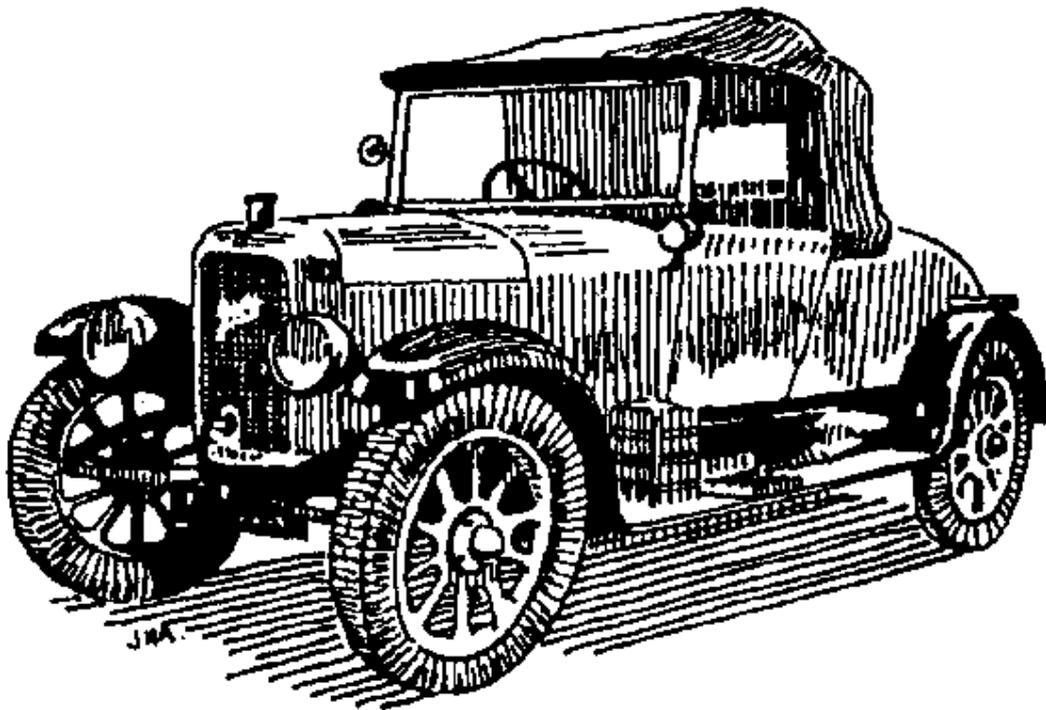




Technical Information for
The Pre War and Veteran Cars





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Repack hubs having nipple (b)		10000
Repack steering joints (b)	5000	
Change engine oil when warm and only clean filter in paraffin (c)	2000	5000
Change gearbox oil when warm, flush with paraffin (c)	5000	5000
Change rear axle oil when warm (if drain plug fitted) (d)	5000	5000
Check timing chain, plug gaps and clutch	5000	5000
Change AC oil filter core (10-4 only) Type XF1		10000
Top up Luvax shock absorbers (Luvax fluid)		10000

Also regularly oil Speedometer drive shaft, Brake, clutch, and gear levers, Shafts and links.

Also regularly grease Steering column dash mountings. Battery terminals, (petroleum jelly).

Also regularly check oil, water, battery, and petrol tank, levels.

Ensure that grease exudes from the other end of bearings and does not over grease hub& or dynamo/distributor. Clogged nipples should be wiped clean, unscrewed and warmed over a gentle gas jet, or otherwise renewed.

ENGINE

Data	1910-21	1921-36	1937-40	1935-40
H.P.	6.4	7	8	10
Bore (mm)		75.4	77	63.5
Stroke (mm)	101.5	101.5	101.5	92
Capacity (cc)	816	907.2	946	1166.4
Maximum b.h.p.	10			
Maximum r.p.m.		14 @2500	17 @3250	31 @4000

Sizes and Clearances (In thousandths of an inch).

Bearing Clearances (All models unless stated)

Mains Diameter	0.5-1.25
End play	2-6
Big End (Diametric Clearance)	0.75-1.5
Side play *	1-3
(* 18 hp inner rods 2 & 3 only)	1-5
Camshaft diameter	0.5-1.25



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End play	1-4.5
Valves in guides 7 & 8 h.p.	1-2.5
18 h.p.	0.5-1.5
Piston Clearance 7 & 8 Heplex	3-4.5
LAC 10	3.5-5
(LAC 10 Alloy has 'WA' cast on the skirt) 10 hp Heplex	0.4-2

Reconditioning

Max. undersize big ends	40 in stages of 10
Max. undersize mains	20 in stages of 5
Max, undersize cylinder	40 in stages of 10

<u>Standard sizes (in Inches)</u>	
Camshaft 7 8 & 10	0.9985 - 0.99825
(10 hp c/s front only)	(1.4985 - 1.49825)
Cylinders 7	2.970 - 2.969
8	3.0325 - 3.0315
10	2.5005 - 2.4995
Big ends 7 & 8	1.500 - 1.4995
10	1.625 - 1.6245
Mains 7 & 8	1.375 - 1.37475
10	1.5 - 1.49975

N.B. First figure of engine number on inter-war models denoted the model year.

DECARBONISATION Models up to 1929

Decarbonise every 10,000 miles, or more if running well. Regrind exhaust valves regularly. This can be done by making up a cranked screwdriver and special socket spanner, which avoids the need to dismantle anything else.

To 'decoke' generally dismantle all attachments so that the engine can be tilted over with the starting handle on the front cross member and the rear engine mounting slack. (N.B. Be sure not to move this rear mounting out of line as this can cause bad vibration.) Start to undo the cylinder base nuts and valve caps before releasing the cylinders from the chassis. Cylinder removal is recommended though this is not essential, thus avoiding some dismantling. The radiator need not be moved on the short wheelbase models if a grooved wooden block is placed between the starting handle and the cross member as a support. The cylinders have a long skirt into the crankcase - be careful. 'Valve caps' must be marked as they vary in depth, which alters the compression. Pistons must be marked L/R and TOP/BOTTOM. "Oil tight cylinder/crankcase seals may be obtained with newspaper gaskets and seccotine"!

Models 1930-1940



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Normal cylinder head removal applies. Loosen heads by turning the engine over or by replacing plugs with old ones and tapping gently. Valve springs and nuts are easily removed by tying in a rag and pulling up smartly. This avoids pinched fingers and lost parts.

Nut tightening order - Twin - starting at any place - 1 3 5 6 2 4. 10-4 - Imagine the head as a clock face and tighten in the following o'clock order - 10 6 2 11 7 3 9 5 1 Centre.

TIMING

Year/Model	Inlet		Exhaust		Ignition		Tappet Clearance Inlet & Exhaust	
	Opens At TDC	Closes After TDC	(At running clearances)		Max Adv	Full Retard	Timing Clearance	Running Clearance
			Opens Before TDC	Closes After TDC				
1921-1929						AT	.002"	.003"
1930-1932	AT	50°	60°	23°				.004"
1932								
No.64310/2 cyl	AT	40°	50°	20°	38°	6°	.006"	.002"
4 cyl	AT	40°	50°	20°	36½	4½	.006"	.002"
64310-1940 all	AT	40°	50°	20°	34°	AT	.012"	.006"

See other handbooks for more precise details.

Procedure: Twin (1921-1929 set tappets at running clearance.
Twin 1930-1940 models set tappets cold.)

1. Set all tappets to Timing Clearance indicated above.
 2. With flywheel at T.D.C. set appropriate, inlet valve (the next to open) to be on the point of opening.
 3. Set distributor with contact points just breaking and rotor firing the opposite cylinder.
 4. Reset all tappets to Running Clearance indicated, which should be a tight fit for the feeler gauge.
- Timing is better if slightly late - up to ½ on the flywheel rim - NEVER EARLY.
 - The difference in the tappet gap is due to different camshafts, which are interchangeable.

Replacements were all of the later design.

Procedure: 10-4 (See Maintenance Handbook e.g. Jowett Car Club Lib. Item 109 pp 17-20.)

Chain must be in place to retime.

Cylinders are numbered 1 to 4 from the front.



1. Set cylinders 1 & 2 (i.e. front cyl. on each side) to correct Timing Clearance adjusting one valve when the similar valve on the opposite side is at top of lift.
2. Take off both vernier coupling peg plates from camshafts.
3. Set flywheel at T.D.C. for cylinders. 1 & 2 (TEDC 1/2 marked).
4. Turn camshaft for cyl, 1 ANTI-CLOCKWISE until inlet valve No. 1 is about to open.
5. Replace that vernier peg plate and secure.
6. Turn flywheel one complete revolution and repeat for cyl.2 and camshaft 2/4 making sure that the camshaft is turned CLOCKWISE until the valve is about to open.
7. Replace vernier peg plate and secure.
8. Check distributor contact breaker points are just opening and rotor is opposite plug lead 1, at TDC 1/2 position on flywheel.
9. Re-set all tappets to Running Clearance.

To Check IGNITION TIMING or on Replacing the Distributor.

1. Set flywheel to TDC and tappets to Timing Clearance.
2. Hold complete distributor unit with cover off all in one hand and with flat side facing dynamo.
3. In this position turn segment so that it would fire cylinder one.
4. Turn gear at bottom so that the points are just breaking.
5. Keeping it in the above position look down shaft hole and use a screwdriver to align oil-pump drive-shaft groove so that it matches the tongue on the distributor gear.
6. Turn distributor about 1/6th of a turn to compensate for the screw action of the gear and slide into the shaft
7. Gently move the flywheel to and fro whilst pressing the distributor lightly into place.
8. Final adjustment of the timing may be made at the base of- the distributor head.
9. Timing is correct when points are just breaking, segment is firing cyl 1 and the flywheel TDC 1/2 mark is opposite the crankcase TDC mark.
10. Re-set the tappets to Running Clearance.



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Timing chain should have $\frac{1}{2}$ side play when checked through timing cover inspection hole.
This is due to natural stretch not slackness.

Timing covers 1934-1940 can be removed after the starting handle dog has been removed by a 'sharp punch' against the direction of rotation. When refitting the timing cover ensure the key on the plain diameter of the nut locates with the slot in the sleeve and is in line when fitting.



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VALVES AND TAPPETS

<u>Valves</u>		<u>Inlet</u>			<u>Exhaust</u>	
	7	8	10	7	8	10
Material		3% Nickel			Chrome Vanadium	
Head Diameter		1 11/16"	1 7/16"		1 11/16"	1 5/16"
Stem Diameter		3/8"	5/16"		3/8"	5/16"
Seating Angle		45°	45°		45°	45°
Seat Width	3/32"	3/32"	3/32"	7/64"	7/64"	7/64"

Exhaust valves on earlier models may stick through coking up of the stem. This may be temporarily cured by dripping paraffin on the stem and allowing it to run down, while the engine is running. Never turn valves round unless re-grinding. Valves should be re-ground regularly and are of special steel with domed heads and therefore not interchangeable with the inlet valves. New guides will cause sticking on all models.

Inlet valves 1930-40 are part drilled in the head and the guides are drilled in the base. This, together with drilled tappets, allows lubrication.

Valve covers should be resealed at the cylinder and with oil tight sealing compound.

Inlet tappets 1930-40 are drilled and guides should have the groove in the flange uppermost. Tappet oil leak, if due to wear, not breather valve sticking, can be cured by (1933-39 only) plugging one of the feed holes in the camshaft end of the tappet with brass wire and machining the guide dead square at the camshaft end to act as an oil scraper. In 1939-40 models the latter cure only is possible.

OTHER ENGINE MATTERS

Camshaft and Crankshaft. Before dismantling take note of the keyway used in the camshaft (1/3 tooth per keyway) and the position of the offset key in the crankshaft (reversing it alters the timing).

Pistons (7 & 8) Bevelled scraper rings fit in the skirt groove (bevel towards the gudgeon pin). If oil consumption is heavy, fit stepped scraper rings in the second groove with the recess towards the gudgeon pin.

Induction Pipe must be a good fit to be watertight, therefore, tighten while the cylinder base nuts are slack. With non-original pipe or cylinders it may be necessary to file the pipe faces to get the necessary fit. Finally, tighten the cylinder base nuts. Two gaskets should be used to avoid cracking the manifold.

10/4 Overhaul When removing steering for engine removal, do so at steering box/chassis mounting. For cylinder removal, remove the top nuts last and ease off horizontally. Mark pistons for L/R and TOP/BOTTOM.

Mountings 1932-1935 on resilient rubber washers. Replacement often aids in curing



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vibrations. 1935-40 top up regularly. There is a washer under the near side engine mounting only, which should be retained.

Oil Level should always be sufficient to show 1" on the indicator. Normally 2"- 2½" indicates full. Never check the level with the engine running as the float may foul the crankshaft and there is a depression within the crankcase on each stroke. Beware low oil level on steep hills, which can cause pump starvation and bearing failure as there are no baffles in the sump and the oil pump is in the front.

Sump capacity

Pre 1931 3 pints, 7 hp 4½ pints, 8 hp 4½ pints, 10-4 7 pints.

Breather Valve This is a non-return valve which should be kept clean and in good order. It allows air to escape freely from the crankcase but restricts the intake. A choked breather valve causes a build up of air in the crankcase which forces oil to leak at the tappets, bearings and dynamo. The depression should be sufficient to raise 12" or more of Redex in a manometer gauge (glass tube resting in a container of Redex at ground level and connected to a rubber tube fitted to the oil level indicator tube) or ¾" to 1" on a mercury gauge. This should decrease from tickover as r.p.m. increases. The star stiffening plate should well support the diaphragm and together with the oil drain hole be kept clean.

Oil drain holes exist at the base of the breather valve housing, the timing case, and the crankcase rear cover plate. They should be cleared regularly with a long wire (not nail or pin which might drop through).

Oil pump 1925-1929 Check external pipe unions to and from the pump as these supply the bearings and pressure indicator. If the sump is drained, prime the pump and draw oil up to it with a cycle pump with the washer reversed. Always check that the pump is supplying oil before running engine.

Oil pump 1930-1940 Remove four nuts, insert two bolts ¼" x 26T in threaded holes and draw out unit complete. If very tight warm crankcase. Dismantle by removing the countersunk screws.

Oil valve 1930-1940 is adjusted by the slotted screw and lock nut on the unit at the rear of the sump. Screwing in increases pressure. Adjust in half turns. The 10-4 has a similar unit supplying oil to the timing chain. This should never be disturbed.

Oilways should be cleaned through during major overhauls by removing brass plugs and washing through with flushing oil. (NOT paraffin).

	Oil pressure (p.s.i.)			
	Idle	At 20 mph	Over 20 mph	Maximum
Up to 1931	4-6	8-10	14-16	25
1931 – 1940 twin			25	
10 - 4			30-40	



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CARBURETTOR

Types Pre 1914
 Longuemâre 1914-25
 Zenith 1925 – Some models had Stromberg.

1925-29 "Standard jets cannot be bettered". A hand throttle adjustment for winter setting is a recommended extra fitment.

Standard settings - sizes in thousandths of a millimetre.

7hp & 8hp	Choke	Main	Comp.	Slow	Prog.	Needle Seat	Capacity Tube	
1930-504469	23	87.5	98	5		1.5*		(*2.5 on gravity feed)
1935 Sports	25	25	65	55	100	1.5*		
504469-1939	25	80	80	50	130	1.75	2	
1940	26	82	80	50	130	1.75		
10-4 up to 1936	23	65	85	40	130	2.5		
1937-1939	24	90	85	50	150	2.5	2	
1940	25	100	85	50	100	2.0		

Twin carburettors should be accurately synchronised, start with them closed and adjust linkage from there.

Zenith Standard jets are reached through square plugs in the base. Main jet is the long thin one. Compensator is 'normal' shape. Slow running jet is adjusted by knob and lock nut.

Zenith 'V' jets are in the float chamber. Main and compensator jets are at the bottom (comp. is more central). Slow running jet is at centre of back edge, capacity tube on left corner of the back edge.

Clean Jets by blowing through only - no poking with wire!

Slow running Adjust by setting throttle to get correct quantity of fuel, then turn knob (later models have screw/spring fitment) clockwise is richer, to get quality of fuel. Correct setting varies, but is between fully rich and two turns back. Set mixture slightly rich to avoid blank (flat) spot on acceleration. (If this persists, try larger compensator jets, if still bad, try larger capacity tube). Over rich mixture creates throbbing and black exhaust.

Also check airtight joints, valve wear and valve seatings, plug gap and that the ignition is not too far advanced.

Popping back in the silencer down hills means weak mixture - clean slow running jet first.

Compensator determines power on hills, try different sizes.



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Popping back (coughing) in the manifold on starting is due to a small compensator jet. If this occurs and the car lacks top speed, increase the main jet until the trouble goes, then retry the compensator jets for correct overall performance.

Also check for retarded or faulty ignition, lack of petrol through the pump, poor compression (valves or tappets worn, sticking, or wrong adjustment), poor spark. If still lacking top speed try larger main jet and finally larger choke tube and retry jets. Check that the filter inside the banjo union is clean.

FUEL PUMP. Up to 1934 type B, 1934-1935 type T, ? later type U.

Early service sheets warn against disassembling diaphragm, therefore, re-fix carefully possibly with a smear of petrol proof sealant, taking care not to over tighten the screws or the casing will split. Keep glass bowl and valves beneath the brass plugs clean. Ensure the gasket above the bowl does not leak. The 10-4 has an electric pump – keep the points clean.

<u>ELECTRICAL.</u>	Bulbs.	Vintage.	Head 4½amp.	Side/tail 2A amp
		6 volt	24/18w	3w (6w by law)
		12 volt	24/36w	6w

Ensure filament is as near to the focus point as possible by trial and error.

Coil For those mounted on the dynamo ensure washers are replaced under the mounting bolts to avoid fouling the field coils.

Distributor Keep clean and dry. Every 1,000 miles place a few drops of oil in the oiling snout. Every 5,000 miles place a few drops of light oil on the centre screw of the cam and one drop on pivot. Smear a little petroleum jelly on the-cam. Some have a greaser for the drive shaft. ¼turn once every 500 miles.

Contact-breaker gap is 0.012" from 1930-40. On earlier types (where stationary contact is mounted on a screw) 0.010".

Dynamo Up to 1929 mark the position of the coupling to the distributor before disconnecting. Charge rate 6-volt cut in at 11 mph, 8 amps at 20 mph.

Others grease at rear gears. Do not over grease to avoid penetration to commutator. 10-4 only a few drops of oil on the rear bearing. Charge rate 1934, 8 amps at 28 mph. Brush set Lucas 222158.

On 3 brush dynamos the charge rate is increased if the third brush is moved slightly in the direction of rotation of the armature. Do not overdo it.

Trafficators Festoon bulbs 12 v No.T126F 6w (Lucas)



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relative position is marked before removal. Reassembly is affected best by compressing the unit together using two flywheel-housing bolts, while inserting the setscrews. The two parallel connecting links from the pedal must always be exactly the same length to give a rolling action.

GEARBOX

Up to 1929 Right-hand gate. Lubricate well. Keep bolts tight. Remove whole top to fill up to middle of the layshaft (bottom shaft). Capacity ? pints. The breather pipe on the top should be kept clear.

Early 1929 Centre gate change - as above.

Late 1929 Centre ball change 3 speed. Capacity 1½pints. Use dip stick (provided) and ensure 2" from bottom of box.

1934 Centre ball change 4 speed. Capacity 2 pints. Fill to neck of oil filler/level plug.

Pre 1929 boxes may be adjusted for meshing by removal of the cover selecting the gear, and ensuring full mesh by adjusting the pinch bolts on the cross shaft.

Other boxes are disassembled by removing rear nuts and tapping out backwards. Layshaft spindle and bearings are also tapped out gently using soft metal drift (bar). Slipping gears are due to weakened selector springs, or slackness or wear on the selector ball locating 'screw' which projects from the side of the bell housing. This screw should be tight.

Oil to the clutch is fed through the spline shaft controlled by a wick in a feedhole. Extra padding in here will cure an oily clutch unless the oil return spiral and bush is worn. Access is by removing the top and rear of the box plus the spline shaft. The 10 hp gearbox removes best when it is in reverse gear.

Ratios

	Pre 1916 6.50 x 65 tyres	1916-29 4.40 x 27 tyres	1930-34 3 speed box 4.40 x 19 tyres	1934 – on 4 speed box 4.50 x 19 (7 hp) 7.75 x 18 (10 hp)	4 speed box 5.25 x 16 10 car & coml. 8 hp car	3 speed box 5.25 x 16 8 hp Coml..
Top (diff)	4.5	4.6	5.125	5.375	4.89	4.89
3 rd	-	-	-	8.05	7.32	-
2 nd	6.6	7.4	10.25	13.5	12.3	9.3
1 st	11.8	14.7	19.9	22.6	20.6	18.1
Reverse	16.3	19.8	27.2	28.3	25.8	24.8



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1930-40 speed approx 15 mph per 1,000 rpm.

Centrifugal Clutch, Freewheel and Synchroniser

On certain 1935 and 1936 cars a Newton Centrifugal Clutch was fitted in conjunction with a Webley and Scott Freewheel.

On all 1937 10hp and special order two-cylinder models a Synchroniser was fitted.

Reference to diagrams is necessary for construction and adjustment details.

See Jowett Car Club Library Ref.109 pp 24-28 (Maintenance Handbook for 1935-1939 issued 1952).

TRANSMISSION COUPLINGS. Fibre work well, even when gaping, so long as bolts are tight. Modern adhesives under pressure will slow down complete disintegration. On fitting new discs, check bolts regularly until bedded in. Ensure good Grover type spring washers (i.e. normal. 'split ring' or 'single spiral' type) are used with the bolts. Some 1933-4 shafts have a locating ball each end of the shaft, which lengthens the life of the coupling. The two nipples should be greased lightly monthly.

Layrub couplings were fitted from 1934 onwards and should never be oiled, but kept tight. They can be fitted back to 1930.

REAR AXLE. Capacity 7hp 8hp 1934 1 pint.

Differential All crown wheel and pinions are mated, beware changing one without the other.

Adjustment of early types. Either side of differential housing, which carries rear bearings, are several 0.005" aluminium washers, which may be changed sides to take up the play at the pinion. Half shafts are non-floating, therefore, to change one, remove the complete axle by dropping the rear ends of springs. Remove hub on broken side and carefully split axle around the differential housing (7 bolts plus 4 at pinion assembly). Take care to note and replace the aluminium washers as before. Extract shaft by removing split pin from the balance gear and withdrawing gear. Push half shaft into centre, remove split collar and slide out the shaft.

Adjustment of later types. More than 3/16" movement on outer edge of coupling denotes excessive play. Meshing of crown wheel with pinion is by locking sleeves on differential assembly. One notch = 0.0025". Shims between bevel pinion flange and housing should only be adjusted when replacing crown wheel and pinion.

Oil leak from the bevel housing 1930-36 is due to end play in the bevel pinion. This is governed by the length of bevel pinion thrust sleeve, which should be level the locating flange on the housing assembly. 1937-39 replacement of distance tube (4105 x 10) by new tube and thrower ring (4116 x 6 & 4116 x 5.) is the only solution.

Half shafts may be removed by disconnecting brake linkage and 6 nuts on axle flange near the back plate - withdraw the whole assembly. If the car is moved with a broken shaft, the rear wheel bearing is certainly strained or damaged.



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Fill differentials with warmed oil through the top until it overflows through the side plug.

REAR WHEEL BEARINGS

1925-29. Should only be a press fit - no hammering - if they turn in the housing, pack very carefully with 0.002" feeler steel. Wear can be checked by jacking up, locking brakes turning transmission and noting bevel gear backlash and take up of differential gears. If there is any other movement, trace it, hub first.

From 1934 taper fit and lock nut.

HUBS 1925-29 Adjustable taper roller. Some 1930 non adjustable.

A nipple can be fitted on the dome of the cap when thin leather or card washers should be used each side of the wheel to prevent grease leakage. Front hub needs no adjustment unless removed. There are two bearings; the inner should remain on the axle. Adjust nut on replacing so that they run free without endplay. Take note of nut and washer assembly order.

SPRINGS. Shackles get hard wear - if oil does not enter easily, slacken the nut and turn the bolt round a little and try again. Do not grease later rubber bushed types. Treat leaves to graphited penetrating oil occasionally.

DAMPERS. See Luvax instruction book (available from Jowett Car Club Library).

BRAKES up to 1929 Foot - External contracting band on transmission.
Hand - External contracting band on rear.

The foot brake is reliable but rough, experienced drivers drove more on the handbrake.

One set of linings should last 30,000 miles

Note that the power of the transmission brake is magnified by the differential, which means that the foot brake requires over four times the sensitivity to achieve the same results as the hand brake.

All levers on brake shafts are a friction-pinch bolt fixing. To adjust the hand brake, pull on fully, insert a lever behind the cross shaft so as to hold the brake-rod lever-arm on further. Slacken the hand brake lever pinch-bolt and then release hand brake and re-tighten the pinch-bolt.

Brakes should begin to come on at the third notch. Individual adjustment should be done at the rear, with the wheels off the ground and the adjustable nut on the band support checked. Lubricate brake cross shaft (no nipple). Transmission brake is the same type - leave fairly free to avoid excess fierceness. Also curl the band slightly in a 'spiral coil' to ensure gradual action.



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			Lining
1929	S.W.B.	As earlier	
	L.W.B.	Foot – Internal expanding on all four.	JO/10/1
		Hand – External contracting on rear	JO/9/1
	(S.W.B. & L.W.B. Hand adjust as on earlier models)		
1930-34	All	Hand & Foot – Internal expanding on all four.	JO/10/1
1935-36	All	Hand & Foot – Internal expanding on all four.	JO/11/1
	(N.B. JO/10/1 are 1/8" linings as against JO/11/1 at 3/16", the difference being made up in the shoes which appear the same until compared.		
	Standard drum size to 1936 (coml. To 1937) 10.003"- 9.997"		

There are adjustments at each wheel and at the pedal. As the handbrake applies uneven pressure always use the pedal for adjustments. While the handbook suggests overall adjustment at the pedal and individual adjustment at the wheels over-use of the pedal nut pulls the cross shaft 'over centre' and much efficiency is lost. Periodically one should reset the brakes by letting the pedal nut back as far as practicable and adjusting the wheel on the brake rods.

Beware the front shaft fouling the axle when linings or King pins are worn. Sometimes it helps to fit longer brake push rods through the Kingpins.

1937	Bendix-Cowdrey 8". Linings 61" x ii" x 5/32"	BP/37/2
1938-40	Bendix-Cowdrey 8". Linings 6.15/16" x 1.23/32" x 3/16"	BP/85/1

The last type axles, 8hp, 10hp and vans are similar to the Bradford 1949/53 (except for pre-war detachable differential inspection pan and post-war 4 stud fixing for back plate). The post-war 10" Girlings are far superior and both front and rear axles can be used on 1937-40 models.

Standard drum size 8.010" - 8.000" replace when 1/8" oversize.

Adjust at each wheel back plate only. Full adjustment by jacking up, hand brake off, fully tighten, and then slacken each five notches. Check for rubbing by driving then stopping on the engine and feeling the drums, or check by tapping to get a clear ring. If any one is overheated or does not ring clear, slacken off all wheels one click. Pulling to one side is due to faulty compensator. These wear badly but can be drilled and sleeved adding new greasing channels.

Overhaul completely every 20,000 miles. The length of thread on the operating rods is NOT for adjustment but to enable the barrel nut to be turned back to permit removal of the plunger. Ensure that the ends of both rods butt together as the barrel is screwed up. Check this on 'strange' cars as the thread can strip. Dust covers should be fitted and contain some graphited grease. Different pull-off springs are used for the shoes - rear: black for primary shoe red for



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secondary, front: green for primary (if black replace with green)(!) red for secondary.

To check play in the linkage, release brakes then tighten at each drum; any further play can then be traced. Correct alignment of the rods is as follows: the rear rods should be so placed that a line drawn through the compensator boss and parallel to the axle, passes through the yoke pin on the pedal-rod arm of the compensator; i.e. the compensator is 'square'. In the front, when the brakes are tightened at drums as above, the yoke pin in the pedal-rod arm is 5/8" forward of such a parallel line.

The centre compensator has a guide bracket with a large hole. With the brakes still tightened at the drums the shaft should be 1/8" clear of the forward edge of the hole. Early models have a solid link from pedal to compensator, when there should be 3/8" clearance at the end of the slotted yoke with the brakes off. Later models have built in spring link and no clearance should exist. There should be 3/4" play on the pedal and two notches free movement on the hand lever. Now slack off each drum five clicks.

A set of six leaf springs was supplied to support compensators and steady the three universal joints, which would have prevented much wear if they had been standard!

STEERING

Up to 1929 one is advised to fit a greasing nipple on the lower end of the steering rod to lubricate the spring and bushes. (Block the hole behind the spring first, and file a grease groove in the first bush). Later models have a nipple actually in the end cap,

Rack and Pinion Box 3/4" is the maximum permissible play on the steering wheel rim. Adjust by rotating the eccentric bushing in the steady tube, which is retained by the collar bolt on the steering box. The large castle nut should not be dead tight, but enough to stop end play. Further play is due to worn conical bushes, which can only be replaced.

Correct adjustment allows 1/4" play at rim only. The tie rod to the chassis should be kept dead tight and checked against breakage, which causes excessive play.

Steering Wobble may be cured by fixing a tapered wooden wedge 3/8" to zero under the front springs, 1/8" end to the front.

1933-1939 - the alignment through the dashboard bearing must be accurate. Adjust via the tie bar on the steering box. It may be due to unmatched tyres on wheels.

Bishop Cam Steering is fitted to 8hp cars from 1940 (vans from 1937). Maintenance is periodic grease gun lubrication with heavy gear oil.

Adjustment on the radius arm for taking up slack between the cam groove and the follower (shown by over half an inch play on the steering wheel rim) is affected by detaching the side (top) plate and removing the minimum number of shims (originally 2 at 0.003" and 2 at 0.010"). Check steering after the removal of each single shim.



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End play (up and down movement of the column) should be negligible. Adjustment is by removing shims singly from behind the end plate.

Marles-Weller Steering is fitted to 10-4 models. This is oil filled, and therefore, joints must always be remade with jointing compound. There should be no free movement in the steering wheel rim. Adjustment is by removing the side (top) plate after jacking up the front axle and draining the steering box. The follower moves in a cam groove as with the Bishop Cam Steering, but here the follower has two hemispherical steel inserts on each side, which align to the face of the groove at all positions of the steering. Play is taken up by replacing these hemispheres, testing after replacement of one side only. The follower is removed by working the radius arm gently up and down, until the follower can be grasped and pulled out. TAKE CARE not to lose the hemispheres into the steering box. New hemispheres should be placed firmly in the sockets with heavy grease and slightly tilted to give a lead-in effect. Test play by moving radius arm out of the way and checking the follower in the groove. Re-assembly is best at either end of the cam groove, where it is wider. Press in the radius arm and then the following (this is helped if an assistant gently moves the steering wheel to and fro). Replace the side plate including the shims, which are not for adjustment, using jointing compound.

Drop Arm (Bishop Cam or Marles-Weller). If this is ever moved mark, clearly its position on the shaft beforehand.

Where you have forgotten, proceed as follows. Set wheels and steering wheel to straight ahead (i.e. halfway from lock to lock). Now set wheels slightly to the left. Replace drop arm. Check by swinging steering fully to the right, marking position of arm on shaft and removing drop arm, when it should be found that the steering wheel can be moved further in that same direction. Replace drop arm and repeat for the other lock. If the above does not apply, the drop arm should be moved over one or more serrations until it does. Finally secure the drop Arm. Check that minimum play in box exists at straight ahead position.

TRACKING ALIGNMENT. Never exceed 1/8" toe in. Never toe out. Jack up front to check.

TYRE PRESSURES (Sizes may be found under 'Gearbox Ratios')

Up to 1929 Tyre size is so generous that pressures can be dictated by comfort.

	Front 25-28	Rear 30-33
(Balloon)	Front 13	Rear 15

There are likewise a variety of recommendations for the later cars but they are generally around the following:

7 & 8 hp	Front 20	Rear 22
Commercial	Front 20	Rear 24
10-4	Front 24	Rear 24
Commercial	Front 28	Rear 36



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MODEL DETAILS

1906-20 Short 2 Seater. No Dickey. 815.8 6.4, 3 pint Sump, 1000 m.p.g. 4-gallon petrol tank, 50 mpg. Mole Grey with deeper shade "mudguards" upholstery of dark green leather. Wt. 7½cwt. 1913 model had hood fitted as standard. 1913 optional extras included:- 12 volt dynamo lighting set and switchboard etc. Speedometer, electric side and tail lamps. Two acetylene headlamps with separate generator.

1921-22 Short 2 Seater with "large" boot. 907.2, 7, 3 pint Sump, 1000 m.p.g. 5 gallon petrol tank 27.5 m.p.g. Standard Model Grey with green upholstery. Khaki twill hood. Wt 8½cwt. Complete with screen, dynamo lighting set, horn, speedometer, spare wheel and tyre pump, jack, and complete tool kit. Optional extra - Dickey seat. De-Luxe: Grey or Saxe Blue with real leather upholstery. Black leathercloth hood. Dickey seat, side curtains, special paint finish, nickel radiator and special nickel fittings.

1923 & Late 1922 Short 2 Seater, 907.2 7, 3 pint Sump 750 m.p.g. 6 gallon petrol tank 40 mpg. Black leathercloth. Wt 8½cwt. Complete with dynamo lighting, 5 Dunlop wheels, cord tyres. Speedometer and horn. Pump, jack and tool kit. Optional extra, dickey seat, upholstery in leather.

Long 4 Seater. 3 pint Sump 750 mpg. 6 gallon petrol tank 36 m.p.g. Colour finish to customer's choice. Wt 10 cwt. Otherwise as above.

Improvements for 1923 on both models were:- Cast aluminium induction pipes provision for electric starter, flexible drive for dynamo. Door on 2 seater made 2" wider.

1924 As 1923. Oil gauge introduced. Oil consumption improved to 1000 m.p.g.

1925 Light car - Short two Seater with or without dickey. 907.2 7, 40 mpg. 8½cwt. Light 4 seater on short chassis. 38 m.p.g. 9½cwt. Travellers car, 2 Seater with long body. Vans, long and short chassis, with or without standard bodies. All models had 3 pint oil sump and 6 gallon petrol tank. Optional extras – all models, Self Starter, Balloon tyres.

1926 1925 plus long saloon (the Greenhouse). 907.2, 7, 35 mpg.

1927 Leather upholstery except for saloon which had deep ribbed Bedford Cord.

1928 Leather cloth hoods. Shades available on coachwork were:- Royal Blue, Deep Biscuit or Munich Laice on Saloon only. 11¾cwt. On all models Dunlop cord balloon tyres and electric starter were fitted as standard, as were nickel radiators and fittings. Scuttle is lower from 1926 and follows height of bonnet. Windscreen is deeper.

1929 Short four (previously light four) 907.2, 7, Fabric body in blue or maroon. General Spec. all models, 6 V electrics. Nickel radiator and fittings, shock absorbers, electric wiper and horn plus driving mirror. Upholstery not now leather but in first class



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material.

Short Saloon. Fabric body in blue, maroon or brown.

Long two. Coachbuilt in blue or maroon. 4 wheel brakes.

Long four. Coach built in blue or maroon. 4 wheel brakes.
Fabric in brown or blue.

Long Saloon. As long four. 4 wheel brakes.

Long Short Commercial. Optional Extra Humphrey Seaberg free wheel clutch.

1930 Detached cylinder head introduced - peculiar to 1930.

General Spec. 6 v. Electrics, 4 wheel brakes, chrome radiator and fittings. Single plate clutch.
Artillery wheels.

Long Two 907.2, 7, Coach built brown or blue.

Long Four Coach built brown or blue. Fabric - brown, blue or maroon.

Short Saloon Fabric - brown, blue or maroon. Interior to match in either grained fabric or repp.

Long Saloon Fabric brown, blue or maroon. Coach built brown or blue. Interior - many choices.

Long/Short Commercials.

Long and Short deluxe as follows, "Black Prince". Black with red or cream decorations. Interior in red fabric or moquette. All de-Luxe models have wire wheels. Steering wheel and gear lever knob to match interior. Single pane opening windscreen.

"Grey Knight" Grey with blue decorations. Interior in blue antique fabric or moquette.

"Silverdale" Fawn with brown decorations. Optional extra on all models - splinter glass.

1931 General Spec. Chassis lowered 4" from previous. All models on 6v electrics. First year of pre-car design of engine. Radiator surround stainless steel with chrome to other bright fittings.

Long two 907.2, 7, oil sump 4 $\frac{1}{2}$ pints. Royal blue coach work with matching trim. All models with dickey seat.

Short Saloon. Maroon fabric with maroon rexine.

Long Saloon. Maroon fabric with maroon rexine.

Long Four. Royal blue coachwork with matching trim. Wire wheels. Steering wheel and



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gear lever knob to match interior. Single opening screen.

Deluxe Saloons as follows "Black Prince". Black with cream or green decorations. Interior in brown rexine or fawn moquette. Specification as long four.

"Silverdale" Fawn with brown decoration. Interior in brown rexine or fawn moquette. Specification as long four. Optional extra on all models "Lancegaze" safety windscreen glass.
1932 General Spec. 6v electrics. Dunlop wire wheels standard models. Dunlop Magna wheels on de-luxe models. Rear mounted petrol tank on de-luxe models. All have stainless steel trim.

Long Two 907.2, 7, Oil Sump 4 $\frac{1}{2}$ pints. Royal Blue coachwork with (Focus) trim to match.

Long Four (Simba) Royal Blue coachwork with trim to match.

Short Saloon (Wren) Maroon fabric body with maroon rexine.

Long Saloon as follows "Black Prince". Black coachwork with shaded blue rexine or fawn moquette.

"Ivanhoe" Blue coachwork with shaded blue rexine or fawn moquette.

Short and long de-luxe saloons as follows "Blackbird". Black with green beading. Shaded blue rexine or fawn moquette.

"King-fisher" Blue with light blue beading. Shaded blue rexine or fawn moquette.

1933 Short Two (Flying Fox) 907.2, Oil Sump 4 $\frac{1}{2}$ pints. Coachbuilt. Maroon with red line. Maroon rexine or dark blue with light blue line. Blue rexine. 12v electrics Dickey seat.

Long Four. Coachbuilt. As above. 12v electrics.

Short Saloon. Fabric. Black with green line. Brown rexine or fawn moquette. 6v electrics.

Ditto. Coachbuilt. Dark blue with light blue lines. Blue rexine or moquette. Maroon with red line. Maroon rexine or moquette. 12v electrics.

Long Saloon. Fabric. Black with green line. Brown rexine or fawn moquette. 12v electrics. Coachbuilt. Dark blue with light blue lines. Blue moquette or rexine. Maroon with red line. Maroon rexine or moquette.

Kestrel (4 light) Coachbuilt only. Fawn with maroon top. Maroon moquette or rexine. Green with black top. Green moquette or rexine. All black with green lines. Green moquette or rexine. 12v electrics.



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1934 General Spec. All models coachbuilt. 12v electrics, Dunlop Magna wheels and bumper front and rear. Kestrel fitted with trafficators.

2 Seat "Flying Fox" 907.2, 7, Oil Sump 4 $\frac{1}{2}$ pints. Green with black lines. Dickey seat green rexine. Black with green lines. Green rexine.

Long Four. Blue. Blue rexine.

Short Saloon. Dark blue with light blue lines. Blue rexine or moquette. Black with green lines. Green rexine or moquette.

Long Saloon (Std. Basic) Black with blue lines. Blue moquette or rexine. Black with green lines. Green moquette or rexine. This model was also available as a traveller's car with large rear doors and detachable rear seats.

Kestrel (4 light). Green with black top and green lines. Green hide or moquette. Grey with blue top and blue lines. Blue hide or moquette. Black with Green lines. Green hide or moquette.

General Spec. 12v electrics. Opening windscreen. Luvax hydraulic shock absorbers. Rear petrol tank with pump feed, gauge and clock. Dunlop Magna wheels. Adjustable seats. Trafficators, brake lights.

2 Seat "Flying Fox" 907.2, 7, Oil Sump 4 $\frac{1}{2}$ pints. Black, green rexine, green hood Now with swept wings. Seats not adjustable. Dickey seat.

4 Seat "Weasel". All red, red rexine and red hood. All green, green rexine, green hood. 2 doors only. Some versions had twin carburettors.

"Kestrel" (6 Light). Black, Green rexine or moquette. Dark green, green rexine or moquette.

1935 2 Seat "Flying Fox" 907.2, 7, Oil Sump 4 $\frac{1}{2}$ pints. Black, green rexine, green hood. Now with swept wings. Seats not adjustable. Dickey seat.

4 Seat "Weasel". All red, red rexine red hood. All green, green rexine, green hood. 2 doors only. Some versions had twin carburettors.

"Kestrel" (6 light). Black, green rexine or moquette. Dark Green, green.rexine or moquette.

"Curlew" Blue, blue rexine or moquette. De-luxe version of the Kestrel with colours as Kestrel, but option of leather, automatic clutch, twin-tone horns, master switch and special door cappings.

1936 "Flying Fox", "Weasel", "Kestrel", "Curlew". 907.2, 7, Oil Sump 4 $\frac{1}{2}$ pints. As for 1935 with addition of Stevenson jacking, tubed radiator behind dummy grill and minor detail changes.



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"Jupiter" 1166 10 Flat four twin carbs. Marles steering electric fuel pump.

"Jason" De-luxe version of "Jupiter" with centrifugal clutch and free wheel.

Mid 1936 "Peregrine" "Plover", "Jason" and "Jupiter" proved unpopular due to "futuristic" body shape and were therefore withdrawn. Pressed steel wheels.

1937 Standard 946, 8. Black or blue rexine or moquette to tone.

De-luxe 8. Black blue or green. Leather or moquette to tone.

General Spec. Marles steering, Bendix-Coudrey brakes. Warren synchroniser standard on 10 h.p. External spare wheel.

Standard 1166 10 Flat four single carb. Black or blue leather or moquette to tone.

De-luxe. Black, blue, green or fawn. Leather or moquette to tone. Sliding roof.

1938 General Spec. Range as for 1937 with minor changes. e.g. "fender's mask" type radiator grill. On 10 h.p. rubber engine mountings. Handbrake centre mounted.

1939 General Spec. As 1938 with following improvements:-

Straight full width bumpers front and rear. Instrument panel in front of driver. Thermostat in cooling system. Engines now have alloy heads and double valve springs.

Black, blue, grey, maroon or fawn. Green, blue, brown, or red upholstery. Rexine or moquette on 8 h.p. Leather or moquette on 10 h.p. Standard fixed head saloon in black only.

1940 General Spec. Much modified versions of 1939 models with externally opening "Built-out" boot. Horizontal bars to grille. Engine rubber mounted on all models. Burman Steering. Borg & Beck clutch, 4 speed synchro-box. Vacuum advance. Enclosed flywheel on 8 h.p.