

Section 3 Electrical system

Group 31 Battery

System voltage 12 V

Ground connection... Negative terminal

Battery capacity

Volvo P/N	Cold start current*		Capacity (DIN)	Reserve capacity*		Rec. charging current
	CCA	SAE		RC	SAE	
3 515 230-5	440	A	50Ah	85		4 A
3 515 231-3	520	A	60Ah	100		5.5 A

Cold start current (CCA, SAE) is the discharging current which a battery can deliver for 30 seconds at a temperature of - 18 ° C (0°F) without dropping below 7.2 V.

Reserve capacity (RC, SAE) is the time it takes at a temperature of + 27° C (81 °F), with a discharging current of 25 A, to lower the voltage of a fully-charged battery to 10.5 V.

Group 32 Generators

Generators

Type	Bosch NC 14V 55/100 A	Nippon Denso 14 V 80 A
Designation	0 120 465 012 0 123 213 006 0 123 545 001	100 211 - 8960
Max. amperageA	100	80
Max. output.....W	1400	1120
Max. speed.....r/s(rpm)	300 (18000)	300 (18000)
Diameter, slip rings,		
newmm	15.0	14.4
min.mm	14.0	12.8
Max. permissible runout,		
slip rings.....mm	0.003	
rotor bodymm	0.005	
Carbon brushes,		
spring force.....N(kp)	3 - 5	3.23/1.37
min. lengthmm	5.0	1.5
Tightening torque		
fastenersNm(kpm)	4	4.5
pulley nutNm(kpm)	45 - 55	115
Test values		
Resistance,		
rotor windingΩ	2.6	2.9
statorΩ	0.02*	0.03
Amperage at 14V (min. value)		
.....A vid r/s(rpm)	55/30(1800)	52/33.3 (2000)
.....A vid r/s(rpm)	100/100(6000)	80/83 (5000)
		108/100 (6000)

* /phase. A low range ohm meter should be used.

Charging regulator

Manuf. P/N	Bosch		Nippon Denso	
	1 197 311 232 1 197 311 234		126000-1321	
Test conditions	*	**	*	**
Battery charge	75	100	75	100
Air temperature	+ 25	+ 25	+ 25	+ 25
Temperature, warm regulator	+ 60-80	+ 60-80	+ 60-80	
Test values				
Generator speed	100 (6000)		100 (6000)	
Engine speed	50 (3000)		40 (2400)	
Generator load	30-50***		30-50***	
Control voltage, between B+ and D- on gen. terminals. V	13.8-14.6	14.1-14.9	13.8-14.6	14.1-14.9
Control tolerance				
Load generator to rated output x 0.85 A. Permissible voltage drop compared to previous reading		0-0.3		0-0.3

* In the car

** Test bench

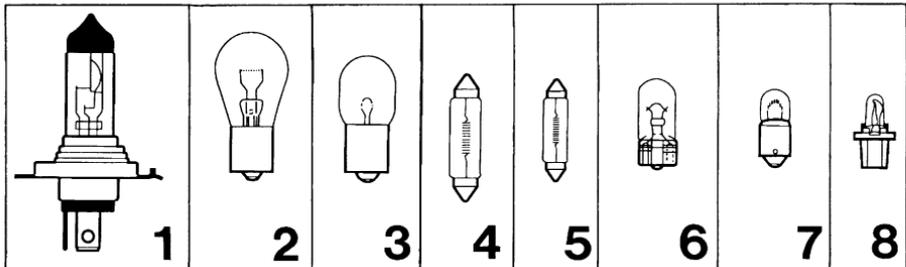
*** This load is achieved with
the engine running.

Group 33 Starter motor

Type	Bosch 12V 1.4 kW	Bosch 12V 1.4 kW	Bosch DW 12V 1.7 kW
Manuf. P/N.....	0 001 108 107	0 001 108 153	0 001 110 063
Volvo P/N.....	13 63 451-4	91 28 421-6	13 63 912-5
Direction of rotationclockwise			
Test values, mechanical			
Armature end clearance.....mm	0.05-0.40		0.05-0.40
Frictional torque, armature brakeNm(kpcm)	0.9-1.4 (9-14)		0.9-1.5 (9-15)
Distance from pinion to ring gearmm	2.0-3.0		2.0-3.0
modulusmm	2.11		2.11
clearance torqueNm(kpcm)	0.12-0.18 (1.2-1.8)		0.12-0.18 (1.2-1.8)
Backlashmm	0.3-0.6		0.3-0.6
Minimum commutator diameter.....mm	31.2		31.2
Carbon brushes min. lengthmm	4.5		6
Max. runout armaturemm	0.05		0.05
commutatormm	0.01		0.01
Test values, electrical			
Unloaded starter motor, 11.5 V and max. 75 A min. ... r/s(rpm)	2900		—
11.2 V and max. 95 A min. ... r/s(rpm)	—		2800
Locked starter motor, 3.5 V och 0 r/s A	475-600		—
Locked starter motor, 3.0 V och 0 r/s A	—		650-840
Lowest cut-in voltage, control solenoidV	7.3		7.3

Group 35 Lighting

Bulbs



S151391

Rating (W)

Socket type

Fig no.

Headlight	60/55	P 43t-38(H4)	9003/HB2	1
Parking lights, tail lights	5 (4cp)	BA 15 s	67	3
Parking lights/direction indicators, front, USA/CAN...	24/2.2 cp	BAY 15 d	1157 NA	2
Turn signals, front	21	BA 15 s		2
rear	21 (32cp)	BA 15 s	1156	2
side	5	W 2.1 x 9.5 d		6
Brake light, standard	21 (32cp)	BA 15 s	1156	3
high level	21 (32cp)	BA 15 s	1156	2
Rear fog light	21 (32cp)	BA 15 s	1156	2
Reversing light	21 (32cp)	BA 15 s	1156	2
Numberplate lights	5	W 2.1x9.5 d		6
Door open warning lights	3	W 2.1x9.5 d		6
Door instep lighting	5	W 2.1x9.5 d		6
Courtesy lighting	5	BA 9 s		7
Reading light, rear	5	BA 9 s		7
Boot (trunk) light	10	SV 8.5		4
Glove compartment light	2	BA 9 s		7
Vanity mirror light	1.2			5
Instrument lighting	3	W 2.1x9.5 d		6
Lighting, controls	1.2	W 2x4.6 d		8
Indicator and warning lights.	1.2	W 2x4.6 d		8

Group 37 Fuses

Model year 1992

Fuse	Supplied by	Circuits protected	A
1	Ignition lock 15	Control module, fuel system; " , ignition system; " , automatic transmission	15
2	Ignition lock 15 via relief relay	Fuel pump; Alarm	15
3		Interior lighting (microswitch in door lock)	10
4		Spare <i>No fuse:</i> <i>Power stage, ignition; Solenoid, intake manifold)</i>	
5		Battery +	Heater fan, 4th speed
6		Central locking; Alarm	25
7		Amplifier(radio)	15
8		Power antenna; Towing hook	25
9		ABS	30
10		Spare	
11		Heated rear window; Heated door mirrors	30
12		Brake lights	10
13		Hazard warning lights; Alarm High beam flasher	15
14		ABS <i>No fuse: light switch</i>	30
15		Radio; Interior lighting; Glove box light; Door open warning lights; Door instep lights; Boot (trunk) light	10
16		Accessories	30
17		Spare	
18	Ignition lock 15 I	Heated seats	25
19	Relay, main beam	High beam, left	15
20		High beam, right; Indicator lamp for high beam	15

Fuse	Supplied by	Circuits protected	A
21	Bulb failure sensor, front	Low beam, left	15
22		Low beam, right	15
23	Battery + via Light switch	Parking and tail lights; Numberplate light	10
24		Parking and tail lights	10
25	Switch, rear fog light	Rear fog lights; Indicator lamp, rear fog light	10
26		Spare	
27	Ignition lock	Reversing lights; Turn signals	15
28	15 I	Control signals for: Bulb failure; Heated rear window; Sunroof; Seat belt reminder; Cruise control	10
29		ABS	15
30	Battery +	Cigar lighter	10
31	via relief relay	Fan 1 – 3; Air conditioning (A/C)	25
32		Radio	10
33	Ignition lock X	Power door mirrors; Light beam regulation; Data link connector (DLC)	15
34		Windshield wiper/washer; Headlight wiper/washer; Horn	25
35		Rheostat, instrument panel	10
36		Spare	
37	Battery + via relief relay	Power windows; Power sun roof	*
38		Spare	
39		"	
40		"	

* Automatic fuse

Model year 1993

Fuse	Supplied by	Circuits protected	A
1	Ignition lock 15	Control module, fuel system; " , ignition system; " automatic transmission; Main relay fuel system	15
2	Ignition lock 15	Fuel pump; Alarm	15
3	via relief relay	Interior lighting (microswitch in door lock); Oil level/pressure sensor; Speed warning device; Exhaust temperature sensor (Japan)	10
4		Spare <i>No fuse:</i> <i>Power stage, ignition; Solenoid, intake manifold)</i>	
5	Battery +	Heater fan, 4th speed	30
6		Central locking; Alarm; Relay for anti-theft pos.	25
7		Amplifier(radio)	15
8		Power antenna; Towing hook	25
9		ABS, combined relay and control module; TRACS	30
10		Spare	
11		Heated rear window; Heated door mirrors	30
12		Brake lights	10
13		Hazard warning lights; Alarm; High beam flasher	15
14		ABS, combined relay; <i>No fuse: light switch</i>	30
15		Radio; Interior lighting;Glove box light; Door open warning lights; Door instep lights; Boot light; Oil level-/pressure sensor; Remote control, central locking	10
16		Accessories	30
17	Ignition lock S	Seat belt reminder	10
18	Ignition lock 15 I	Heated seats; Power door mirrors	25
19	Relay, main	High beam, left	15
20	beam	High beam, right; Indicator lamp, main beam	15

Fuse	Supplied by	Circuits protected	A
21	Bulb failure sensor, front	Low beam, left	15
22		Low beam, right	15
23	Battery + via Light switch	Parking and tail lights; Numberplate light	10
24		Parking and tail lights	10
25	Switch, rear fog light	Rear fog lights; Indicator lamp, rear fog light	10
26		Spare	
27	Ignition lock 15 I	Reversing lights; Turn signals; TRACS	15
28		Control signals for: Bulb failure; Heated rear window; Seat belt reminder; Cruise control; Heated door mirrors; Shift lock	10
29		ABS combined relay and control unit; TRACS	15
30	Battery + via relief relay X	Cigar lighter	10
31		Fan 1 – 3; Air conditioning (A/C)	25
32		Radio; Remote-controlled central locking	10
33	Ignition lock X	Power seats; Light beam regulation; Data link connector (DLC) A	15
34		Windshield wiper/washer; Headlight wiper/washer; Horn	25
35		Rheostat, instrument panel; Power sun roof	10
36		Spare	
37	Battery + via relief relay X	Power windows; Power sun roof	*
38		Spare	
39	Battery +	Power seats, left	*
40		Power seats, right	*

* Automatic fuse

Model year 1994

Fuse	Supplied by	Circuits protected	A
1	Ignition lock 15	Control module, fuel system; " , ignition system; " automatic transmission; Main relay fuel system	15
2	Ignition lock 15	Fuel pump; Alarm	15
3	via relief relay	Interior lighting (microswitch in door lock); Oil level-/pressure sensor; Speed warning device; Exhaust temperature sensor (Japan)	10
4		Spare <i>No fuse:</i> <i>Power stage, ignition; Solenoid, intake manifold)</i>	
5	Battery +	Heater fan, 4th speed;	30
6		Central locking; Alarm; Relay for anti-theft pos.	25
7		Amplifier(radio)	15
8		Air pump	40
9		ABS, combined relay and control module; TRACS	30
10		Rear heated seats	15
11		Heated rear window; Heated door mirrors	30
12		Brake lights	10
13		Hazard warning lights; Alarm High beam flasher	15
14		ABS, combined relay; TRACS <i>No fuse: light switch</i>	30
15		Interior lighting; Glove box light, Door open warning lights; Door instep lights; Boot light; Oil level-/pressure sensor; Remote control; central locking; Seat belt reminder; Diagnostic socket OBDII	10
16	Accessories; Power antenna; Trailer socket	30	
17	Ignition lock S	Key warning	10
18		Spare	25
19	Relay, main	High beam, left	15
20	beam	High beam, right; Indicator lamp, main beam	15

Fuse	Supplied by	Circuits protected	A
21	Bulb failure sensor, front	Low beam, left	15
22		Low beam, right	15
23	Battery + via Light switch	Parking and tail lights; Numberplate light	10
24		Parking and tail lights	10
25	Switch, rear fog light	Rear fog lights; Indicator lamp, rear fog light	10
26	Ignition lock 15 I	Front heated seats; Power door mirrors	25
27		Reversing lights; Turn signals; TRACS	15
28		Control signals for: Bulb failure; Heated rear window; Seat belt reminder; Cruise control; Heated door mirrors; Shift lock	10
29		ABS combined relay and control unit; TRACS	15
30	Battery + via relief relay	Cigar lighter	10
31		Fan 1 – 3; Air conditioning (A/C)	25
32		Radio; Remote-controlled central locking	10
33	Ignition lock X	Power seats; Data link connector (DLC) A; Light beam regulation; Tailgate wiper/washer	15
34		Windshield wiper/washer; Headlight wiper/washer; Horn	25
35		Instrument and control lightning; Rheostat, instrument panel; Power sun roof	10
36		Spare	
37	Battery + via relief relay	Power windows; Power sun roof	*
38		Spare	
39	Battery +	Power seats, left	*
40		Power seats, right	*
* Automatic fuse			

Relay location

1992 - 1993

Engine compartment (in central electrical module)		Passenger compartment (in central electrical module)	
No.	Designation	No.	Designation
101	Cruise control	201	1992 : Front bulb-failure sensor 1993-: Control module, oil level sensor
102	Cruise control	202	1992 : Spare 1993-: Anti-theft position, locked
103	Fuel pump	203	Intermittent wipers, windshield
104	1992 : Headlight 1993-: Headlight/Front bulb-failure sensor	204	Intermittent wipers, tailgate
105	Relief X	205	Central locking with delayed cabin lighting
106	Relief 15	206	----- " -----
107	1992 : Relief 15 I 1993-: Relief 15 X	207	1992 : Spare 1993-: Speed warning device or exhaust temperature sensor
108	1992 : Headlight 1993-: Headlight/Front bulb-failure sensor	208	Defroster, rear window and door mirrors
Engine compartment (outside central electrical module)		209	Spare
2/11	Engine cooling fan	210	Anti-theft alarm, option
2/32	Main relay, fuel system	211	Anti-theft alarm, option
2/42	Combination relay, ABS	212	Seat belt reminder
2/53	Air pump	213	1994 : P-shift lock
		214	1993-: Rear heated seats
		215	Spare
		Passenger compartment (Outside central electrical module)	
		2/22	A/C
		2/24	Fan, max
		2/45	1993: P-shift lock
		K 1	Autodown, power window

Group 38 Instruments

Fuel level sensor	Volume litres	Resistance Ω
Empty tank.....	0	325 ± 2.5
Full tank	73	10 ± 2.5

Engine coolant temperature (ECT) 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 of sensor	1820 ± 180