drum towards gearbox, simultaneously apply and release brake pedal a few times, noting amount of end float of drum. Adjust as necessary until drum has an end float of $\frac{1}{12}$. On Post-War cars the clearance between friction liner and pressure plate is set by means of inner nut on servo shaft. Apply handbrake and undo outer locknut, tighten inner nut until drag between liner and pressure plate can just be felt on rocking the servo; slacken nut back 2 flats ($\frac{1}{2}$ of a turn) to free servo. Hold inner nut and tighten locknut. Apply pedal once to ensure that outer servo lever has followed back the nuts. On Silver Cloud and 'S' Type Bentley cars do not apply handbrake.
- E Camber. Vertical to \$\frac{1}{2}\text{ positive.} The camber is taken with car in laden condition, i.e., complete with all accessories, petrol (18 Imperial gallons) oil and water and with the lower triangle levers becomes The variation of camber and castor between the two sides of car
- F Variable, depending on deflection of suspension due to load on car.

must not exceed 4°.

R.H. lock 50' 6", L.H. lock 55' 10".

- G Pivot pin inclination. 41° at zero camber and 4° at 1° positive camber. H For left-hand drive Phantom II the turning circle diameter is:-
- J On all Pre-War models except Phantom III and Wraith, the cross On all Pre-War models except Phantom III and Wraith, the cross steering tube poundage is checked with a spring balance on end of Test Bar, R-3199 (10° leverage) after clipping Bar to centre of tube. Ensure that friction load is equally distributed on the two ball joints. Phantom III. Check cross steering tube poundage on each tube separately by clamping one ball pin in a vice so that tube is horizontal applying a spring balance at opposite end. When correct, repeat procedure for other ball pin. Ensure that friction load is equally distributed on the two ball joints. If necessary fit a shim(s) between spring and cap nut.
- K Where a poundage is quoted for Pre-War models, check with a spring balance on end of Test Bar. R-3199 (10" leverage) after clipping bar to tube. Adjust for poundage at front end of tube after adjusting and assembling the rear end (See Note: L). For Phantom I, if necessary fit shim(s) between spring and ball pad at rear end of tube. For Phantom II (See Note: L). adjustment for front end of tube is same as for rear end.
- PHANTOM III AND PRE-WAR BENTLEY. The forward spring assembly is adjusted so that spring is turnable by fingers without end play when castle nut is fully secured. If necessary, fit packing shims between spring guide and spring. Adjust rear spring assembly similarly. The two nuts and lock-washer may be positioned on thread as necessary. Do not lock up at this stage. Place assemblies in position, check spring guide projects -010 015' beyond end of tube before tightening large end nut. This projection regulates the pre-load on springs and is obtained by fitting shims between spring and guide; noting that spring can be turned by fingers and without end play (when nuts are locked on stem of ball pad) after each change of shims. Lock the nuts when adjustment is obtained and fully tighten up large end nut.

of shims. Lock the nuts when adjustment is obtained and fully tighten up large end nut.

20 H.P. (K SERIES ONWARDS) 20/25 H.P., 25/30 H.P. AND PHANTOM II. Adjust forward spring assembly as for Phantom III. Place spring assembly as in position, fully tighten up large end nut and adjust the two nuts on stem of ball pad until a 010 feeler can be inserted between inner nut and end face of spring guide and lock nuts

WRAITH. Screw in slotted retaining nut until end of nut is flush with rear end of side steering tube and secure.