VOLVO SERVICE

CARS

Part 0 (03)
SPECIFICATIONS
P 120
Station Wagon

SERVICE MANUAL

VOLVO
101 059

CONTENTS

GENERAL

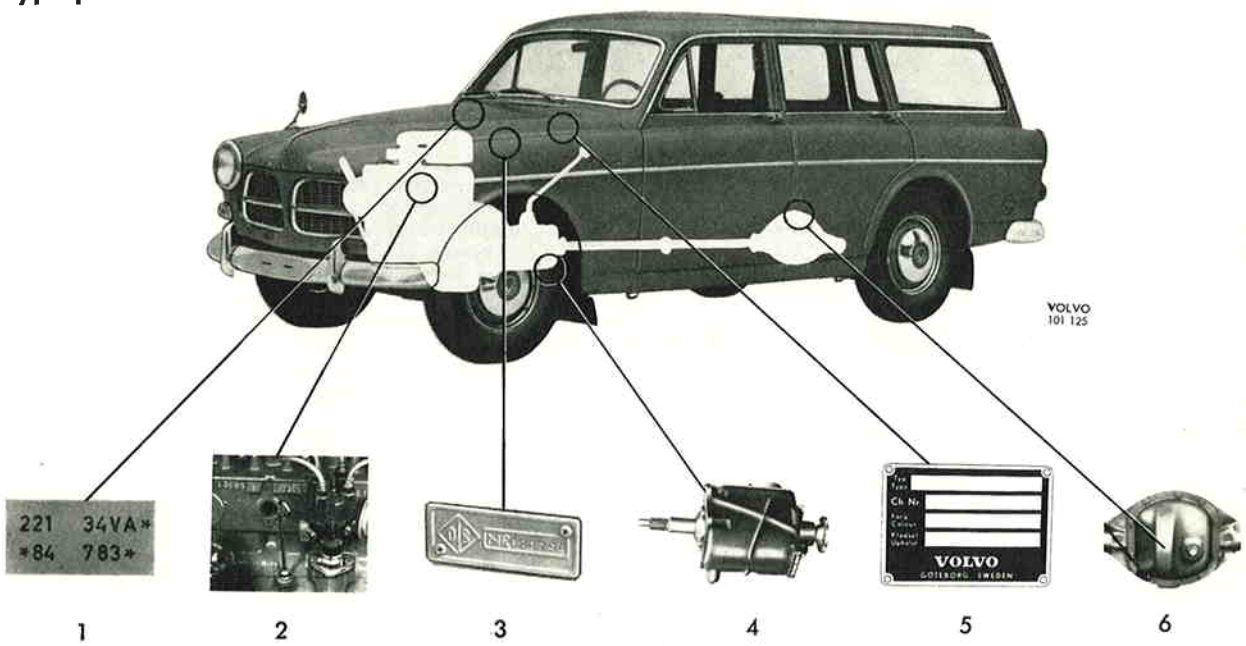
TYPE DESIGNATIONS

These specifications concern the Volvo 120 Station Wagon with the type designations and main data shown below.

Type designation	Model	With effect from	Chassis number	Engine	Gearbox	Rear axle
P 22134 P 22244*)	VA/HA	Feb 1962	1— 1399	B 18 A B 18 D	M 40 M 40	4.55:1 4.55:1
P 22134 P 22244*)	VB/HB	Aug 1962	1400— 8274	B 18 A B 18 D	M 40 M 40	4.55:1 4.55:1
P 22134 P 22244*)	VD/HD	Aug 1963	8275—17949	B 18 A B 18 D	M 40 M 40	4.55:1 4.55:1
P 22134 P 22244*)	VE/HE	Aug 1964	17950—	B 18 A B 18 D	M 40 M 40	4.55:1 4.55:1

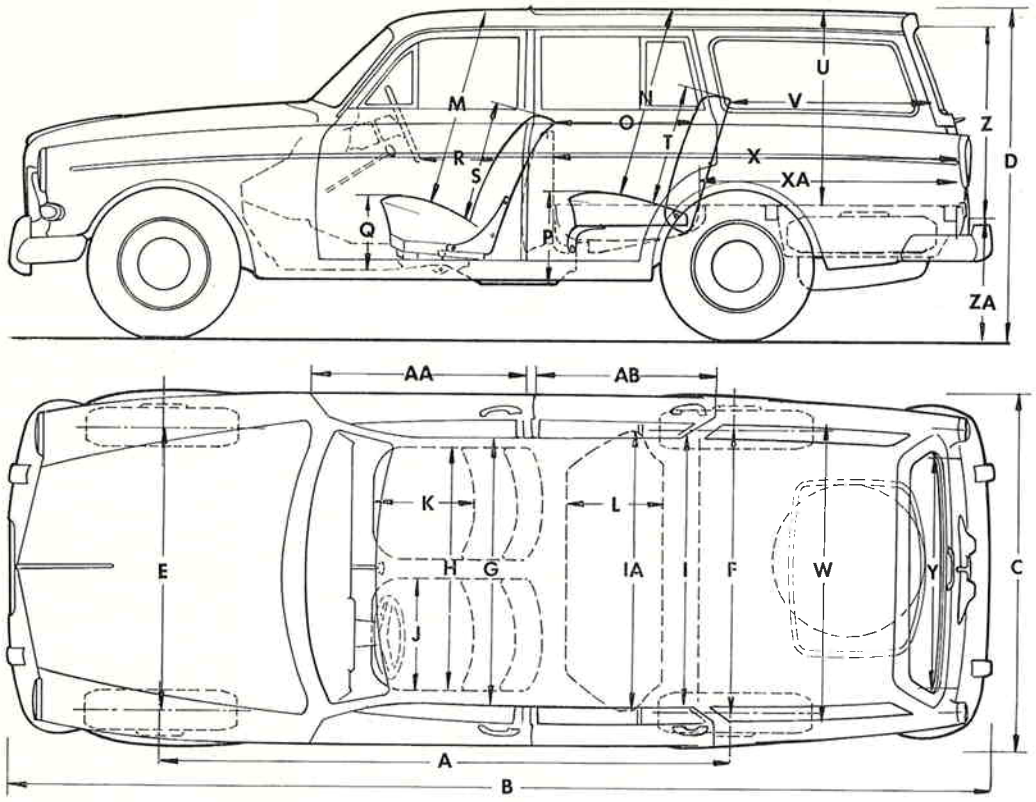
*) United States market only.

Type plates



1. The chassis number is stamped on the bulkhead.
2. Engine type designation, serial and part numbers.
3. Body number.
4. Gearbox type designation, serial and part numbers.
5. Vehicle type designation, chassis number, colour and upholstery codes.
6. Rear axle. Number of teeth and ratio on plate attached to lower part of inspection cover.

GENERAL DATA



VOLVO
26890

Dimensions:

		* mm	* in.	** mm	** in.
A	Wheelbase	2600	102.36		
B	Overall length	4490	176.77		
C	Overall width	1620	63.78		
D	Overall height	1530	60.24		
E	Track, front	1315	51.78		
F	Track, rear	1315	51.78		
G	Front seat width at shoulder height	1280	50.39	1340	52.75
H	Width over front seat, hip height	1340	52.75	1290	50.79
I	Rear seat width at shoulder height	1250	49.21	1330	52.36
IA	Rear seat width, hip height	1330	52.36	1240	48.81
J	Width of front seat	530	20.87		
K	Length (depth), front seat	470	18.50	500	19.69
L	Length (depth), rear seat	460	11.11	480	18.90
M	Roof height, front seat, 15 cm (6") in front of squab	980	38.58	950	37.40
N	Roof height, rear seat, 15 cm (6") in front of squab	910	35.83	950	37.40
O	Distance between front seat squab and rear seat cushion	600	23.62	700	27.56
P	Height of rear seat cushion above floor	370	14.57	400	15.75
Q	Height of rear seat cushion above floor	330	12.99	340	13.39
R	Space between steering wheel and squab	350	13.78	390	15.35
S	Height of front squab	540	21.26		
T	Height of rear squab	550	21.65	580	22.83
U	Height, floor-roof of luggage space	865	34.06		
V	Distance between rear squab and rear door	970	38.19	900	35.43
W	Width, luggage space	1260	49.61		
X	Length, luggage space (rear seat folded down)	1830	72.05		
XA	Length, luggage space (rear seat in raised position)	1185	46.65		
Y	Width of rear door	1055	41.54		
Z	Height of rear door	780	30.71		
ZA	Loading height	620	24.41		
AA	Door width, front	935	36.81		
AB	Door width, rear	840	33.07		
	The front seats can be fully adjusted lengthwise	150	5.91	225	8.86

Turning circle:
Outermost edge of vericle .... 11200 mm (37 ft. 4 in.)
Kerb to kerb ..... 10600 mm (35 ft.)

Type designation	Kerb weight		Dry weight		Axle pressure (with kerb weight)			
					Front		Rear	
	kg	lb.	kg	lb.	kg	lb.	kg	lb.
VA/HA	1260	2777	1140	2513	592	1305	668	1472
VB/HB	1260	2777	1140	2513	592	1305	668	1472
VD/HD	1270	2799	1146	2526	597	1316	673	1483
VE/HE	1270	2799	1146	2526	597	1316	673	1483

* Up to chassis number 17949.
** W.e.f. chassis number 17950.

LUBRICATION

ENGINE

Oil capacity, with oil filter	3.75 litres (3 1/2 Imp. qts. = 4 US qts.)
without oil filter	3.25 litres (3 1/4 Imp. qts. = 3 1/2 US qts.)
Oil pressure at 2000 r.p.m. (with warm engine and new oil	3.5—6.0 kg/cm² (50—85 lb/sq.in.)
Lubricant	Engine oil for Service MS
viscosity, all the year round	Multigrade oil SAE 10W—30
viscosity, below 0° C (32° F)	SAE 10W
between 0 and 30° C (32 and 90° F)	SAE 20
above 30° C (90° F)	SAE 30
Oil for carburetter damping cylinders	SAE 20 engine oil (multigrade oil may not be used)

GEARBOX

Lubricant, type	Gear oil
viscosity, below 0° C (32° F)	SAE 80
above 0° C (32° F)	SAE 90
Oil capacity	0.75 litres (1 1/4 Imp. pints = 1 1/2 US pints)

DIFFERENTIAL

Lubricant, type	Hypoid oil
viscosity, below 0° C (32° F)	SAE 80
above 0° C (32° F)	SAE 90
Oil capacity	1.3 litres (2 3/8 Imp. pints = 2 3/4 US pints)

STEERING BOX

Lubricant, type	Hypoid oil
viscosity, below 0° C (32° F)	SAE 80
above 0° C (32° F)	SAE 90
Oil capacity	0.25 litres (3/8 Imp. pint = 1/2 US pint)

ENGINE

GENERAL

	B 18 A	B 18 D
Type designation	(496801 and 496814)*	(496802-815-816-817)
Output, h.p. at r.p.m. (SAE)	75/4500	90/5000
(DIN)	68/4500	80/5000
Max torque, kgm (lb.ft.) at r.p.m. (SAE)	14.0 (103)/2800	14.5(105)/3500
(DIN)	13.5(98)/2600	14.0(103)/3000
Compression pressure (warm engine) when turned over with starter motor, 250—300 r.p.m. kg/cm²	11—13	
lb./sq.in.	156.4—185.0	
Compression ratio	8.5:1	
Number of cylinders	4	
Bore	84.14 mm (3.313″)	
Stroke	80 mm (3.150″)	
Displacement	1.78 litres	
Weight, including electrical equipment and carburetters	approx. 155 kg (342 lb.)	

* Refers to the engine model number, and is stamped on the right-hand side of the engine.

CYLINDER BLOCK

	B 18 A	B 18 D
Material	Special-alloy castiron	
Bore, nominal standard	84.14 mm (3.313″)	
0.020″ oversize	84.65 mm (3.333″)	
0.030″ oversize	84.90 mm (3.343″)	
0.040″ oversize	85.16 mm (3.353″)	
0.050″ oversize	85.41 mm (3.363″)	

PISTONS

Material	Light-alloy
Permissible weight deviation between pistons in same engine	10 grammes (0.35 oz.)
Height, overall, early prod.	83.5 mm (3.287″)
late prod.	71.0 mm (2.795″)
Height from gudgeon pin centre to piston crown	46 mm (1.811″)
Piston clearance	0.02—0.04 mm (0.0008—0.0016″)

Piston rings

Piston ring gap, measured in ring opening	0.25—0.50 mm (0.010—0.020″)
Piston ring oversizes	0.020″
	0.030″
	0.040″
	0.050″

COMPRESSION RINGS

Marked "TOP". Upper ring chromed.

Number on each piston	2
Height	1.98 mm (0.078″)
Piston ring clearance in groove	0.054—0.081 mm (0.0021—0.0032″)

SCRAPER RINGS

Number on each piston	1
Height	4.74 mm (0.1866″)
Piston ring clearance in groove	0.044—0.072 mm (0.0017—0.0028″)

GUDGEON PINS

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″)
0.05 mm (0.002″) oversize	22.05 mm (0.868″)
0.10 mm (0.004″) oversize	22.10 mm (0.870″)
0.20 mm (0.008″) oversize	22.20 mm (0.874″)

CYLINDER HEAD

Height, measured from cylinder head face to bolt head level	88 mm (3.46″)
Distance from the upper surface of the cylinder head to the upper end of the overflow pipe (pipe located under thermostat)	35 mm (1.38″)

CRANKSHAFT

Crankshaft, end play	0.017—0.108 mm (0.0007—0.0043″)
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″)

Main bearings

	B 18 A	B 18 D
MAIN BEARING JOURNALS		
Diameter, standard	63.441—63.454 mm (2.4977—2.4982″)	
0.010″ undersize	63.187—63.200 mm (2.4877—2.4882″)	
0.020″ undersize	62.933—62.946 mm (2.4777—2.4782″)	
0.030″ undersize	62.679—62.692 mm (2.4677—2.4682″)	
0.040″ undersize	62.425—62.438 mm (2.4577—2.4582″)	
0.050″ undersize	62.171—62.184 mm (2.4477—2.4482″)	
Width on crankshaft for pilot bearing shell		
Standard	38.930—38.970 mm (1.5327—1.5343″)	
Oversize 1 (0.010″ undersize shell)	39.031—39.072 mm (1.5367—1.5383″)	
2 (0.020″ undersize shell)	39.133—39.173 mm (1.5407—1.5423″)	
3 (0.030″ undersize shell)	39.235—39.275 mm (1.5447—1.5463″)	
4 (0.040″ undersize shell)	39.336—39.376 mm (1.5487—1.5503″)	
5 (0.050″ undersize shell)	39.438—39.478 mm (1.5527—1.5543″)	
MAIN BEARING SHELLS		
Thickness, standard	1.985—1.991 mm (0.0781—0.0784″)	
0.010″ undersize	2.112—2.118 mm (0.0831—0.0834″)	
0.020″ undersize	2.239—2.245 mm (0.0881—0.0884″)	
0.030″ undersize	2.366—2.372 mm (0.0931—0.0934″)	
0.040″ undersize	2.493—2.499 mm (0.0981—0.0984″)	
0.050″ undersize	2.620—2.626 mm (0.1031—0.1034″)	

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″)	
0.010″ undersize	53.835—53.848 mm (2.1195—2.1200″)	
0.020″ undersize	53.581—53.594 mm (2.1095—2.1100″)	
0.030″ undersize	53.327—53.340 mm (2.0995—2.1000″)	
0.040″ undersize	53.073—53.086 mm (2.0895—2.0900″)	
0.050″ undersize	52.819—52.832 mm (2.0795—2.0800″)	
BIG-END BEARING SHELLS		
Thickness, standard	1.833—1.841 mm (0.0722—0.0725″)	
0.010″ undersize	1.960—1.968 mm (0.0772—0.0775″)	
0.020″ undersize	2.087—2.095 mm (0.0822—0.0825″)	
0.030″ undersize	2.214—2.222 mm (0.0872—0.0875″)	
0.040″ undersize	2.341—2.349 mm (0.0922—0.0925″)	
0.050″ undersize	2.468—2.476 mm (0.0972—0.0975″)	

CONNECTING RODS

End play on crankshaft	0.15—0.35 mm (0.006—0.014″)
Length, centre to centre	145±0.1 mm (5.710±0.004″)
Max. permissible weight deviation between connecting rods in same engine	6 grammes (0.21 oz.)

FLYWHEEL

Permissible axial throw, max.	0.05 mm (0.002″) at a diam. of 150 mm (6″)
Ring gear (chamfer facing forwards)	142 teeth

FLYWHEEL HOUSING

Max. axial throw for rear face	0.05 mm (0.002″) at a diam. of 100 mm (4″)
Max. radial throw for rear guide	0.15 mm (0.006″)

CAMSHAFT

	B 18 A	B 18 D
Marking	A	
Number of bearings	3	
Front bearing journal, diameter	46.975—47.000 mm (1.8494—1.8504″)	
Centre bearing journal, diameter	42.975—43.000 mm (1.6919—1.6929″)	
Rear bearing journal, diameter	36.975—37.000 mm (1.4557—1.4567″)	
Radial clearance	0.020—0.075 mm (0.0008—0.0030″)	
End play	0.020—0.060 mm (0.0008—0.0024″)	
Valve clearance for control of camshaft setting (cold engine)	1.1 mm (0.04″)	
Inlet valve should then open at	10° after T.D.C.	

Camshaft bearings

Front bearing, diameter	47.020—47.050 mm (1.8512—1.8524″)
Centre bearing, diameter	43.025—43.050 mm (1.6939—1.6949″)
Rear bearing, diameter	37.020—37.045 mm (1.4575—1.4585″)

TIMING GEARS

Crankshaft gear, number of teeth	21
Camshaft gear (fibre), number of teeth	42
Backlash	0.04—0.08 mm (0.0016—0.0032″)
End play, camshaft	0.02—0.06 mm (0.0008—0.0023″)

VALVES

Inlet

Disc diameter	40 mm (1.58″)
Stem diameter	8.685—8.700 mm (0.3419—0.3425″)
Valve seat angle	44.5°
Seat angle in cylinder head	45°
Seat width in cylinder head	1.4 mm (0.06″)

Exhaust

Disc diameter	35 mm (1.38″)
Stem diameter	8.645—8.660 mm (0.3404—0.3409″)
Valve seat angle	44.5°
Seat angle in cylinder head	45°
Seat width in cylinder head	1.4 mm (0.06″)

Valve clearance

Clearance, both warm and cold engine, exhaust	0.40—0.45 mm (0.016—0.018″)
Clearance, both warm and cold engine, inlet	0.40—0.45 mm (0.016—0.018″)

VALVE GUIDES

Length	63 mm (2.48″)
Inner diameter	8.725—8.740 mm (0.3435—0.3441″)
Height above upper face of head	21 mm (0.83″)
Clearance, valve stem—guide, inlet valve	0.025—0.055 mm (0.0010—0.0022″)
exhaust valve	0.065—0.095 mm (0.0026—0.0037″)

VALVE SPRINGS

Early prod.:

Length, without loading, approx.	45 mm (1.77″)
with a loading of 25.5±2.0 kg (56±4 1/2 lb.)	39 mm (1.54″)
with a loading of 66.0±3.5 kg (145±8 lb.)	30.5 mm (1.20″)

	B 18 A	B 18 D
Late prod.:		
Length, without loading, 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 (182±9 1/2 lb.)	30 mm (1.18″)	

LUBRICATING SYSTEM

Oil capacity, with oil filter	3.75 litres (3 1/2 Imp. qts. = 4 US qts.)
without oil filter	3.25 litres (3 1/4 Imp. qts. = 3 1/2 US qts.)
Oil pressure at 2000 r.p.m. (with warm engine and new oil)	3.5—6.0 kg/cm² (50—85 lb./sq.in.)
Lubricant	Engine oil for Service MS
viscosity, all the year round	Multigrade oil SAE 10W—30
viscosity, below 0° C (32° F)	SAE 10W
between 0 and 30° C (32 and 90° F)	SAE 20
above 30° C (90° F)	SAE 30

Lubricating oil filter

Type	Full-flow
Make	Wix or Mann

Lubricating oil pump

Lubricating oil pump, type	Gear
number of teeth on each gear	10
end play	0.02—0.10 mm (0.0008—0.0040″)
radial clearance	0.08—0.14 mm (0.0032—0.0055″)
backlash	0.15—0.35 mm (0.0060—0.0140″)

Relief valve springs (in oil pump)

Length, unloaded, early prod.	approx. 31 mm (1.22″)
late prod.	approx. 32.5 mm (1.28″)
loaded with 4.0±0.2 kg (9±1/2 lb.), early prod.	27.5 mm (1.08″)
9.5±0.3 kg (21±3/4 lb.)	22.5 mm (0.88″)
8.0±0.8 kg (17 1/2±1 3/4 lb.), late prod.	22.5 mm (0.88″)

FUEL SYSTEM

Fuel pump

Fuel pump, type I, diaphragm pump	AC-UG
Fuel pump, type II, diaphragm pump	Pierburg APG
Fuel ump, type III, diaphragm pump	AC-YD
Fuel pressure, measured at same level as pump	min. 0.11 kg/cm² (1.5 lb./sq.in.) max. 0.25 kg/cm² (3.5 lb./sq.in.)

Carburetters

Type	Down-draught	Horizontal
Make and designation	Zenith 36 VN	SU-HS 6

DATA (ZENITH 36 VN)

Venturi	30
Main jet	117
Compensating jet	115
Idling jet	70
Air jet for idling	70
Air jet for partial acceleration	140
Acceleration jet, early prod.	40
late prod.	50

	B 18 A	B 18 D
Acceleration pump stroke	Short	
Float valve	1.75	
Gasket for float valve, thickness	1 mm (0.04″)	
Idling speed (warm engine)	500—700 r.p.m.	

DATA (SU-HS 6)

Number		2
Size (air intake diameter)		44.5 mm (1 3/4″)
Fuel needle, designation		ZH
Idling speed		500—700 r.p.m.
Oil for damping cylinders		SAE 20, engine oil (not multigrade)

IGNITION SYSTEM

Voltage	12 V	
Order of firing	1—3—4—2	
97 octane ROT	21—23° before T.D.C.	
97—100 octane ROT		22—24° before T.D.C.
at 1500 engine r.p.m. (vacuum regulator disconnected)		
Sparking plugs	Bosch W 175 T1 or equivalent	
Sparking plug gap	0.7—0.8 mm (0.028—0.032″)	
tightening torque	3.8—4.5 kgm (28—32 lb.ft.)	

Distributor

Make	Bosch
Breaker points, gap	0.4—0.5 mm (0.016—0.018″)
pressure	0.4—0.6 kg (0.88—1.32 lb.)
Dwell angle	61° ± 4°
Direction of rotation	Anti-clockwise

COOLING SYSTEM

Type	Pressure
Radiator cap valve opens at	0.25—0.30 kg/cm² (3—4 lb./sq.in.) pressure
Capacity	approx. 8.5 litres (2 Imp. galls. = 2 1/4 US galls.)
Fan belt, designation	HC 38 × 35″
tension: The pulley should start slipping when the force applied is	8.0—11.0 kg (17.6—24.3 lb.) at a lever of 150 mm (6″)

Anti-freeze

Amount of glycol required for frost-protection down to	
−10° C (+15° F)	2 litres (3 1/2 Imp. pints = 4 US pints)
−20° C (−5° F)	3 litres (5 1/4 Imp. pints = 6 US pints)
−30° C (−22° F)	4 litres (7 Imp. pints = 9 US pints)
−40° C (−40° F)	4.5 litres (1 Imp. gall. = 1 1/4 US gall.)

The maximum depression of freezing point down to −56° C (−70° F) is obtained by adding 5.1 litres (1 1/8 Imp. galls = 1 1/4 US galls) of ethylene glycol.

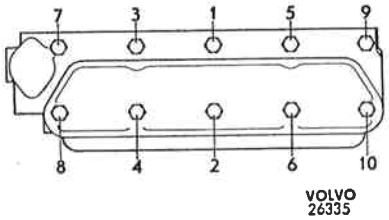
Thermostat

Type	Fulton Sylphon 1—1700-D 3
Marked	170
Starts to open at	75—78° C (167—172° F)
Fully open at	89° C (192° F)

WEAR TOLERANCES

	B 18 A	B 18 D
Cylinder		
To be rebored when wear reaches (if engine shows abnormal oil consumption)	0.25 mm (0.010″)	
Crankshaft		
Permissible out-of-round on main bearing journals, max.	0.05 mm (0.002″)	
Permissible out-of-round on big-end bearing journals, max.	0.07 mm (0.003″)	
Crankshaft end play, max.	0.15 mm (0.006″)	
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″)	
Camshaft		
Permissible out-of-round (with new bearings), max.	0.07 mm (0.0030″)	
Bearings, permissible wear	0.02 mm (0.0008″)	
Timing gears		
Permissible backlash, max.	0.12 mm (0.005″)	

Tightening torques	Kgm	Lb.ft.
Cylinder head	8.5—9.5	61—69
Main bearings	12—13	87—94
Big-end bearings	5.2—5.8	38—42
Flywheel	4.5—5.5	33—40
Sparking plugs	3.8—4.5	27—33
Camshaft nut	13—15	94—108
Crankshaft pulley bolt	7—8	51—58
Dynamo bolt (3/8″—16″)	3.5—4.0	25—29
Oil filter nipple	4.5—5.5	33—40
Oil sump bolts	0.8—1.1	6—8



Tightening sequence, cylinder head bolts

ELECTRICAL SYSTEM

BATTERY

Type	Boliden 107GM60 or equivalent
Earthed	Negative terminal
Voltage	12 V
Battery capacity, standard	60 Ah

	B 18 A	B 18 D
Electrolyte specific gravity:		
Fully charged battery	1.275—1.285	
When recharging is necessary	1.230	
Recommended charging current	4.5 A	

IGNITION SYSTEM

Order of firing	1—3—4—2	
Ignition setting:		
97 octane ROT	21—23° before T.D.C.	
97—100 octane ROT		22—24° before T.D.C.
at 1500 engine r.p.m. (vacuum regulator disconnected)		
Ignition coil	Bosch ZS/KZ 1/12 A (14/3)	
Sparking plug, type	Bosch W 175 T 1 or equivalent	
thread	14 mm (0.06″)	
gap	0.7—0.8 mm (0.028—0.032″)	
tightening torque	3.8—4.5 kgm (27.5—32.5 lb.ft.)	

DISTRIBUTOR

Make	Bosch	
Designation	VJU 4 BL 33 (JFUR 4)	Early prod. VJU 4 BL 33 (JFUR 4) Late prod. JFR 4

Test values (VJU 4 BL 33)

Direction of rotation	Anti-clockwise			
Ignition setting values, centrifugal regulator:				
Crankshaft degrees	0	10	22	22±3
Crankshaft r.p.m.	750—1050	1300—1850	2300—2900	2800—3300
Vacuum regulator:				
Crankshaft degrees	6		15±4	
Vacuum cm (in.) Hg	6—10 (2.36—3.94″)		18 (7.09″)	
Breaker points, gap	0.4—0.5 mm (0.016—0.020″)			
pressure	0.4—0.5 kg (0.88—1.10 lb.)			
dwell angle	57—63°			

Test values (JFR 4)

Direction of rotation	Anti-clockwise			
Ignition setting values, centrifugal regulator:				
Crankshaft degrees	0	10	20	26±3
Crankshaft r.p.m.	510—1050	1450—1920	2350—3700	4600—4900
Breaker points, gap	0.4—0.5 mm (0.016—0.020″)			
pressure	0.50—0.63 kg (1.1—1.4 lb.)			
dwell angle	59—65°			

DYNAMO

Make	Bosch	
Designation	LJ/GG 240 12/ 2400 AR 7	LJ/GG 240 12/ 2400 AR 6
Voltage	12 V	
Rated effect	240 W	
Max. continuous effect	30 A	
Earthed	Negative terminal	
Direction of rotation	Clockwise	
Ratio, engine—dynamo	1.8:1	
Brushes, designation	WSK 43 L 1	
number	2	
pressure	450—600 grammes (1.0—1.3 lb.)	

Test values	B 18 A	B 18 D
Field winding resistance		4.8 + 0.5 ohms
Charging, cold dynamo, 240 W		2300 r.p.m.
warm dynamo, 240 W		2500 r.p.m.
Speed for rated voltage, unloaded		1700 r.p.m.

Charging relay

Make	Bosch RS/VA 240/12/2
Equalizing resistance aR	15.5—16.5 ohms
Control resistance wR	8—9 ohms

Test values

Reverse current relay:	
Adjusted for, cutting-in at	12.4—13.1 V
reverse current at	2.0—7.5 A
Voltage control:	
Control voltage, dynamo unloaded (idling)	14.1—14.8 V
loaded	13.0—14.0 V
Loading current:	
Cold dynamo and voltage control	45 A
Warm dynamo and voltage control	30 A

STARTER MOTOR (early prod.)

Make	Bosch EGD 1/12 AR 37
Voltage	12 V
Earthed	Negative terminal
Direction of rotation	Clockwise
Output	about 0.9 h.p. at −10° C (+15° F)
	about 1.2 h.p. at +20° C (70° F)
Number of teeth on pinion	9
Brushes, designation	DSK 35/5
number	4

Test values

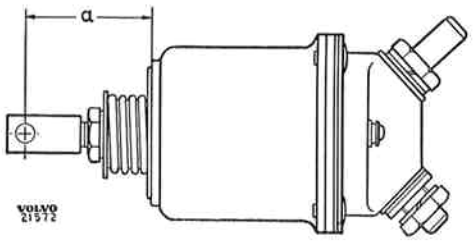
Mechanical:		
Rotor end play		0.1—0.3 mm (0.004—0.012″)
Brush spring tension		0.8—0.9 kg (1.76—1.98 lb.)
Distance from pinion to ring gear		2.5—3.0 mm (0.10—0.12″)
Frictional torque of rotor brake		3—5 kgcm (2.6—3.4 lb.in.)
Pinion idling torque		1.3—1.8 kgcm (1.13—1.56 lb.in.)
Backlash		0.35—0.60 mm (0.014—0.024″)
Pinion modulus		2.11
Electrical:		
Unloaded starter motor:		
11.5 V and 40—60 A		5500—7500 r.p.m.
Loaded starter motor:		
10 V and 200 A		1100—1300 r.p.m.
Locked starter motor:		
r.p.m. = 0	8 V	400—450 A

CONTROL SOLENOID

	B 18 A	B 18 D

Test values

Cut-in voltage	Max. 7 V
Adjusting measurement "a"	32.2±0.1 mm (1.27±0.004")



Adjusting the control solenoid (iron core withdrawn).

STARTER MOTOR (late prod.)

Make and designation	Bosch GF 12 V 1 PS
Voltage	12 V
Earthed	Negative terminal
Direction of rotation	Clockwise
Output	about 1 h.p.
Number of teeth on pinion	9
Brushes number	4

Test values

Mechanical:		
Rotor end play	0.05—0.30 mm (0.002—0.012")	
Brush spring tension	1.15—1.30 kg (2.54—2.86 lb.)	
Distance between pinion and ring gear	1.2—4.4 mm (0.047—0.173")	
Frictional torque of rotor brake	2.5—4.0 kgcm (2.2—3.5 lb.in.)	
Pinion idling torque	1.3—1.8 kgcm (1.13—1.56 lb.in.)	
Backlash	0.35—0.45 mm (0.014—0.018")	
Pinion modulus	2.11	
Electrical:		
Unloaded starter motor:		
12.0 V and 40—50 A	6900—8100 r.p.m.	
Loaded starter motor:		
9 V and 185—200 A	1050—1350 r.p.m.	
Locked starter motor:		
r.p.m. = 0	6 V	300—350 A

CONTROL SOLENOID

Cut-in voltage	Max. 8 V

FUSES

Fusebox under bonnet on left side of cowl	Three 8 A, one 25 A

BULBS

	Watts	Socket	Number
Headlights	45/40	P 45 t	2
Parking lights, front	5	Ba 15 s	2
Flashers, front	32 CP*	Ba 15 s	2
rear	32 CP*	Ba 15 s	2

	B 18 A	B 18 D	
Brake/parking lights, rear	32/4 CP*	Ba 15 d spec.	2
Tail lights	15	Ba 15 s	2
Number plate lighting	5	S 8	2
Roof light	10	S 8	1
Parcel shelf light	2	Ba 9 s	1
Instrument and heater control lamps	2	Ba 9 s	3
Warning lamps, directional indicators	2	Ba 9 s	1
headlamps	2	Ba 9 s	1
charging	2	Ba 9 s	1
oil pressure	2	Ba 9 s	1

* "CP" = Candle Power.

POWER TRANSMISSION, REAR AXLE

CLUTCH

Type	Single dry-disc
Size	8 1/2" (215.9 mm)
Friction area, total	440 cm² (68.2 sq.in)
Clutch yoke free travel	3—4 mm (0.12—0.16")
Clutch pedal travel	140 mm (5 1/2")
Rivets for clutch facings:	
Number	16
Size	9/64" × 7/32" (3.5 × 5.5 mm)
Distance between clutch throw-out lever (thrust washer) contact surface for throw-out bearing and flywheel	46 mm (1.81")
Clutch plate thickness when fitted	7.0—7.5 mm (0.276—0.295")
Clutch springs:	
Marking	Neutral
Number	6
Length, loaded with 85.5—90.5 kg (188—199 lb.)	38 mm (1.496")
Clutch throw-out lever adjustment:	
Adjustment in clutch fixture SVO 2322	41.5
Spacing block number	0

GEARBOX

Type designation, serial number and part number stamped on a plate attached to the bottom of the gearbox.

Type designation	M 40
Reduction ratios:	
1st speed	3.13:1
2nd speed	1.99:1
3rd speed	1.36:1
4th speed	1:1
Reverse	3.25:1
Number of teeth on the different gears:	
Input shaft	19
Countershaft, drive gear	27
1st speed gear	15
2nd speed gear	20
3rd speed gear	23
gear for reverse	14

	B 18 A	B 18 D
Mainshaft, 1st speed gear	33	
2nd speed gear	28	
3rd speed gear	22	
gear for reverse	32	
Reverse gear	19	
Lubricant, type	Gear oil	
Viscosity, continuous temperatures below 0° C (32° F)	SAE 80	
above 0° C (32° F)	SAE 90	
Oil capacity	0.75 litre (1 1/4 Imp. pints = 1 1/2 US pints)	

PROPELLER SHAFT

Type	Tubular, divided, three universal joints, centre bearing
Universal joints, make and type	Hardy-Spicer with needle bearings
Lubricant, universal joints	Chassis grease

REAR AXLE

Number of teeth and reduction ratio stamped on plate on lower part of inspection cover.

Make and model	Salisbury, 3 HA
Type	Semi-floating
Track	1315 mm (51 3/4")
End play for drive shafts	0.07—0.20 mm (0.0027—0.0059")

Final drive

Type	Hypoid
Reduction ratio	4.55:1 (1/50)
Axial throw, crown wheel	max. 0.08 mm (0.0032")
Backlash (pinion-crown wheel)	0.10—0.20 mm (0.0039—0.0079")
Tension for pinion bearings	9—14 kgcm (7.8—12.2 lb.in.)
Lubricant, type	Hypoid oil
Viscosity, continuous temperatures below 0° C (32° F)	SAE 80
above 0° C (32° F)	SAE 90
Oil capacity	1.3 litres (2 1/4 Imp. pints = 2 3/4 US pints)

Tightening torques

	Kgm	Lb.ft.
Flange	28—30	200—220
Cap	8.5—10.0	60—70
Crown wheel	5.5—7.0	40—50

BRAKES

WHEEL BRAKE UNITS

Vehicles with drum brakes

Brake drum, diameter, front wheel	10" (254 mm)
rear wheel	9" (228.6 mm)
radial throw, max.	0.15 mm (0.006")
Brake linings, riveted model:	
Width	2"
Thickness, rear lining, front wheel	1/4 × 3/16" (ground)
others	3/16"
Length, front wheel, front shoe	192 mm (7 1/2")
rear shoe	250 mm (9 27/32")
rear wheel, front shoe	212 mm (8 11/32")
rear shoe	250 mm (9 27/32")

	B 18 A B 18 D
Effective brake lining area, front wheels	497 cm² (77 sq.in.)
rear wheels	451 cm² (70 sq.in.)
total	948 cm² (147 sq.in.)
Rivets for brake linings, size	9/64 × 5/16″ (3.5 × 8 mm)
Brake linings, bonded model:	
Width	2″
Thickness, rear lining, front wheel	1/4 × 3/16″ (ground)
others	3/16″
Length, front wheel, front shoe	190 mm (7 1/2″)
rear shoe	245 mm (9 13/16″)
rear wheel, front shoe	165 mm (6 1/2″)
rear shoe	220 mm (8 21/32″)
Effective brake lining area, front wheels	441 cm² (68 sq.in.)
rear wheels	398 cm² (61 sq.in.)
total	839 cm² (129 sq.in.)

MASTER CYLINDER

Inner diameter	7/8″ (22.2 mm)
Clearance between piston and cylinder	0.001—0.005″ (0.025—0.127 mm)
Tightening torque for master cylinder push rod adjuster nuts	1.1—1.2 kgm (8—9 lb.ft.)

WHEEL UNIT CYLINDERS

Inner diameter, front wheel	1″ (25.4 mm)
rear wheel	13/16″ (20.64 mm)
Clearance between piston and cylinder	0.001—0.005″ (0.025—0.127 mm)

BRAKE LINES

External diameter	3/16″

Vehicles with disc brakes

FRONT WHEEL BRAKES

Type	Disc brakes
Brake disc:	
External diameter, early prod.	276.5 mm (10.88″)
late prod.	268.5 mm (10.57″)
Thickness, new	12.7—12.8 mm (0.500—0.504″)
reconditioned	Min. 12.2 mm (0.480″)
Thickness variation	Max. 0.03 mm (0.001″)
Run-out	Max. 0.10 mm (0.004″)
Brake pads:	
Number per wheel	2
Thickness	10.7 mm (0.421″)
Effective area per wheel	92.5 cm² (14.3 sq.in.)
Wheel unit cylinders:	
Number per wheel	3
Diameter, inner cylinder	2 1/8″ (53.98 mm)
outer cylinder	1 1/2″ (38.1 mm)
Tightening torque, inner bolts	6.2—7.0 kgm (45—50 lb.ft.)
outer bolts	3.5—4.2 kgm (25—30 lb.ft.)

REAR WHEEL BRAKES	B 18 A	B 18 D
Type	Drum brakes	
Brake drum:		
Diameter	9″ (228.6 mm)	
Radial throw	Max. 0.15 mm (0.0006″)	
Brake linings:		
Width	2″ (50.8 mm)	
Thickness	3/16″ (4.76 mm)	
Length	220 mm (8.66″)	
Effective brake lining area per wheel	223 cm² (35 sq.in.)	
Rivets for brake linings, size	11/64 × 17/64″ (6.7 × 4.4 mm)	
number per shoe	10	

WHEEL UNIT CYLINDERS

Inner diameter	3/4″ (19.04 mm)
Clearance between piston and cylinder	Max. 0.25 mm (0.001″)

MASTER CYLINDER

Inner diameter	3/4″ (19.05 mm)
Clearance between piston and cylinder	Max. 0.20 mm (0.0008″)

BRAKE LINES

External diameter	3/16″

SERVO BRAKE CYLINDER

Make and designation, early prod.	Girling AHV 550 MK 2
late prod.	Girling AHV 550 MK 2 A
Vacuum cylinder diameter	5 1/2″ (139.7 mm)
Test values at 0.7 kg/cm² (10 lb./sq.in.) vacuum:	
Outgoing hydraulic pressure at input pressure of 2.5 kg/cm² (35.6 lb./sq.in.)	Min. 3.5 kg/cm² (50 lb./sq.in.)
Outgoing hydraulic pressure at input pressure of 35 kg/cm² (498 lb./sq.in.)	Min. 67 kg/cm² (950 lb./sq.in.)
Tightening torque, screws in valve housing	0.3—0.4 kgm (2—3 lb.ft.)
screws for vacuum cylinder	1.4—1.8 kgm (10—12 lb.ft.)
screws for vacuum cylinder cap	0.3—0.4 kgm (2—3 lb.ft.)
screws for air filter casing	0.3—0.4 kgm (2—3 lb.ft.)

FRONT AXLE AND STEERING GEAR

WHEEL ALIGNMENT (unloaded vehicle)

Caster	0 to +1°
Camber	0 to +1/2°
King pin inclination at 0° camber	8°
Toe-in	0 to 4 mm (0.16″)
Steering geometry:	
When the outer wheel is turned 20° the inner wheel should be turned	21.5 to 23.5°
Max. turning angle outwards	40°

FRONT AXLE

	B 18 A	B 18 D
Shims at front axle member	Thickness = 2 mm	
	Thickness = 3 mm	
Shims at upper wishbone	0.15 mm	
	0.5 mm	
	1 mm	
	3 mm	
	6 mm	

STEERING GEAR

Steering wheel diameter	430 mm (17″)
Number of turns (from lock to lock)	3 1/4
Steering box, type	Gemmer, cam and roller
reduction ratio	15.5:1
Turning circle	10300 mm (37 ft. 2 in.)
Shims for steering cam bearings	Thickness = 0.10 mm
	Thickness = 0.12 mm
	Thickness = 0.15 mm
	Thickness = 0.30 mm
Washer between adjuster screw and pitman arm shaft (0.05 mm stages)	Thickness = 2.20—2.45 mm
Lubricant for steering box, type	Hypoid oil
Viscosity, continuous temperatures below 0° C (32° F)	SAE 80
abov 0° C (32° F)	SAE 90
Oil capacity	0.25 litre (3/8 Imp. pint = 1/2 US pint)
Relay arm:	
Necessary torque	10—20 kgcm (8.7—17.4 lb.in.)
Shims	Thickness = 0.10 mm
	Thickness = 0.15 mm
	Thickness = 0.35 mm

Tightening torques

	Kgm	Lb.ft.
Nyloc nut on relay arm shaft	8.5	60
Steering wheel nut	3.5—5	25—35
Pitman arm nut	13.5—16.5	100—120
Slotted nut for steering rod and tie rod	3.2—3.7	23—27
Nut for wishbone clamp	2.0—2.5	14—18
Bolt for upper wishbone shaft	4.8—5.5	35—40

FRAME, SUSPENSION, WHEELS

SPRINGS

Front springs

Type	Coil springs
Material thickness	14.1—14.3 mm (0.555—0.563″)
External diameter	121.0—122.5 mm (4.763—4.823″)
Total number of coils	8.7
Test values:	
Loading for compression of 1 cm (25/64″)	47.8—51.8 kg (105—114 lb.)
measured within a spring length of	175—215 mm (6.89—8.46″)
Length when fully compressed	Max. 120 mm (4.72″)
Loading	481—511 kg (1060—1126 lb.)
for a spring length of	195 mm (7.68″)

Rear springs, standard

Type	Coil springs
Material thickness	12.28—12.48 mm (0.483—0.491″)

	B 18 A B 18 D
External diameter	127.5—129.0 mm (5.020—5.079″)
Number of coils	9.2
Test values:	
Loading for a compression of 1 cm (25/64″)	18.5—20.5 kg (41—45 lb.)
measured within a spring length of	227—267 mm (8.94—10.51″)
Length, fully compressed	Max. 110 mm (4.33″)
Loading	276—294 kg (608—648 lb.)
for a spring length of	247 mm (9.72″)

Rear springs, extra equipment

Type	Coil springs
Material thickness	12.77—12.97 mm (0.503—0.511″)
External diameter	127.5—129.0 mm (5.020—5.079″)
Total number of coils	9.5
Test values:	
Loading for a compression of 1 cm (25/64″)	22.4—24.4 kg (49 1/2—54 lb.)
measured within a spring length of	245—285 mm (9.65—11.22″)
Length, fully compressed	Max. 119 mm (4.68″)
Loading	273—297 kg (602—655 lb.)
for a spring length of	265 mm (10.43″)

SHOCK ABSORBERS

Type	Double-acting hydraulic telescopic shock absorbers
Overall length:	
front shock absorber, compressed	approx. 300 mm (12″)
extended	approx. 415 mm (18.3″)
rear shock absorber, compressed	approx. 270 mm (10.6″)
extended	approx. 428 mm (16.9″)

WHEELS

Rims

Type	Disc wheels
Designation	4 1/2 J × 15
Number of wheel nuts	5
Radial throw	Max. 2.5 mm (0.10″)
Run-out	Max. 2.5 mm (0.10″)
Out-of-balance (complete wheel)	Max. 900 gcm (0.8 lb.in.)
Wheel nut tightening torque	10—14 kgm (70—100 lb.ft.)

Tyres

Type	Tubeless
Size	6.40 × 15″
Number of plies	4
Rolling radius	315 mm (12 3/8″)
Number of wheel turns per km (mile)	approx. 492 (787)
Air pressure (cold tyres),	
with 1 or 2 persons: front	1.4 kg/cm² (20 lb./sq.in.)
rear	1.7 kg/cm² (24.2 lb./sq.in.)
with 5 persons and luggage: front	1.4 kg/cm² (20 lb./sq.in.)
rear	2.1 kg/cm² (30 lb./sq.in.)

INSTRUMENTS AND OTHER EQUIPMENT

SPEEDOMETER GEARS

B 18 A B 18 D

Tyres 6.40—15″

Rear axle ratio	Speedometer gears			Theoretical percentage error of mileometer
	Number of teeth		Ratio	
	Driving	Driven		
4.55:1 (11:50)	5	17	3.4	+2.7

The percentage error in the above table is calculated for a rolling radius of 330 mm (13″), which constitutes the value established by AB Volvo for tyres at a vehicle speed of 80 km.p.h. (50 m.p.h.).

The speedometer cable makes ..... 630 revolutions per registered km (1008 revolutions per registered mile)

REFERENCES TO WORKSHOP BULLETINS

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