

Section 3 Electrical system

Group 31 Battery

System voltage	12 V
Ground terminal	Minus terminal

Battery capacity

Cold start current* CCA SAE	Capacity (DIN)	Reserve- capacity** RC SAE	Rec. charge cur- rent
520 A	50 Ah	90	5.5 A
600 A	65 Ah	115	6 A

* **Cold start current (CCA, SAE)** is the discharge current which a battery can issue for 30 seconds, at a temperature of -18 °C without falling below 7.2 V.

** **Reserve capacity (RC, SAE)** is the time taken at a temperature of +27 °C and a discharge current of 25 A to reduce the voltage of a fully charged battery to 10.5 V.

Group 32 Generators

Generators

Type	Value 14.1 V 80 A
Volvo P/N	94 42 188
Max current strength	A 80
Maximum output	W 1120
Maximum engine speed (RPM)	r/s (r/min) 300 (18000)
Diameter, slip rings	
new	mm 14.4
min	mm 12.8
Carbon brushes	
new/minimum spring tension	N 3.23/1.37
minimum length	mm 5.5
Tightening torques	
mounting screws	Nm 4.5
nut for pulley	Nm 115

Type	Value
	14.1 V 80 A
Test values	
Resistance	
rotor winding Ω	2.9
stator winding Ω	0.03
Current strength at 14V (minimum value)	
..... A at r/s(r/min)	52/33.3 (2000)
..... A at r/s(r/min)	80/83 (5000)
..... A at r/s(r/min)	108/100 (6000)

* /phase. Low ohmmeter should be used.

Generators

Type	Bosch NC
	14V 55/100 A
Volvo P/N	91 62 683
Code	0 120 510 423
Max current strength A	100
Maximum output W	1400
Maximum engine speed (RPM) r/s (r/min)	300 (18000)
Diameter, slip rings	
new mm	15.4
min mm	14.0
Max permitted radial runout	
slip rings mm	0.03
rotor body mm	0.05
Carbon brushes	
new/minimum spring tension N	1.0/3 - 5
minimum length mm	5.0
Tightening torques	
mounting screws Nm	4.5 - 5.5
nut for pulley Nm	60 - 70
Test values	
Resistance	

Type	Bosch NC 14V 55/100 A	
rotor winding	Ω	2.6
stator winding	Ω	0.02*
Current strength at 14V (minimum value)		
..... A at r/s(r/min)		55/30(1800)
..... A at r/s(r/min)		100/100(6000)

* /phase. Low ohmmeter should be used.

Charge regulator

Type	Bosch		Value		
Volvo P/N	91 28 982		94 42 403		
Conditions	*	**	*	**	
Battery charging	%	75	100	75	100
Intake air temperature (IAT) ..	$^{\circ}\text{C}$	+ 25	+ 25	+ 25	+ 25
Temperature, heat governor	$^{\circ}\text{C}$	+ 60 - 80	+ 60 - 80	+ 60 - 80	
Test values					
Generator speed	r/s (r/min)	100 (6000)		100 (6000)	
Engine speed (RPM) ..	r/s(r/min)	50 (3000)		40 (2400)	
Generator (GEN) load	A	30 - 50***		30 - 50***	
Control voltage between B+ and D- on generator	V	13.4 - 14.2	13.7 - 14.5	13.8 - 14.6	14.1 - 14.9
Control tolerance					
Load generator with rated output x 0.85 A. Permitted voltage reduction compared with previous reading	V		0 - 0.3		0 - 0.3

* | car

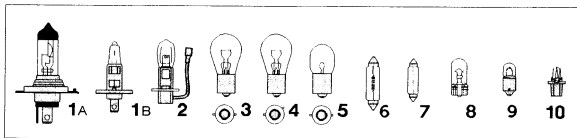
** | bench

*** This load is reached when the engine is running.

Group 33 Starter motor

Type	Bosch 12V 1.4 kW
Manufacturers P/N	0 001 108 167
Volvo P/N	86 02 085
Direction of rotation	clockwise
Test value, mech	
Rotor axial clearance	mm 0.2-0.7
Rotor brake friction torque	Nm (kpcm) 0.6-1.1 (6-11)
Sprocket, distance from ring gear	mm 0.7-4.5
module	mm 2.11
free wheel torque	Nm (kpcm) 0.12-0.18 (12-18)
Backlash	mm 0.3-0.5
Commutator min. diameter	mm 32.7
Carbon brushes min. length	mm 11.2
Max. radial runout rotor body	mm 0.05
commutator	mm 0.01
Test value, elec	
Unloaded starter motor, 12.0 V and max. 70 A min. . .	r/s 2900
(rpm)	
Locked starter motor, 4.0 V and 0 r/s	A 650-750
Lowest connection voltage solenoid	V 7.4

Group 35 Lighting



Bulbs (Market dependent)

	Power (W)	Base type	US/CAN	Fig No.
Headlamps				
late	55	H7		1B
USA/CDN				
high	70		9005/HB3	
low	60		9006/HB4	
Fog lamps	55	H3	H3	2
Front parking lamps	5 (4cp)	BA 15 s	67	5
Tail lamps				
4-D	5 (4cp)	BA 15 s	67	5
Parking lamps/turn signal lamps, front, USA/CAN	24/2.2 cp	BAY 15 d	1157 NA	3
Turn signal lamps				
front	21/4	BAU 15 s		3
rear	21 (32cp)	BAU 15 s	1156	3
page	5	W 2.1 x 9.5 d yellow		8
Stop (brake) lamp				
standard	21 (32cp)	BA 15 s	1156	3
high mounted	21 (32cp)	Special	1156	3
spoiler	5	W 2.1 x 9.5 d		8
Fog tail lamps				
4-D	21 (32cp)	BA 15 s	1156	3
Back-up (reversing) lamps ..	21 (32cp)	BA 15 s	1156	3
License plate lighting	5	W 2.1 x 9.5 d		8
Door open warning lamp ..	3	W 2.1x9.5 d		8
Courtesy lighting	5	W 2.1x9.5 d		8
Roof lighting	5	BA 9 s		9
	5	W 2.1 x 9.5 d (cab)		8
Rear reading lamps	5	BA 9 s		9
		W 2.1 x 9.5 d (cab)		8
Cargo compartment lighting	10	SV 8.5		6
Glove compartment lighting	2	BA 9 s		9
Vanity mirror lighting	5	SV 8.5		6
Instrument lighting	3	W 2.1x9.5 d		8

	Power (W)	Base type	US/CAN	Fig No.
Lighting, control	1.2 + 1.5	Special		10
Warning/indicator lamps	1.2	W 2x4.6 d		10

Group 37 fuses

Fuse	Measured by	Connected functions	A
1	Ignition switch 15	Lock unit tailgate	10
2		Central locking, Gear selector, RTI	10
3		ABS	10
4		Immobilizer	10
5	Battery +	Climate control, On-board diagnostic system (OBD) (cab also Radio)	15
6		Central locking, Anti-theft alarm, Siren	20
7		Radio	15
8		Light switch, Immobilizer	15
9		Amplifier (cab also Radio)	30 (20)
10		Ignition switch	15 (10)
11		Stop (brake) lamp, Tow hitch	10
12		Amplifier (cab also Radio)	30 (20)
13		Hazard warning signal flasher, Full beam flash, Remote control, Glass breakage sensor, Anti-theft alarm	15
14		Rear demist, Heated door mirrors	30
15		Courtesy lighting, Glove compartment lighting, Courtesy lighting, Door open warning lamps, Cargo compartment lighting, Seat belt reminder, RTI	10
16		Power antenna, Trailer socket, Accessories	30
17		Front fog lamps	20
18		Ignition switch S	Key reminder, Central locking

Fuse	Measured by	Connected functions	A
19	Main lighting relay with bulb failure warning sensor	Left high beam, Accessory	15
20		Right high beam, High beam warning lamp	15
21		Left low beam	15
22		Right low beam	15
23	Battery + via Light switch	Left parking lamps, License plate lighting, Tow hitch	10
24		Right parking lamps, Bulb failure warning sensor, Tow hitch	10
25	Switch, fog tail lamp	Fog tail lamp, Fog tail lamp indicator lamp, Tow hitch	10
26	Via overload relay 15 I	Light switch	15
27		Back-up (reversing) lamp, Turn signal lamp	15
28		Heated seats	25
29		Rear demist, Heater door mirrors, Seat belt reminder, P/N position switch automatic transmission, Bulb failure warning sensor, Cruise control, Siren	10
30	Battery + via overload relay (X-supply)	Front cigarette lighter, RTI	15 (10)
31		Climate control	25 (20)
32		Radio (cab also tailgate opening)	10
33		Headlamp range adjustment	15
34		Horn, Windshield wipers/washers	25
35		Instrument and control panel lighting, Power sunroof, Accessories, Rear view mirror	10
36		Rear cigarette lighter, Power seats	15
37		Power windows, Power sun roof (not cab)	*
38		Spare	*
39	Battery +	Left power seat	*
40		Right power seat	*
41		Power soft top+	*
42		Power soft top+	*

* Automatic fuse

+ Fuse 41 and 42 are located in central electrical unit

Main fuses 11 A

Fuse	Measured by	Connected functions	A
11A/1	Battery +	Engine cooling fan (FC)	60
11A/2		Fuses 11C/26-29 via overload relay 15 I, Fuses 11C/33-37 via overload relay X	50
11A/3		Starter motor, Pulsed secondary air injection system (PAIR) pump	50
11A/4		ABS control module	50
11A/5		Main lighting relay with bulb failure warning sensor	50
11A/6		Fuses 11C/5-10	60
11A/7		Fuses 11C/11-17, Fuses 11C/39-42	50
11A/8		Fuse 11B/1, Fuse 11B/2-5 via fuel injection system main relay	60
11A/9		Relay power windows (cab only)	80

Relay location

Engine compartment (central electrical unit)	
No.	Designation
101, 102	Cruise control
103	Fuel pump (FP)
104, 108	Head lamp/Front bulb failure warning sensor
105	Overload X-supply
106	Overload 15 I-supply
107	Overload X
Engine compartment (outside central electrical unit)	
7/1	Rear bulb failure warning sensor
2/11	Engine cooling fan (FC)
2/32	Fuel injection system main relay
2/42	ABS Combination Relay,
2/53	PAIR pump

Passenger compartment (central electrical unit)	
No	Designation
201	Fog lamp relay
202	Anti-theft lock position
203	Intermittent wiper, windshield
204	Intermittent wiper, rear windshield
205, 206	Central locking with delayed interior lighting
207	Speed warning or exhaust temperature sensor
208	Defroster, rear windshield and door mirrors
209	Spare
210, 211	Anti-theft alarm, option
212	Seat belt reminder/key warning
213	Mounting bracket, front fog lamp
214	Automatic fuse cabriolet control module CCU
215	Spare
Passenger compartment (outside central electrical unit)	
2/3	Governor DIM/DIP (1992-1997)
2/11	Engine cooling fan (FC) relay (1994-1997)
2/22	A/C (1992-1997)
2/24	Max fan speed relay (1992-1997)
2/32	Fuel injection system main relay (1992-1997)
2/42	ABS Combination Relay (1992-1995)
2/45	Shift lock (1993)
2/53	PAIR pump relay (1994-1997)
7/1	Rear bulb failure warning sensor (1996-1997)
K 1	Autodown, power window (1993-1997)

Group 38 Instrument

Fuel level sensor	Volume liters	Resistance Ω
Empty fuel tank	0	325 \pm 2.5
Full fuel tank	73	10 \pm 2.5

Temperature sensor	Temperature $^{\circ}\text{C}$ ($^{\circ}\text{F}$)	Resistance Ω
Resistance at various temperatures,	20 (68)	2800
	60 (140)	560
	90 (212)	206

Vehicle Speed Sensor (VSS)	Resistance Ω
Resistance in sensor	1820 \pm 180