



SERVICE MANUAL

VOLVO 140 1969



FOREWORD

This Manual contains servicing instructions for the Volvo 140-series (142, 144, 145), 1969 models. The book is divided up into 10 parts as indicated by the register opposite. The pages and figure illustrations in each part are numbered in such a way that the first group shows the number of the part concerned while the second group shows the number of the page or figure illustration in that particular part, for example, under the heading "Electrical system"; 3—1, 3—2, etc. A convenient way of finding the particular section you are looking for is to bend the right side of the Manual back so that the arrows in the register point to the index marks on the first page of each section.

The various parts are divided up as follows:

- Tools
- Description
- Repair Instructions

The specifications can be found in Part 0, General. The instructions given in this book generally assume that special tools are used and are based on experience gained from method studies.

Similar results may be obtained with other working methods, but we are convinced that by following the instructions given in this Manual you will always achieve the best results in the shortest possible time.

AB VOLVO
Göteborg - Sweden

0**General****1****Servicing and
maintenance****2****Engine****3****Electrical system****4****Power transmission,
rear axle****5****Brakes****6****Front end and
steering gear****7****Frame, suspension,
wheels****8****Body****9****Instruments, accessories
and other equipment**

Part 0

GENERAL

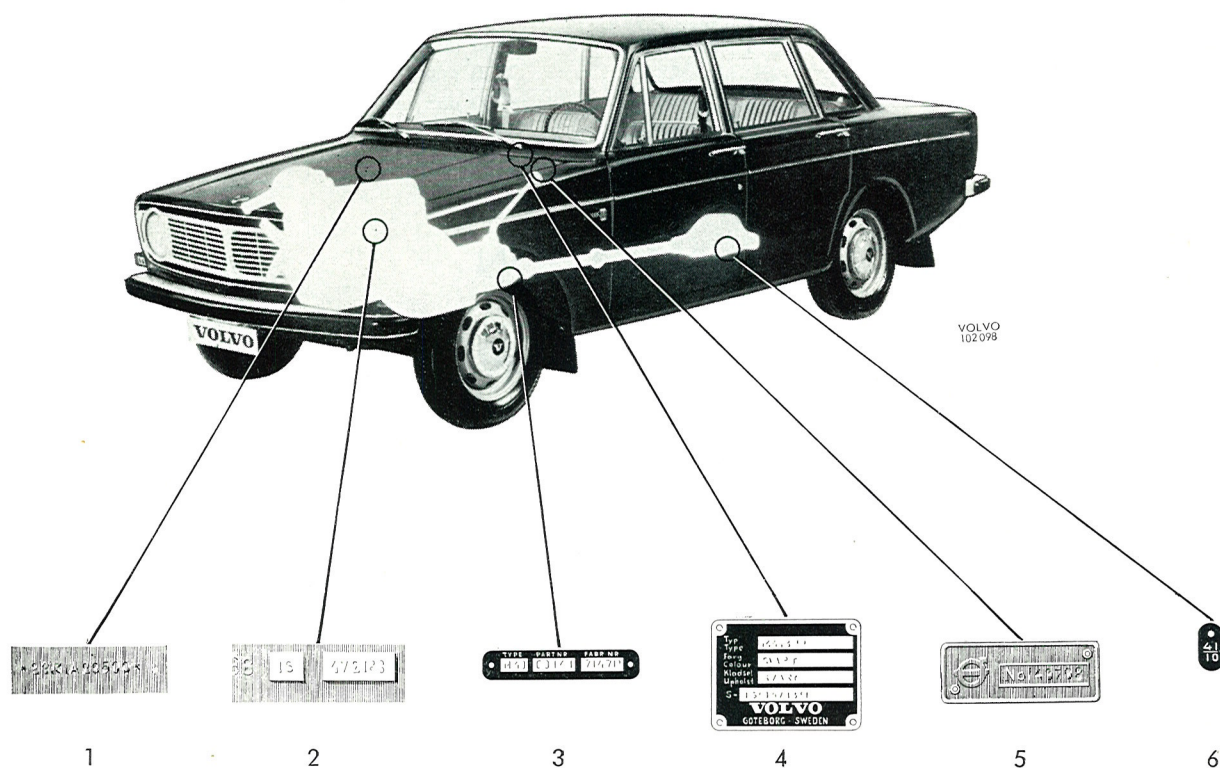
GROUP 01

TYPE DESIGNATIONS

This Manual deals with Volvo 140-series cars, 1969 models, of the following types:

Type	Type designation
Two-door	142
Four-door	144
Station Wagon	145

TYPE PLATES



1. Type designation and chassis number (stamped on the front right-hand door pillar).

2. Engine type designation, part number and manufacturing serial number.

3. Gearbox type designation, part number and manufacturing serial number.

4. Vehicle type designation, chassis number and code number for colour and upholstery.

5. Body number.

6. Plate on lower part of inspection cover showing number of teeth and reduction ratio of final drive.

GROUP 03

SPECIFICATIONS

DIMENSIONS AND WEIGHTS

	142	144	145
Length	4640 mm (182.7")	4540 mm (182.7")	4640 mm (182.7")
Width	1735 mm (68.3")	1735 mm (68.3")	1735 mm (68.3")
Height	1440 mm (56.7")	1440 mm (56.7")	1450 mm (57.0")
Wheelbase <i>odstęp między osiami tylnymi</i>	2600 mm (102.4")	2600 mm (102.4")	2600 mm (102.4")
Ground clearance, empty	210 mm (8.3")	210 mm (8.3")	210 mm (8.3")
with 2 persons	180 mm (7.0")	180 mm (7.0")	180 mm (7.0")
Track, front <i>rozstaw koł. front.</i>	1350 mm (53.1")	1350 mm (53.1")	1350 mm (53.1")
rear	1350 mm (53.1")	1350 mm (53.1")	1350 mm (53.1")
Turning circle	9250 mm (30 ft. 4")	9250 mm (30 ft. 4")	9250 mm (30 ft. 4")
Curb weight	1190 kg (2618 lb.)	1180 kg (2596 lb.)	1230 kg (2706 lb.)

LUBRICATION

ENGINE

Oil capacity, including oil filter <i>Pojemność oleju</i>	3.75 litres (6.60 Imp. pints=7.91 US pints)
excluding oil filter	3.25 litres (5.72 Imp. pints=6.86 US pints)
Lubricant <i>Smar</i>	Engine oil for Service MS
viscosity, all year round	✓ Multigrade Oil SAE 10 W-30
continuous temp. below -20° C (-4° F)	Multigrade Oil SAE 5 W-20
viscosity, below -10° C (14° F)	SAE 10 W
between -10° and +30° C (14 and 90° F)	SAE 20/20 W
above +30° C (90° F)	SAE 30

GEARBOX (WITHOUT OVERDRIVE)

Lubricant, type	Gear oil
viscosity, below 30° C (90° F)	✓ SAE 80
above 30° C (90° F)	SAE 90
Alternative lubricant, type	Engine oil
viscosity, all year round	SAE 30
alternative	Multigrade oil SAE 20 W-40
Oil capacity	0.75 litre (1.32 Imp. pints=1.58 US pints)

GEARBOX WITH OVERDRIVE

Lubricant, type	Engine oil
viscosity, all year round	SAE 30
alternative	Multigrade oil SAE 20 W-40
Oil capacity	1.6 litres (2.81 Imp. pints=3.38 US pints)

AUTOMATIC TRANSMISSION

Lubricant	Oil for Automatic Transmissions, Type A
Oil capacity	6.2 litres (10.91 Imp. pints=13.08 US pints)

FINAL DRIVE

Lubricant, type	Hypoid oil
viscosity, above -10° C (14° F)	SAE 90
below -10° C (14° F)	SAE 80
Oil capacity	1.3 litres (2.28 Imp. pints=2.74 US pints)

For final drive with differential brake, oil according to MIL-L-2105 or MIL-L-2105 B, provided with additive for differential brake, is used.

SKRYNKA PRZEKŁADNIOWA KIEROWNICY STEERING BOX

Lubricant, type	Hypoid oil
viscosity	SAE 80
Oil capacity	0.25 litre (0.44 Imp. pint = 0.50 US pint)

ENGINE



GENERAL

Type, designation	B 20 A	B 20 B
Output, h.p. at r.p.m. (SAE)	90/4800	118/5800
(DIN)	82/4700	100/5500
Max. torque, kgm (lb.ft.) at r.p.m. (SAE)	16.5 (119)/3000	17.0 (123)/3500
(DIN)	16.0 (15.5)/2300	15.5 (112)/3500
Compression pressure (warm engine when turned over with starter motor) 250—300 r.p.m.	11—13 kg/cm ² (156—185 lb/sq.in.)	12—14 kg/cm ² (170—200 lb/sq.in.)
Compression ratio <i>stopień sprężania</i>	8.7:1	9.5:1
Number of cylinders	4	4
Bore <i>średnica cylindra</i>	88.90 mm (3.500")	88.90 mm (3.500")
Stroke <i>suw tłoka</i>	80 mm (3.150")	80 mm (3.150")
Displacement <i>wypchnięcie pojemności</i>	1.99 litres	1.99 litres
Weight, including electrical equipment and carburettor, approx.	155 kg (341 lb.)	155 kg (341 lb.)

CYLINDER BLOCK

Material	Special alloy cast iron
Bore, standard	88.90 mm (3.499")

PISTONS *TŁOK*

Material	Light alloy (<i>lekki stop</i>)
Weight, standard	500±5 grammes (17.5±0.18 oz.)
Permissible weight deviation between pistons in same engine	10 grammes (0.35 oz.)
Height, total	71 mm (2.79")
Height from piston pin centre to piston crown	46 mm (1.81")
Piston clearance	0.02—0.04 mm (0.0008—0.0016")

PISTON RINGS *PIERSCIENIE TŁOKA*

Piston ring gap, measured in ring opening	0.40—0.55 mm (0.016—0.022")
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COMPRESSION RINGS

Marked "TOP". Upper ring chromed.	
Number on each piston	2
Height	1.98 mm (0.078")
Compression ring clearance in groove	0.045—0.072 mm (0.0017—0.0028")

OIL SCRAPER RINGS

Number on each piston	1
Height	4.74 mm (0.186")
Scraper ring clearance in groove	0.045—0.072 mm (0.0017—0.0028")

GUDGEON PINS *środek tłokowy*

Floating fit. Circlips at both ends in piston.	
Fit:	
In connecting rod	Close running fit
In piston	Push fit
Diameter, standard	22.00 mm (0.866")

revolutions per minute — obroty na minutę

CYLINDER HEAD

Height, measured from cylinder contact face to face for bolt heads

86.7 mm (3.41")

Distance from top side of head to overflow pipe upper end (pipe placed under thermostat)

35 mm (1.38")

Cylinder head gasket, thickness (unloaded),

B 20 A

2 mm (0.08")

(loaded 1.65 mm = 0.065")

B 20 B

0.8 mm (0.031")

(loaded 0.7 mm = 0.028")

WAL KORBOWY

CRANKSHAFT

Crankshaft, end float

0.017—0.108 mm (0.007—0.0042")

Main bearings, radial clearance

0.026—0.077 mm (0.0010—0.0030")

Big-end bearings, radial clearance

0.039—0.081 mm (0.0015—0.0032")

ŁOŻYSKO GŁÓWNE WALKU KORBOWEGO

MAIN BEARINGS

MAIN BEARING JOURNALS

Diameter, standard

63.441—63.454 mm (2.4911—2.4982")

Width on crankshaft for pilot bearing shell

Standard

38.930—38.970 mm (1.5327—1.5342")

BIG-END BEARINGS

Big-end bearing journals

Width of bearing recess

31.950—32.050 mm (1.2579—1.2618")

Diameter, standard

54.089—54.102 mm (2.1295—2.1300")

KORBOWÓD

CONNECTING RODS

End float on crankshaft

0.15—0.35 mm (0.006—0.014")

Max. permissible weight deviation between connecting rods in same engine

6 grammes (0.21 oz.)

KOŁO ZAMACHOWE

FLYWHEEL

Permissible axial throw, max.

0.05 mm (0.002") at a diameter of 150 mm (5.9")

OBUDOWA (OSŁONA KOŁA ZAMACHOWEGO)

FLYWHEEL HOUSING

Max. axial throw for rear face

0.05 mm (0.002") at a diameter of 100 mm (3.9")

Max. radial throw for rear guide

0.15 mm (0.006")

WAL ROZRZĄDZĄCY

CAMSHAFT

Marking, B 20 A

A

B 20 B

C

Number of bearings

3

Radial clearance

0.020—0.075 mm (0.0008—0.0030")

End float

0.020—0.060 mm (0.0008—0.0024")

Valve clearance for control of camshaft setting (cold engine),

B 20 A

1.10 mm (0.043")

B 20 B

1.45 mm (0.057")

Inlet valve should then open at, B 20 A

10° (A.T.D.C.)

B 20 B

0° (T.D.C.)

TIMING GEARS

Backlash

0.04—0.08 mm (0.0016—0.0032")

End float, camshaft

0.02—0.06 mm (0.0008—0.0024")

ZAMOROW SYSTEM

VALVE SYSTEM

VALVES

Inlet

Disc diameter	42 mm (1.654")
Stem diameter	7.955—7.970 mm (0.3132—0.3138")
Valve seat angle	44.5°
Seat angle in cylinder head	45°
Seat width in cylinder head	2.0 mm (0.080")
Clearance, both warm and cold engine, B 20 A	0.40—0.45 mm (0.016—0.018")
B 20 B	0.50—0.55 mm (0.020—0.022")

Exhaust

Disc diameter	35 mm (1.378")
Stem diameter	7.925—7.940 mm (0.3120—0.3126")
Valv seat angle	44.5°
Seat angle in cylinder head	45°
Seat width in cylinder head	2 mm (0.080")
Clearance, both warm and cold engine, B 20 A	0.40—0.45 mm (0.016—0.018")
B 20 B	0.50—0.55 mm (0.020—0.022")

VALVE GUIDES

Length, inlet valve	52 mm (2.047")
exhaust valve	59 mm (2.323")
Inner diameter	8.000—8.022 mm (0.32—0.321")
Height above upper face of cylinder head	17.5 mm (0.689")
Clearance, valve stem-valve guide, inlet valve	0.030—0.067 mm (0.0012—0.0026")
exhaust valve	0.060—0.097 mm (0.0024—0.0038")

VALVE SPRINGS

Length, unloaded, approx.	46 mm (1.81")
with a loading of 29.5±2.3 kg (65±5 lb.)	40 mm (1.57")
with a loading of 82.5±4.3 kg (181.5±9.5 lb.)	30 mm (1.18")

SMAROWANIA SYSTEM

LUBRICATING SYSTEM

Oil capacity, including oil filter	3.75 litres (6.60 Imp.pints=7.91 US pints)
excluding oil filter	3.25 litres (5.72 Imp.pints=6.86 US pints)
Oil pressure at 2000 r.p.m. (with warm engine and new oil filter)	2.5—6.0 kg/cm ² (36—85 lb/sq.in)

OIL PUMP

Oil pump, type	Gear
number of teeth on each gear wheel	9
end float	0.20—0.10 mm (0.0080—0.0040")
radial clearance	0.08—0.014 mm (0.0032—0.0055")
backlash	0.15—0.35 mm (0.0060—0.0140")

RELIEF VALVE SPRING (IN OIL PUMP)

Length, unloaded	approx.	39.0 mm (1.54")
loaded with 5.0±0.4 kg (11.0±88 lb.)		26.25 mm (1.03")
7.0±0.8 kg (15.4±1.7 lb.)		21.0 mm (0.83")

SYSTEM PALIWA

FUEL SYSTEM

FUEL PUMP

Diaphragm type pump, B 20 A	AC - YD
Diaphragm type pump, B 20 B and as alt. on B 20 A	Pierburg APG
Fuel pressure, measured at same level as pump	min. 0.11 kg/cm ² (1.56 lb/sq.in.)
	max. 0.25 kg/cm ² (3.55 lb/sq.in.)

CARBURETTORS

STROMBERG, B 20 A

Type	Horizontal carburettor
Make and designation	Zenith-Stromberg 175 CD-2 SE
Number	1
Air intake diameter	41.3 mm (1.63")
Fuel needle, designation	B 2 AF
Idling speed	700 r.p.m.
Oil for damping cylinder	Oil approved as "Oil for Automatic Transmissions, Type A"

SU, B 20 B

Type	Horizontal carburettor
Make and designation	SU-HS 6
Number	2
Air intake diameter	41.3 mm (1.63")
Fuel needle, designation	KN
Idling speed	800 r.p.m.
for cars with automatic transmission	700 r.p.m.
Oil for damping cylinders	"Oil for Automatic Transmissions, Type A"

Stromberg, B 20 B (in P 1800 and cars for USA and Canada).

Type	Horizontal carburettor
Make and designation	Zenith-Stromberg 175 CD-2 SE
Number	2
Air intake diameter	41.3 mm (1.63")
Fuel needle, designation	B 1 S
Idling speed	800 r.p.m.
for cars with automatic transmission	700 r.p.m.
Oil for damping cylinders	"Oil for Automatic Transmissions, Type A"

COOLING SYSTEM

Type	Sealed system - <i>system zamknięty</i>	
Radiator cap valve opens at	0.7 kg/cm ² (10.0 lb/sq.in.)	
Capacity	Approx. 8.5 litres (1.87 Imp. galls = 2.24 US galls)	
Fan belt, designation	HC - 38×888	
right-steered car	HC - 38×988	
Fan belt tension: for a force of 5.6—7.6 kg (12.3—16.7 lb.), on the belts between the pulleys obtained with a depression of ..	10 mm (0.39")	
Thermostat	Type 1	Type 2
Type	Fulton Sylphon	Wahler
Marking	170	82°
Begins opening at	75—78° C	81—83° C
	(168—172° F)	(177—181° F)
Fully open at	89° C (192° F)	90° C (195° F)

WEAR TOLERANCES

CYLINDERS:

To be rebored when wear amounts to (if engine has abnormal oil consumption)

0.25 mm (0.010")

CRANKSHAFT

Permissible out-round on main bearing journals, max.	0.05 mm (0.0020")
Permissible out-of-round on big-end bearing journals, max. ..	0.07 mm (0.0028")
Crankshaft end float, max.	0.15 mm (0.0060")

VALVES

Permissible clearance between valve stems and valve guides, max.	0.15 mm (0.0060")
Valve stems, permissible wear, max.	0.02 mm (0.0008")

WAT R02R2A D02 Y

CAMSHAFT

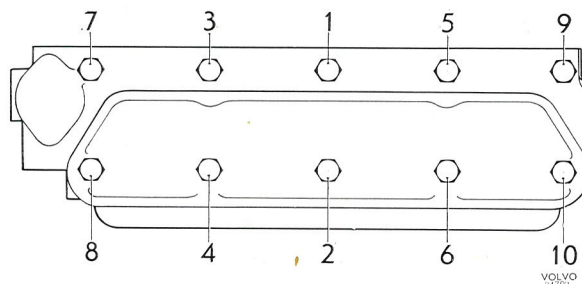
Permissible out-round (with new bearings) max.	0.07 mm (0.0028")
Bearings, permissible wear, max.	0.02 mm (0.0008")

TIMING GEARS

Permissible backlash, max.	0.12 mm (0.0048")
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TIGHTENING TORQUES

	Kgm	Lb. Ft.
Cylinder head	8.5—9.5	61—68
Main bearings	12—13	87—94
Big-end bearings	5.2—5.8	38—42
Flywheel	4.5—5.5	32—40
Spark plugs	3.5—4.0	25—29
Camshaft nut	13—15	94—108
Bolt for crankshaft pulley	7—8	50—58
Alternator bolt (1/2")	6—10	45—75
Nipple for oil filter	4.5—5.5	32—40
Sump bolts	0.8—1.1	6—8



Tightening sequence for cylinder head bolts

ELECTRICAL SYSTEM

BATTERY

Type	Tudor 6 EX 4 EF D.P.
Grounded .. <i>uziemiwienie</i>	Negative terminal
System voltage	✓ 12 V
Battery, capacity, standard	60 Ah
Specific gravity of electrolyte:	
Fully charged battery .. <i>pełne naładowanie</i>	1.28
When recharging is necessary	1.21
Recommended charging current	5.5 A

PRĄDNIKA

ALTERNATOR

Type	Bosch K1(R)-14V, 35A20
Wattage	490 W
Max. continuous current	35 A
Max. speed	12000 r.p.m.
Direction of rotation	Clockwise
Ratio, engine-alternator	1:2
Sliprings, min. diameter	31.5 mm (1.24")
Max. permissible radial throw on sliprings	0.03 mm (0.0012")
Max. permissible radial throw on rotor body	0.05 mm (0.0020")
Brushes, min. length	8 mm (0.32")
Brush force	0.3—0.4 kg (0.66—0.88 lb.)
Tightening torque for pulley	3.5—4.0 kgm (25—29 lb.ft.)

TEST VALUES

Resistance in stator	0.26+0.03 ohm
Resistance in rotor	4.0+0.4 ohm
Output test	23 amps (min.) at 2,000 r.p.m. and 14 V

VOLTAGE REGULATOR

Type	Bosch AD - 14 V
Regulator voltage at 4000 alternator r.p.m. cold regulator (read off within 30 seconds, two lower contacts)	14.0—15.0 V
Load current, two lower contacts	28—30 amps
Control range	—0.1—+0.2 V
Load current, two upper contacts	3—8 amps

ЗАПЕОН

IGNITION SYSTEM

Voltage	12 V
Firing order	1-3-4-2

B 20 A: *м.б.ж*

Ignition timing, 97 octane (ROT) at 1500 engine r.p.m. (vacuum governor disconnected)	21—23° B.T.D.C.
Spark plugs	<i>свечи зажигания</i> Bosch 175 T 35 or corresponding
Tightening torque	3.5—4.0 kgm (25.3—29.0 lb.ft.)
Thread	14 mm (0.56")

B 20 B:

Ignition timing, 100 octane (ROT) at 600—800 engine r.p.m. (vacuum governor disconnected)	10° B.T.D.C.
Spark plugs, normal driving	Bosch W 200 T 35
hard driving	Bosch W 225 T 35 or corresponding
Spark plug gap	0.7—0.8 mm (0.028—0.320")
Tightening torque	3.5—4.0 kgm (25.3—29.0 lb.ft.)
Thread	14 mm (0.56")

STARTER MOTOR

Type	Bosch GF 12 V 1 PS
Voltage	12 V
Grounded	Negative terminal
Direction of rotation	Clockwise
Output	Approx. 1 h.p.
Brushes, number	4

TEST VALUES

MECHANICAL

Rotor end float	0.05—0.30 mm (0.002—0.12")
Brush spring tension	1.15—1.3 kg (2.53—2.86 lb.)
Distance from pinion to ring gear	1.2—4.4 mm (0.047—0.173")
Frictional torque of rotor brake	2.5—1.0 kgcm (2.17—3.81 lb.in.)
Pinion idling torque	1.3—1.8 kgcm (1.13—1.56 lb.in.)
Backlash	0.35—0.60 mm (0.014—0.024")
Min. diameter of commutator	33 mm (1.29")
Min. length of brushes	14 mm (0.55")

ELECTRICAL

Unloaded starter motor:	
12.0 volts and 40—50 amp.	6900—8100 r.p.m.
Loaded starter motor:	
9 volts and 185—220 amp.	1050—1350 r.p.m.
Locked starter motor:	
6 V, 300—350 A	0 r.p.m.

CONTROL SOLENOID

Cut-in voltage	min. 8 V
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ROZDZIAŁ DISTRIBUTOR

(B 20 A)

Type	Bosch JFUR 4
Direction of rotation	Anti-clockwise
Breaker points, gap	0.4—0.5 mm (0.016—0.020")
dwell angle (at 500 r.p.m.)	59—65°
contact force	500—630 grammes (1.10—1.40 lb.)
Centrifugal governor:	
Advance, total	13±1 degrees (distributor)
Advance begins at	300—500 distr. r.p.m.
Values 5°	750—950 distr. r.p.m.
10°	1210—1750 distr. r.p.m.
Advance finishes at	2400 distr. r.p.m.
Vacuum governor:	
Advance, total	5±1 degrees (distributor)
Advance begins at	60—100 mm (2.36—3.96") Hg
Values 3°	105—145 mm (4.13—5.71") Hg
Advance finishes at	150—160 mm (5.91—6.30") Hg

(B 20 B)

Type	Bosch JFUR 4
Direction of rotation	Anti-clockwise
Breaker points, gap	0.4—0.5 mm (0.016—0.020")
dwell angle (at 500 r.p.m.)	59—65°
contact force	500—630 grammes (1.10—1.40 lb.)
Centrifugal governor:	
Advance total	13.5±1 degrees (distributor)
Advance begins at	500—600 distr. r.p.m.
Values 5°	675—775 distr. r.p.m.
10°	1430—2100 distr. r.p.m.
Advance finishes at	2900 distr. r.p.m.
Vacuum governor:	
Drop, total	3±0.5 degrees (distributor)
Drop, begins at	160—240 mm (5.91—9.45") Hg
Values 2°	230—305 mm (9.06—12.0") Hg
Drop finishes at	280—320 mm (11.0—12.6") Hg

Lamp bulb (12 D)

	Power	Socket	Number
Headlights	45/40 W	P 45 t	2
Parking lights, front	5 W	S 8	2
rear	4 cp	Ba 15 s	2
Flashers, front and rear	32 cp	Ba 15 s	4
Stop lights	32 cp	Ba 15 s	2
Reversing lights	32 cp	Ba 15 s	2
Number plate light	5 W	S 8	2
Interior lighting	10 W	S 8	1 (145,2)
Glove compartment light	2 W	Ba 9 s	1
Instrument lighting	3 W	W 2.2 d	2
Lighting, heater controls	1.2 W	W 1.8 d	3
Warning lamp, charging	1.2 W	W 1.8 d	1
directional indicators	1.2 W	W 1.8 d	1
handbrake	1.2 W	W 1.8 d	1
headlights	1.2 W	W 1.8 d	1
oil pressure	1.2 W	W 1.8 d	1
electrically heated rear window (145)	2 W	Ba 7 s	1

Fuses

	Number
Rated current 8 A	4
Rated current 5 A	5
16 A (145)	1

ELECTRICALLY HEATED REAR WINDOW (145)

Output	120 W
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POWER TRANSMISSION, REAR AXLE

CLUTCH

Clutch, type	Single dry plate, diaphragm spring
Size	8½"
Clutch friction area, total	440 cm ² (68.2 sq.in.)
Clutch pedal travel	125—130 mm (4.92—5.12)
Throw-out yoke travel	3 mm (0.12")

GEARBOX

M 40

Type designation	M 40
Reduction ratios:	
1st speed	3.13:1
2nd speed	1.99:1
	1.36:1
4th speed	1:1
Reverse	3.25:1
Lubricant, see under "lubrication"	
Oil capacity	0.75 litre (1.32 Imp. pints=1.58 US pints)

TIGHTENING TORQUE

TIGHTENING TORQUE	Kgm	Lb.ft.
Nut for driving flange	9.5—10.5	65—75

M 41 (GEARBOX M 40 WITH OVERDRIVE)

Reduction ratio, overdrive	0.797:1
Clearance, piston-cylinder in oil pump	0.005—0.040 mm (0.0002—0.0016")
Oil pressure, direct drive	approx 1.5 kg/cm ² (21 lb./sq.in.)
overdrive	32—35 kg/cm ² (455—500 lb./sq.in.)
Lubricant, see under "Lubrication"	
Oil capacity, gearbox and overdrive	1.6 litres (2.81 Imp. pints=3.38 US pints)

TIGHTENING TORQUE

TIGHTENING TORQUE	Kgm	Lb.ft.
Nut for driving flange	11.0—14.0	80—100

REAR AXLE

Rear axle, type	Semi-floating
Track	1350 mm (53.15")
Drive shaft end float	0.05—0.13 mm (0.002—0.005")

FINAL DRIVE

Type	Spiral bevel (hypoid)
Reduction ratio	4.10:1 (10/41) or 4.30:1 (10/43)
Warp, crown wheel	max. 0.08 mm (0.0032")
Backlash	0.10—0.20 mm (0.004—0.008")
Pre-loading on pinion bearings, new bearings	11—23 kgcm (9.55—20 lb.in.)
run-in bearings	6—11 kgcm (5.21—9.55 lb.in.)
Pre-loading on differential bearings	0.13—0.20 mm (0.005—0.008")
Lubricant, see under "Lubrication"	
Oil capacity	1.3 litres (2.28 Imp. pints=2.74 US pints)

TIGHTENING TORQUES

TIGHTENING TORQUES	Kgm	Lb.ft.
Flange	28—30	200—220
Caps	5.0—7.0	35—50
Crown wheel	6.5—9.0	45—65
Wheel nuts	10—14	70—100

BRAKES

FRONT WHEEL BRAKES

Type	Disc brakes
Brake discs:	
Outside diameter	272.2 mm (10.7")
Thickness, new	12.7—12.8 mm (0.500—0.504")
reconditioned	min. 12.2 mm (0.480")
Warp	max. 0.10 mm (0.004")
Brake linings:	
Thickness, new	10 mm (0.394")
Effective area	129 cm ² (20 sq.in.)
Wheel unit cylinders:	
Diameter	36.12 mm (1.422")

REAR WHEEL BRAKES

Type	Disc brakes
Brake discs:	
Outside diameter	294.6 mm (11.6")
Thickness, new	9.6mm (0.378")
reconditioned	min. 9.1mm (0.358")
Warp	max. 0.15mm (0.006")
Brake linings:	
Thickness, new	10 mm (0.394")
Effective area	93 cm ² (14.4 sq.in.)
Wheel unit cylinders:	
Diameter	36.12 mm (1.422")
Diameter, 145	38.10 mm (1.5")

MASTER CYLINDER

Nominal diameter	7/8" (22.2 mm)
Bore	max. 22.40 mm (0.882")
Piston diameter	min. 22.05 mm (0.868")

BRAKE VALVE

Operating pressure	34±2 kg/cm ² (484±28.4 lb/sq.in.)
Operating pressure, 145	50±2 kg/cm ² (711±28.4 lb/sq.in.)

TIGHTENING TORQUES

	Kgm	Lb.ft.
Attaching bolts, front brake caliper	9—10	65—70
Attaching bolts, rear brake caliper	6—7	45—50
Wheel nuts	10—14	70—100
Stop screw, master cylinder	1.3	9.5
Attaching nuts, master cylinder	2.4	17
Venting nipples	0.4—0.6	3—4.5
Brake hose, front brake caliper	1.6—2.0	12—15
Warning valve, switch	1.4—2.0	10—15
Brake pipes	1.1—1.5	8—11
Plug, brake valve	10—12	70—85
Lock nut, brake valve	2.5—3.5	18—25

FRONT END AND STEERING GEAR

WHEEL ALIGNMENT (UNLOADED VEHICLE)

Caster	0 to +1°
Camber	0 to +0.5°
King pin inclination at a camber of 0°	7.5°
Toe-in	0 to 4 mm (0 to 0.16")

Turning angles:

At a 20° turn of the outer wheel the inner wheel should be turned 21.5° to 23.5°.

Shims, thickness	0.15 mm (0.006")
	0.50 mm (0.020")
	1.0 mm (0.039")
	3.0 mm (0.118")
	6.0 mm (0.236")

STEERING GEAR

Number of turns from lock to lock	4.15
Steering gear reduction ratio	17.5:1
Lubricant, see under "Lubrication"	
Oil capacity	approx. 0.25 litre (0.44 Imp. pint=0.53 US pint)

TIGHTENING TORQUES

	Kgm	Lb.ft.
Nut for idler arm shaft	6.9—8.3	50—60
Steering wheel nut	3.5—4.8	25—35
Nut for pitman arm	19	135
Nyloc nut for steering rod and tie rod	3.5—4.2	25—30
Bolt for upper wishbone shaft	4.8—5.5	35—40

SUSPENSION, WHEELS

SPRINGS

FRONT SPRINGS

Type	Helical spring
Test values:	
Loading for a compression of 1 cm (25/64") (measured within a spring length of 185—205 mm=7.28—8.07")	52.6—56.6 kg (115.7—124.5 lb.)
Length, fully compressed	max. 125 mm (4.9")
Length when loaded with 517—547 kg (1137—1203 lb.)	195 mm (7.6")

REAR SPRINGS

	142—144	145
		Helical spring
Wire diameter	12.0 mm (0.47")	12.85 (0.51")
External diameter	127.0 mm (4.9")	127.9 mm (5.0")
Number of effective turns	8 $\frac{2}{3}$	9
Test values:		
Loading (for a compression of 1 cm=0.4")	15.7—16.7 kg (34.5—36.7 lb.)	19.9—20.9 kg (44—46.0 lb.)
within a spring length of	258—308 mm (10.15—12.12")	258—308 mm (10.15—12.12")
Length, fully compressed	max. 114 mm (4.5")	max. 127 mm (4.9")
Load/spring length	201—216 kg/283 mm (442—475 lb./11.14")	yellow: 242—257 kg/295 mm (532—565 lb./11.61") blue: 247—252 kg/295 mm (543—554 lb./11.61") red: 252—257 kg/295 mm (554—565 lb./11.61")

SHOCK ABSORBERS

Type	Double-acting, hydraulic, telescopic
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WHEELS

WHEEL RIMS

Type	Disc
Designation	4.5 J×15 L
Radial throw	max. 1.6 mm (0.063")
Warp	max. 1.6 mm (0.063")
Imbalance, complete wheel	900 gcm (7.8 lb.in.)
Tightening torque for wheel nuts	10—14 kgm (72—101 lb.ft.)

TYRES

Type	Tubeless
Size, 142, 144	165 S 15-4-PR, 165 SR 15-4-PR
USA	6.85-15-4-PR
145	165 S 15-8-PR, 165 SR 15-4-PR
USA	6.85-15-4-PR

