

Motor Trader service data

26 MAY 1971

SHEET NUMBER **502**

VOLKSWAGEN 1200 and 1300 models

Manufacturer: Volkswagenwerke AG, Wolfsburg, Germany

SOME considerable time has elapsed since our last article in this series featured a VW car and during that period of time a considerable number of changes have been made to the vehicle range as a whole and to the "Beetle" in particular.

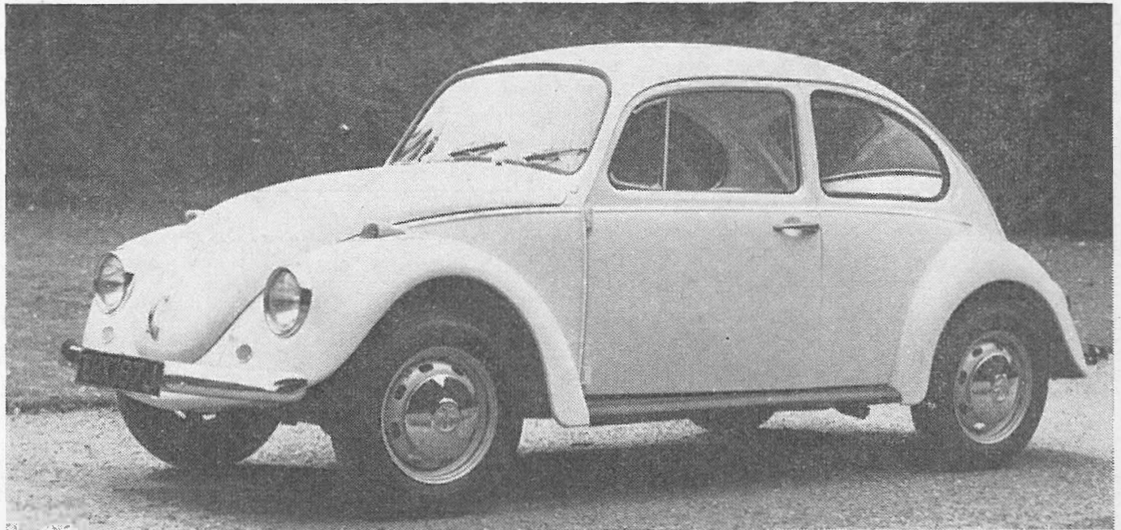
Since the 1200 and 1300 models differ principally in engine internal dimensions and power output only it may be assumed that both models are identical except where otherwise stated and it should be borne in mind that manual transmission models only are dealt with in these pages.

Mechanical layout is relatively simple; the flat four cylindered horizontally opposed air-cooled engine is rear mounted and is an integral part of the transmission and final drive unit. All four forward gears are synchromesh and transmit the drive to the rear wheel final drive unit. Suspension is independent at front and rear and steering is of the direct acting worm and sector type.

Cars are identified by chassis and engine serials, also by an identification plate. The chassis number is stamped on the backbone of the chassis, and is revealed on removal of the rear seat. Engine serials, seven figure, with coding letters "A" and "D" for 1200cc and "F" and "E" for 1300cc engine cars. These symbols are embossed on the crankcase side of the generator support flange; above and to the left of the dipstick. The identification plate is found on the valance behind the spare wheel which is mounted in the front luggage compartment.

Special tools have been designed to facilitate service work. A list of those which are considered essential is set out on p. ix and it should be borne in mind that many service operations may be found difficult or impracticable without them. Before attempting service work, it is advisable to possess the requisite complement of these service tools.

Service policy of the manufacturers and their UK distributors remains much as before in that where possible or practicable they state that service



DISTINGUISHING FEATURES: Both 1200 and 1300 models share similar body shell and instant recognition points are vent slots on rear quarters fitted on the 1300

work should be carried out through VW dealers who are staffed, trained and equipped to carry out all repair and overhaul operations on all VW cars. This is a policy much in line with that stated by the British and British-based manufacturers.

Threads and hexagons are all of the Metric thread series classification. To avoid confusion, readers will note that both British and Metric units are used in the tabular data

and where dimensional tolerances are quoted in the text, similar notation is also used.

As is the case with most vehicle manufacturers, but particularly in the case of VW, they insist that none but genuine VW spare parts are used to effect repairs. In this context it should be noted that a "goodwill" aspect applies to the vehicle guarantee in the sense that warranty claims may be considered favourably

even outside the official guarantee period, but **ONLY** if genuine VW parts have been used in the repairs so effected.

ENGINE

Mounting

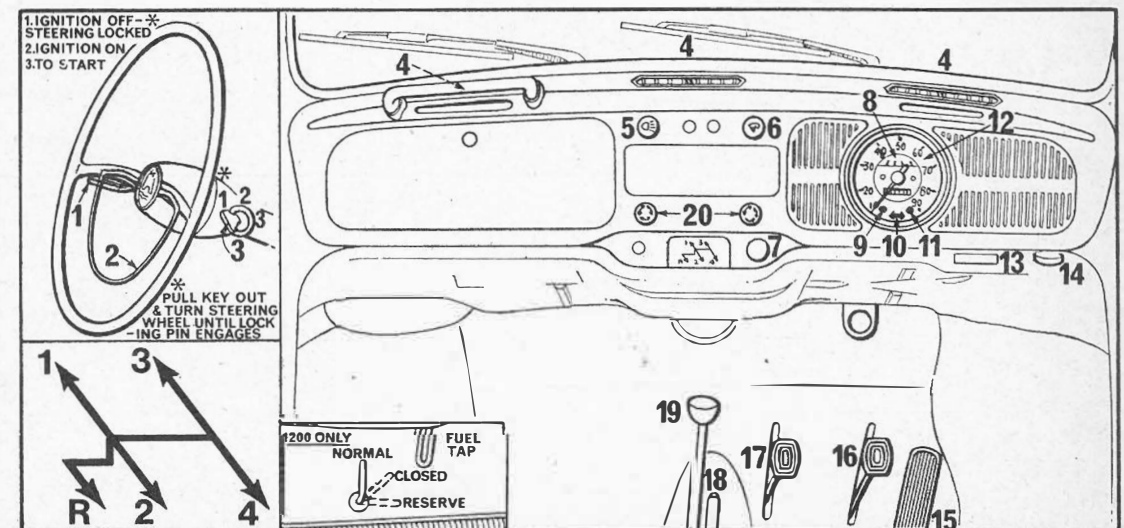
The engine has no separate mountings and is bolted direct to the transmission case at the clutch

FACIA PANEL KEY

- 1 Turn signal and dimmer lever
- 2 Horn ring
- 3 Steering/ignition lock
- 4 Defroster vents
- 5 Lighting switch
- 6 Windscreen wiper switch with knob for washer

- 7 Hazard warning light switch
- 8 Fuel gauge
- 9 Generator and cooling warning light
- 10 Turn signal warning light
- 11 Oil pressure warning light
- 12 Speedometer
- 13 Fuse box

- 14 Bonnet release
- 15 Accelerator pedal
- 16 Brake pedal
- 17 Clutch pedal
- 18 Handbrake
- 19 Gear lever
- 20 Fresh air control knobs



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housing joint face by two nuts and bolts and two studs and nuts.

The transmission is mounted to the frame by a rubber cushion at the front end and a rubber cushioned carrier at the rear. Carrier is bolted up to body extension and secured by one 27mm bolt at each end side. Additional mounting rubber is nipped up by two nuts and studs to body frame at front end of transmission case.

Removal

Engine may be removed without transmission and final drive. To remove transmission it will be necessary to remove engine first.

Jack up vehicle and place on stands so that car is clear of ground by three feet (approx.). Disconnect earth strap from battery, block fuel line and open engine cover. Take off air cleaner and engine rear cover plate. Disconnect cables, pipes and wires connected to engine unit and generator. Loosen mounting screw on distributor support and turn unit

so that vacuum chamber will clear rear cover plate when engine unit is removed. Disconnect both heating control cables and loosen flexible heater pipes from engine. Remove fuel pipe at engine end.

Unscrew nuts of lower engine mounting bolts, withdraw accelerator cable from conduit tube. Place jack beneath engine and remove nuts from upper mounting bolts. Raise jack until platform contacts engine and manoeuvre engine until clutch release plate clears main drive shaft. Lower jack and tilt unit down rear end and withdraw from vehicle. Care should be taken to see that clutch components are not damaged during this stage of the procedure.

Installation is reverse of dismantling process, following points being observed: Install engine only, with rear cover plate removed. Retime distributor when replacing engine. Centralize clutch plate with special mandrel VW 219. Check over clutch mechanism and replace defective parts, if any. Examine needle bearing in flywheel gland nut for wear and

repack with 10 grams (.35oz) Universal Grease. Lubricate:—starter shaft bush, drive pinion, and main drive shaft splines and spigot with graphite-based oil. Clean transmission case and engine flange. To ease entry of main drive shaft into clutch plate and gland unit needle bearing rotate engine at V-belt and engage a gear to steady drive shaft.

When mounting engine, insert lower mounting bolts in their respective holes in transmission case flange. Press engine against flange and ensure good seatings. Tighten upper and lower bolts slightly and then fully.

Cylinders and Crankcase

Horizontally opposed, each pair of cylinders is spigot mounted in either half of crankcase, which is split vertically and of light metal casting. Crankcase halves are machined in pairs and replacement must be made in pairs. Any of the four cylinders, finned for air-cooling is interchangeable. They can be replaced separately,

or together with corresponding pistons. NB. Colour coding and piston sizing applies. A clearance of .04mm should be established between pistons and cylinders. Each pair of cylinders has a detachable cylinder head, also of light metal die-casting. Combustion chambers are fitted with shrunk-in valve seat inserts.

To remove cylinders, after cylinder head removal, take out valve pushrods and tubes, deflector plate below, and lift off. When replacing, care should be taken to ensure that checks for wear are made and that, if necessary, the replacement should be of same bore size to other three.

Crankshaft

Four main bearings carried in either half of crankcase. No. 2 bearing (from clutch end) is split. No. 1 is lead-coated and takes crank end-float. Flywheel, with starter ring gear is retained by gland nut and dowelled to crankcase by four dowel pins. Timing and distributor drive gears are keyed on to shaft by Woodruff keys and retaining ring, together with fan pulley, which is bolted to crank end. Oil thrower and return thread provide oil seal at front (flywheel side) and oil seal is fitted at rear of flywheel. NB. Special Tool only. Bearings are thick-walled alloy pre-finished to size, no hand fitting permissible. When replacing bearings place Nos. 1, 3, and 4 in left-hand half of crankcase so that dowel holes and oil holes register with oil passages in crankcase. Dowel hole in No. 1 bearing must be towards flywheel. Note: Crankshaft dowel holes should be checked for wear. If worn, remove crank, insert drill and jig (VW 231 c/d), drill new holes 7.8mm dia. 45 deg offset and ream out to 8mm. When refitting crankshaft slide No. 3 main bearing into position followed by Woodruff key for crankshaft timing gear and distributor drive gear. Note: Spacer in between. Check gears for tooth contact. Heat gear to 80 deg C in oil bath and press on to shaft followed by spacer. Check distributor drive gear for wear, heat to 80 deg C and press on to shaft, and fit circlip slide on No. 4 main bearing. Fit oil thrower to shaft, concave face outwards (to crankshaft pulley) insert Woodruff key.

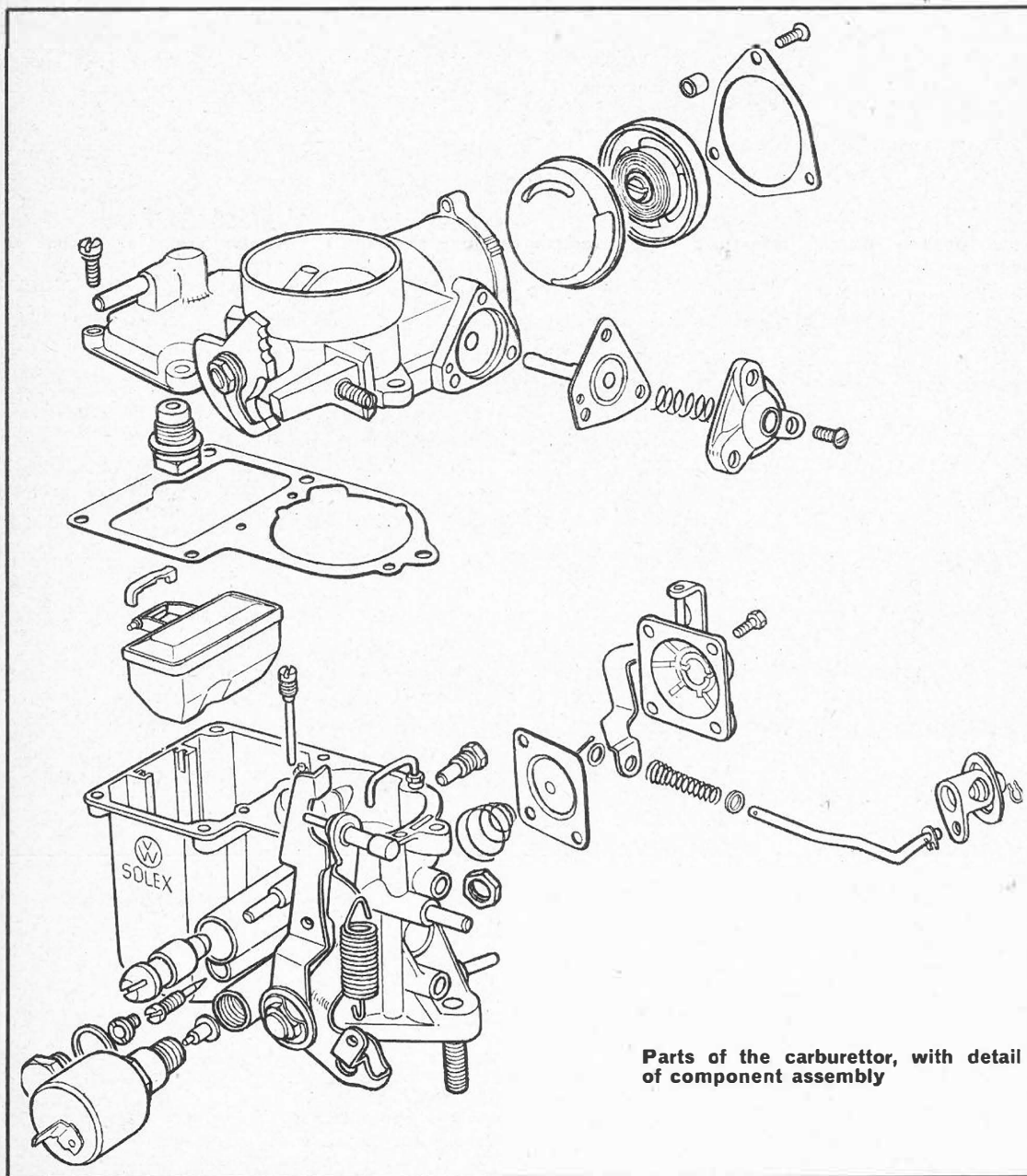
Connecting Rods

H-section stampings, big ends split horizontally, small ends bushed for fully floating gudgeon pins. Thin-wall steel-backed lead-indium lined bearings location by tabs in rods and caps. Rod shoulders are machined for heads of high tensile steel nuts, which should be renewed on re-assembly. As with main bearings, crankcase must be split and crankshaft removed for removal of rods.

Rods are balanced and difference in weight between any two in one set must not be in excess of 5 grams (2.8dr.). If necessary, shoulders and sides of heavier rods should be ground to achieve this tolerance.

Gudgeon pins should be light push fit dry in new bushes at room temperature.

Rods and caps are numbered and should be assembled with numbered sides together. Retaining bolts should be tightened to torque figure of 3-3.5



Parts of the carburettor, with detail of component assembly

CHASSIS DATA	
Clutch Make	Fitchell & Sachs
Type	15cmg
Permissible out of balance max.	.004in
Pressure plate runout wear limit	1.0511-1.0747in
Flywheel to release ring distance	light blue/ dark blue
Clutch springs: colour	1.1495in
loaded length	132-141lb
load (new)	136-145lb
load (settled)	114-123lb
	119-128lb
Clutch plate run-out (max)	.004in
(1200)	.016in
(1300)	1/2-3/4in
Pedal free-play (approx)	

CRANKSHAFT AND CON. RODS		
	Main Bearings	Crankpins
	Nos 1 & 3	No 4
Diameter	55mm	40mm
Length	Not quoted	Not quoted
Running clearance: main bearings	.002-.004in	
big ends	.0008-.0024in	
End-float: crankshaft	.002-.005in	
big ends	.0067-.016in	
Undersizes	.010, .020, .030in	
Con. rod centres	Not quoted	

CAMSHAFT	
Drive type	Gears
No. of bearings	3
Bearing journal: diameter	.9837-.9842in
length	.0008-.0019in
Bearing clearance	.0016-.0051in
End float (thrust bearing)	

PISTONS AND RINGS		
Clearance (skirt)	.0015-.0019in	
Oversizes	.002 & .004in	
Max weight variation per set	5 grams	
Gudgeon pin: diameter	.7871-.7874in	
fit in piston	Floating	
fit in con. rod	.0004-.0008in	
	Compression	Oil Control
No. of rings	2	1
Gap	.012-.018in	.010-.016in
Side clearance in grooves:		
Upper	.0027-.0035in	.0012-.0019in
Lower	.0019-.0027in	
Width of rings	—	—

VALVES		
	Inlet	Exhaust
Head diameter	{ 1200 1.239in 1300 1.299in	1.181in 1.181in
Stem diameter	1.3149-.3156	.3114-.3118
Face angle	45°	45°
Spring length: loaded	{ 1200 1.305in 1300 1.220in	90-103lb 117-135lb
load	{ 1200 1.200in 1300 1.175in	

GEARBOX	
Type	synchromesh
No. of forward speeds	4
Gear ratios: 1st	3.80:1
2nd	2.06:1
3rd	1.26:1
4th	0.88:1
Rev.	3.61:1

FINAL DRIVE	
Type	sb drive swinging half-axes
Crownwheel/bevel pinion teeth ratio	4.375:1

SHOCK ABSORBERS	
Make	VW
Type	telescopic hydraulic
Service	replacement

FRONT-END SERVICE DATA	
Castor	3°20' ± 1°
Camber (straight-ahead)	0°30' ± 20'
King pin inclination	not quoted
Toe-in	+30' ± 15'
No. of turns lock to lock	2.6
Adjustments: castor	not quoted
camber	screwed track rod ends
toe-in	

GENERAL DATA	
Wheelbase	7ft 10 1/2in
Track: front	4ft 3 1/2in
rear	4ft 5in
Turning circle	36ft 0in
Ground clearance (loaded)	6in (approx)
Tyre size: tubeless	5.60-15 4 ply
radial	155SR 15
Overall length	13ft 2 1/2in
Overall width	5ft 1in
Overall height (unladen)	4ft 11in
Weight (unladen)	1808lb

mkg (22.25 lb.ft), dry. NB. Casting mark on shafts must be uppermost.

Pistons

Flat-topped aluminium alloy, solid skirts ground for clearance. Two compression rings and one scraper ring, all fitted above gudgeon pin. Fully floating gudgeon pins retained in piston bosses by circlips.

Pistons are graded and marked for size as follows: Size grade, grade of size marked by paint dot, arrow and word "vorn" stamped or indented, which must point to flywheel when fitting piston, weight grade marked by paint line and grade of weight indicated by symbols—brown colour = "under"—and grey = "over" weight. All these marks, colours, symbols and letters appear on piston crowns or lug marks for correct assembly.

When refitting pistons to cylinders ensure that compression rings are fitted with markings "top" or "oben" uppermost and that ring gaps are properly established (see data tables) and spaced at approx. 120 deg around piston.

Oversize gudgeon pins, bushes reamed to size, are also available in .003 mm steps, coloured for identification; black small, white med., and green oversize.

Cylinders must be removed for piston removal and refitting—see previous section under "Cylinders and Crankcase."

Camshaft

Helical drive gear at front end, shaft runs in three bearing shells machined in each half of crankcase. Removal achieved by parting crankcase when shaft may be lifted out.

When installing, care should be taken to see that cams and journals are free from burrs and abrasions.

One timing gear tooth is centre punched for timing and when refitting, this should be mated between two similarly marked crankshaft gear teeth.

Check backlash of timing gear to be nil—.05mm (.002in). Various sizes of camshaft gear on shafts are available to secure this tolerance and are marked -1, 0, +1, +2, etc., on their inner face.

This indicates in .001 mm the variation in pitch radius from standard pitch radius on gears marked "0". These size markings should not be confused with the timing mark on other side of gear.

Tappets and Rockers

Plain cylindrical tappets sliding in crankcase. Remove after parting crankcase for dismantling. Short pushrods operate inlet and exhaust valve rockers for each pair of cylinders. Rockers, offset are carried on hollow tubular shaft supported in two retaining blocks in each cylinder head. Pair of rockers for each cylinder fitted either side of shaft retaining block. Lateral movement of rockers controlled by packing washers and shims and each is retained in lateral location by spring clip on shaft.

Adjustment provided by threaded ball ended screw in each rocker, which contacts valve stem and ball ends should rest eccentrically in rocker arm sockets. To ensure valve rotation during operation, rocker arm adjusting screws should contact valve stem slightly offset to right.

Individual rockers and shafts may be removed after taking out retaining blocks and removal of spring clips and washers.

Valve adjustment should be made in following order: 1st—2nd—3rd—4th cylinder, and adjustment made to valves of cylinder, the piston of

which is on TDC of compression stroke. Adjustment for valve timing should only be made with engine cold. Clearances should be as set out in data tables, p. ix.

Valves

Overhead, in-line for each pair of cylinders. Inlet valves larger than exhaust, but of similar face angle. Valves not interchangeable. Valve seat inserts pressed into cylinder heads and may be recut to 45 deg providing that outer edge of 15 deg chamfer does not exceed outer diameter of valve seat insert.

Valve guides are chill fit in cylinder heads, chamfered at inner ends, remove guides by punching out with stepped drift. New guides pressed in from top of cylinder head.

Valves have single coil springs locating on seats around upper ends of guides and are retained by caps and split cone cotter fixings. Fit with close coils to head.

Lubrication

Gear-driven pump recessed on engine crankcase casting. Oil cooler fitted, and when replacing after engine overhaul should be pressure tested to 6kg/cm². Relief valves fitted in crankcase casting. In unladen condition spring should be 62-64mm long.

Pump may be extracted for overhaul after removal of securing nuts and gears. Backlash of gears should be nil-.008in and endfloat .0027-.0075in.

Pump is driven from camshaft and circulation is via oil cooler and delivered under pressure to main and big-end bearings through drilled passages in crankcase. Oil is fed to big ends and camshaft bearings through drillings in crankshaft and through hollow pushrods to rocker

arms and valve gear. Cylinder walls, pistons and con. rods are lubricated by splash and mist.

Pressure switch in circuit, and warning light gives indication of low pressure, below .3-.6kg/cm² (4.3-8.5 lb/sq in).

Ignition

Coil and distributor, incorporating vacuum advance-retard mechanism.

When stripping engine, remove distributor unit complete with its bracket. This will facilitate ignition timing, which will be undisturbed on reassembly of distributor to engine, provided that distributor drive shaft is refitted at the same place at which it was dismantled.

TRANSMISSION

Clutch

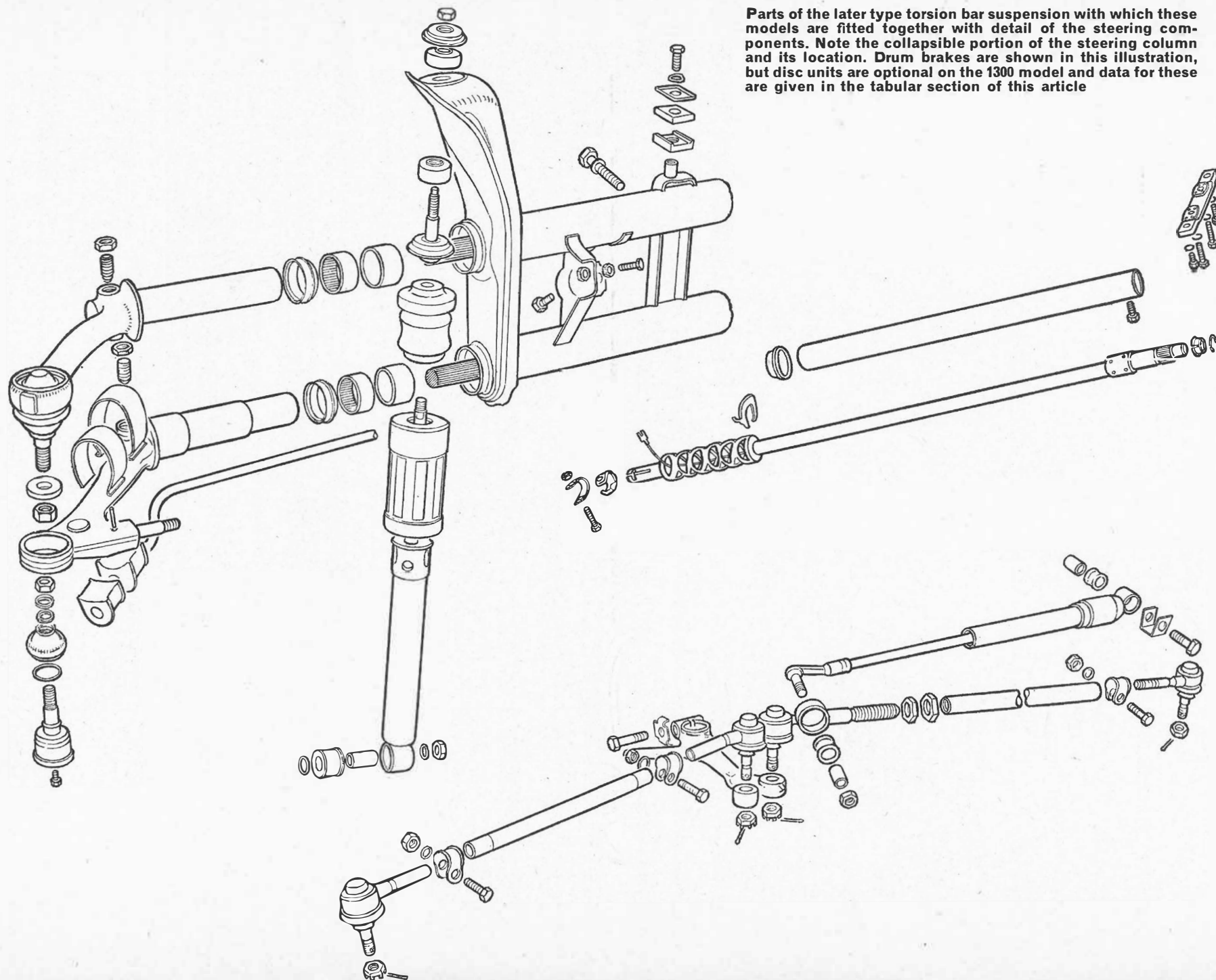
Single dry plate clutch, with centered carbon thrust release bearing. Operation is by cable and access to clutch unit in service is obtained after removal of engine unit as detailed in engine section.

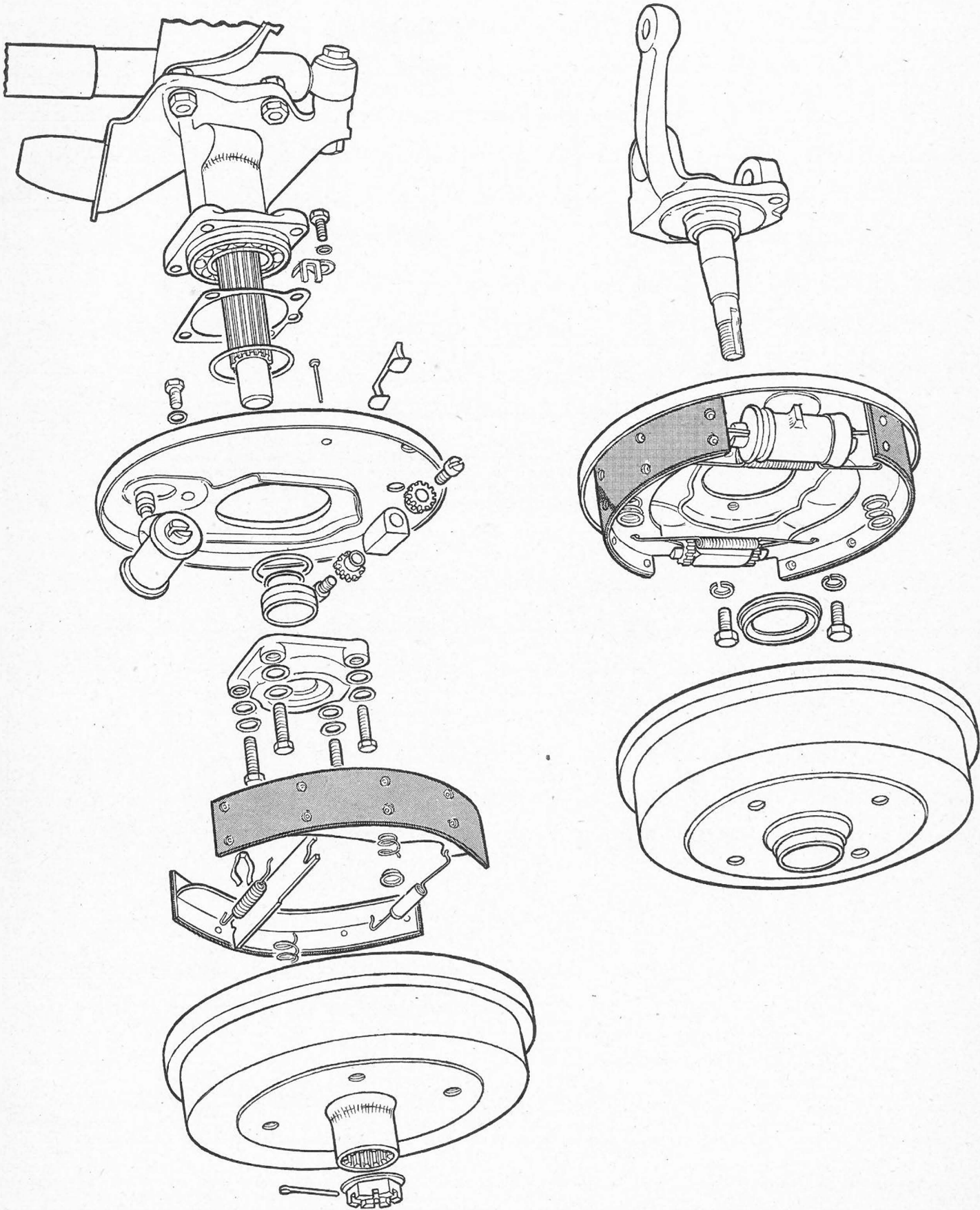
Adjust so that there is pedal free play clearance of 10-20mm (.4-.8in). Adjustment is provided at cable end by wing nut.

Gearbox and Rear Axle

Four-speed gearbox, synchromesh on all forward gears, remote control centre lever operating. Synchromesh devices consist of clutch gear, shifting plates, stop ring and operating sleeve. When operating sleeve is moved towards gear to be engaged, shifting plates bring coned surface of stop ring into contact with coned face of gear. The faster-moving gear carries synchronizing stop ring around until ring is stopped by shifting plates,

Parts of the later type torsion bar suspension with which these models are fitted together with detail of the steering components. Note the collapsible portion of the steering column and its location. Drum brakes are shown in this illustration, but disc units are optional on the 1300 model and data for these are given in the tabular section of this article





bringing stop ring gear teeth out of line with internally cut spline of operating sleeve. Braking takes place between two coned surfaces and when exact synchronization speed is reached, splines of operating sleeve engage with teeth of synchronizer stop ring and with clutch teeth of gear, these are chamfered for easier engagement. Clutch adjustment and proper free-play of pedal is very important since cases of synchromesh failure have been traced to faulty clutch operation.

Final Drive

Helical cut drive pinion and crown-wheel with differential bevel gears which transmit the drive, via two swing axles to the rear wheels. Drive is taken forwards from engine and clutch unit to gearbox and from mainshaft of gearbox rearwards to final drive pinion and crown-wheel. Since gearbox and final drive unit are in one transmission unit, we depart from our usual practice, and describe these items, and servicing together.

To remove Rear Axle and Gearbox

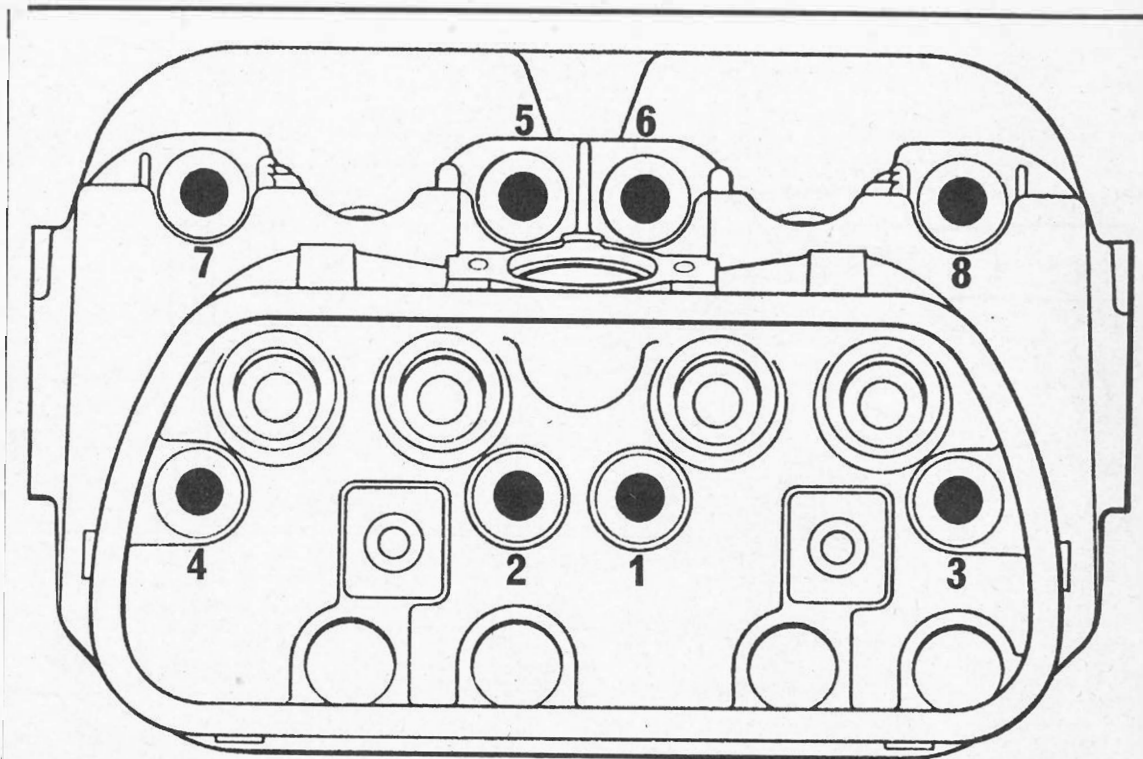
Disconnect earth strap from battery, raise vehicle and support on trestles. Remove engine unit (see *Engine* section). Note: if swing axle gearbox is removed the position of spring plate in relation to bearing housing should be marked with centre punch.

Disconnect clutch cable from operating shaft lever, slide off rubber boot and withdraw cable and sleeve from bracket on left-hand final drive cover. Unhook accelerator cable from retainer on gear carrier and disconnect cable from terminals on starter motor. Remove frame end inspection cover under rear seat. Take off rear screw of shifting rod coupling and move gearlever to withdraw coupling from transmission shift rod. Remove nuts at front rubber mounting on transmission case. Place trolley jack under vehicle and clamp axle cradle (VW 609) to axle. Remove two bolts at transmission carrier (27mm) and draw out axle to rear of car. Replacement is reversal of above procedure.

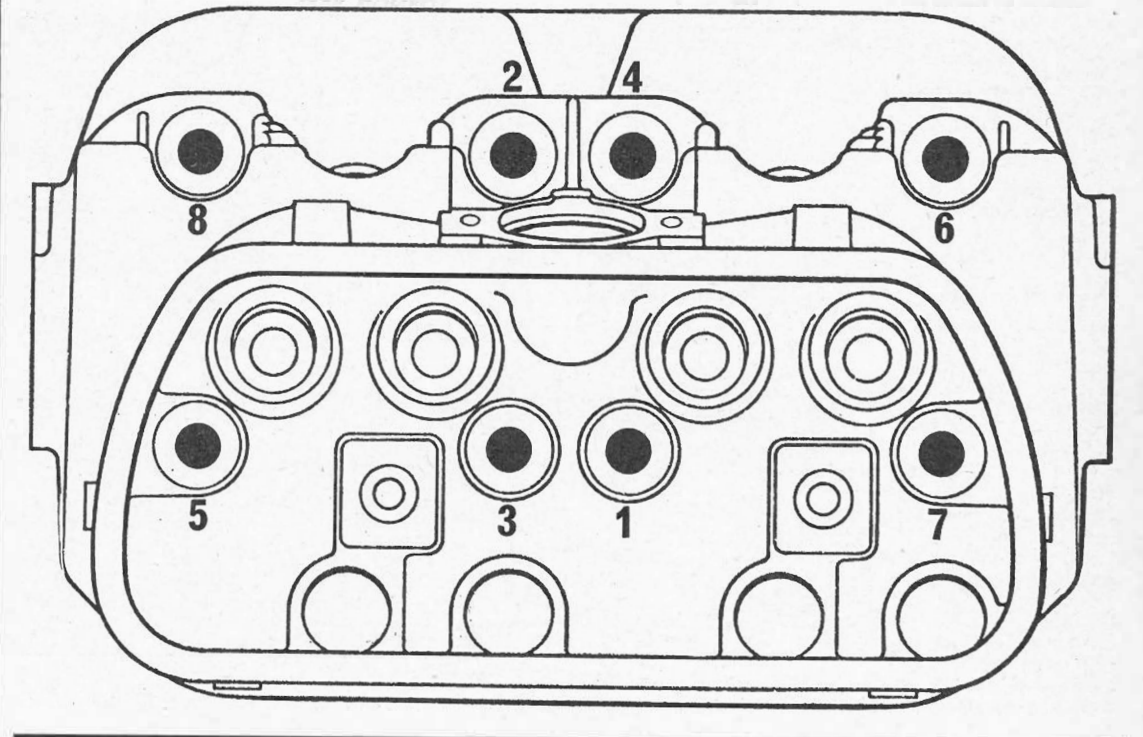
NB. with double-jointed axle arrangement, remove socket head screws from drive shaft flanges (transmission end first) and then wheel shaft end. Remove shafts downwards and out of car. Should it not be necessary to move vehicle after removal of transmission, shafts need only be detached at transmission end. Tie shafts up to body with wire hooks and cover joints with plastic caps to prevent ingress of dirt.

Take off nuts from front transmission mounting and position jack and clamp rear axle in axle bracket VW 609 or 609a. Remove securing screws in transmission carrier.

Replacement of axle is a reversal of dismantling procedure noting following points: align marks made on spring plate and bearing housing, attach bearing housing to spring plate and tighten screws to correct torque. When a new axle frame, spring plate or front transmission mounting has been fitted, rear wheels **must** be aligned. Track and alignment **cannot** be set without optical align-



Order of tightening cylinder head stud nuts. Note: correct procedure is to tighten stud nuts of EACH head down to 7lb.ft (1mkg) in order shown in top diagram. Tighten nuts finally in order shown in lower diagram to 22-23lb.ft (3-3.2mkg) on EACH cylinder head



ment gauge. If such a gauge is not available then wheels must be set so that marks on spring plate sides are aligned with marks in bearing housing. When using optical equipment, axle should be fitted with marks in line first and then rectified accordingly. Movement of bearing

housing 1mm is equivalent to a track alteration of 8'.

Fit lower shock absorber screw, and tighten to correct torque, fit push rods for equalizer spring, fit self-locking nuts and tighten. Slotted nuts on axle shafts should be tightened to correct torque, but if split pin

cannot be inserted, turn nut on to next slot; nuts to be tightened when vehicle is resting on its suspension.

Brakes should be bled and adjusted; clutch cable fitted greasing cable end slightly. Fit shift rod coupling, tighten screw and secure with wire.

SPECIAL TOOLS	
	Part No.
Box wrench 10mm	109
Open end wrench 27mm	113/2
"T"-wrench 8mm square socket	114
Circlip pliers	123
Piston ring compressing tool 75mm	123A
Piston ring compressing tool 75mm	126B
Fuel pump wrench 13mm	161A
Circlip pliers	165
Socket wrench for cylinder head nuts	170
Socket	171
Spring clip (cam followers)	179
Special wrench 36mm	201
Oil pump extractor	202
Extractor head piece	202S
Extractor hooks	203B
Fan pulley extractor	203D
Fan pulley thrust pad	204B
Crankshaft oil seal installing tool	207
Piston pin pilot drift	215B
Flywheel retainer	215C
Flywheel retainer	240A
Drift	244
Driving sleeve	244B
Protractor	261
Ball joint removal tool	267A
Torsion arm offset gauge	270A
Open end wrench 41mm	278A
Wrench for steering worm adjustment	281A
Lever for checking ball joint play	307A
Support	313
Support clamp	360
Measuring rod for rear axle	401
Thrust plate	402
Thrust plate	407
Punch	411
Thrust disc	412
Tube 60mm dia	415A
Tube 31.5mm dia	418A
Tube 28mm dia	421
Tube 28mm dia	422
Guide tube tapered	428A
Thrust ring	429
Thrust pad 16.5/28mm dia	431
Arbor 50mm dia	432
Thrust pad	433
Arbor	434
Guide pin tapered	436A
Guide pin conical	437A
Support ring	440
Thrust pad	442
Drop arm puller—will be deleted and replaced by Kukko 204/1	236
RECOMMENDED TOOLS	
000 230—Hub puller	STN
001 000—Bearing extractor kit	V
007 100—Supplementary head (7 Ball Race)	V

TUNE-UP DATA	
Firing order	1-4-3-2
Tappet clearancet (cold): inlet	.004in
exhaust	.004in
Valve timing: inlet opens	7°30' B.T.D.C.
inlet closes	37° A.B.D.C.
exhaust opens	44°30' B.B.D.C.
exhaust closes	4° A.T.D.C.
Standard ignition timing	5° A.T.D.C.
Location of timing mark	Mark on c/shaft pulley in line with crankcase halves joint face
Plugs: make	Bosch*
type	W145
size	14mm
gap	.028in
Carburettor: make	Solex
type (for 1970 models only)	30PICT-I
Settings:	
Choke	24mm
Main jet	125
Air correction jet	125z
Pilot jet	g35
Pilot jet air bleed fuel jet for pump	150
Air cleaner: make	VW
type	Oil bath and pre-heater tube
pressure	VW
	Mech
	1.8-2.5 lb/in ²
*Alternative plugs—Champion L88 or Beru 145/14	
†For timing set clearances to .04in	

ENGINE DATA		
General Type	horiz-opposed	
No. of cylinders	4	
	1200	1300
Bore x stroke: mm	77 x 64	77 x 69
in	3.03 x 2.52	3.03 x 2.72
Capacity: c.c.	1192	1285
cu in	72.7	78.4
Max. bhp at rpm (SAE)	41.5-3900	50-4600
Max. torque (lb ft) at rpm (SAE)	65-2400	69-2600
Compression ratio	7.0:1	7.3:1

TORSION BARS		
	Front	Rear
No. of leaves, upper & lower (941.5mm) later version—10 leaves but different type (954mm)	8	—

NUT TIGHTENING TORQUE DATA		
	Thread	lb.ft
ENGINE		
Nuts securing crankcase halves	M12 x 1.5	25
Screws and nuts for crankcase halves	M8	14
Cylinder head nuts	M10	23
Con rod nuts and bolts	M9 x 1	22-25
Generator pulley nut	M12 x 1.5	40-47
Special bolt for fan and crankshaft pulley	M20 x 1.5	94-108
Converter drive plate screws	M8	14
Engine carrier/body self-locking nuts	M8	18
GEARBOX & FINAL DRIVE		
Drive pinion nut	M22 x 1.5	58-65
Main drive shaft nut	M16 x 1.5	30-36
Housing nuts and bolts (see tightening sequence)	M8 x 1.25	14
Axle shaft nut	M24 x 1.5	217
Transmission carrier/frame	M18 x 1.5	166
Big gear screws	M10 x 1.5	43
Selector fork clamp screw	M8 x 1.25	18
Transmission housing nuts and bolts	M8 x 1.25	14
FRONT AXLE		
Inner wheel bearing nut	M18 x 1.5	29
Wheel bearing locknut	M18 x 1.5	50
Torsion bar set screws	M14 x 1.5	29-36
Torsion bar set screws l'knut	—	50
Wheel bearing locknut	—	50

BRAKES		
	Front	Rear
Type	disc	drum
Drum diameter	—	9.055in +.008in
Disc diameter	277mm	—
thickness (new)	.374-.004in	—
min. thickness after re-working	.335in	—
lateral run-out max.	.008in	—
friction pad thickness	.394in	—
Lining thickness (new)	—	.16-.15in
Lining width	—	1.57in
Total lining surface	—	55.5in ²

STEERING BOX	
Make Type	VW
Adjustments: column and float	Worm & sector
cross shaft end float	none
mesh	grubscrew & lock-nut

CHASSIS

Brakes

Hydraulic on all four wheels, disc/drum layout, tandem master cylinder used. Handbrake operates separate expander unit in each rear wheel assembly.

No adjustment, apart from replacement of pads for front brakes, and rear brakes have starwheel adjusters. To adjust, jack up each of the rear wheels in turn, apply pedal to centralize shoes in drums; insert screwdriver through hole in wheel and brake drum and turn starwheel to right to lock shoes in drum; backing adjustment off as necessary to obtain free rotation of wheel.

Handbrake adjustment will also be effected by above method, but in the event of cable stretch, adjustment is also provided at handbrake lever end of cables to correct this.

To renew brake pads in front brakes, jack up car and remove road wheels as necessary. With a punch, drive out pad retaining pins and extract friction pads from caliper (special tool facilitates this operation). Note: if pads are to be re-used, mark them for replacement in caliper units from which they were removed; it is NOT permissible to re-use friction pads any other way, and when renewing pads, this should be done

in pairs as is usual workshop practice, front and/or rear per vehicle.

To fit pads, push pistons right back in their cylinders, use retaining tool to keep them there and clean seating and sliding surfaces of pads in calipers. Blow out caliper dust with airline, check piston seals for damage, brittle or cracked seals must be replaced, and to do this, caliper must be removed. Ensure that pistons are located correctly (use special setting gauge, which must always be held against lower guide surface in caliper, ie: counter-clockwise to brake disc rotation of forward vehicle movement. Replace piston retaining plate; circular part of plates must be firmly pressed into piston crowns, in addition plates must also lie below relieved portion of pistons. Insert friction pads into calipers and fit new pad spreader springs, and fit pad retainer pins into caliper housing.

Rear Suspension

Independent, torsion bar. Inner ends of each bar are anchored to centre of frame cross member by splined tube welded *in situ*. Outer ends of torsion bars (splined) carry radius arms, hubs are rubber mounted. Rear axle tubes are mounted to inner ends of radius arms. Rubber stop is screwed to radius arm and axle shaft bearing housing.

Torsion bars are removable for

replacement, but are not interchangeable, being handed from side to side. Arrow marks are stamped on outside face showing torque direction.

Front Suspension

Independent, torsion bars, telescopic hydraulic shock absorber controlled. Unit comprises two tubes rigidly fixed together and secured to frame head by four bolts.

Torsion bar is pivoted in each tube and anchored to prevent twisting and lateral movement. Ends of torsion bars are attached to links pivoting in metal bushing and needle roller bearings. Outer ends of links carry ball and socket joints, tapered and threaded shanks of which mate with forged arms of swivel axle assemblies.

Hubs, integral with brake drums discs, run on taper roller bearings. Each brake plate is secured to stub axle by three bolts and lock washers. Hubs are secured on stub axles by lock nuts, fitted with locking devices.

Front wheel bearings: when checking track or at other overhaul times, check that datum end-float of hubs is .001-.005in, and VW state that although there "will be quite a noticeable amount of rock at the upper limit, this is permissible".

To adjust bearings, loosen screw in clamp nut, and tighten clamp nut so that tapered rollers bear against shoulder of inner race. Rotate wheel

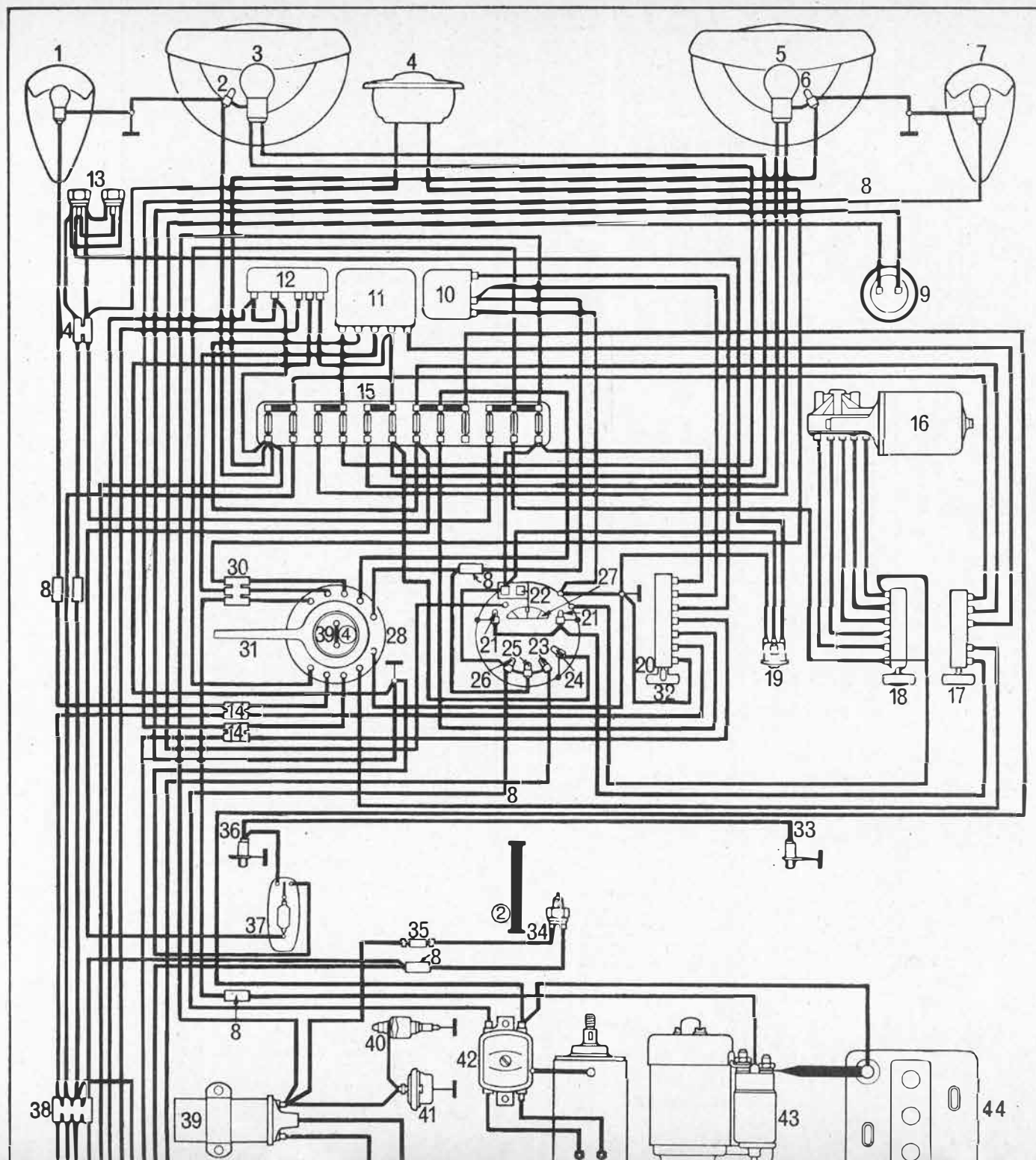
while making this adjustment to avoid overtightening bearing. Slacken off clamp nut to achieve datum clearance and retighten clamp nut screw, note that width of slot in clamp nut must be .10-.02in., so that clamping is adequate even when tolerances are not. Recheck adjustment and refit hub cap which should be grease-free.

To remove axle assembly complete with suspension: support vehicle on stands or hydraulic jack, use cradle VW 610. Disconnect and remove components in following order: fuel tank, after first taking off fuel hose and sealing it. Earth wire from horn unit, remove brake hoses at brackets and plug them with suitable caps.

Remove cotter pin from speedo, cable in left-hand front wheel and pull cable out of steering knuckle.

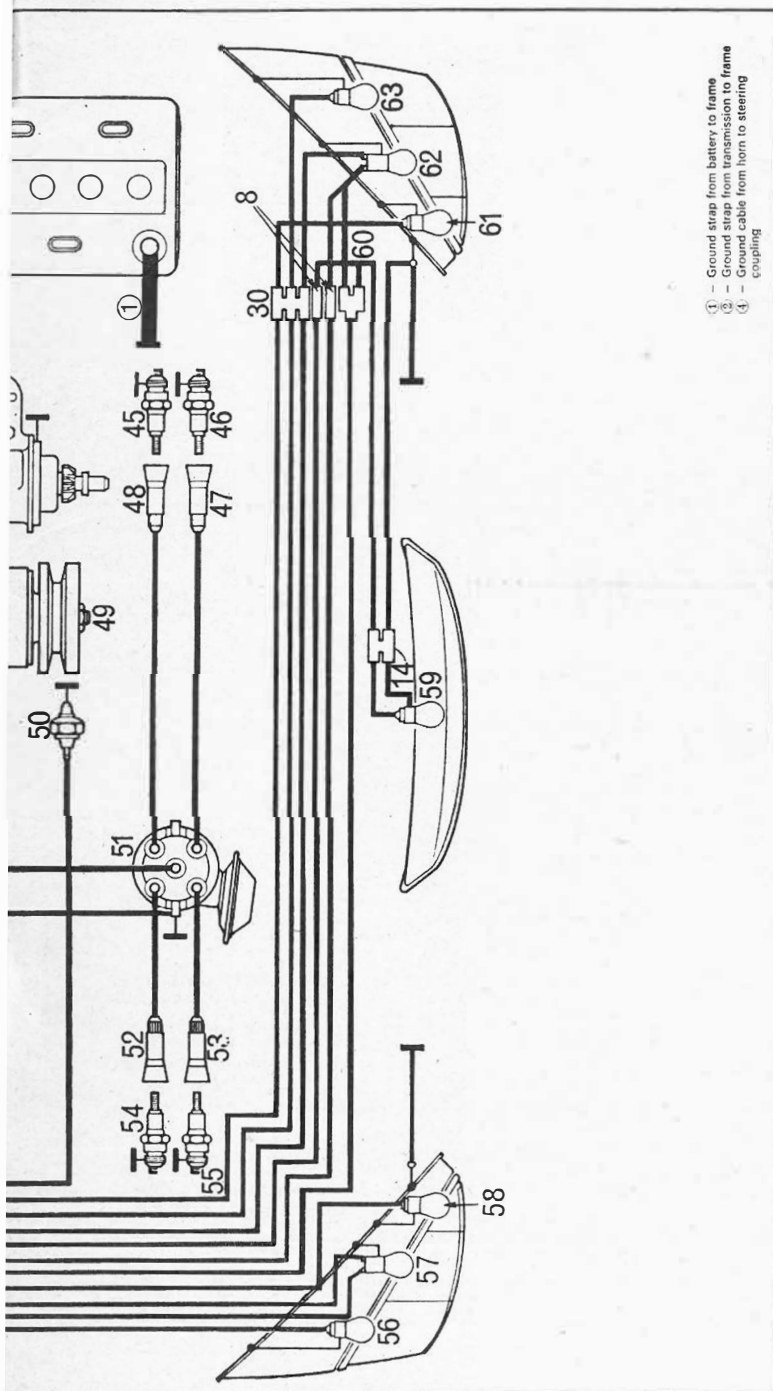
Disconnect steering rod coupling at steering box, undo two bolts to achieve this. Remove drag link after taking out securing pinch bolt. Remove steering damper from its mounting on rear face of axle. Press out tie rod ends, using suitable puller and remove steering box, after taking out two bolts and lock-plate. Remove four axle mounting securing bolts and lockplates.

Open bonnet, remove spare wheel and when access has been achieved, undo two axle/body mounting bolts. Lower jack and wheel away axle from car.



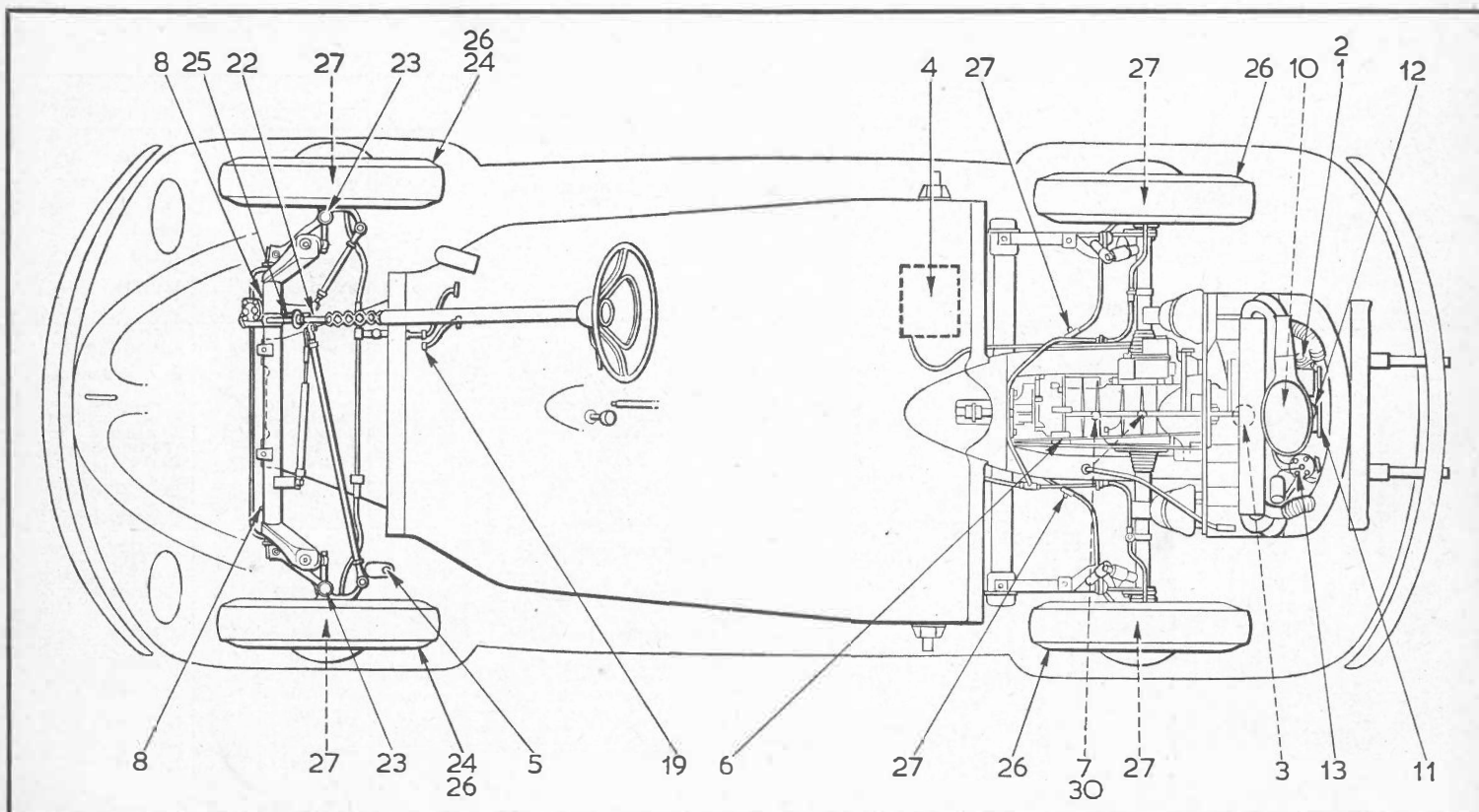
ELECTRICAL SPECIFICATIONS

Designation	VW 1200	Type I VW 1300/1500
Generator		
Maximum current	45 amps	30 amps
Mean regulating voltage	7V	14V
Nominal output speed	2400 rpm	2000 rpm
Cut-in speed	1600 rpm	1450 rpm
Ratio	1.8:1	1.8:1:1.9:1
Battery	6V:66 Ah	12V:36 Ah
Starter	6V:0.5hp	12V:0.7hp
Windshield wiper motor	6V	12V
Current draw	Stage I: approx. 4 amps	Stage I: approx. 2 amps Stage II: approx. 3 amps
Windshield washer	pneumatic	pneumatic
Maximum pressure	43 psi (3kg/cm ²)	43 psi (3kg/cm ²)
Capacities	2.1 US pts/ 1.75 Imp pts/ 1 litre	2.1 US pts/ 1.75 Imp pts/ 1 litre
Headlight bulb	6V:45/40W	12V:45/40W
Sealed beam unit	—	12.8V:50/40W
Turn signal bulb	6V:21W 6V:18W	12V:21W
Brake/tail light bulb	6V:21/5W 6V:18/5W	12V:21/5W
Licence plate light bulb	6V:10W	12V:10W
Back-up light bulb	6V:25W	12V:25W
Interior light bulb	6V:10W	12V:10W
Parking light bulb	6V:4W	12V:4W
Warning lamp bulb	6V:2W 6V:1.2W	12V:2W 12V:1.2W
Side marker light bulb	—	—
Speedometer		
Kilometres	Ratio of road speed/revolution Range	0.5:1 0-140km/h
Miles	Ratio of road speed/revolution Range	0.8:1 0-90mph
Clock	—	—
Fuel gauge	—	thermoelectric
Heatable rear window	6V:60W	12V:60W
Fresh air fan	—	—
Current draw	—	—
Fuse box	10 fuses	10 fuses



KEY TO WIRING DIAGRAM

- | | |
|--|---|
| 1 Turn signal: Front left | 33 Door contact switch light |
| 2 Parking light, left | 34 Reverse light switch |
| 3 Twin-filament bulb, left headlight | 35 Single fuse for reverse light |
| 4 Horn | 36 Door contact switch, left |
| 5 Twin-filament bulb, right headlight | 37 Interior light |
| 6 Parking light, right | 38 Cable connector, quadruple |
| 7 Turn signal: Front right | 39 Ignition coil |
| 8 Cable connector, single | 40 Electro-magnetic cut-off valve |
| 9 Fuel gauge sender unit | 41 Automatic choke |
| 10 Hazard warning light relay | 42 Regulator |
| 11 Relay for hand dimmer and headlight flasher | 43 Starter |
| 12 Parking light relay (only for Austria) | 44 Battery |
| 13 Brake light switch | 45 Spark Plug, No. 1 cylinder |
| 14 Cable connector, double | 46 Spark plug, No. 4 cylinder |
| 15 Fuse box | 47 Spark plug connector, No. 4 cylinder |
| 16 Windshield wiper motor | 48 Spark plug connector, No. 1 cylinder |
| 17 Lighting switch | 49 Generator |
| 18 Windshield wiper switch | 50 Oil pressure switch |
| 19 Dual circuit brake warning light | 51 Distributor |
| 20 Hazard warning light lamp | 52 Spark plug connector, No. 2 cylinder |
| 21 Instrument panel light | 53 Spark plug connector, No. 3 cylinder |
| 22 Fuel gauge vibrator | 54 Spark plug, No. 2 cylinder |
| 23 High beam warning lamp | 55 Spark plug, No. 3 cylinder |
| 24 Oil pressure warning lamp | 56 Turn signal: rear left |
| 25 Turn signal warning lamp | 57 Tail/brake light: left |
| 26 Generator charging warning lamp | 58 Reverse light, left |
| 27 Fuel gauge | 59 Licence plate light |
| 28 Ignition/starter lock | 60 Cable adaptor |
| 29 Horn half ring | 61 Reverse light, right |
| 30 Cable connector, treble | 62 Tail/brake light, right |
| 31 Turn signal switch (also hand dimmer and headlight flasher) | 63 Turn signal, rear light |
| 32 Hazard warning light switch | |



KEY TO MAINTENANCE DIAGRAM

DAILY

1. Engine sump—check and top up.

EVERY 3,000 MILES

2. Engine sump—drain and refill.
3. Engine oil strainer—clean.
4. Battery
- * 5. Windshield washer } check and top up

EVERY 6,000 MILES (as for 3,000 miles plus following)

6. Full-flow oil filter—replace.
7. Transmission—check and top up.

8. Front axle
- * 9. Door hinges, locks } lubricate
10. Air cleaner—clean and refill with fresh oil.
11. V-belt—tighten or replace if necessary.
12. Fuel pump—clean filter.
13. Distributor—lubricate, check C.B. gap and attend, if necessary, to ignition timing.
- * 14. Valve clearances—adjust.
- * 15. Rocker cover gasket—replace.
- * 16. Sparking plugs—clean, check and adjust gaps; check compression.
- * 17. Carburettor pre-heating—check control flaps.
- * 18. Crankcase ventilation—check rubber valve, replace if necessary.
19. Clutch—adjust pedal free play.
- * 20. Rear axle—check bolts of cv joints for tightness.
- * 21. Drive shafts—check seals for damage and leaks.
22. Tie rod ends—tighten if necessary, check dust seals.
23. Ball joints—check axial play and seals.
24. Front wheels—check camber and toe.
25. Steering gear—check and adjust play between roller or peg and worm.
26. Tyres—check for wear and damage, adjust pressures.
27. Brakes—check lines, hoses and connections for damage and leaks. Check fluid level and thickness of linings, adjust all brakes.
- * 28. Electrical system—check operation, adjust headlights.
- * 29. Wiper blade—check, replace if necessary.

ADDITIONALLY AT 30,000 MILE INTERVALS

30. Transmission—change oil, clean magnetic drain plug and check for leaks.
- * 31. Brake fluid—replace with clean fluid every two years.

* Not shown on diagram.

Continued from p. ix

Steering

Worm and sector steering unit, adjustable worm carried in ball bearings in box and hemispherical sector freely located in concave recess of sector shaft. Track rods are connected to drop arm ends and transmit motion to steering arms of front wheels. Steering damper, with telescopic tubes, used in this series.

Shock Absorbers

Double-acting piston hydraulic type integral with front suspension units at front of car and double-acting hydraulic units at rear of vehicle. Ensure that if replacements are fitted, they are of the correct pattern.

APPROVED LUBRICANTS

To SAE Specification	Summer	Winter	—15°C	—25°C
ENGINE	30	30	10W	5W
GEARBOX and Final Drive		EP 80/90		
Front axle tie rod ends	Any multipurpose lithium base grease			

FILL-UP DATA

	Pints	Litres
Engine sump	4.4	2.5
Gearbox	5.5	3.0
Rear axle	8.8	40
Fuel tank	16lb/in ²	1.1kg/cm ²
Tyre pressures*: front	24lb/in ²	1.7kg/cm ²
rear		

* Plus suitable increase according to load