



SERVICE MANUAL

CARS AND VANS

PV 830

Part. 13

SPECIFICATIONS

Export Service Department

AKTIEBOLAGET

VOLVO

GÖTEBORG . SWEDEN

Frans Klerck

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IMPORTANT

N.B. To avoid beforehand any possible confusion which may arise concerning the points and commas in the decimal figures in this book, we should like to point out that the *CONTINENTAL* system is used and not the English and American, i.e.

read $0,8 = \frac{8}{10}$ $0,08 = \frac{8}{100}$
 $1,000 = \text{One}$ $1.000 = \text{One thousand}$

However, with typical English measurements such as inches, the *ENGLISH* system is used, i.e.

$.004''$ and *not* $0,004''$

TYPE DESIGNATION

These specifications are concerned with vehicles and chassis of the following type designations:

Vehicle or chassis type	Wheel base	Engine	Gearbox	Rear axle gear ratio
PV 831	3250 mm (128")	} ED	} L-1	} 4,45:1 11:49) or } 4,27:1 (11:47)
PV 832	3250 mm (128")			
PV 833	3250 mm (128")	} ED	} L-1	} 4,45:1 (11:49)
PV 834	3550 mm (140")			

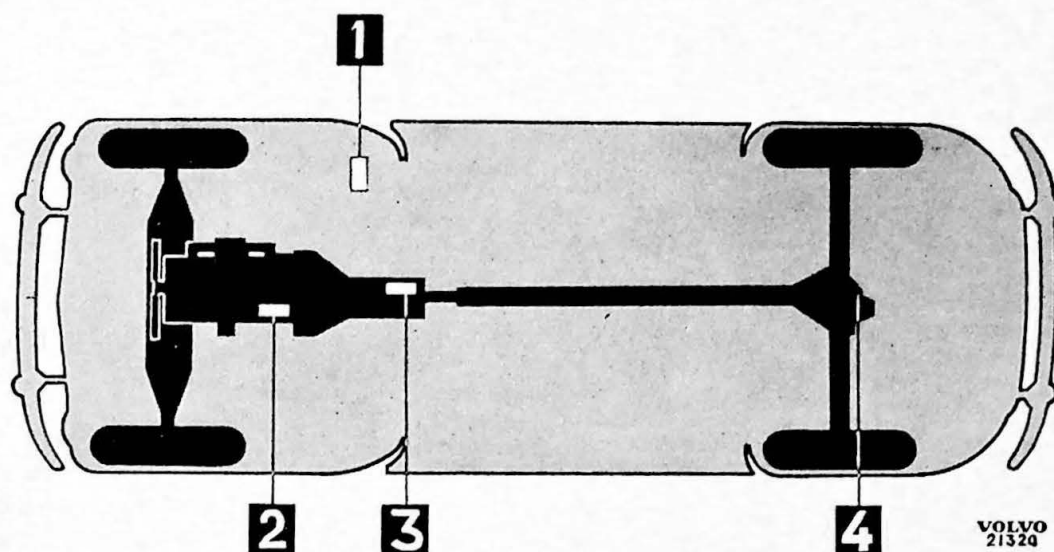


Fig. 1.

- Location of chassis number: Both the type designation and the chassis number are stamped on a plate attached to the right on the forward part of the cowl (1).
- Location of engine number: Engine Part No. and engine number are on a plate attached to the left side of the engine (2).
- Gearbox number: On a plate attached to the right side of the gearbox (3).
- Rear axle gear ratio: A plate on the lower part of the inspection cover shows the number of teeth (4).

GENERAL INFORMATION

	PV 831-32	PV 833	PV 834
Chassis weight	—	1215 kg (2678 lbs.)	1245 kg (2745 lbs.)
Service weight	1860 kg (4100 lbs.)	—	—
Payload with loading platform	—	900 kg (1984 lbs.)	850 kg (1874 lbs.)
Track, front	1505 mm (59 1/4")	1505 mm (59 1/4")	1505 mm (59 1/4")
„ rear	1524 mm (60")	1524 mm (60")	1524 mm (60")
Overall width	1850 mm (73")	1820 mm (71 1/2")	1820 mm (71 1/2")
Overall length	5210 mm (205")	5000 mm (197")	5300 mm (208 1/2")
Overall height	1780 mm (70")	—	—
Ground clearance	180 mm (7")	180 mm (7")	180 mm (7")
Turning circle, diameter	12500 mm (492")	12500 mm (492")	13500 mm (531")

ENGINE

General information

Type designation	ED
Output at 3600 r.p.m.	90 b.h.p.
Max torque at 1400 r.p.m.	22 kgm (159 lb. ft)
Number of cylinders	6
Bore	84,14 mm
Stroke	110 mm
Displacement, total	3,67 litres
Compression ratio	6,5:1
Compression pressure	9,0 kg/cm ² (128 p.s.i.) at 200 r.p.m.
Order of firing	1-5-3-6-2-4
Idling speed (warm engine)	ca. 400 r.p.m.
Weight	ca. 290 kg (639 lbs.)

Cylinder block

Material	Special alloy cast-iron
The cylinder cavities are bored directly in the block.	
Bore, standard	84,14 mm
.010" oversize	84,39 mm
.020" oversize	84,65 mm
.030" oversize	84,90 mm
.040" oversize	85,16 mm
.050" oversize	85,41 mm
.060" oversize	85,66 mm
.070" oversize	85,92 mm
.080" oversize	86,17 mm

Pistons

Pistons of different makes may not be fitted in the same engine.

Material	Light-alloy	
Weight, Zollner	537 grammes	
" Mahle	495 grammes	
Permitted weight difference between pistons in the same engine ..	10 grammes	
Total height	98,831—98,984 mm (3.891"—3.897")	
Height, from piston pin centre to piston top	55,423—55,575 mm (2.182"—2.188")	
Piston clearance, Zollner	0,06—0,08 mm (.0023"—.0032")	
Piston clearance, Mahle	0,04—0,06 mm (.0016"—.0023")	
	Zollner	Mahle
Diameter, standard	84,07 mm	84,09 mm
.010" oversize	84,32 mm	84,34 mm
.020" oversize	84,58 mm	84,60 mm
.030" oversize	84,83 mm	84,85 mm
.040" oversize	85,09 mm	85,11 mm
.050" oversize	85,34 mm	85,36 mm
.060" oversize	85,59 mm	85,61 mm
.070" oversize	85,85 mm	85,87 mm
.080" oversize	86,10 mm	86,12 mm

Piston rings

The top ring on each piston is chromium-plated. There are no oversizes.

Compression rings

Upper piston rings, number per piston	1
Height	1/8" early production 3/32" late production
Lower piston rings, number per piston	2"
Height	1/8"

Oil rings

Number per piston	1
Height	3/16"
Piston ring gap measured in ring opening	0,18—0,38 mm (.0071"—.0149")
Ring clearance in groove:	
1st compression ring	0,063—0,102 mm (.00248"—.00401")
2nd and 3rd compression rings	0,038—0,076 mm (.00150"—.00300")
Oil ring	0,037—0,088 mm (.00146"—.00346")
Piston ring overdimensions0025" .010" .020" .030" .040" .050" .060" .070" .080"

Piston pins

Fully floating, circlips at both ends in piston.	
Class of fit in connecting rod (18° C=65° F)	Push fit
Class of fit in piston (18° C=65° F)	Sliding fit
Diameter, standard	22 mm (.866")
0,05 mm oversize	22,05 mm (.868")
0,10 mm oversize	22,10 mm (.870")
0,20 mm oversize	22,20 mm (.874")

Cylinder head

Height, measured from cylinder head contact surface to cylinder head bolt level	50 mm (1 31/32")
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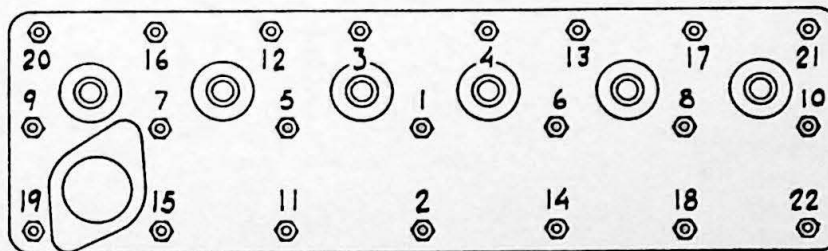


Fig. 2. Tightening sequence for cylinder head bolts.

Crankshaft

Replaceable bearing shells on main bearings and connecting rod bearings.	
Crankshaft axial clearance	0,10—0,20 mm (.0039"—.0079")
Main bearings, radial clearance	0,015—0,067 mm (.00059"—.00263")

Main bearings

Main bearing journals

Diameter, standard	60,271—60,286 mm
" undersize .010"	60,017—60,032 mm
" " .020"	59,763—59,778 mm
" " .030"	59,509—59,524 mm
" " .040"	59,255—59,270 mm
" " .050"	59,001—59,016 mm

Main bearing journal width (distance between webs):

Standard	44,100—44,150 mm
Oversize 0,1 mm (undersize shell .010")	44,200—44,250 mm
" 0,2 mm (" " .020")	44,300—44,350 mm
" 0,3 mm (" " .030")	44,400—44,450 mm
" 0,4 mm (" " .040")	44,500—44,550 mm
" 0,5 mm (" " .050")	44,600—44,650 mm

Main bearing shells

Thickness, standard	2,165—2,171 mm
undersize .010"	2,292—2,298 mm
" .020"	2,419—2,425 mm
" .030"	2,546—2,552 mm
" .040"	2,673—2,679 mm
" .050"	2,800—2,806 mm

Crankshaft bearings

Crankshaft bearings, radial clearance	0,018—0,053 mm (.00071"—.00209")
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Crankshaft bearing journals

Crankshaft bearing journal width	33,900—34,000 mm
Diameter, standard	53,950—53,960 mm
" undersize .010"	53,696—53,706 mm
" " .020"	53,442—53,452 mm
" " .030"	53,188—53,198 mm
" " .040"	52,934—52,944 mm
" " .050"	52,680—52,690 mm

Crankshaft bearing shells

Thickness, standard	1,726—1,732 mm
undersize .010"	1,853—1,859 mm
" .020"	1,980—1,986 mm
" .030"	2,107—2,113 mm
" .040"	2,234—2,240 mm
" .050"	2,361—2,367 mm

Connecting rods

Marked 1—6 on the camshaft side.

Fitted with replaceable bearing shells.

Side clearance at crankshaft end	0,05—0,25 mm (.002"—.0098")
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Flywheel

Permissible axial play (measured at a radius of 150 mm) max.	0,1 mm (.0039")
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Number of teeth on flywheel ring gear	146
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Flywheel housing

Permissible axial play, max.	0,2 mm (.0079")
Permissible radial play, max.	0,2 mm (.0079")

Camshaft

Chain drive.

Supported by four bearings.

Forward bearing journal, diameter	53,111—53,137 mm
2nd bearing journal, diameter	52,705—52,730 mm
3rd " " "	52,299—52,324 mm
4th " " "	38,024—38,049 mm
Radial clearance	0,025—0,076 mm (.001"—.003")
Clearance for checking camshaft timing	1 mm (.039")
Intake valves should open at	6° ± 4° ATDC

Camshaft bearings

Forward bearing, diameter	53,162—53,187 mm
2nd bearing journal, diameter	52,755—52,781 mm
3rd " " "	52,349—52,375 mm
4th " " "	38,074—38,100 mm

Timing gears

Crankshaft gear	18 teeth
Camshaft gear	36 teeth

Valve system

Valves

Intake:

Disc diameter	42 mm (1 21/32")
Stem diameter	8,674—8,700 mm
Valve seat angle	44 1/2°
Seat width in cylinder block	1,5—2 mm (1/16"—5/64")
Seat angle in cylinder block	45°
Clearance, warm engine	0,25 mm (.0098")

Exhaust:

Disc diameter	37 mm (1 15/32")
Stem diameter	8,674—8,700 mm
Valve seat angle	45°
Seat width in cylinder block	1,5—2 mm (1/16"—5/64")
Seat angle in cylinder block	45°
Clearance, warm engine	0,35 mm (.0138")

Valve seats

Intake valve seats:

Diameter, standard (measurement A)	44,987—44,013 mm
Height (measurement B)	5,500—5,630 mm (.217"—.222")

Valve seat position:

Diameter, standard (measurement A)	44,910—44,930 mm
Depth (measurement D)	5,500—5,600 mm (.217"—.220")
Bottom radius, max. (measurement R)	0,8 mm (.032")



Fig. 3. Outline of valve seats and positions.

Exhaust valve seats:

Diameter, standard (measurement A)	39,987—40,013 mm
Height (measurement B)	5,500—5,630 mm (.217"—.222")

Valve seat position:

Diameter, standard (measurement C)	39,910—39,930 mm
Depth (measurement D)	5,500—5,600 mm (.217"—.220")
Bottom radius, max. (measurement R)	0,8 mm (.032")

Valve guides

Length, intake valve guides	73 mm (2 7/8")
Length, exhaust valve guides	76 mm (3")
Inner diameter	8,720—8,745 mm
Distance from cylinder block level to upper end of guides:	
Intake valve guides	34 mm (1 11/32")
Exhaust valve guides	31 mm (1 7/32")
Clearance, valve stem—valve guide	0,020—0,071 mm

Valve springs

Tightly wound at one end. This end is turned towards the block.

Length, unloaded	54,4 mm (2 5/32")
" loaded with 19,5 ± 1,5 kg (43 ± 3 1/2 lbs.)	47,6 mm (1 7/8")
" loaded with 50,5 ± 2 kg (111 ± 4 1/2 lbs.)	38,9 mm (1 17/32")
" totally compressed	35,4 mm (1 25/64")

Lubricating system

Oil capacity including oil cleaner	about 6 litres (11 Imp. pints)
Oil pressure (warm engine)	1,5—2,5 kg/cm ² (21—36 p.s.i.)
Lubricant	Engine oil
" viscosity, summer	SAE 20
" " winter	SAE 10
Oil pump, type	Gear pump
" " number of teeth	10
" " axial clearance	0,02—0,10 mm (.0008"—.004")
" " tooth flank clearance	0,15—0,35 mm (.006"—.014")
Relief valve spring:	
Length, unloaded	81 mm (3 3/16")
" loaded with 3,5 ± 0,2 kg (8 ± 1/2 lbs.)	53 mm (2 3/32")

Fuel system

Fuel pump	AC diaphragm pump
Fuel pressure, min.	0,15 kg/cm ² (2 p.s.i.)
" " max.	0,25 kg/cm ² (3.5 p.s.i.)
Fuel tank capacity	60 litres (13 Imp. gals.)
Fuel gauge, type	Electric

Carburettor

Manufacture and model	Carter WAI—457 S	
	Designation	Dimensions
Venturi, diameter		1 1/4"
Metering rod jet	120—47S	diam. .935"
Needle (standard)	75—402	„ .068"—.055"— .046" (3-stage)
Main jet	12—246	
Acceleration jet	48—58	„ .028"
Idling jet	11—161S	„ .028"
Needle valve	25—75S	
Adjuster jig for metering rod jet	T 109—102	length 2.468"
Float level (measured with jig No. T 109-83 between top of float and float chamber top)		12,7 mm (1/2")
Acceleration pump stroke		7,55 mm (19/64")

Cooling system

Type	Pressure system
Capacity	18 litres (4 Imp. gals.)
Thermostat:	
Type	Balanced — does not open under water pump pressure
Starts to open at	72° C (162° F)
Fully open at	84° C (183° F)
Radiator hose, diameter	1 1/2"
Fan-belt, length	1148 mm (45") (internal measurement)
„ width	3/4"
„ height	1/2"

Wear tolerances

Cylinders:

The cylinders should be re-bored and the pistons and piston rings replaced when wear reaches 0,25—0,30 mm (.0098"—.0118") or when out-of-roundness attains 0,08 mm (.003")

Crankshaft:

Permissible out-of-roundness on main bearing journals, max. . .	0,05 mm (.0019")
Permissible out-of-roundness on connecting rod bearing journals max.	0,07 mm (.0028")
Permissible taper on main bearing and connecting rod bearing journals, max.	0,05 mm (.0019")
Crankshaft max. axial play	0,25 mm (.0098")

Valves:

Valve stem, permissible wear	0,02 mm (.00079")
Permissible clearance between valve stems and valve guides:	
Intake valves	0,13 mm (.0051")
Exhaust valves	0,15 mm (.0059")
Valve disc chamfered edge should be at least	1 mm (3/64") wide

Camshaft:

Permissible out-of-roundness(with new bearings)	0,07 mm (.0028")
Bearing, permissible wear	0,05 mm (.0020")

Tightening torque

	Kgm	lb. ft
Cylinder head	7—8	50—60
Main bearings	8,5—10	60—70
Crankshaft bearings	5,5—6	40—45
Flywheel	5,5—6	40—45

CLUTCH

Type	Single dry disc
Size	10"
Clutch friction area, total, early production	585 cm ² (90 sq. in)
" " " " late production	520 cm ² (81 sq. in)
Driven plate thickness, when installed	8,4 mm (.331")
Driven plate facing rivets:	
Size	3,57×6,35 mm (⁹ / ₆₄ "× ¹ / ₄ ")
Number of rivets (early production)	20
" " " (late production)	40
Distance between flywheel and release bearing contact surface of release levers	46,1 mm (1 ¹³ / ₁₆ ")
Number of pressure springs	12
Pressure spring length:	
Spring (Part No. 306036):	
Length, unloaded	66 mm (2 ¹⁹ / ₃₂ ")
Length, loaded with 50 ± 2 kg (110 ± 4 ¹ / ₂ lbs.)	43 mm (1 ¹¹ / ₁₆ ")
Spring (Part No. 306037):	
Length, unloaded	68 mm (2 ²¹ / ₃₂ ")
Length, loaded with 57 ± 2 kg (125 ± 4 ¹ / ₂ lbs.)	43 mm (1 ¹¹ / ₁₆ ")
Release levers should be adjusted to:	
a position 4 mm (⁵ / ₃₂ ") below the hub of the adjuster jig (SVO 2066) within ± 1.5 mm and within 0,25 mm with respect to each other.	
Clutch pedal free travel	25—30 mm (1"—1 ³ / ₁₆ ")

GEARBOX

Type and number are stamped on a plate attached to the right-hand side of the gearbox.

Type	L-1
Gear ratios:	
1st speed	2,56: 1
2nd speed	1,52: 1
3rd speed	1: 1
Reverse	3,16: 1
Number of teeth on the various gears:	
Main drive pinion	19 teeth
Countershaft:	
Drive gear	30 teeth
Gear for 1st speed	21 teeth
Gear for 2nd speed	26 teeth
Gear for reverse	17 teeth
Reverse gear	20 teeth
Gear on main shaft for 1st speed and reverse	34 teeth
" " " " " 2nd speed	25 teeth
Lubricant	Gearbox oil
" viscosity, summer	SAE 90
" " winter	SAE 80
Oil capacity	1,4 litres (2 ¹ / ₂ Imp. pints)

FRONT AXLE AND STEERING GEAR

Front axle

Early production

Type	One-piece front axle
Spring seats to lie in the same level within (measuring length 300 mm)	± 1,5 mm
Centre line of king pins to lie at right-angles to spring seats within (measuring length 300 mm)	± 1,5 mm
Centre line of king pins to be level within (measuring length 300 mm)	± 1,5 mm
King pin inclination inwards	7 1/2°
King pin diameter	22 mm (55/64")
Shims for king pin bearings, thickness	0,1 mm (.0039")
	0,35 mm (.0138")

Late production

Type	Independent front wheel suspension
King pin diameter	22 mm (55/64")
King pin inclination inwards	9°
Shims for king pin bearings, thickness	0,1 mm (.0039")
	0,35 mm (.0138")
Adjuster shim for front axle member (caster adjustment), thickness	2 mm (.079")
" " " upper control arm attachment (camber adjustment), thickness	1 mm (.039")

Steering gear

Steering gear, make and type	Gemmer roller sector and gear
Gear ratio	20,4: 1
Turns of steering wheel from lock to lock	4 1/3
Adjuster shims for steering housing bearing, thickness	0,051 mm (.002")
	0,127 mm (.005")
	0,254 mm (.010")
Lubricant, type	Gearbox oil
" viscosity, summer	SAE 90
" " winter	SAE 80

Wheel alignment

(Apply for unloaded vehicle)

	One-piece front axle	Independent front wheel suspension
Caster	1/2° to 1 1/2°	-1° to +1/2°
Camber	1/4° to 1 1/2°	-1/4° to +3/4°
King pin inclination	7 1/2°	9°
Toe-in	2-3 mm (.080"—.118")	0-3 mm (0—.118")

BRAKES

Footbrake

Brake drums, diameter, front and rear	12" (304,8 mm)
" " permissible out-of-roundness, max.	0,178 mm (.007")
	Early production Late production
Effective brake lining area, front	545 cm ² (84 1/2 sq. in.)
" " " " rear	545 cm ² (84 1/2 sq. in.)
" " " " total	1090 cm ² (169 sq. in.)
Brake linings, size, front,	1 3/4" × 1/4" × 350 mm
" " " rear, early production	1 3/4" × 1/4" × 350 mm

Brake linings, rear, late production, size:	
Forward lining	1 3/4" × 1/4" × 350 mm
Rear lining	1 3/4" × 1/4" × 270 mm
Brake lining facing rivets:	
Size	9/64" × 5/16" (3,57 × 7,9 mm)
Number of rivets per shoe:	
Front wheel brakes	10
Rear wheel brakes, early production	10
Rear wheel brakes, late production:	
Forward shoe	10
Rear shoe	8
Clearance, brake shoe—brake drum	0,1 mm (.0039")
Pedal free travel	7—12 mm (9/32"—15/32")

Hydraulic system

Make	Lockheed
Master cylinder, diameter	1 1/16"
Wheel cylinder, diameter, front wheels	1"
" " " rear wheels, early production	1"
" " " " late production	1 1/4"—1"
Clearance between piston and cylinder min.	0,025 mm (.001")
" " " " " max.	0,127 mm (.005")

Handbrake

Type	Propeller shaft brake
Brake drum, diameter	152,4 mm (6")
Permissible radial throw	max. 0,2 mm (.0079")
Brake lining, size	2" × 5/32" × 425 mm
Brake lining rivets:	
Size	3,57 × 6,35 mm (9/64" × 1/4")
Number of rivets	15
Size	3,97 × 13,7 mm (5/32" × 13,7 mm)
Number of rivets	4

WHEELS AND TYRES

Wheels

Type	Disc wheels
Size	5.00"—15.00"
Warp, max.	2,5 mm (.10")
Out-of-roundness, max.	2,5 mm (.10")
Wheel r.p.km. (7.00"—15.00")	460 revs. (736 r.p.mile)
" " (8.20"—15.00")	416 revs. (714 r.p.mile)

Tyres

Size	7.00"—15.00" (6-ply)	8.20"—15.00" (4-ply)
Tyre pressure:		
Front	1,75 kg/cm ² (25 p.s.i.)	1,4—1,6 kg/cm ² (20—23 p.s.i.)
Rear	2,25—2,75 kg/cm ² (32—39 p.s.i.)	1,6—2,5 kg/cm ² (23—36 p.s.i.)

FRAME, SPRINGS AND SHOCK ABSORBERS

Frame

X-type with box-section girders.

Early production constructed for one-piece front axle.

Late production constructed for independent front wheel suspension.

Number of cross members (including x-members)	6
Frame width, front	756 mm (30")
" " rear	1176 mm (46 1/2")
Overall length PV 831—33	4750 mm (187")
" " PV 834	4995 mm (196")

Springs

Front springs

Early production

Type	Semi-elliptic
Length	1067 ± 3 mm (42" ± 1/8")
Width	50 mm (2")
Number of leaves	11

Leaf thickness:

Leaves No. 1 and 2	6 mm (15/64")
" " 3—5	5 mm (1/5")
" " 6—11	4 mm (5/32")

Test values:

Load required to depress the spring 1 cm (25/64") (measured within ± 25 mm when the spring is loaded to a point 11 mm below the centre bolt)	29 ± 1,5 kg (64 ± 3 1/2 lbs.)
The spring leaves should be depressed to a point 11 mm below the centre bolt with a weight of	440 ± 15 kg (970 ± 33 lbs.)

Late production

Type	Coil springs
Material thickness	14,5 mm (37/64")
Outer diameter	113,0—114,5 mm (4 7/16" — 4 1/2")
Number of turns, total	11

Test values:

Length:	
With a load of 645 ± 16 kg (1421 ± 35 lbs.)	235 mm (9 1/4")
Totally compressed, max.	155 mm (6")

Rear springs

Type	Semi-elliptic
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Rear springs PV 831—32

Length	1390 ± 3 mm (55" ± 1/8")
Width	50 mm (2")
Number of leaves	10

Leaf thickness:

Leaves 1—4	7 mm (9/32")
" 5—10	6 mm (15/64")

Test values:

Load required to depress the spring 1 cm (25/64") (measured within ± 25 mm when the spring is loaded to a point 33,5 mm below the centre bolt)	31 ± 1 kg (68 ± 2 1/4 lbs.)
The spring leaves should be depressed top a point 33,5 mm below the centre bolt with a load of	535 ± 16 kg (1179 ± 35 lbs.)

Rear springs PV 833—34, early production

Length	1390±3 mm (55"±1/8")
Width	50 mm (2")
Number of leaves	9
Leaf thickness:	
Leaves 1—3	8 mm (5/16")
" 4—6	7 mm (9/32")
" 7—9	6 mm (15/64")
Test values:	
Load required to depress the spring 1 cm (25/64") (measured within ± 25 mm when spring is loaded to a point 33.5 mm below the centre bolt)	38±1 kg (84±2 1/2 lbs.)
The spring leaves should be depressed to a point 33.5 mm below the centre bolt with a load of	715±20 kg (1576±44 lbs.)

Rear springs PV 833—34, late production

Length	1390±3 mm (55"±1/8")
Width	50 mm (2")
Number of leaves	9
Leaf thickness:	
Leaves 1—6	8 mm (5/16")
" 7—9	7 mm (9/32")
Test values:	
Load required to depress the spring 1 cm (25/64") (measured within ± 25 mm when the spring is loaded to a point 33.5 mm below the centre bolt)	49±2 kg (108±4 1/2 lbs.)
The spring leaves should be depressed to a point 33.5 mm below the centre bolt with a load of	715±20 kg (1576±44 lbs.)

Shock absorbers

Double-action hydraulic shock absorbers front and rear.

Not re-fillable.

Make and type Delco telescopic

ELECTRICAL SYSTEM

Voltage in system 6 volts

Battery

Make	Warta 3E6 C Noack 200, SAAJ E 13 or similar types
Earth	Negative terminal
Battery capacity	114 amp. hours
Electrolyte specific weight:	
Fully charged battery	1,275—1,285
Should be re-charged at	1,230

Ignition system

Order of firing	1-5-3-6-2-4
Setting	0°—2° B.T.D.C.
Ignition coil	Auto-Lite CR 4601
Sparkling plugs	Bosch W 145 T1 AC 45 Com, Auto-Lite A7, Champion J8 or similar types
Sparkling plug gap	0,7—0,8 mm (.028"—.032")

Distributor

Make and designation	Auto-Lite IGS-4209
Direction of rotation	Anti-clockwise
Test values:	
Settings for:	
Centrifugal timing control	
Distributor r.p.m.	350 400 770 1150 1400
Degrees	0 3 6 9 11
Vacuum control	
Vacuum, cm Hg	10 (4") 15 (6") 23 (9") 30 (12") 35 (14")
Distributor, degrees	0 2 5 8 10
Contact breakers, gap	0,4—0,5 mm (.016"—.020")
" " pressure	0,48—0,57 kg (1—1 1/4 lbs.)
Condenser, designation	IG 2671 K
" capacity	0,20—0,25 μF (microfarads)

Dynamo and control box

Dynamo, early production

Make and designation	Auto-Lite GDZ 4801 L
Voltage	6 volts
Maximum charging current	35 amps.
Electrical test values:	
Field coils	1,3—1,5 amps. at 5 volts
Dynamo as motor (field terminal earthed)	3,9—4,4 amps. at 5 volts
Output test	8 volts, 35 amps. at max. 2000 r.p.m.
Brushes, designation	GBW 1012 A
Number of brushes	2
Brush spring tension	1—1,5 kg (2 1/4—3 1/4 lbs.)

Control box, early production

Make and designation	Auto-Lite VRP 6003 A
Resistances	38 ohms (1) and 7 ohms (1)
Air gap between magnet core and armature:	
Cut-out relay	0,79—0,86 mm (.031"—.034")
Voltage regulator	1,22—1,32 mm (.048"—.052")
Current regulator	1,22—1,32 mm (.048"—.052")
Electrical test values:	
Cut-out relay:	
Cut-in voltage	6,4—7 volts
Drop-off voltage	4,1—4,8 volts
Voltage regulator:	
Voltage at an air temperature of 19°—21° C (66°—70° F)	7,35 volts
Current regulator	Adjust to 35 amps.

Dynamo and control box, late production

Dynamo, make and designation	Bosch LJ/GJM 160/6-1500 RT
Control box, designation	RS/UA 160/6/1
Voltage	6 volts
Maximum charging current	40 amps.
Electrical test values:	
Control voltage when idling	7,0—7,6 volts
Cutting-in speed	1050 r.p.m.

Loading and speed with:

Cold generator	160 watts, 1490 r.p.m.
Warm generator	160 watts, 1580 r.p.m.
Load at control voltage	38—40 amps.
Field resistance	1,20—1,32 ohms
Brushes, designation	Wsk 35L1 and Wsk 35L3
Number of brushes	2
Brush spring tension	0,45—0,60 kg (1—1 1/4 lbs.)

Starter motor

Early production

Make and designation	Auto-Lite MAX-4073
Voltage	6 volts
Output	1 b.h.p.
Number of teeth on gear	9
Brushes, designation	MAV 12 and MAV 13
Number of each	2
Brush spring tension	1,2—1,5 kg (2 1/2—3 1/4 lbs.)

Electrical test values:

Stalled starter motor:

Torque	Min. 1,1 kgm (8 lb.ft)
Current	Max. 410 amps.
Voltage	2 volts

No-load test:

Speed	4900 r.p.m.
Current	65 amps.
Voltage	5 volts

Late production

Make and designation	Bosch EJD 1/6 R 32
Voltage	6 volts
Output	1 b.h.p.
Number of teeth on gear	9
Brushes, designation	DSK 11/15
Number of brushes	4
Brush spring tension	0,8—0,9 kg (1 3/4—2 lbs.)
Gear friction torque	1,5—2 kgcm
„ idling torque	0,7—1,2 kgcm
„ distance from flywheel ring gear	2,5—3 mm (.1"—.12")
Armature friction torque	5,5—7,0 kgcm
„ axial clearance	0,1—0,3 mm (.004"—.012")

Electrical test values:

Stalled starter motor:

Current	580—600 amps.
Voltage	3,2 volts

Partial load test:

Speed	850—900 r.p.m.
Current	320—340 amps.
Voltage	4,5 volts

No-load test:

Speed	4000—5000 r.p.m.
Current	65—75 amps.
Voltage	5,5 volts

PV 830

Fuses

The fuse boxes are fixed to the front of the cowl on the left-hand side.

	Early production	Late production
Number of 25 amp. fuses	3	4
" " 8 " "	9	8

Light bulbs

	Number	Watts	Socket
Headlights early production	2	35	BA 20 d
" late production	2	45—40	BA 20 d
Parking lights	2	1,5	BA 9 s
Number plate light	1	5	BA 15 s
Stop- and tail lights (PV 831—32)	2	20/5	BA 15 d spec.
" " " " (PV 833—34) early prod.	2	5	S 8
" " " " (PV 833—34) late prod.	2	15	BA 15 s
Reversing light	1	15	BA 15 s
Instrument lights	2	2,4	BA 9 s
Warning light for headlights	1	1,5	BA 9 s
Warning light for heater	2	1,5	BA 9 s
Traffic indicator bulbs, early prod.	2	3	S 5
Traffic indicator bulbs, late prod. (blinkers) only			
Philips 6407 or Osram 7520 may be used	2	15	BA 15 s
Warning light for traffic indicators	1	1,5	BA 9 s
Roof lights, early production	2	5	BA 15 s
" " late production	2	15	BA 15 s

Headlight beam adjustment

Beams are adjusted on a wall at a distance of 5 m (16 ft.) with an empty car and the headlights on "full".

Vertical adjustment	75 mm (3") below headlight horizontal centre line.
Horizontal adjustment	75 mm (3") outwards from the headlight vertical centre line.

LUBRICATION

Engine

Lubricant	Engine oil
" viscosity, summer	SAE 20
" " winter	SAE 10
Oil capacity including oil cleaner	6 litres (11 Imp. pints)

Gearbox

Lubricant	Gearbox oil
" viscosity, summer	SAE 90
" " winter	SAE 80
Oil capacity	1,4 litres (2 1/2 Imp. pints)

Rear axle

Lubricant	Hypoid oil
" viscosity, summer	SAE 90
" " winter	SAE 80
Oil capacity	2 litres (3 1/2 Imp. pints)

Steering gear

Lubricant	Gearbox oil
" viscosity, summer	SAE 90
" " winter	SAE 80
Oil capacity	0,5 litre (1 Imp. pint)

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