

# Motor Trader

## SERVICE DATA No. 473

### Ford Escort

Manufacturers: Ford Motor Co. Ltd., Warley, Essex

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## ENGINE

### Mounting

At front, bonded rubber blocks welded to brackets which are in turn bolted up to bosses on engine crankcase. Inner sides of brackets have trap-nuts to which engine mounting bolts (1 per mounting) are bolted up. At rear, mounting insulator rubber is integral with cross-member which is bolted up to body by two bolts each side. Single insulator is secured to a pad on gearbox extension or automatic transmission and consists of rubber blocks bonded between steel channel section plate and cross-member. On automatic transmission models, a separate insulator and rear cross-member are used, together with retainer which is fitted beneath and in front of insulator.

### Removal

Engine may be removed without taking out gearbox in following manner: Raise bonnet, fit wing covers, drain coolant after undoing plugs on cylinder block and radiator matrix. Disconnect screenwasher hose and remove bonnet, disconnect battery lead and earth strap from engine. Take off air cleaner, and on GT models first remove dipstick and part dipstick tub extension tubing from air cleaner.

Undo radiator hoses at engine and take out matrix assembly. Remove brake servo and bracket assembly, where fitted. Unscrew exhaust pipe clamp bolts and part exhaust pipe from manifold. NB.—On GT cars complete this operation after jacking up vehicle.

Disconnect and remove where applicable, all pipes, wires, hoses and ancillaries. NB: plug fuel feed line at pump when disconnecting to prevent fuel loss. Take off manifolds, jack up car and fit stands, remove sump shields where fitted. Disconnect

starter motor lead and remove starter motor, take off sump/lower clutch housing support bracket and withdraw dust cover. Remove stands and jack from car and suitable support gear box or auto. transmission. Unscrew clutch/torque converter housing to engine bolts, and on auto. transmission models turn engine as necessary and remove drive plate/torque converter bolts. Fit lifting tackle, brackets and attach taking weight of engine unit. Part engine mountings from front cross-member. Pull engine unit forwards off main drive gear, or torque converter and lift out assembly from engine compartment.

Replacement of engine is, in the main, a reversal of dismantling procedure. Note following points: when mating up engine to gearbox ensure that upper flywheel cover is located on the dowels. On auto. transmission cars turn engine as necessary and fit drive plate to torque converter bolts.

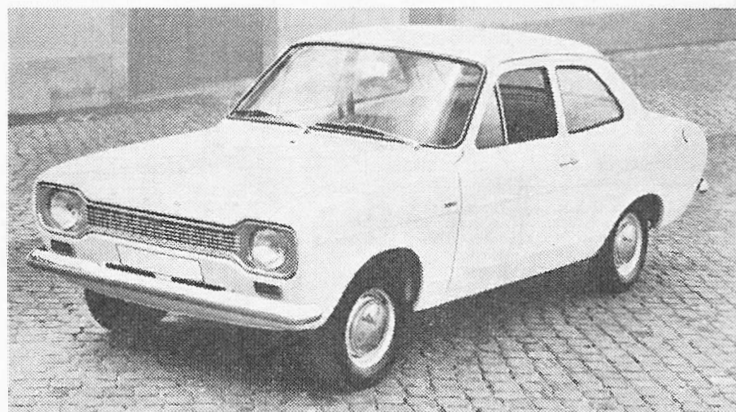
### Crankshaft

Five main bearings. Thin wall steel-backed white-metal lined shells in 1,098cc and 1,297cc high or low compression ratio engines and copper/lead or lead/bronze bearings in 1,297cc GT engine. Both types are located by tabs in bearing caps. Flywheel has shrunk-on starter ring gear and is spigoted on flanged end of shaft and retained by six setscrews. Oil impregnated spigot bush pressed into shaft end. Crankshaft end-float controlled by split half-thrust washers positioned either side of centre main bearing, grooves to crankshaft. Oversize washers, .010in. max. are available. Timing sprocket, large boss to rear, keyed on to front end of shaft by Woodruff key together with fan pulley, oil thrower between. Fan pulley retained by large hexagon-headed set bolt. Oil seal, pressed into timing cover, runs on pulley hub. Rear seal pressed into a carrier, runs on crankshaft flanges. Align front seal with tool No. P.6150 and rear with P.6173 while tightening bolts.

### Connecting Rods

"H"-section forgings, big-ends split horizontally are retained by bolts and located by dowels. Rods have oil squirt holes on piston non-thrust side and marked "FRONT". Rods for the 1100cc series cars bear the serial number 2733E and those for 1300cc cars have the serial 2735E.

Big end bearing shells are thin wall, steel-backed with copper/lead, lead/bronze or aluminium/tin linings and are located by tabs in rods and caps. Gudgeon pin bushes are steel-



backed bronze type and are not available as service replacements, rods and bushes only are available as replacements. Bearing caps should always be replaced on rods from which they were dismantled, and both rods and caps are numbered to facilitate identification.

### Pistons

Aluminium alloy, cut-away solid skirt, combustion bowl in crown pattern. Valve recesses are also machined on crowns of pistons of 1,100cc and 1,300cc high compression pistons, but not in those of the GT cars. Different pistons are used on each capacity engine and for each compression ratio option.

Numbers are stamped on crowns and inside piston skirts for identity purposes, and see table of Piston Identification for further details.

Piston gudgeon pin bores are graded in manufacture and pins are interference fit, for this reason pistons and pins only are supplied as replacements. Graded pistons should be matched to similarly graded bores, and when refitting, correct clearance is established when a 7-11lb pull is required to extract feeler strip. .50in wide and .002in thick (.0025in for 1300 engines) from between piston and cylinder wall, when the cylinder has been wiped dry from an oiled condition.

Two compression rings and one scraper ring fitted, all above gudgeon pin. Upper compression ring is chrome plated and tapered on periphery, lower compression ring is stepped externally on bottom face. Both rings marked "TOP" for correct replacement. Oil control rings may be fitted either way up. Pistons will not pass crank throws, but big ends will pass through bores. Remove and assemble pistons and con-rods from top.

### Camshaft

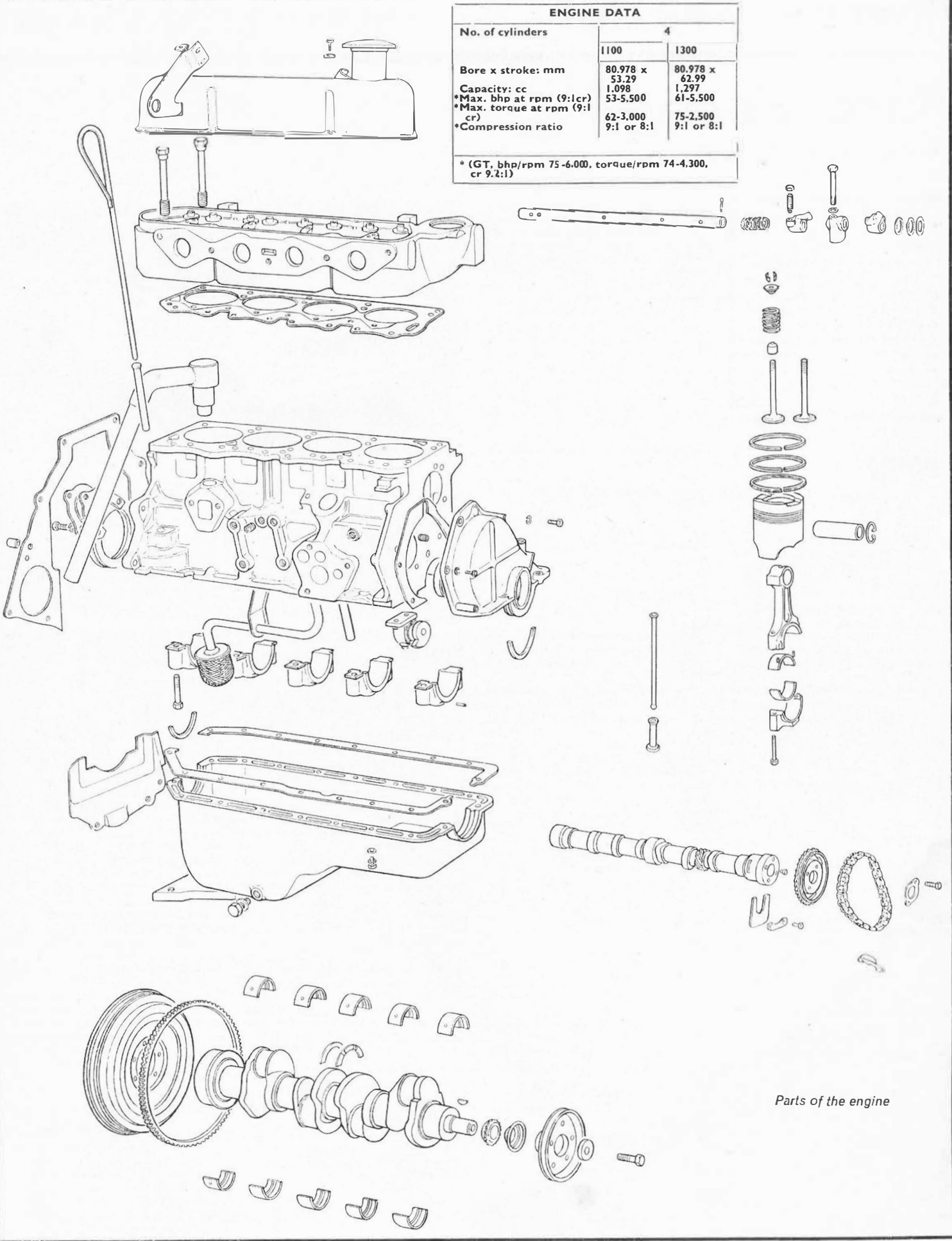
Single row roller endless chain drive. Camshaft sprocket spigoted on end of shaft, dowel located and retained by setscrews and lockplate. Note: two types of camshaft used, that of the 1,100 and 1,300 engine bears the number "109E" cast on the shaft at the rear and white paint identified. That of the GT engine bears the number "116E" cast in similar manner on rear end of shaft.

Camshaft sprocket may be removed with chain; thrust plate is trapped in groove between front bearing journal and spigot and is retained by two bolts and lockplate.

Camshaft runs in three steel-backed white-metal lined bushes. (.020in o/s on dia. available) pressed into housings in cylinder blocks. When renewing bushes ensure that oil holes are in line with centres, no hand fitting required. Valve timing

FORD ESCORT (front engine, rear wheel drive)

Model	Engine size (cc)	Date Introduced	Vehicle Serial Nos. chassis/body/engine
Saloon de-luxe	1100	17th Jan 1968	BB42GM53812
Saloon Super	1100	17th Jan 1968	BB44GP12712
Saloon GT	1300 (optional)	17th Jan 1968	BB48GM58032
Estate car	1100	28th March 1968	BB43HR17766
6cwt van	1300 (optional)	5th April 1968	BB50HR32491
8cwt van	1100 (optional)	5th April 1968	BB51HR32493



ENGINE DATA		
No. of cylinders	4	
	1100	1300
Bore x stroke: mm	80.978 x 53.29	80.978 x 62.99
Capacity: cc	1,098	1,297
*Max. bhp at rpm (9:1cr)	53-5,500	61-5,500
*Max. torque at rpm (9:1cr)	62-3,000	75-2,500
*Compression ratio	9:1 or 8:1	9:1 or 8:1
* (GT, bhp/rpm 75-6,000, torque/rpm 74-4,300, cr 9.2:1)		

Parts of the engine

## SPECIAL TOOLS

Front hub bearing cups remover and replacer (Main tool) PT 1024  
 Front hub bearing cups remover and replacer (Adaptor) P 1024-9  
 Front suspension unit bump stop platform wrench P 5044  
 Coil spring adjustable restrainer P 5045  
 Spindle body gauge P 3110  
 Steering pinion preload gauge (adaptor) P 4030-7  
 Hand press (main tool) CP 4000  
 Crown wheel and pinion backlash gauge (main tool) P 4008  
 Crown wheel and pinion backlash gauge (adaptor) P 4008-1  
 Differential bearing preload gauge P 4009  
 Drive pinion bearing cups and oil seal replacer (main tool) P 4013A  
 Drive pinion cups and oil seal replacer (adaptor) P 4013-3  
 Flange holding wrench P 4028  
 Drive pinion bearing preload gauge (main tool) CP 4030  
 Preload gauge (adaptor) P 4030-1  
 Preload gauge (adaptor) P 4030-4  
 Drive pinion depth gauge (main tool) P 4075  
 Drive pinion depth gauge (adaptor) P 4075-4  
 Differential bearing adjusting nut wrench P 4079

Differential bearing cone replacer P 4080  
 Spring indicator for press P 4084  
 Rear axle bearing and retainer remover P 4090-6  
 Flange holding wrench P 4097  
 Camshaft bush remover and replacer (main tool) P 6031  
 Camshaft bush remover and replacer (adaptor) P 6031-3  
 Camshaft sprocket replacer CP 6032A  
 Valve guide reamers or B P 6056-015  
 and P 6056-030  
 P 6107  
 P 6110  
 6118A  
 P 6118-3A  
 P 6129  
 CP 6147  
 P 6150  
 P 6161  
 P 6165  
 P 6171  
 3072  
 Engine bracket  
 Main bearing liner remover and replacer  
 Valve spring compressor (main tool)  
 Valve spring compressor (adaptor)  
 Cylinder head bolt socket  
 Crankshaft rear oil seal alignment  
 Crankshaft front oil seal aligner  
 Crankshaft front cover oil seal remover and replacer  
 Crankshaft rear oil seal remover and replacer  
 Engine lifting brackets  
 Slide hammer (main tool)

Idle shaft remover (adaptor) P 3072-7  
 Hand press (main tool) CP 4000  
 Main drive gear bearing replacer P 4000-39  
 Mainshaft hubs remover P 4090-6  
 Hub bearing and speedometer gear remover and replacer (adaptors) P 4090-8  
 Transmission mainshaft oil seal replacer P 7095  
 LH gear selector housing oil seal replacer P 7102R-H  
 Gearbox bracket P 7147  
 Dummy countershaft P 7148  
 Transmission extension housing bush remover P 7149  
 Transmission extension housing bush replacer P 7150  
 Master spacer for snap ring assessment P 7151  
 Clutch pilot bearing remover (main tool) 7600A or B  
 Clutch pilot bearing remover (adaptor) CP 7600-6  
 Mainshaft oil seal remover (main tool) 7657  
 Mainshaft oil seal remover (adaptor) P 7657-4  
 Water pump overhaul tool (main tool) CPT 8000  
 Water pump overhaul tool (adaptors) CPT 8000-4B  
 Fuel tank sender unit lock ring wrench P 9084

## NUT TIGHTENING TORQUE DATA

ENGINE	Bolt size	lb.ft
Cylinder head stud nuts	7/16-14UNC	65-70
Main bearing caps	7/16-14UNC	65-70
Con. rod big end	3/8-24UNF	30-35
Flywheel bolts	3/8-24UNF	45-50
<b>CLUTCH &amp; GEARBOX</b>		
Pressure plate/flywheel		12-15
Gearbox/engine bolts		22-26
Extension housing/gearbox case bolts		32-36
<b>REAR AXLE</b>		
Crown wheel/diff. case		50-55
Diff. carrier/axle housing		15-18
Diff. bearing cap bolts		45-50
<b>FRONT SUSPENSION</b>		
Compression strut/mounting bracket		25-30
Compression strut/mounting brkt./side-member		25-30
Track control arm inner bushing		25-30
Compression strut/track control arm		35-40
Spindle/top mount assy.		28-32
Track control arm ball stud		30-35
Suspension top mount assy./body		15-18

CRANKSHAFT AND CON. RODS  
(dimensions in inches)

	Main bearings (Blue)*	Crankpins
Diameter	2.1253-2.1257	1.9368-1.9376
Running clearance: main bearings	.0005-.0020	.0005-.0020
big ends	.003-.011	.004-.010
End float: crankshaft	.002-.010	.002-.010
crankpin	.030-.040	
Undersizes		
	1100	1300
Con. rod centres	4.324-4.326	4.133-4.135
* Red 2.1257-2.1261, Green 2.1153-2.1157, Yellow 2.1157-2.1161		
<b>VALVES (dimensions in inches)</b>		
	*Inlet	Exhaust
Head diameter	1.405-1.415	1.240-1.250
Stem diameter	.3095-.3105	.3086-.3096
Seat angle	45°-45°	15°
Spring length: free		1.48
fitted (valve closed)		1.263
load		44-49lb
* Inlet GT 1.497-1.507		

## CAMSHAFT (dimensions in inches)

Bearing journal: diameter	1.6925-1.6940
length (front, rear, centre)	.79, .79, .68
Bearing clearance	.001-.0023
End float	.0025-.0075
Timing chain: pitch	.375
no. of links	46

PISTONS AND RINGS		
dimensions in inches		
	1100	1300
Clearance (skirt)	.0013-.0019	.0019-.0025
Oversizes		.0025, .015, .030
Weight without rings or pin (1100 HC)*		433-437gms
Gudgeon pin: diameter		.8119-.8123
interference fit in piston		.0001-.0003
fit in small end		.0001-.0003
	Compression	Oil Control
No. of rings	2	1
Gap		.009-.014
Side clearance in grooves		.0016-.0036
Width of rings		.077-.078

\* 1100 LC 420-424gms, 1300HC 415-419gms, 1300LC 402-406gms, 1300GT 439-443gms.

marks on sprockets should be in line with centres when refitting; no fine adjustment for timing. Chain tensioner fitted consists of rubber rubbing block bonded to spring blade tensioner arm located and pressure controlled by spring loaded eccentric tensioner cam. To dismantle when removing timing chain, remove two mounting bolts and take off bracket, when arm may be detached from pivot pin.

## Valves

Overhead, in line, non interchangeable, inlet larger than exhaust. Split cone cotter fixings, single springs. Umbrella oil seals fit around valve stems.

Valve guides plain, integral with head. Provision is made for reaming out .003 and .015in to accommodate valves with stems oversize to these dimensions in service. After reaming, valve seats should be re-cut.

## Tappets and Rockers

Plain mushroom tappets working directly in crankcase. Remove camshaft to extract.

Rockers, all unbrushed and handed, work on hollow shaft supported in four pillars, secured and located on cylinder head by hexagon headed setbolts. Oil feed to shaft is through head drillings to No. 1 (front) rocker pillar, radial holes drilled in rocker

shaft for oil are assembled each side of pillars, separating springs between rockers.

Adjuster screws fit in rocker ends, secured by lock-nuts and lower ends of screws are ball-shaped for location in upper cup ends of pushrods. End rockers are retained against pillars by split pins and each has two thrust washers with a crimped spring washer interposed. Pushrods may be removed singly after adjustment has been slackened right off, but better to remove rocker shaft complete for pushrod removal.

## Lubrication

Gear driven eccentric bi-rotor or sliding vane type pump externally flange mounted to engine crankcase. External oil filter element housing bolted to flange integral with pump body. Non-adjustable plunger and spring relief valve fitted in pump/filter housing. Valve set to blow off at 35-40lb/sq in and warning light indicates at pressure below 5-7lb/sq in.

## Cooling

Pump, fan and thermosyphon. Thermostat located in forward portion of cylinder head casting.

Pump driven by belt from crankshaft pulley, adjust generator link so that there is 1/2in play in longest run of belt.

## PISTON IDENTIFICATION

Model	Bowl Depth	Standard	Identification Number			
			0.0025in o/s*	0.015in o/s*	0.030in o/s†	
1.100 cc H.C.	0.496 to 0.504in	3/D	3/G	3/J	3/K	
1.100 cc L.C.	0.596 to 0.604in	3/E	3/V	3/Z	3/AA	
1.300 cc H.C.	0.540 to 0.548in	5/D	5/G	5/J	5/K	
1.300 cc L.C.	0.640 to 0.648in	5/E	5/V	5/Z	5/AA	
1.300 cc G.T.	0.531 to 0.539in	5/F	5/AH	5/AK	5/AL	
Casting Number *2733E-6110-D 12733E-6110-K						

## TRANSMISSION

## Clutch

Single dry plate diaphragm spring clutch cable operated by pendant pedal. Release ball bearing race sealed type carried in dished plate with pivot bolt on inner face of bell housing.

Provision for cable adjustment by threaded sleeve at cable end mounted on engine side of bulkhead. Pedal free play, i.e. clutch adjustment, is correct when clutch pedal is level with brake pedal. It can be removed after gearbox removal (see gearbox section) two sizes of clutch are used, 6 1/4in dia. for 1100 saloons and 7 1/4in dia. for all 1300 models and all vans and estate cars.

## Gearbox

All synchromesh, (blocker ring) four forward speeds, one reverse. All threads are Metric.

Selection is by remote-control floor-mounted lever, linked to selector rail which has, pinned to it, a selector lever, which engages with appropriate selector forks. For engagement of reverse gear the selector lever first has to be depressed against a spring.

## Gearbox Removal

Jack up front and rear of vehicle and fit chassis stands. Lift gearlever gaiter and remove circlip holding spring in compression. Bend up lock tab and undo plastic dome nut. Withdraw gear lever. Raise bonnet and fit wing covers. Disconnect exhaust pipe from manifold. Remove top four gearbox/engine bolts (9/32in A/F top two, 17mm other two) from within engine compartment. Slacken clutch cable at adjuster on engine rear bulkhead. The cable should be as slack as possible to enable other end of cable to be disconnected from clutch release fork later. Disconnect battery earth strap. From underneath car remove starter motor lead.

Remove three bolts (or with pre-engaged starter motors, two bolts) securing starter motor, and remove this unit. Detach clutch cable from release fork. Withdraw speedometer cable from gearbox extension housing. **Mark drive shaft and rear axle pinion flanges** and remove four nuts and bolts holding flanges together. Remove drive shaft and fit an old drive shaft yoke to prevent oil loss from rear of extension housing. Remove flywheel dust cover securing bolts. **Support front of engine** and then remove four bolts on engine rear crossmember which supports gearbox. Remove two remaining engine to clutch housing bolts (17mm). Lower jack supporting engine and remove gearbox. Remove crossmember centre bolt and detach crossmember from gearbox.

### Selector Mechanism Removal

Using gearbox mounting bracket, tool no. P.7147, mount gearbox on engine stand. Remove eight bolts (6mm) securing top cover plate to gearbox. Lift off plate. Using suitable drift, knock out blanking plug from rear of extension housing. Remove plunger screw from side of gearbox case then remove spring pin securing

selector lever to rail. Withdraw selector rail rearward. Lift out selector forks and lever. If necessary, remove plunger and spring from bore.

### Extension Housing and Mainshaft Removal

Remove four bolts securing extension housing to gearbox casing and then, using a hide mallet, tap extension housing slightly rearwards until possible to rotate it so that countershaft aligns with cutaway in extension housing flange. Tap countershaft rearwards until it is just clear of front of gearbox case. Push countershaft out using a dummy, tool no. P.7148. Cluster gear now will drop to bottom of gearbox. Remove extension housing and mainshaft assembly. It is necessary to push 3rd/top synchroniser sleeve slightly forward to give clearance between it and cluster gear.

**3rd Top Synchroniser.** To dismantle; lift off top gear blocker ring from main drive gear side of 3rd/top synchroniser assembly. Remove and discard circlip from forward end of mainshaft. Locate split rings, tool no. P.4090-8b, around rear face of third gear and in the base plate (tool no. 370) of a press. Press mainshaft out of 3rd/top synchroniser assembly,

and 3rd gear, while extension housing and mainshaft is being supported. Dismantle synchroniser assembly by pulling sleeve off hub and withdrawing blocker bars and springs.

**1st/2nd Synchroniser.** To dismantle: Withdraw speedometer gear after removing plug in extension housing. Remove circlip securing mainshaft rear bearing to extension housing. Tap mainshaft assembly out of extension housing. Position split adaptors, P.4090-86, behind 1st gear and place assembly in press base plate, 370. Press 1st gear, spacer (or oil slinger), mainshaft bearing, circlip and speedometer drive gear of mainshaft. Remove circlip securing 1st and 2nd synchroniser to mainshaft. Position split adaptors, P.4090-8b, behind 2nd gear and fit assembly in press base plate, 370. Press 2nd gear and 1st and 2nd synchroniser assembly, complete with blocker rings, off mainshaft. Dismantle synchroniser assembly.

**Main drive gear.** To dismantle: Remove spigot bearing from recess in end of main drive gear. Tap main drive gear and bearing assembly out through front of gearbox. Remove and discard circlips from main drive gear and bearing. With split rings, P.4090-6, located round the bearings,

press bearing off main drive gear. Use 370 base plate to position split rings in press.

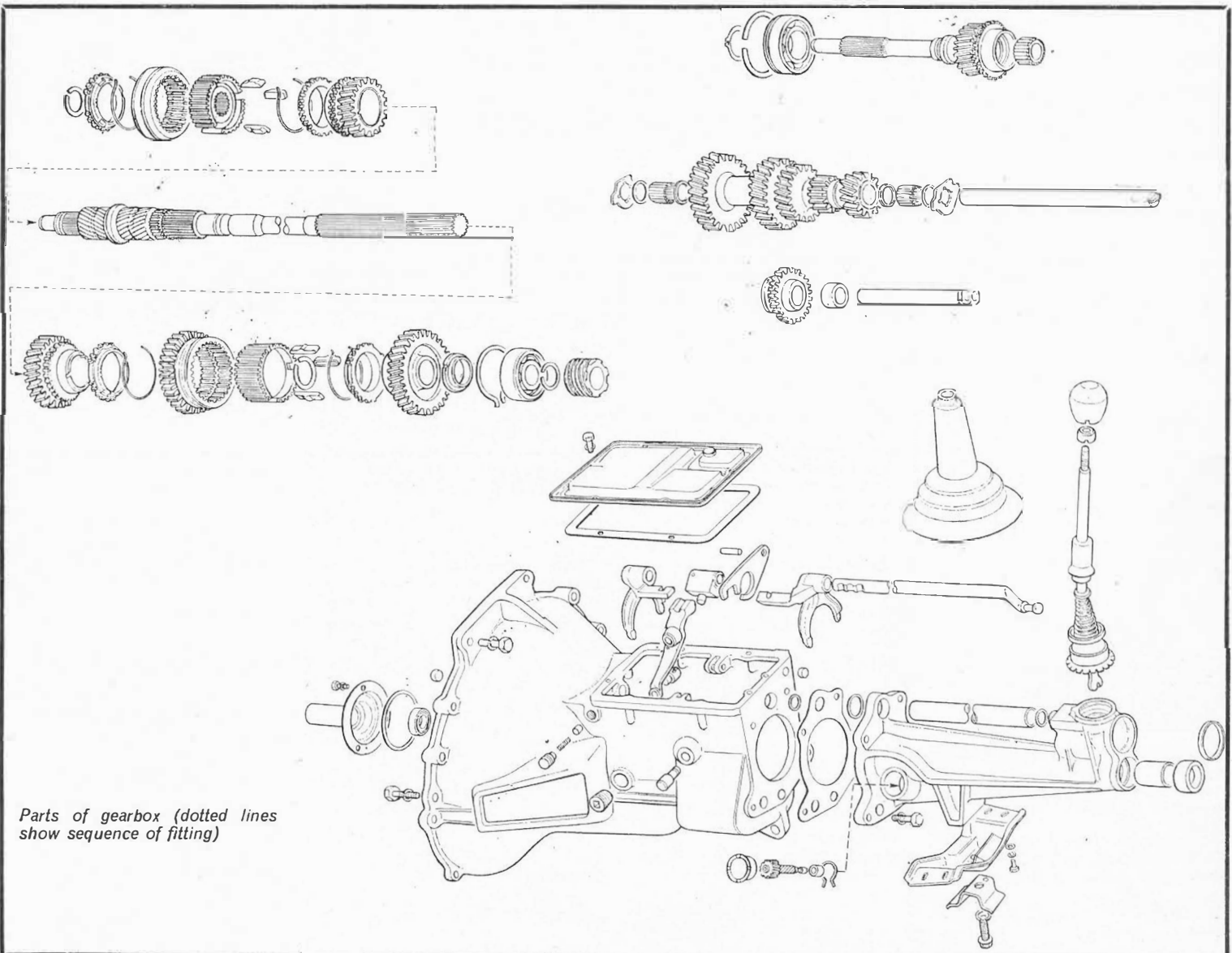
**Countershaft Gear.** To dismantle: With counter-shaft gear two thrust washers removed from gearbox. In both ends of this shaft are 21 needle roller bearings retained by a washer on each side of each set of rollers; remove these.

**Reverse Idler Gear.** To remove, screw idler shaft remover, tool no. P.3072-7, into idlershaft. Screw slide hammer, tool no. P.3072, on to idler shaft remover.

**Reverse Selector Relay.** To remove, take off spring clip securing selector relay lever to pivot pin.

### To Assemble Gearbox Installing selector mechanism

Position selector forks in synchroniser sleeves. Grease selector rail oil seal in rear of gearbox casing and slide it through extension housing, through 1st/2nd selector fork, position selector lever on rail, then slide rail through 3rd/top selector fork. Push rail forwards until plunger hole is in line with neutral notch. **Do not damage oil seal.** Assemble plunger and spring to their bore and fit



Parts of gearbox (dotted lines show sequence of fitting)

GENERAL DATA	
Wheelbase	7ft 10 <sup>1</sup> / <sub>2</sub> in
Track: front	4ft 1in
rear	4ft 2in
Turning circle	29ft
Ground clearance (normal laden)	4.85in
Tyre size	5.50-12/4*
Overall length	13ft 0.6in
Overall width	5ft 1.8in
Overall height (normal laden)	4ft 5in
Kerb weight	1642lb
* 155-12 Radial ply optional	

BRAKES (Saloons) dimensions in inches			
	1100	1300	GT
Type	hyd.	hyd.	hyd.
Disc dia.	—	—	8.6
Drum dia.	—	8	—
Drum dia. (rear)	8	8	8
Linings: width (front)	1.5	1.75	—
width (rear)	1.5	1.5	1.5
thickness (front)	.188	.188	.188
thickness (rear)	.188	.188	.188
Disc run out	—	—	.002
Servo	—	—	Yes

CHASSIS DATA			
Clutch: type		sdp diaphragm spring	
Linings: dia. ext.*		6.5	
dia. int.**		4.5	
* 7.5 1300 & GT    ** 5.36 1300 & GT			
GEARBOX			
Type		all synchromesh	
No. of forward speeds		4	
		1100, 1300	GT
Final ratios: 1st		13.809	12.604
(3.777:1		8.260	7.535
axle)		5.382	5.356
3rd		3.777	3.777
4th		15.995	14.606
rev.			
FINAL DRIVE			
Type		semifloating hypoid	
Crown wheel/bevel pinion teeth		34/9 (1300 & GT)	

FRONT-END SERVICE DATA		
Castor		0° 35'-1° 35'
Camber		0° 10'-1° 10'
King pin inclination		8° 05'-9° 05'
Toe-in		.06-.12in
No. of turns lock to lock		3½
Adjustments: castor	}	Nil
camber		screwed tie rod ends
toe-in		
SPRINGS (1100 saloon) dimensions in inches		
	Front	Rear
Load (mean)	512lb	—
Width	—	2in
No. of leaves	—	3
Length (eye centres)	—	47in
STEERING BOX		
Type	Burman or Cam Gears rack & pinion	
Adjustments:		
Pinion brg. pre-load	shims	
Damper	shims	
No. of turns lock-lock	3½	

securing screw using sealer. Fit spring pin to retain selector lever to rail. Apply sealer to blanking plug and tap it into aperture in extension housing behind selector rail. Fit new gasket (using sealing compound) to top of gearbox. Refit cover plate.

Installing extension housing and mainshaft

Fit new oil seal to selector rail aperture. Thread cord under cluster to facilitate lifting into position. Fit new gasket to extension housing (use jointing compound). Slide extension housing and mainshaft into position after pulling 3rd/top synchroniser sleeve forward to clear cluster gear. Ensure top gear blocker ring locates correctly. Align cutaway on extension housing with countershaft aperture in rear face of gearbox. Lift counter-shaft into mesh with mainshaft (using cord as detailed at beginning of this section). Make sure that thrust washer "ears" are correctly located on each side of bosses at end of gearbox case. **Check:** Cluster gear bore aligns with countershaft apertures. Push dummy countershaft home by inserting counter-shaft from rear. Finally, tap countershaft into place (use a hide or copper mallet). Lug on rear end of countershaft must be horizontal and must protrude slightly so that it locates in recess in front of extension housing. Rotate extension housing so that bolt holes align.

To reassemble 3rd/top synchroniser

Slide synchroniser over hub and locate a blocker bar in each of the three slots in hub. **Note:** If a new synchroniser unit is being installed, slide sleeve off the hub and clean all traces of preservative from hub, sleeve, blocker bars and springs. Lightly oil them. Install a blocker bar spring to run around, clockwise or anti-clockwise, inside synchroniser sleeve beneath blocker bars. Tagged end of spring must be located in U section of a blocker bar. Fit other spring to opposite face of synchroniser unit ensuring that spring tag locates in same blocker bar as spring just fitted and runs in contra rotational direction. View direct on to one side of synchroniser assembly and note direction of spring. Also, view direct on to other side of synchroniser assembly—direction of

spring should be same as first spring. Position 3rd gear on mainshaft so that dog teeth face forward. Assemble blocker ring on 3rd gear cone. Position synchroniser assembly on mainshaft with boss forward. Locate replacer adaptor, P.4090-8d, plain side towards hub, so that it abuts the boss on synchroniser hub. With split rings, P.4090-8b, in press base plate, 370, locate mainshaft so that the replacer fits into split rings. Press synchroniser assembly on to mainshaft as far as possible. Secure 3rd/4th synchroniser to mainshaft with circlip. Before fitting the mainshaft and extension housing assembly to gearbox locate top gear blocker ring on main drive cone.

Reassembly of 1st/2nd synchroniser

Assemble 2nd gear to mainshaft so that cone and dog teeth are rearwards. Using master spacer, P.7151, plain side towards 2nd gear, assess which circlip would be required to clamp the spacer to the mainshaft. Then, with a micrometer, measure the width of 1st/2nd synchroniser hub. If this dimension is different to that marked on the master spacer, it will be necessary to vary the airclip to compensate (see following example; dimension on spacer .6275 in, measured thickness of 1st/2nd synchro, hub .6260in, subtract one from the other, equals .0015in. Therefore, circlip required must be approx. .0015in thicker than one selected when using spacer. Slide synchroniser sleeve over hub and locate a blocker bar in each of the three slots in hub. Install a blocker bar spring to run around, clockwise or anti-clockwise, inside synchroniser sleeve beneath blocker bars. Tagged end of spring must locate in U section of a blocker bar. Fit other spring to opposite face of synchroniser unit ensuring that spring tag locates in the same blocker bar as spring just fitted and runs in contra rotational direction. View direct onto one side of the synchroniser assembly and note the direction of the spring. View direct onto other side of synchroniser assembly—direction of rotation of the spring should be the same as for first spring. Assemble blocker ring to cone on 2nd gear. Fit synchroniser sleeve are forwards. Locate replacer, P.4090-8d, so that plain side abuts

rear of synchroniser hub. With split ring, P.4090-8a, in press base plate 370, locate mainshaft so that replacer fits into split rings. Press synchroniser assembly onto mainshaft as far as possible. Secure synchro assembly with previously selected circlip. Use protective sleeve, P.4090-8e, to protect bearing surface for 1st speed gear. Assemble a blocker ring to the 1st gear side of 1st/2nd synchro-assembly on mainshaft. Fit 1st, cone side forwards, to mainshaft. Position spacer (or oil slinger) on mainshaft so that the larger diameter is adjacent to 1st speed gear. Assemble master spacer, P.7151 to mainshaft bearing recess in the extension housing so that the flat side is visible. Select circlip that will obviate bearing recess end-float. Position selected circlip loosely on mainshaft adjacent to spacer (or oil slinger). Locate replacer, P.4090-8d, on bearing so that recessed side abuts inner race. With split rings, P.4090a, in press base plate, 370, locate bearing and replacer so that they will fit into split rings. Press bearing into position on mainshaft. Using thickest circlip which fits groove, secure bearing to mainshaft. Replace speedometer drive with aid of P.4090-8b, P.4090-8a and 370. Heat front end of extension housing prior to refitting. **DO NOT USE WELDING TORCH.** Fit circlip to secure mainshaft bearing to extension housing. Refit speedometer driven gear and new plug.

Propeller Shaft

Tubular, splined to gearbox output shaft and bolted to pinion shaft flange. Universal joints are pre-lubricated and sealed. Latest models except 1100 and van now have 2-stage shafts with centre bearings.

Rear Axle

Semi-floating shafts, hypoid bevel drive. Final drive unit removable. To remove rear axle unit complete, jack up vehicle, placing supports under frame side members in front of rear springs. Remove wheels, support axle, disconnect drive shaft, handbrake cables, shock absorbers and brake pipes. Remove spring clips, nuts and plates. Draw out of axle unit. When refitting tighten spring clip nuts to 20-25lb. ft. Half shafts are interchangeable

and have outer end flanges on which hub bearing housings, carrying wheel studs, register. Inner ends are splined in differential side bevel. Hubs run on ball bearing pressed into housings, with lipped oil seals behind. Bearing retained on axle tube ends by ring nuts and tab washers. Bevel pinion shaft runs in taper roller bearings, outer races pressed into final drive housing. Distance piece between inner races, which are nipped up by driving flange nut. Flange hub passes through lipped oil seal in housing. Bearings adjusted to give 13-19lb in pre-load with oil seal fitted with new bearings, by selective distance pieces, available in 10 lengths in .002in steps from 2.004/ 2.005 to 2.022/2.023. N.B. 6<sup>1</sup>/<sub>2</sub>-9<sup>1</sup>/<sub>2</sub>lb. in preload with original bearings and oil seal drag. Pinion mesh adjustment by shims between pinion and inner race of rear bearing. Shims available in 13 thicknesses, .010in steps from .1304 to .1428in. Crown wheel spigoted on one-piece differential cage and retained by eight self-locking setscrews. Differential side bevel gears have flat thrust washers behind, plant bevel pinions have spherical thrust washers. Differential assembly is carried in with ring-nuts for bearing and mesh adjustment. Bearing caps have hollow dowels. Tighten ring-nuts to spread bearing housings .005 to .007in then turn both ring-nuts equally to adjust mesh for .005 to .007in backlash.

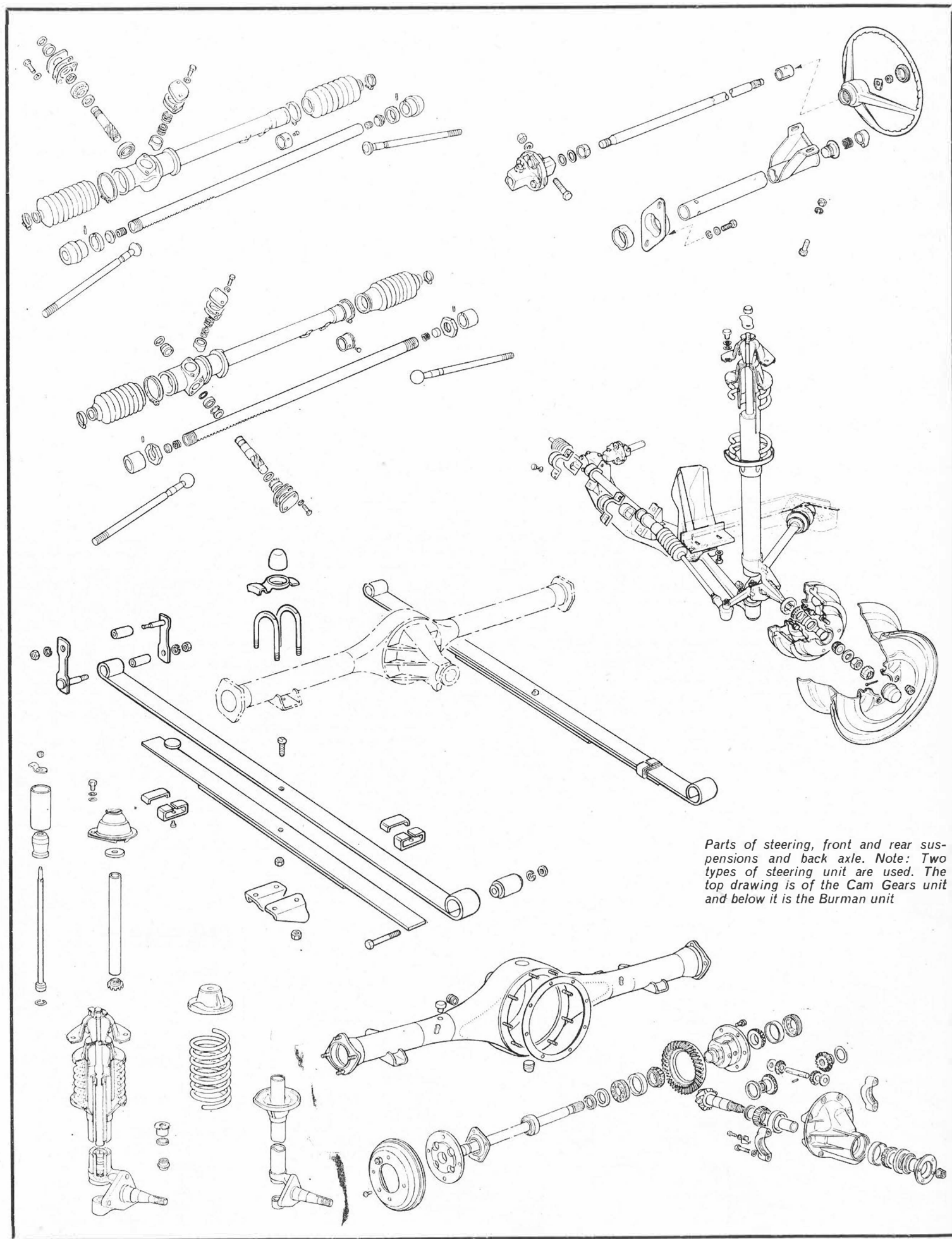
CHASSIS Brakes

Hydraulic, single circuit front and rear. Drum or front disc, rear drum. Drum: Front drums two leading shoe, rear drums leading and trailing shoe. Adjusters on back plates, two on front one on rear. Discs: At front these are self adjusting. Vacuum servo is fitted with disc-drum system.

Suspension

Front: Independent MacPherson strut pattern, coil springs around telescopic shock absorbers. Lateral movement controlled by track arm and fore and alternate movement by compression strut. Compression strut

Contd:—p. vii col i



Parts of steering, front and rear suspensions and back axle. Note: Two types of steering unit are used. The top drawing is of the Cam Gears unit and below it is the Burman unit

runs rearwards and inwards from outer end of track control arm to a mounting on the sidemember.

Mounting points are rubber insulated. Camber, castor and king-pin inclination angles are set in manufacture and are not adjustable.

Rear: Semi-elliptic leaf spring with axle asymmetrically mounted. Telescopic shock absorbers are fitted. All mounts to body use rubber bushes.

## Steering

Rack and pinion, Burman or Cam Gears with 16.35:1 or 16.63:1 ratio. There is adjustment for rack damper and pinion bearing pre-load, both by shims. Note: Different shim sizes are used for Burman and Cam Gears units. On Burman unit the pinion shim pack is on the underside. The Cam Gears unit has the pinion shim pack and cover plate upwards.

## ELECTRICAL EQUIPMENT

BATTERY		Lead acid
Type	...	12
Voltage	...	12
Capacity (amp hr):	...	...
1100 cc—Domestic	...	32 at 20 hr rate
1300 cc and 1100 cc—Export	...	38 at 20 hr rate
Cold climate	...	53 at 20 hr rate
Plates/cell—Standard equipment	...	9
—Cold climate	...	13
Specific gravity charged	...	1.275 to 1.290
Low limit while discharging at 20 hr rate	...	1.105
Electrolyte capacity:	...	...
Standard equipment	4.5 Imp pints (5.4 US pints, 2.5 litres)	
Cold climate	6.4 Imp pints (7.7 US pints, 3.6 litres)	
COIL		Oil filled low voltage type for use with 1.5 ohm ballast resistor
Type	...	...
Resistance at 20°C (68°F):	...	...
Primary	...	3.1 to 3.5 ohms
Secondary	...	4,750 to 5,750 ohms
Output	...	30 kv
GENERATOR		Standard C-40 Cold Start C-40L
Type	...	...
Speed (ratio to engine)	...	1.5:1
Brush length	...	0.718 in (18.23 mm)
Maximum charge	...	22 amps
Maximum output	...	25 amps
Fan belt tension (total free movement)	...	264 watts 300 watts
	...	1/2 in (13 mm)
DISTRIBUTOR		Single pair contact breaker point Mechanically and vacuum controlled Skew gear from camshaft Anti-clockwise from rotor end
Type	...	...
Automatic advance	...	...
Drive	...	...
Rotation	...	...
Identification number—1100 cc and 1300 cc HC	...	C7AH-A
—1100 cc and 1300 cc LC	...	C7AH-B
—GT	...	C7AH-C
Identification colour—HC	...	Red
—LC	...	Green
—GT	...	Blue

## INITIAL ADVANCE

G.T.	Compression Ratio	Octane Number (Research)	Star Rating	1100 cc	1300 cc	G.T.	Initial Advance
9.2:1	97	97	4	6°	10°	10°	
H.C.	9:1	97	4	2°	6°	—	
L.C.	8:1	89	3	10°	10°	—	
		86	—	10°	4°	—	
Shaft pre-load				Set with 0.015 in (0.38 mm) shim			
Breaker arm spring tension				17 to 21 oz (481.9 to 567.0 gms)			
Condenser capacity				0.21 to 0.25 microfarad			
Contact breaker points gap				0.025 in (0.64 mm)			
Dwell angle				39° to 42°			
Firing order				1,2,4,3			
High tension lead resistance				5,000 to 9,000 ohms/ft (304.8 mm)			
REGULATOR							
Cut-out—Cut-in voltage				12.6 to 13.4 volts			
Drop-off voltage				9.25 to 11.25 volts			
Armature to core gap				0.35 to 0.45 in (0.89 to 1.14 mm)			
"Follow-through" of moving contact				0.010 to 0.020 in (0.25 to 0.51 mm)			
Current regulator, on-load setting				Maximum rated generator output ± 1 1/2 amps			
Armature to core air gap				0.052 to 0.056 in (1.32 to 1.42 mm)			
Voltage regulator, open circuit setting				13.8 to 14.2 volts at 20°C (68°F)			
Armature to core air gap				0.052 to 0.056 in (1.32 to 1.42 mm)			
Atmospheric Setting				Checking Voltage			
Temperature				Voltage			
10°C (50°F)				14.5 to 15.8			
20°C (68°F)				14.4 to 15.6			
30°C (86°F)				14.3 to 15.3			
40°C (104°F)				14.2 to 15.1			
Resistance of shunt windings				Cut-out 8.8 to 9.6 ohms			
"Swamp" resistor				Voltage Regulator 10.8 to 12.0 ohms			
Field resistor				resistor resistance measured between centre tag and base 13.25 to 14.25 ohms			
				either 55 to 65 ohms (identification colour—Red) or 37 to 43 ohms (identification colour—Yellow)			

## SPARKING PLUGS

Size	14mm
Type	Autolite A.G. 22
Gap	0.023 in (0.58 mm)

## INERTIA STARTER MOTOR

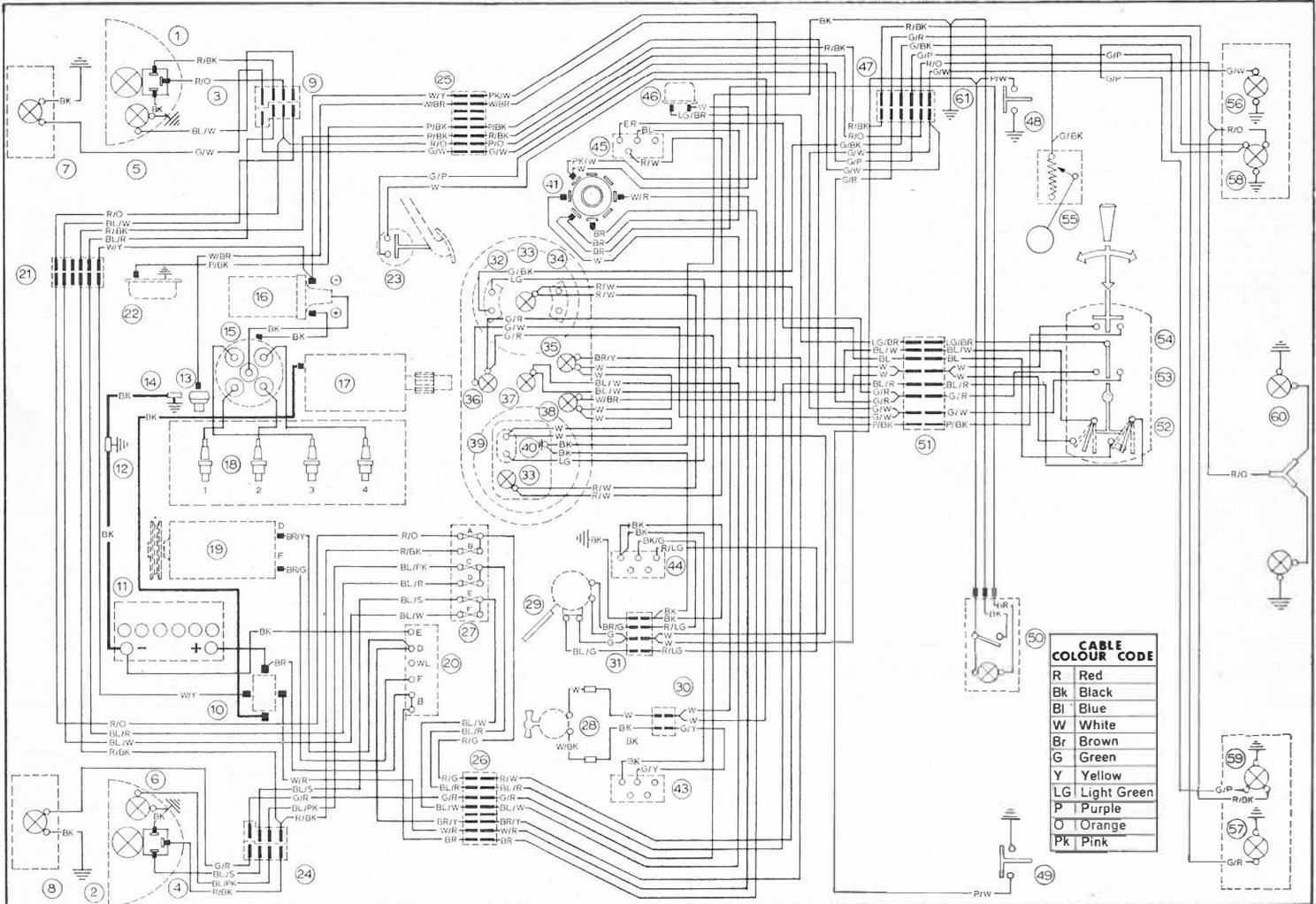
Ampere draw (zero rpm)	340 at 7.4 volts
Ampere draw (1,000 starter rpm)	245 at 7.8 volts
Gear ratio	11:1
Teeth on pinion	10
Teeth on ring gear	110
Lock torque	6.4 lb/ft (0.884 kg.m)

## PRE-ENGAGED STARTER MOTOR

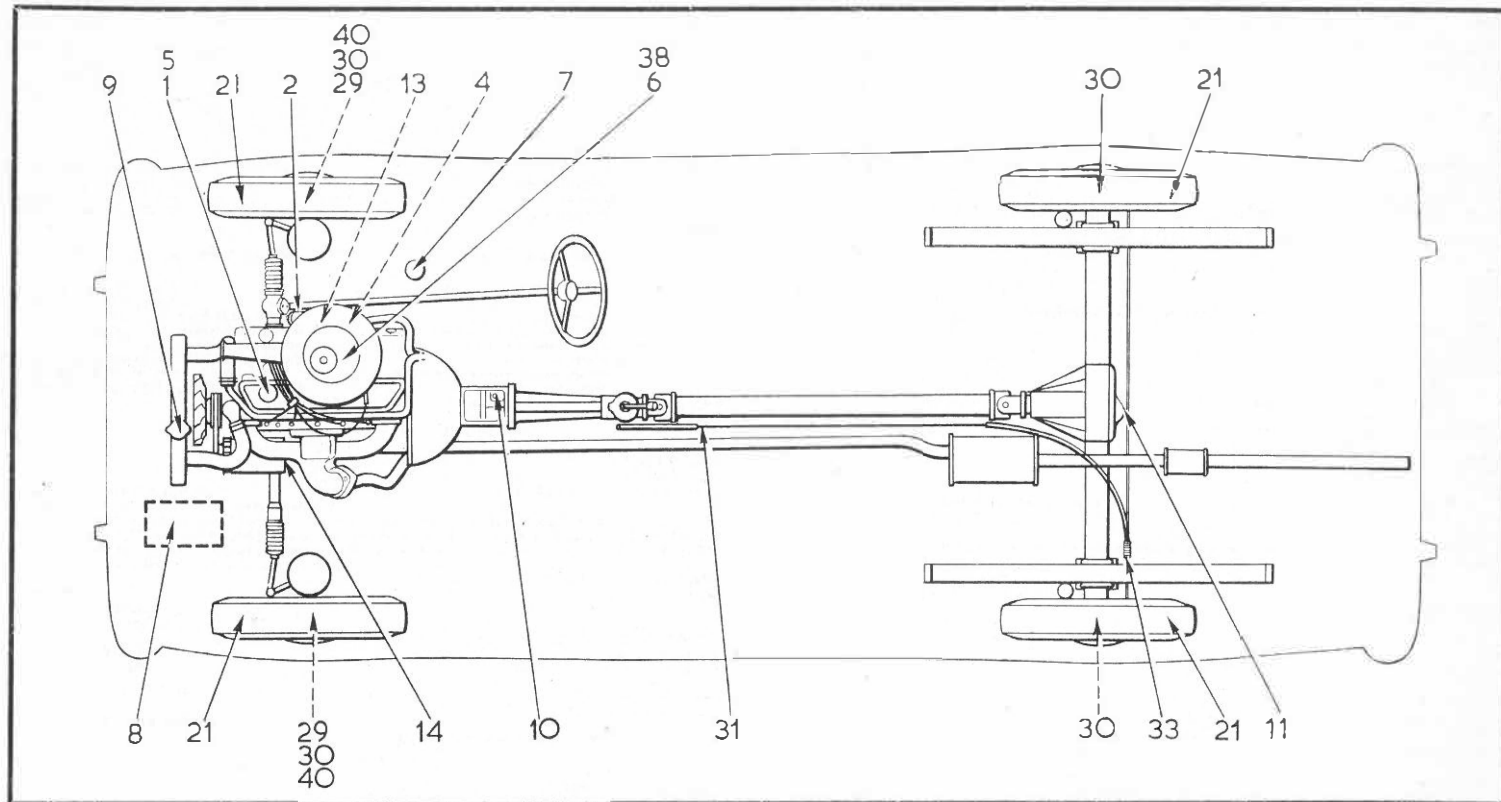
Gear ratio	12:1
Teeth on pinion	11
Teeth on ring gear	132

## TIGHTENING TORQUES, lb ft (kg.m)

Spark plug	14 x 1.25 mm	24 to 28 (3.32 to 3.87)
Starter motor retaining bolts	3/16 in—16 UNC	20 to 25 (2.76 to 3.46)
Generator pulley	7/16 in—20 UNF	14 to 17 (1.93 to 2.35)
Generator mounting bolts	5/16 in—24 UNF	15 to 18 (2.07 to 2.49)
Generator mounting bracket	3/16 in—16 UNC	20 to 25 (2.76 to 3.46)



Wiring Diagram by permission of Ford Motor Co., Ltd.



## KEY TO MAINTENANCE DIAGRAM

### EVERY 5,000 MILES

1. Engine sump—drain and refill
2. Oil filter element—renew
3. Crankcase emission valve
4. Fuel pump filter
5. Oil filler cap
6. Air cleaner
7. Brake fluid reservoir
8. Battery
9. Radiator
10. Gearbox
11. Rear axle
- \*12. Sparking plugs—clean and reset
13. Distributor—clean points and reset gap (.025in), oil shaft bearing, auto. advance mechanism and contact breaker pivot, smear cam with grease
14. Generator rear bearing—oil can
- \*15. Cables, linkages, door locks, catches, hinges, etc.—oil can
- \*16. Valve clearances—check and adjust (.010 Inlet .020 Ex. max.); (GT; .013 Inlet .023 Ex. Max.)
- \*17. Accelerator cable
- \*18. Fan belt tension
- \*19. Clutch cable
- \*20. Battery cables
21. Tyre pressure
- \*22. Rear spring "U" bolts torque
- \*23. Front suspension crossmember retaining bolts
- \*24. Front suspension arm joint gaiters
- \*25. Steering gear bellows
- \*26. Steering end ball joints and gaiters
- \*27. Condition of steering shaft coupling
- \*28. Torque of compression strut bracket/bodymember nuts
29. Front brake pads
30. Front & rear brake linings
- \*31. Brakes
- \*32. Brake hoses and lines
33. Handbrake cable

clean

check and top up

check and adjust (if necessary)

- \*34. Lights alignment
- \*35. Controls & instruments
- \*36. Seat belts security
- \*37. Ignition & carburettor performance

check and adjust (if necessary)

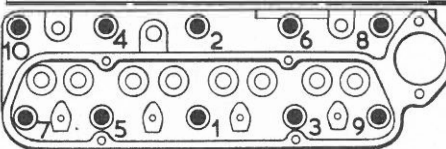
### EVERY 10,000 MILES (as for 5,000)

- EVERY 15,000 MILES (as for 5,000 plus following)**
38. Air cleaner element—renew
  - \*39. Rear spring inserts—check
  40. Front wheel bearings—repack with grease and adjust
  - \*41. Front wheel toe-in—check and adjust
- \*—Not shown on diagram.

### FILL-UP DATA

	Pints	Litres
Engine sump	6.4	3.6
Gearbox	1.5	.90
Rear axle	2	1.1
Cooling system	9	5.12
Fuel tank	9 galls	40.9
Tyre pressure: front	24psi	1.7kg/cm <sup>2</sup>
rear	24psi	1.7kg/cm <sup>2</sup>

Sequence of tightening cylinder head stud nuts (see also "Nut Tightening Torque Data, pii")



### TUNE-UP DATA

Firing order	1, 2, 4, 3	
Tappet clearance (cold): inlet exhaust	1100-1300 .008-.010 .018-.020	GT .011-.013 .021-.023
Valve timing: inlet opens inlet closes exhaust opens exhaust closes	17° BTDC 51° ABDC 51° BBDC 17° ATDC	27° BTDC 65° ABDC 65° BBDC 27° ATDC
Standard ignition timing * (GT, 1300 H & LC, 1100 HC all 10° BTDC) Location of timing mark	6° BTDC*  crankshaft pulley & timing cover pointer Autolite AG22 14mm .023in	
Plugs: make type size gap	1100-1300 Ford down- draught	
Carburettor: make type	GT Weber down- draught	
Settings (mm): Choke plate pull-down (manual) Main jet	3.6-4.1 1.12, 1.32	5 4.5
Air cleaner: type Fuel pump: type *pressure	Wire gauze mech. 1-2psi  (* 3 1/2-5 GT)	

## RECOMMENDED LUBRICANTS

	Duckhams	Castrol	Esso	Shell	Mobil	Amoco	B.P.
Engine	Q5500 or NOL20	Castrolite 10W/30	Extra Motor Oil 20W or Extra Motor Oil 10W/30	Super Motor Oil or X-100 20W	Mobiloil Special or Mobiloil Arctic	Super Permalube 10W/30 or Perma- lube 20W/20	Super Visco-static 10W/40 or Energol SAE 20W
Gearbox (manual)	NOL EP 80	Hypov Light	Gear Oil GP 80	Spirax 80 EP	Mobilube GX 80	American Multi- Purpose Gear Lubri- cant SAE80	Gear Oil SAE 80 EP
Rear Axle	Hypoid 90	Hypov	Gear Oil GP90/140	Spirax 90 EP	Mobilube GX 90	American Multi- Purpose Gear Lubri- cant SAE 90	Gear Oil SAE 90 EP

Approved lubricants of similar grades and SAE ratings are also manufactured by Regent Oil Co., Ltd. and Petrofina (Gt. Britain), Ltd. who are suppliers to Ford Motor Co. Ltd. as are the other companies listed above. Also approved are the products of the following companies:—British Oil & Turpentine Corp., Ltd., Filtrate, Ltd., Germ Lubricants, Ltd., Morris & Co. (Shrewsbury) Ltd., Stermol, Ltd.

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# Bodywork Repair Data

## FORD ESCORT

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### Bodywork

Construction is all-steel, monocoque, welded, and the saloon body is two-door four-light type. Four types of sealing materials are used but only one is required in service, this is SR518 made by Expandite Ltd., Chase Road, London, N.W.10. Paintwork is applied in two stages. (1) Primer paint, baked or stoved then sanded ready for (2) application of Acrylic resin base enamel. The latter also is baked or stoved.

### Engine Compartment Alignment Check

Remove engine assembly, front suspension crossmember, front suspension, compression struts and their mounting brackets and steering box. Position engine compartment jig locating lower portion between front body sidemembers. From under front mudguards, pass locating pins through master control holes which are located toward the front of the body sidemembers. Engage corresponding holes in jig and push in locating pins. From under mudguards pass second pair of locating pins one each side, through master control holes located toward the front of the body sidemembers. Push in locating pins.

To check alignment of suspension unit upper mounting holes in engine side apron panels, engage the set of three parallel pins. The pins should pass through the holes in the engine side apron panel and reinforcement and should not be forced into engagement. Check clearance between upper face of engine side apron panel and underside of jig top plate. A clearance of  $\frac{1}{16}$  in should be present.

In rebuilding engine compartment jig tool no. P.5519 may be used. **Note:** If a complete engine compartment is built around the jig offer the welded assembly in the body with jig in position. When correctly aligned to body, sub-assembly may be welded in position. Do not remove jig until front mudguards and radiator grille panel have been welded in position.

### Checking Underbody

If a Churchill 700 body jig is not available the following method of underbody alignment check may be used with the aid of the dimensioned drawing on p. iv:—

Support body on suitable stands on a level floor. Check dimensions shown along length of body and note any discrepancies outside dimensions given on diagram on p. iv. Diagonals on plan view can be checked by using large callipers or a pair of trammels (or plumb bob and line). With plumb bob method, transfer points to floor by chalk marks, connect points by straight line and then draw line through intersecting points of diagonals. Finally, check dimensions between front and rear side-members.

### Windscreen Removal

Before attempting to remove a windscreen note the following points: Cover bonnet and cowl top with cloth to prevent accidental damage. Remove screen wiper arms.

Using a lipping tool, push weatherstrip lip under top and sides of windscreen aperture flange. From inside car, push out windscreen and weatherstrip as an assembly. Prise cut joint cover clip and pull finish strip out of weatherstrip and remove weatherstrip from glass.

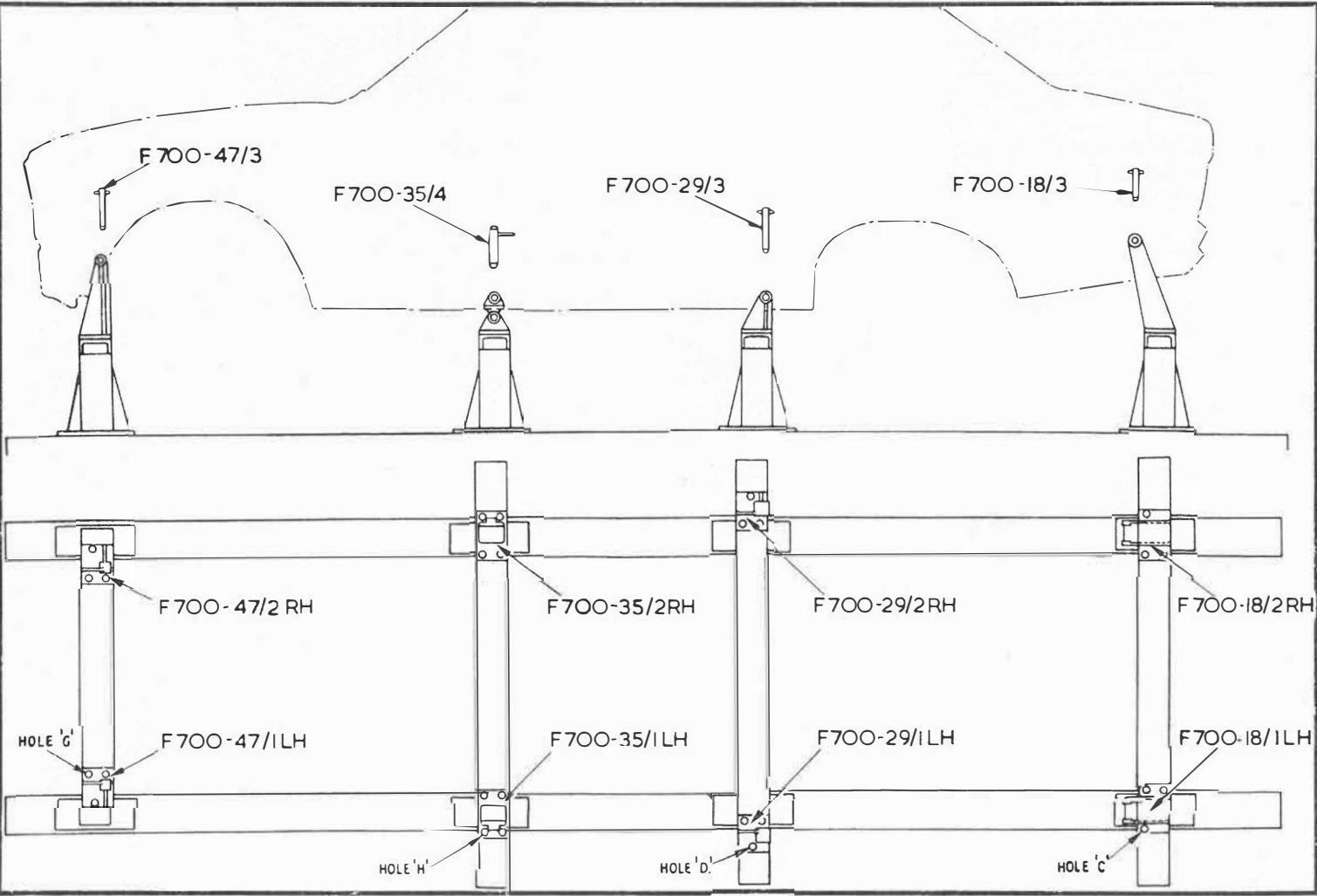
For removal of laminated screen the following method is possible\*:

Sit in front seat, place cloth between soles of shoes and windscreen, place both feet in one top corner of windscreen and push firmly. When weatherstrip is free of body flange in that area, repeat procedure at intervals along top edge of windscreen until whole unit can be removed from outside of car.

If a shattered windscreen is being replaced remove all traces of hardened sealer and shattered glass from weatherstrip and body flange.

\* Operator should be wearing lightweight shoes for this method of windscreen removal.

Churchill 700 body jig. Numbers indicate bracket numbers



## KEY TO BODY PARTS

- |                                      |   |
|--------------------------------------|---|
| 1. Floor pan                         | 17. Roof panel  |
| 2. Front panel                       | 18. Wheelhouse  |
| 3. Front mudguard apron              | 19. Reinforcement (wheel arch to floor side member)       |
| 4. Body front upper crossmember      | 20. Panel (back upper) assembly                           |
| 5. Body front lower crossmember      | 21. Panel (windshield header)                             |
| 6. Front body panel reinforcement    | 22. Rail (roof side drop)                                 |
| 7. Radiator support panel            | 23. Reinforcement (luggage compartment door)              |
| 8. Battery support                   | 24. Pan (rear floor) assembly                             |
| 9. Front wing                        | 25. }   |
| 10. Engine rear mounting panel       | 26. } Boot panel assembly                                 |
| 11. Dash and cowlside panel          | 27. }   |
| 12. Body side panel                  | 28. Bracket (rear suspension radius) and support assembly |
| 13. Front body-pillar reinforcement  |   |
| 14. Side window and wheelhouse-outer |   |
| 15. Front floor pan extension        |   |
| 16. Heel plate                       |   |

Note items 25, 26, 27 are bracketed together under one description.

