

Air conditioning

REFRIGERANT

OIL

Model	Year	Type	Grams	Type	Viscosity	ml
ALFA ROMEO						
33	1983-94	R12	1150	Suniso 5GS	—	10
33 D-Turbo	1986-94	R12	900	Suniso 46	—	10
145/146 1.3/1.4/1.6/1.7	1994-97	R134a	700	SP10	ISO 46	225-255
145/146 Twin Spark	1996-01	R134a	700	Dens Oil 9	ISO 100	130-170
145/146 D-Turbo	1994-01	R134a	700	UCON RL 488	ISO 150	221-251
145/146 1.9 JTD	1998-01	R134a	10	SP20	ISO 100	130
75	1985-93	R12	900	Suniso 5GS	—	10
155	1992-93	R12	950	Suniso 5GS	—	135
155	1994-97	R134a	700	SP10	ISO 46	225-255
155 1.6/1.8/2.0 16V	1995-97	R134a	700	Dens Oil 9	ISO 100	260-320
155 1.9 Diesel	1993-97	R134a	700	UCON RL 488	ISO 150	236
156	1997-01	R134a	650	SP20	ISO 100	145
156 1.9 JTD	1997-01	R134a	650	SP20	ISO 100	130
156 2.4 JTD	1997-01	R134a	650	Dens Oil 9	ISO 100	150
164	1987-93	R12	1250	Suniso 46	—	10
164	1994-98	R134a	1200	Sanden E13 M6	ISO 100	120-150
166	1998-01	R134a	700	SP10	ISO 46	135
Sprint	1987-91	R12	1150	Suniso 5GS	—	10
Spider	1990-93	R12	10	Suniso 5GS	—	10
Spider/GTV 1.8	1998-01	R134a	600-700	SP10	ISO 46	260-320
Spider/GTV 2.0	1996-01	R134a	650-750	Dens Oil 9	ISO 100	260-320
Spider 3.0 V6/GTV 2.0 Turbo	1996-01	R134a	650-750	SP10	ISO 46	225-255
GTV 3.0 V6 24V	1997-01	R134a	650-750	SP10	ISO 46	230-250

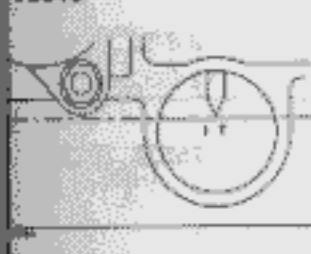
Spark Plugs

Model	Year	Bosch	mm	Champion	mm	NGK	mm	Beru	mm
ALFA ROMEO									
33 1.5i/1.7i SOHC Cat	1990-94	W5DC	0,7	N6YCC	0,8	BP6E-VG	0,7	14-5DU	0,7
33 1.7i SOHC	1990-94	W6DTC	0,8	N6YCC	0,8	BP6E-VG	0,7	14-5DU	0,7
33 1.7i DOHC 16V	1990-94	F7DTC	0,8	-	-	PFR6B	0,7	-	-
33 1.7i DOHC 16V Cat	1990-94	F7DTC	0,8	RC6YCC	-	BCPR6ET	0,7	-	-
145/146 1.3i	1994-01	-	-	N6YCC	0,8	-	-	14-6DTU	0,8
145/146 1.6i	1994-97	W6DTC	0,8	N6YCC	0,8	BP6E-VG	0,7	14-6DTU	0,8
145/146 1.7i 16V	1994-97	F5DPOR	0,6	RC6YCC	-	PFR6B	0,7	-	-
145/146 1.6/1.8 Twin Spark	1996-01	-	-	RG4PHP/RC6PYP	-	PMR7A/BKR6EKPA	0,8/0,9	-	-
145/146 2.0 Twin Spark	1996-99	-	-	RG4PHP/RC6PYP	-	PMR7A/BKR6EKPA	0,8/0,9	-	-
145/146 2.0 Twin Spark	1999-01	-	-	RG4PHP/RC8TYC	-	PMR7A/BKR6EKPA	0,8/0,9	-	-
75 2.0 Twin Spark	1987-93	F5DC	0,7	RC6YCC	-	BCP6E-VG	0,7	-	-
75 3.0i Cat	1990-93	W7DC	0,7	RN7YCC	0,8	PFR6B	0,7	14-7DU	0,8
155 Twin Spark 8V	1992-97	F5DC	0,7	RC6YCC	0,8	BCP6E-VG	0,7	14F-5DU	0,7
155 Twin Spark 16V	4.95-99	-	-	RG4PHP/RC6PYP	-	PMR7A/BKR6EKPA	0,8/0,9	-	-
155 Twin Spark 16V	1999-01	-	-	RG4PHP/RC8TYC	-	PMR7A/BKR6EKPA	0,8/0,9	-	-
155 2.0i Turbo	1992-97	WR6DTC	0,6	N7BYC	-	BP6ET	0,8	-	-
155 2.5i V6	1992-97	W5DC	0,7	RN7YCC	0,8	BPR7E	0,7	14-5DU	0,7
156 1.6i Twin Spark	1997-99	-	-	RG4PHP/RC6PYP	-	-	-	-	-
156 1.6i Twin Spark	1999-01	-	-	RG4PHP/RC8TYC	-	-	-	-	-
156 1.8/2.0 Twin Spark	1997-99	-	-	RG4PHP/RC6PYP	-	PMR7A/BKR6EKPA	0,8/0,9	-	-
156 1.8/2.0 Twin Spark	1999-01	-	-	RG4PHP/RC8TYC	-	PMR7A/BKR6EKPA	0,8/0,9	-	-
156 2.5 V6 24V	1997-01	FR5DP1	0,8	RN7YCC	0,8	PFR6B	0,7	-	-
164 2.0 Twin Spark	1987-99	F5DC	0,7	RC6YCC	-	BCP6E-VG	0,7	14F-5DU	0,7
164 3.0 V6	1987-93	W5DC	0,7	RN7YCC	0,8	BP6E-VG	0,7	14-5DU	0,7
164 3.0 V6 Cat	1987-93	WR6DC	0,7	RN7YCC	0,8	PGR6A	0,7	14-5DU	0,7
164 3.0 V6 24V eng:663.01	1993-99	FR5DP1	0,9	RC6YCC	-	PFR6B	0,7	-	-
164 3.0 Cloverleaf eng:643.04	1993-99	FR5DP1	0,9	RN7YCC	0,8	PFR6B	0,7	14R-6DU	0,8
166 2.0 Twin Spark	1998-01	-	-	RG4PHP/RC8TYC	-	PMR7A/BKR6EKPA	0,8/0,9	-	-
166 2.0 Turbo	1998-01	-	-	N6YCC	0,8	-	-	-	-
166 2.5/3.0 V6	1998-01	-	-	RC8PYP	0,8	PFR6B	0,7	-	-
Spider 1.6i	1990-94	-	-	RN7YCC	0,8	-	-	14-5DU	0,7
Spider 2.0i	1990-94	W7DC	0,7	N3C	0,7	BP6E-VG	0,7	14-7DU	0,8
Spider 3.0 V6 12V	1995-01	-	-	RN7YCC	0,8	-	-	-	-
Spider/GTV 2.0i T.Spark	1995-99	-	-	RG4PHP/RC6PYP	-	PMR7A/BKR6EKPA	0,8/0,9	-	-
Spider/GTV 1.8/2.0i T.Spark	1999-01	-	-	RG4PHP/RC8TYC	-	PMR7A/BKR6EKPA	0,8/0,9	-	-
GTV 2.0i Turbo	1995-01	-	-	N6YCC	0,8	-	-	14-5DU	0,7
GTV 3.0 V6 24V	1997-01	FR5DP1	0,7	RC8PYP	0,8	PFR6B	0,7	-	-

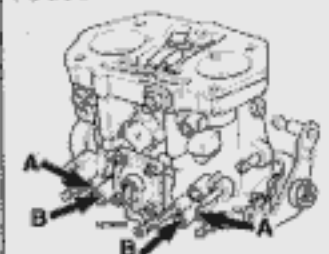
			1	2	3	4	5
Vehicle Identification			8590	9325	13000	8592	8521
2	Model		33	33	33	33 16V	33
3			1.5	Sport Wagon	Sport Wagon	Sport Wagon	Sport Wagon
4				1.5 ie +4x4	1.5 ie +4x4	+4x4	1.7 ie +4x4
5	Engine specially tuned for:				R-Cat		
6	Year		1990-93	1990-94	1990-94	1990-92	1990-93
7	Engine	Code	307.34	307.50	307.51	307.46	307.33
8	No. of cylinders/Type		4/OHC	4/OHC	4/OHC	4/DOHC	4/OHC
9	Capacity	cm ³	1490	1490	1490	1712	1712
10	Output	kW (DIN hp) rpm	77 (105) 6000	71 (96) 6000	70 (95) 6000	93 (127) 6500	79 (107) 5800
11	Ignition system	Description	Trans-i	Trans-i	Trans-i	Map-i	Trans-i
12		Trigger location	Distributor	Distributor	Distributor	Crankshaft	Distributor
13	Fuel system	Make	Weber/Dellorto	Bosch	Bosch	Bosch	Bosch
14		Type	40ICF/DRLA40	L3-Jetronic	L3-Jetronic	Motronic ML4.1	L3-Jetronic
15		Description	Carb-2V	MFI-i	MFI-i	MFI-i	MFI-i
16	Air metering	Type	-	Flow	Flow	Flow	Flow
17	Tuning and emissions			4	1		4
18	Ignition coil - Primary resistance	Ω	0,7-1,0	0,7-1,0	0,7-1,0	-	0,7-1,0
19	- Secondary resistance	Ω	6700-9600	6700-9600	6700-9600	-	6700-9600
20	Firing order		1-3-2-4	1-3-2-4	1-3-2-4	1-3-2-4	1-3-2-4
21	Ignition distributor (ECM)	No.	0 237 001 021	0 237 507 009	0 237 507 009	0 237 523 012	0 237 507 009
22	Ignition timing BTDC	Engine / rpm	8±1/900	8±1/900	8±1/900	8±1/900 Δ	8±1/900
23		a without + with vacuum	0	0	0	0	0
24	Ignition advance checks	Engine / rpm	0-2/1000 a	0-2/3000 a	0-2/3000 a	ECM controlled	0-2/3000 a
25		Engine / rpm	10-14/2000 a	4-10/4000 a	4-10/4000 a	-	4-10/4000 a
26		Engine / rpm	23-27/4000 a	16-20/6000 a	16-20/6000 a	-	16-20/6000 a
27	Idle speed	rpm	850-1000	800-900	900-1050	800-900 Δ	800-900
28	alternative	rpm	-	-	-	-	-
29	Oil temperature for CO test	°C	70	80	60	80	30
30	CO content at idle - tail pipe	Vol. %	1,5-2,5	0,6-1,7	0,5 Max	0,8-1,7	0,8-1,7
31	- sample pipe	Vol. %	-	-	-	-	-
32	CO ₂ / O ₂ content at idle speed	Vol. %	13-16/0,5-2,0	13-16/0,5-2,0	14,5-16/0,1-0,5	13-16/0,5-2,0	13-16/0,1-2,0
33	HC content at idle speed	ppm	300	300	50 Max	300	300
34	Increased idle speed for CO test	rpm	-	-	2500-2900	-	-
35	CO content at increased idle speed	Vol. %	-	-	0,3	-	-
36	Lambda at increased idle speed	λ	-	-	0,97-1,03	-	-
37	Service checks and adjustments						
38	Spark plugs	Make	Lodge	Lodge	Lodge	Lodge	Lodge
39	(also see Spark Plugs list)	Type	25HL	25HL	25HL	25HL	25HL
40	Electrode gap	mm	0,7	0,7	0,7	0,7	0,7
41	Valve clearance - inlet	mm	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic
42	- exhaust	mm	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic
43	Compression pressure	bar	10,3 Min	10,3 Min	10,3 Min	-	10,3 Min
44	Oil pressure	bar / rpm	-	-	-	-	-
45	Lubricants and capacities						
46	Engine oil - grade	SAE	10W/40	10W/40	10W/40	10W/40	10W/40
47	- classification	API/ACEA	SH/A2-95	SH/A2-96	SH/A2-96	SH/A2-96	SH/A2-96
48	alternative - grade	SAE	10W/40 Synth.	10W/40 Synth.	10W/40 Synth.	10W/40 Synth.	10W/40 Synth.
49	- classification	API/ACEA	SH/A3-95	SH/A3-96	SH/A3-96	SH/A3-96	SH/A3-96
50	Engine with filter	litres	4,0	4,0	4,0	4,0	4,0
51	Gearbox oil grade	SAE	75W/90	75W/90	75W/90	75W/90	75W/90
52	4/5 speed	litres	2,6	2,6	2,6	2,6	2,6
53	Automatic transmission fluid	Type	-	-	-	-	-
54	drain and refill	litres	-	-	-	-	-
55	Differential oil grade	SAE	-	80W/90	80W/90	80W/90	80W/90
56	front/rear	litres	-	1,0	1,0	1,0	1,0
57	Cooling system	litres	7,8	7,8	7,8	7,8	7,8
58	Fuel system						
59	Fuel pump delivery pressure	bar	0,18-0,30	-	-	-	-
60	System pressure without vacuum	bar	-	2,8-3,2	2,8-3,2	2,8-3,2	2,8-3,2
61	Regulated pressure with vacuum	bar	-	2,3-2,7	2,3-2,7	2,3-2,7	2,3-2,7
62	Illustration reference numbers						
63	Cylinder layout		75125	75125	75125	75125	75125
64	Timing mark	refer to Technical Information at end of this manual	76010	76010	73233	-	76010
65	Idle speed/CO adjustment		70030/70030	69529/58746	69529/58746	58748	69529/58746
66	Cylinder head tightening sequence		75211	75211	75211	75211	75211

		1	2	3	4	5
Tightening torques						
16 Cylinder head	Renew bolts	No	No	No	No	No
18	Maximum bolt length	—	—	—	—	—
20	Tighten	40-60 Nm	40-60 Nm	40-60 Nm	31-35 Nm	40-60 Nm
21	Tighten	81-87 Nm	81-87 Nm	81-87 Nm	61-65 Nm	81-87 Nm
22	Slacken off	↓	↓	↓	↓	↓
23	Individually slacken off	↓	↓	↓	↓	↓
24	Tighten	↓	↓	↓	91-95 Nm	↓
25	Run engine	15 min	15 min	15 min	—	15 min
26	Wait	120 min	120 min	120 min	—	120 min
27	Individually slacken off	360°	360°	360°	—	360°
28	Tighten	81-87 Nm	81-87 Nm	81-87 Nm	—	81-87 Nm
29	Run engine	—	—	—	—	—
30	Wait	—	—	—	—	—
31	Individually slacken off	—	—	—	—	—
32	Tighten	—	—	—	—	—
33	Tighten	—	—	—	—	—
34 Main bearings	Renew bolts / nuts	No	No	No	No	No
35	Stage 1	5	5	5	5	5
36	Stage 2	—	—	—	—	—
37 Big end bearings	Renew bolts / nuts	No	No	No	No	No
38	Stage 1	22-24 Nm	22-24 Nm	22-24 Nm	22-24 Nm	22-24 Nm
39	Stage 2	43-48 Nm	43-48 Nm	43-48 Nm	43-48 Nm	43-48 Nm
40 Oil pump to cylinder block		—	—	—	—	—
41 Sump bolts		8-10 Nm	8-10 Nm	8-10 Nm	8-10 Nm	8-10 Nm
42 Sump drain bolt		—	—	—	—	—
43 Flywheel / Drive plate		94-105 Nm	94-105 Nm	94-105 Nm	94-105 Nm	94-105 Nm
44 Clutch to flywheel		12-23 Nm	12-23 Nm	12-23 Nm	12-23 Nm	12-23 Nm
45 Crankshaft pulley / damper		118-144 Nm	118-144 Nm	118-144 Nm	118-144 Nm	118-144 Nm
46 Camshaft sprocket / gear		63-70 Nm	63-70 Nm	63-70 Nm	63-70 Nm	63-70 Nm
47 Camshaft carrier / cap		—	—	—	—	—
48 Camshaft / rocker cover		—	—	—	—	—
49 Inlet manifold to cylinder head		19-24 Nm	19-24 Nm	19-24 Nm	19-24 Nm	19-24 Nm
50 Exhaust manifold to cylinder head		—	—	—	—	—
51 Spark plugs		25-34 Nm	25-34 Nm	25-34 Nm	25-34 Nm	25-34 Nm
52 Oxygen sensor (Lambda)		—	—	—	—	—
53 Knock sensor		—	—	—	—	—
54 Front hub		427-472 Nm	427-472 Nm	427-472 Nm	427-472 Nm	427-472 Nm
55 Rear hub		—	19	19	19	19
56 Steering track rod end		39-48 Nm	39-48 Nm	39-48 Nm	39-48 Nm	39-48 Nm
57 Brake disc to hub		—	—	—	—	—
58 Brake caliper to carrier	front	—	—	—	—	—
59 Brake caliper carrier to hub	front	66 Nm	66 Nm	66 Nm	66 Nm	66 Nm
60 Brake caliper to carrier	rear	—	33 Nm	33 Nm	33 Nm	33 Nm
61 Brake caliper carrier to hub	rear	—	47 Nm	47 Nm	47 Nm	47 Nm
62 ABS sensor	front / rear	—	—	—	—	—
63 Road wheels		88-108 Nm	88-108 Nm	88-108 Nm	88-108 Nm	88-108 Nm
Brake dimensions						
64 Minimum disc thickness - solid	front	9 mm	9 mm	9 mm	9 mm	9 mm
65	- ventilated	front	—	—	—	—
66		rear	—	—	—	—
67 Minimum disc thickness	rear	—	—	—	—	—
68 Thickness variation	front / rear	—	—	—	—	—
69 Disc run out	front / rear	0,03 mm/-	0,03 mm/-	0,03 mm/-	0,03 mm/-	0,03 mm/-
70 Maximum drum diameter	rear	229,6 mm	229,6 mm	229,6 mm	229,6 mm	229,6 mm
71 Minimum pad thickness	front / rear	7 mm 49/-	7 mm 49/-	7 mm 49/-	7 mm 49/-	7 mm 49/-
72 Minimum shoe thickness	rear	0,5 mm	0,5 mm	0,5 mm	—	—
73 Handbrake travel	No. of notches	1-3	1-3	1-3	1-3	1-3

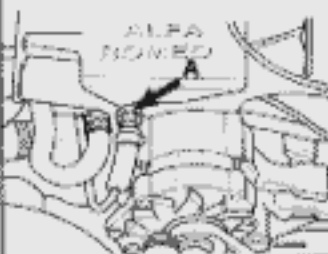
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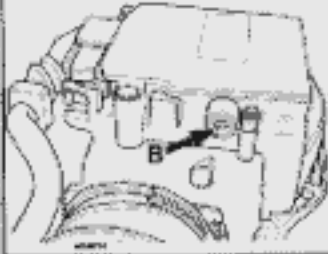
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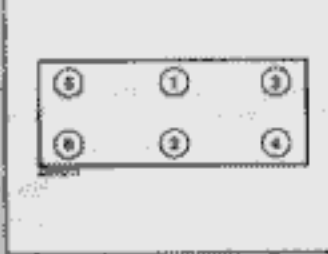
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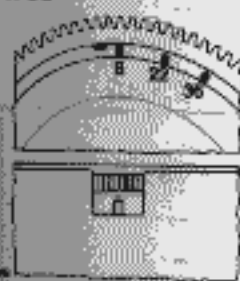
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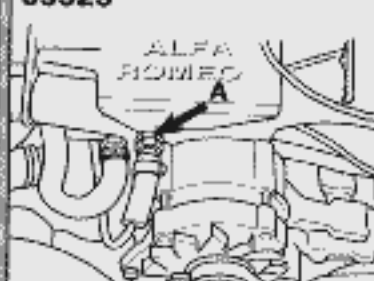
		1	2	3	4	5
1	Vehicle Identification	13001	6593	13400	17372	20263
2	Model	33	33 16V	145/146	145/146	145/146
3		Sport Wagon	Sport Wagon	1,6i	Twin Spark	Twin Spark
4		1,7 ie +4x4	+4x4		1,6i	1,6i
5	Engine specially tuned for:	R-Cat	R-Cat	R-Cat	R-Cat	R-Cat
6	Year	1990-93	1990-94	1994-97	1996-98	1998-01
7	Engine Code	307.37	307.47	332.01	676.01	676.01
8	No. of cylinders / Type	4/OHC	4/DOHC	4/OHC	4/DOHC	4/DOHC
9	Capacity cm ³	1712	1712	1596	1598	1598
10	Output kW (DIN hp) rpm	79 (110) 5800	95 (132) 6500	76 (103) 6000	88 (120) 6300	88 (120) 6300
11	Ignition system Description	Trans-i	Map-i	Map-DIS	Map-DIS	Map-DI
12	Trigger location	Distributor	Crankshaft	Crankshaft	Cam, crankshaft	Cam, crankshaft
13	Fuel system Make	Bosch	Bosch	Bosch	Bosch	Bosch
14	Type	L3-Jetronic	Motronic ML4.1	Motronic MP3.1	Motronic M2.10.4	Motronic M1.5.5
15	Description	MFI-i	MFI-i	MFI-i	MFI-s	MFI-s
16	Air metering Type	Flow	Flow	MAP	Mass	Mass
17	Tuning and emissions	[4]				
18	Ignition coil - Primary resistance Ω	0,7-1,0	—	0,50	0,27-0,33	0,26-0,34
19	- Secondary resistance Ω	6700-9600	—	13300	6160-7840	6160-7840
20	Firing order	1-3-2-4	1-3-2-4	1-3-2-4	1-3-4-2	1-3-4-2
21	Ignition distributor (ECM) No.	0 237 507 009	0 237 523 012	—	—	—
22	Ignition timing BTDC Engine / rpm	8±1/900	8±1/900 △	△	△	△
23	o without + with vacuum	o	o	—	—	—
24	Ignition advance checks Engine / rpm	0-2/3000 a	34/4500 c	ECM controlled	ECM controlled	ECM controlled
25	a = without vacuum and basic timing Engine / rpm	4-10/4000 a	—	—	—	—
26	b = without vacuum, with basic timing Engine / rpm	16-20/6000 a	—	—	—	—
27	c = with vacuum and basic timing					
27	Idle speed rpm	800-900	900-1050 △	850±50 △	840±50 △	850±30 △
28	alternative rpm	—	—	—	—	—
29	Oil temperature for CO test °C	60	60	60	80	80
30	CO content at idle - tail pipe Vol. %	0,5 Max △	0,2 Max △	0,2 Max △	0,5 Max △	0,5 Max △
31	- sample pipe Vol. %	—	—	—	—	—
32	CO ₂ / O ₂ content at idle speed Vol. %	14,5-16/0,1-0,5	14,5-16/0,1-0,5	14,5-16/0,1-0,5	14,5-16/0,1-0,5	14,5-16/0,1-0,5
33	HC content at idle speed ppm	50 Max	70 Max	50 Max	100	100
34	Increased idle speed for CO test rpm	2500-2900	2500-2900	2500-2900	2500-2900	2500-2900
35	CO content at increased idle speed Vol. %	0,3	0,3	0,3	0,3	0,3
36	Lambda at increased idle speed λ	0,97-1,03	0,97-1,03	0,97-1,03	0,97-1,03	0,97-1,03
37	Service checks and adjustments					
38	Spark plugs Make	Lodge	Lodge	Lodge	NGK	NGK
39	(also see Spark Plugs list) Type	25HL	25HL	25HL	BKR6ECPA/PMR7A	PMR7A/PFR6B
40	Electrode gap mm	0,7	0,7	0,7	0,9/0,8	—
41	Valve clearance - inlet mm	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic
42	- exhaust mm	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic
43	Compression pressure bar	10,3 Min	—	—	—	—
44	Oil pressure bar / rpm	—	—	4,0/4000	1,5/840	4,5/4000
45	Lubricants and capacities					
46	Engine oil - grade SAE	10W/40	10W/40	10W/40 Semi-Synth.	10W/40 Semi-Synth.	10W/40 Semi-Synth.
47	- classification API / ACEA	SH/A2-96	SH/A2-96	SH/A3-96	SH/A3-96	SJ/A3-96
48	alternative - grade SAE	10W/40 Synth.	10W/40 Synth.	10W/60 Synth.	10W/60 Synth.	10W/60 Synth.
49	- classification API / ACEA	SH/A3-96	SH/A3-96	SJ/A3-96	SJ/A3-96	SJ/A3-96
50	Engine with filter litres	4,0	4,0	4,0	4,4	4,4
51	Gearbox oil grade SAE	75W/90	75W/90	75W/90	75W/90	75W/90
52	4 / 5 speed litres	2,6	2,6	2,4	2,0	2,0
53	Automatic transmission fluid Type	—	—	—	—	—
54	drain and refill litres	—	—	—	—	—
55	Differential oil grade SAE	80W/90	80W/90	—	—	—
56	front / rear litres	1,0	1,0	—	—	—
57	Cooling system litres	7,8	7,8	6,7	8,4	8,4
58	Fuel system					
59	Fuel pump delivery pressure bar	—	—	—	—	—
60	System pressure without vacuum bar	2,8-3,2	2,8-3,2	2,8-3,2	2,8-3,2	3,3-3,7
61	Regulated pressure with vacuum bar	2,3-2,7	2,3-2,7	2,3-2,7	2,3-2,7	2,8-3,2
62	Illustration reference numbers					
63	Cylinder layout	75125	75125	75582	75573	75573
64	Timing mark	54738	76010	—	—	—
65	Idle speed / CO adjustment	69529/58746	—	—	—	—
66	Cylinder head tightening sequence	75211	75211	75211	75238	75238

Tightening torques		1	2	3	4	5
67	Cylinder head	Renew bolts	No	No	No	No
68		Maximum bolt length	—	—	—	—
69			—	—	—	—
70	Nm = Newton metres	Tighten	40-60 Nm	31-35 Nm	30 Nm	40 Nm
71	° = angular torque	Tighten	81-87 Nm	61-65 Nm	60 Nm	90°
72	to ft conversion, see last page	Slacken off	↓	↓	↓	↓
73		Individually slacken off	↓	↓	↓	↓
74		Tighten	↓	91-95 Nm	91-101 Nm	90°
75		Run engine	15 min	—	—	↓
76		Wait	120 min	—	—	↓
77		Individually slacken off	360°	—	—	↓
78		Tighten	81-87 Nm	—	—	90°
79		Run engine	—	—	—	—
80		Wait	—	—	—	—
81		Individually slacken off	—	—	—	—
82		Tighten	—	—	—	—
83		Tighten	—	—	—	—
84	Main bearings	Renew bolts / nuts	No	No	No	No
85		Stage 1	[5]	[5]	[5]	48-60 Nm
86		Stage 2	—	—	—	96-119 Nm
87	Big end bearings	Renew bolts / nuts	No	No	No	No
88		Stage 1	22-24 Nm	22-24 Nm	25 Nm	25 Nm
89		Stage 2	43-48 Nm	43-48 Nm	53-58 Nm	60°
90	Oil pump to cylinder block		—	—	—	—
91	Sump bolts		8-10 Nm	8-10 Nm	—	—
92	Sump drain bolt		—	—	28-35 Nm	20-25 Nm [50]
93	Flywheel / Drive plate		94-105 Nm	94-105 Nm	97-107 Nm	121-149 Nm
94	Clutch to flywheel		12-23 Nm	12-23 Nm	19-23 Nm	22 Nm
95	Crankshaft pulley / damper		118-144 Nm	118-144 Nm	119-147 Nm	340-378 Nm
96	Camshaft sprocket / gear		63-70 Nm	63-70 Nm	67-71 Nm	100-124 Nm
97	Camshaft carrier / cap		—	—	20-24 Nm	15 Nm
98	Camshaft / rocker cover		—	—	—	—
99	Inlet manifold to cylinder head		19-24 Nm	19-24 Nm	—	17-21 Nm
100	Exhaust manifold to cylinder head		—	—	—	17-21 Nm
101	Spark plugs		25-34 Nm	24-34 Nm	25-30 Nm	[28]
102	Oxygen sensor (Lambda)		—	—	43-53 Nm	43-53 Nm
103	Knock sensor		—	—	—	—
104	Front hub		427-472 Nm	427-472 Nm	[41]	[41]
105	Rear hub		[19]	[19]	266-294 Nm	266-294 Nm
106	Steering track rod end		39-48 Nm	39-48 Nm	34-42 Nm	34 Nm
107	Brake disc to hub		—	—	5-13 Nm	5-13 Nm
108	Brake caliper to carrier	front	—	—	35 Nm [33]	35 Nm [33]
109	Brake caliper carrier to hub	front	66 Nm	66 Nm	50 Nm [42]	50 Nm [42]
110	Brake caliper to carrier	rear	33 Nm	33 Nm	55 Nm [33]	55 Nm [33]
111	Brake caliper carrier to hub	rear	47 Nm	47 Nm	22 Nm [33]	22 Nm [33]
112	ABS sensor	front / rear	—	—	—	—
113	Road wheels		88-108 Nm	88-108 Nm	83-103 Nm	83-103 Nm
114	Brake dimensions					
115	Minimum disc thickness - solid	front	9 mm	9 mm	10,2 mm	10,2 mm
116	- ventilated	front	—	—	18,2 mm	18,2 mm
117	Minimum disc thickness	rear	—	—	9,2 mm	9,2 mm
118	Thickness variation	front / rear	—	—	—	—
119	Disc run out	front / rear	0,03 mm/—	0,03 mm/—	0,15 mm/—	0,15 mm/—
120	Maximum drum diameter	rear	229,6 mm	229,6 mm	—	—
121	Minimum pad thickness	front / rear	7 mm [49]/—	7 mm [49]/—	1,5 mm/—	1,5 mm/1,5 mm
122	Minimum shoe thickness	rear	—	—	1,5 mm	1,5 mm
123	Handbrake travel	No. of notches	1-3	1-3	3	3

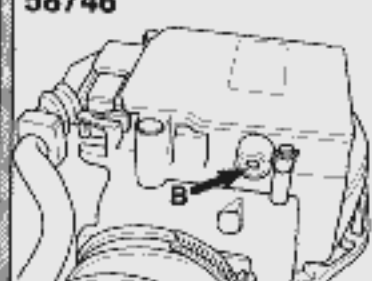
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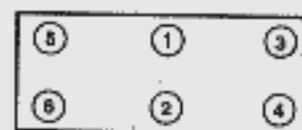
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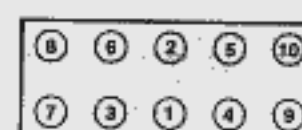
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Vehicle Identification			13401	17373	20139	15738	20140
Model			145/146	145/146	145/146	145/146	145/146
			1,7i 16V	Twin Spark	Twin Spark	Twin Spark	Twin Spark
				1,8i	1,8i	2,0i	2,0i
Engine specially tuned for:			R-Cat	R-Cat	R-Cat	R-Cat	R-Cat
Year			1994-97	1996-98	1998-01	1996-98	1998-01
Engine	Code		334.01	671.06	322.01	672.04	323.01
No. of cylinders / Type			4/DOHC	4/DOHC	4/DOHC	4/DOHC	4/DOHC
Capacity	cm ³		1712	1747	1747	1970	1970
Output	kW (DIN hp) rpm		95 (129) 6500	103 (140) 6300	106 (144) 6500	110 (150) 6200	114 (155) 6400
Ignition system	Description		Map-DIS	Map-DIS	Map-DI	Map-DIS	Map-DI
	Trigger location		Crankshaft	Cam, crankshaft	Cam, crankshaft	Cam, crankshaft	Cam, crankshaft
Fuel system	Make		Bosch	Bosch	Bosch	Bosch	Bosch
	Type		Motronic M2.10.3	Motronic M2.10.4	Motronic M1.5.5	Motronic M2.10.3/4	Motronic M1.5.5
	Description		MFI-s	MFI-s	MFI-s	MFI-s	MFI-s
Air metering	Type		Mass	Mass	Mass	Flow	Mass
Tuning and emissions							
Ignition coil - Primary resistance	Ω		0,50	0,27-0,33	0,26-0,34	—	0,26-0,34
- Secondary resistance	Ω		13300	6160-7840	6160-7840	—	6160-7840
Firing order			1-3-2-4	1-3-4-2	1-3-4-2	1-3-4-2	1-3-4-2
Ignition distributor (ECM)	No.		—	—	—	—	—
Ignition timing BTDC	Engine / rpm		△	△	△	△	△
	o without + with vacuum		—	—	—	—	—
Ignition advance checks	Engine / rpm		ECM controlled	ECM controlled	ECM controlled	ECM controlled	ECM controlled
a = without vacuum and basic timing	Engine / rpm		—	—	—	—	—
b = without vacuum, with basic timing	Engine / rpm		—	—	—	—	—
c = with vacuum and basic timing	Engine / rpm		—	—	—	—	—
Idle speed	rpm		900±50 △	840±50 △	850±30 △	800±50 △	850±30 △
alternative	rpm		—	—	—	97→840±50 △	—
Oil temperature for CO test	°C		60	80	80	80	80
CO content at idle - tail pipe	Vol. %		0,2 Max △	0,5 Max △	0,5 Max △	0,5 Max △	0,5 Max △
- sample pipe	Vol. %		—	—	—	—	—
CO ₂ / O ₂ content at idle speed	Vol. %		14,5-16/0,1-0,5	14,5-16/0,1-0,5	14,5-16/0,1-0,5	14,5-16/0,1-0,5	14,5-16/0,1-0,5
HC content at idle speed	ppm		50 Max	100	100	100	100
Increased idle speed for CO test	rpm		2500-2900	2500-2900	2500-2900	2500-2900	2500-2900
CO content at increased idle speed	Vol. %		0,3	0,3	0,3	0,3	0,3
Lambda at increased idle speed	λ		0,97-1,03	0,97-1,03	0,97-1,03	0,97-1,03	0,97-1,03
Service checks and adjustments							
Spark plugs	Make		NGK	NGK	NGK	NGK	NGK
(also see Spark Plugs list)	Type		PFR6B	BKR6EKPA/PMR7A	PMR7A/PFR6B	BKR6EKPA/PMR7A	PMR7A/BKR6EKPA
Electrode gap	mm		0,7	0,9/0,8	—	0,9/0,8	—
Valve clearance - Inlet	mm		Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic
- exhaust	mm		Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic
Compression pressure	bar		—	—	—	—	—
Oil pressure	bar / rpm		4,0/4000	1,5/840	4,5/4000	4,5/4000	4,5/4000
Lubricants and capacities							
Engine oil - grade	SAE		10W/40 Semi-Synth.	10W/40 Semi-Synth.	10W/40 Semi-Synth.	10W/40 Semi-Synth.	10W/40 Semi-Synth.
- classification	API / ACEA		SH/A3-96	SH/A3-96	SJ/A3-96	SH/A3-96	SJ/A3-96
alternative - grade	SAE		10W/60 Synth.	10W/60 Synth.	10W/60 Synth.	10W/60 Synth.	10W/60 Synth.
- classification	API / ACEA		SJ/A3-96	SH/A3-96	SJ/A3-96	SH/A3-96	SJ/A3-96
Engine with filter	litres		4,5	4,5	4,4	6,0	4,4
Gearbox oil grade	SAE		75W/90	75W/90	75W/90	75W/90	75W/90
4 / 5 speed	litres		2,4	2,0	2,0	2,0	2,0
Automatic transmission fluid	Type		—	—	—	—	—
drain and refill	litres		—	—	—	—	—
Differential oil grade	SAE		—	—	—	—	—
front / rear	litres		—	—	—	—	—
Cooling system	litres		6,7	8,4	8,4	8,4	8,4
Fuel system							
Fuel pump delivery pressure	bar		—	—	—	—	—
System pressure without vacuum	bar		2,8-3,2	2,8-3,2	3,3-3,7	2,8-3,2	3,3-3,7
Regulated pressure with vacuum	bar		2,3-2,7	2,3-2,7	2,8-3,2	2,3-2,7	2,8-3,2
Illustration reference numbers							
Cylinder layout			75582	75573	75573	75573	75573
Timing mark			—	—	—	—	—
Idle speed / CO adjustment			—	—	—	—	—
Cylinder head tightening sequence			75211	75238	75238	75238	75238

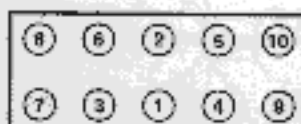
refer to Technical Information
at end of this manual

Tightening torques		1	2	3	4	5
87	Cylinder head	Renew bolts	No	No	No	No
88	Maximum bolt length	—	—	—	—	—
89	Tighten	30 Nm	40 Nm	40 Nm	40 Nm	40 Nm
90	Tighten	60 Nm	90°	90°	90°	90°
91	Slacken off	↓	↓	↓	↓	↓
92	Individually slacken off	↓	↓	↓	↓	↓
93	Tighten	91-101 Nm	90°	90°	90°	90°
94	Run engine	—	↓	↓	↓	↓
95	Wait	—	↓	↓	↓	↓
96	Individually slacken off	↓	↓	↓	↓	↓
97	Tighten	—	90°	90°	90°	90°
98	Run engine	—	—	—	—	—
99	Wait	—	—	—	—	—
100	Individually slacken off	—	—	—	—	—
101	Tighten	—	—	—	—	—
102	Tighten	—	—	—	—	—
103	Tighten	—	—	—	—	—
104	Main bearings	Renew bolts / nuts	No	No	No	No
105	Stage 1	5	48-60 Nm	48-60 Nm	48-60 Nm	48-60 Nm
106	Stage 2	—	96-119 Nm	96-119 Nm	96-119 Nm	96-119 Nm
107	Big end bearings	Renew bolts / nuts	No	No	No	No
108	Stage 1	25 Nm	25 Nm	25 Nm	25 Nm	25 Nm
109	Stage 2	53-58 Nm	60°	60°	60°	60°
110	Oil pump to cylinder block	—	—	—	—	—
111	Sump bolts	—	—	—	—	—
112	Sump drain bolt	28-35 Nm 50	20-25 Nm 50	17-21 Nm	20-25 Nm 50	17-21 Nm
113	Flywheel / Drive plate	97-107 Nm	121-149 Nm	121-149 Nm	121-149 Nm	121-149 Nm
114	Clutch to flywheel	19-23 Nm	22 Nm	20-25 Nm	22 Nm	20-25 Nm
115	Crankshaft pulley / damper	219-242 Nm	340-378 Nm	340-378 Nm	340-378 Nm	340-378 Nm
116	Camshaft sprocket / gear	76-84 Nm	100-124 Nm	100-124 Nm	100-124 Nm	100-124 Nm
117	Camshaft carrier / cap	20-24 Nm	15 Nm	13-16 Nm	15 Nm	13-16 Nm
118	Camshaft / rocker cover	8-10 Nm	—	—	—	—
119	Inlet manifold to cylinder head	—	17-21 Nm	17-21 Nm	—	—
120	Exhaust manifold to cylinder head	—	17-21 Nm	17-21 Nm	—	—
121	Spark plugs	25-30 Nm	28	28	28	28
122	Oxygen sensor (Lambda)	43-53 Nm	43-53 Nm	43-53 Nm	43-53 Nm	43-53 Nm
123	Knock sensor	—	—	—	—	—
124	Front hub	41	41	41	41	41
125	Rear hub	266-294 Nm	266-294 Nm	266-294 Nm	266-294 Nm	266-294 Nm
126	Steering track rod end	34-42 Nm	34 Nm	30-37 Nm	34 Nm	30-37 Nm
127	Brake disc to hub	5-13 Nm	5-13 Nm	5-13 Nm	5-13 Nm	5-13 Nm
128	Brake caliper to carrier	front 35 Nm 33	35 Nm 33	35 Nm 33	35 Nm 33	35 Nm 33
129	Brake caliper carrier to hub	front 50 Nm 42	50 Nm 42	50 Nm 42	50 Nm 42	50 Nm 42
130	Brake caliper to carrier	rear 55 Nm 33	55 Nm 33	55 Nm 33	55 Nm 33	55 Nm 33
131	Brake caliper carrier to hub	rear 22 Nm 33	22 Nm 33	22 Nm 33	22 Nm 33	22 Nm 33
132	ABS sensor	front / rear —	—	—	—	—
133	Road wheels	83-103 Nm	83-103 Nm	83-103 Nm	83-103 Nm	83-103 Nm
134	Brake dimensions					
135	Minimum disc thickness - solid	front 10,2 mm	10,2 mm	10,2 mm	10,2 mm	10,2 mm
136	- ventilated	front 18,2 mm	20,2 mm	20,2 mm	20,2 mm	20,2 mm
137	Minimum disc thickness	rear 9,2 mm	9,2 mm	9,2 mm	9,2 mm	9,2 mm
138	Thickness variation	front / rear —	—	—	—	—
139	Disc run out	front / rear 0,15 mm/-	0,15 mm/-	0,15 mm/-	0,15 mm/-	0,15 mm/-
140	Maximum drum diameter	—	230 mm	230 mm	230 mm	230 mm
141	Minimum pad thickness	front / rear 1,5 mm/-	1,5 mm/1,5 mm	1,5 mm/1,5 mm	1,5 mm/1,5 mm	1,5 mm/1,5 mm
142	Minimum shoe thickness	rear —	—	—	—	—
143	Handbrake travel	No. of notches 3	3	3	3	3

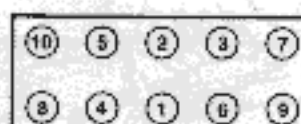
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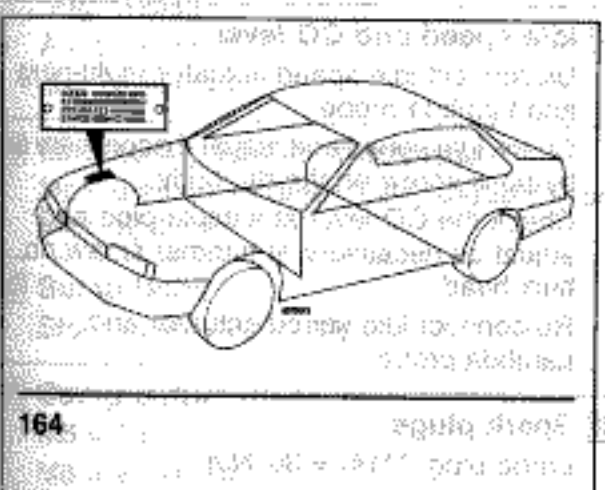
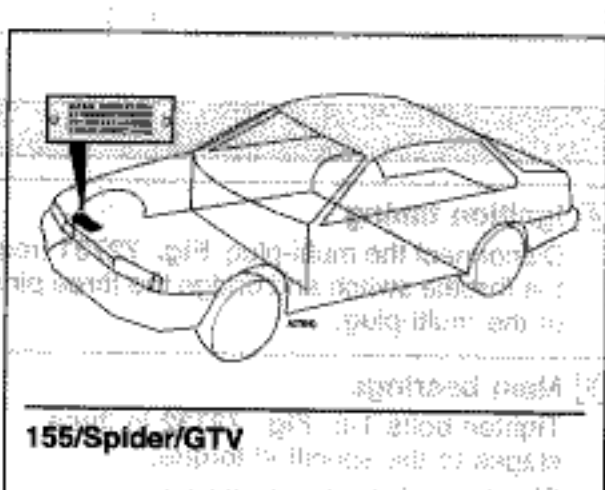
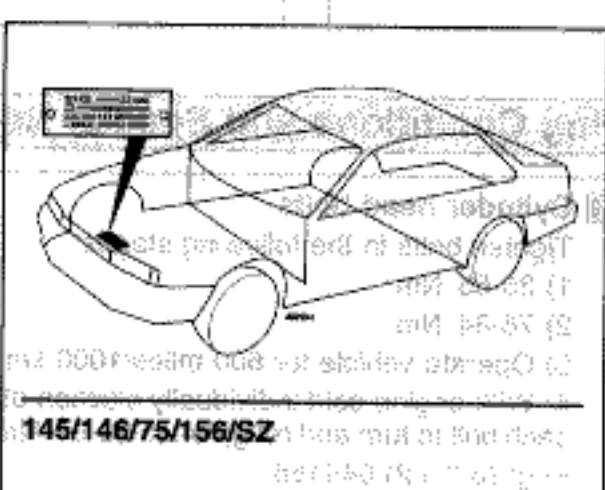
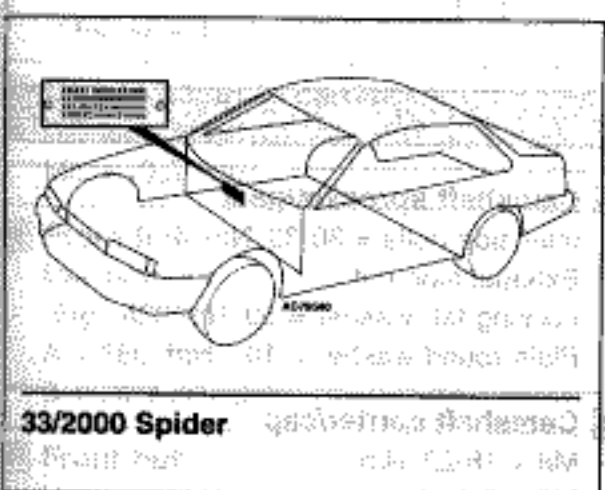
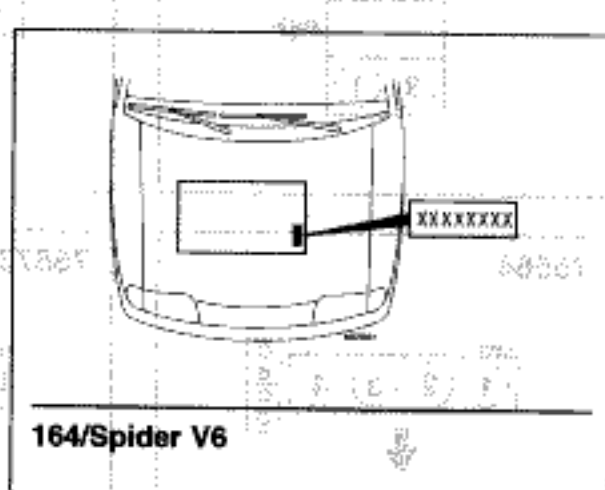
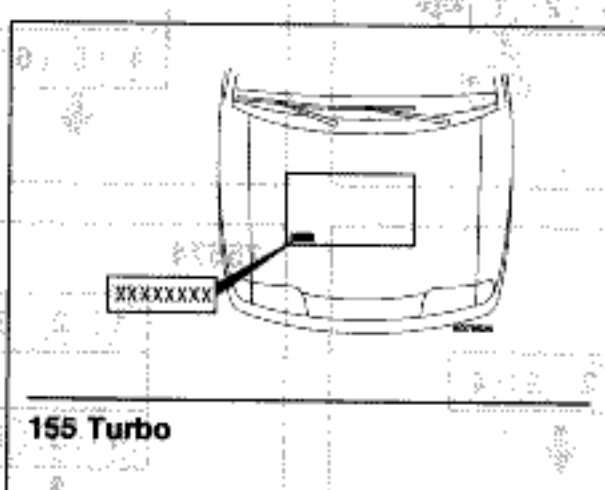
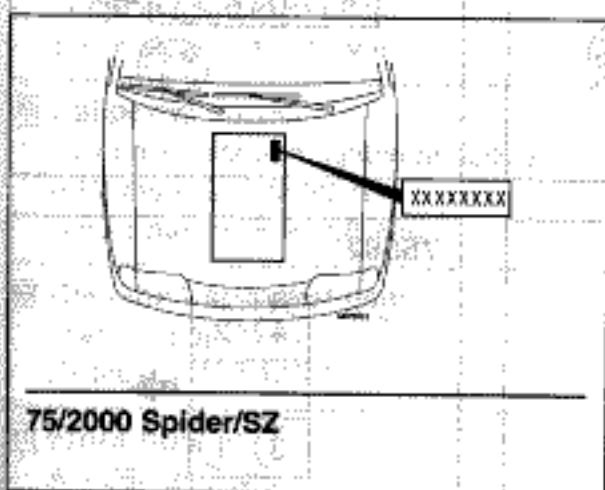
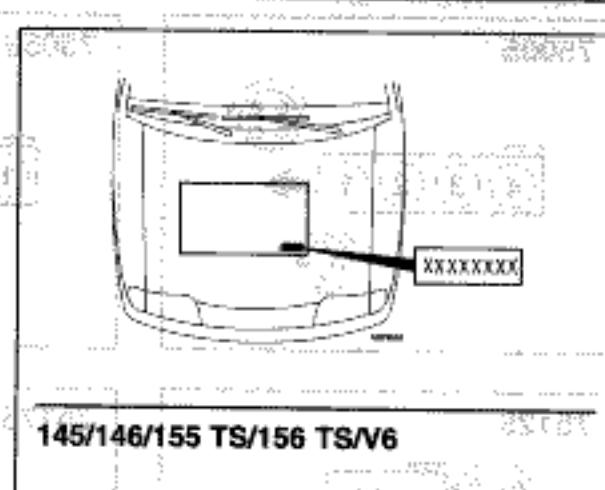
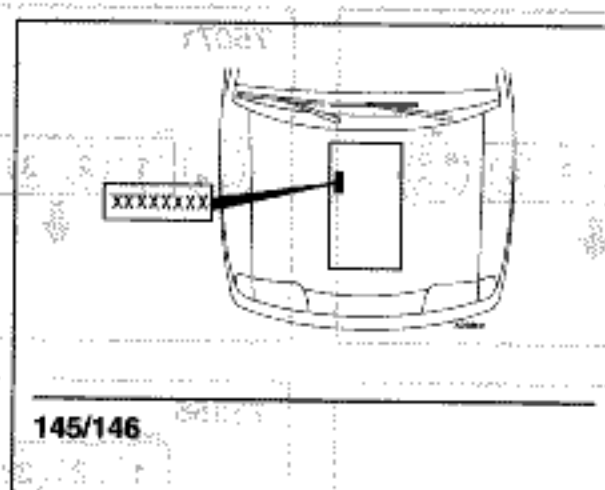
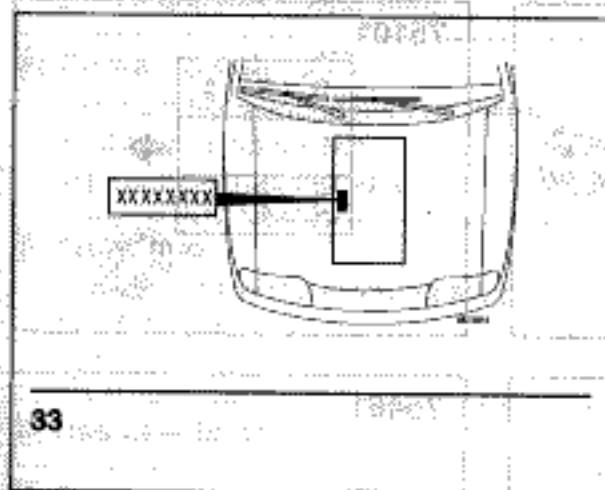
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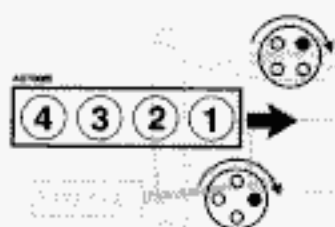


Engine Code and VIN Plate Locations

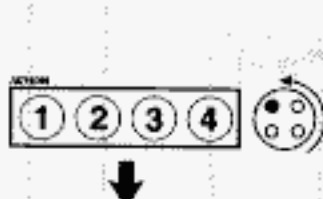


Cylinder Layouts

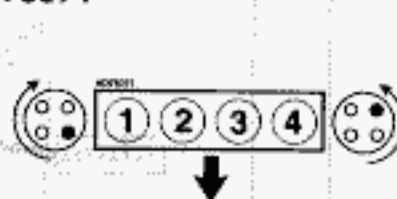
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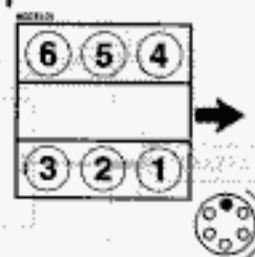
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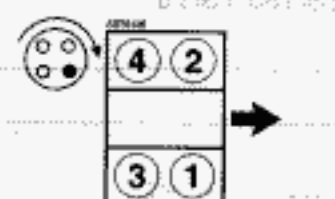
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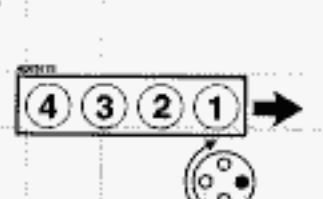
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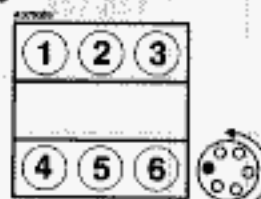
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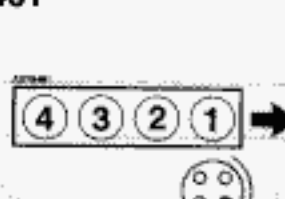
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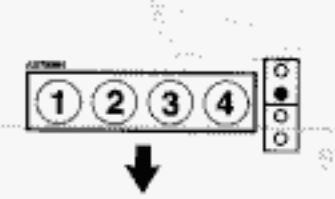
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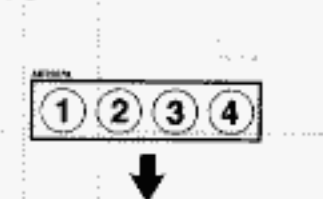
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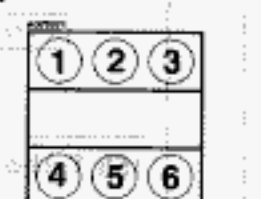
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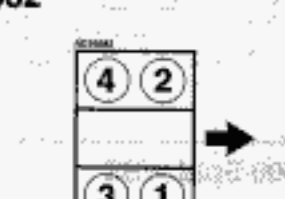
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75582



Tuning Conditions and Special Notes

4 Ignition timing

Disconnect the multi-plug Fig. 72731 from the throttle switch and bridge the three pins of the multi-plug.

5 Main bearings

Tighten bolts 1-6 Fig. 72732 in three stages to the specified torque. Check crankshaft turns freely.

Tighten bolts 7-12 Fig. 72732 in three stages to the specified torque.

Bolts 1-6 = 66-73 Nm

Bolts 7-12 = 40-49 Nm.

16 Cylinder head bolts

Tighten bolts in the following stages:

1) 35-55 Nm

2) 74-82 Nm

3) Operate vehicle for 600 miles/1000 km

4) With engine cold individually slacken off each bolt in turn and retighten to 82-88 Nm

Eng: (641.03) 009641-

1) 25 Nm

2) 100°

3) 100°.

18 Cylinder head bolts

Tighten bolts in the following stages:

1) 35-55 Nm

2) 76-84 Nm

3) Operate vehicle for 600 miles/1000 km

4) With engine cold individually slacken off each bolt in turn and retighten to 83-91 Nm

Eng: (671.02) 044168-

Eng: (672.02) 017218-

Eng: (671.05) 011055-

1) 25 Nm

2) 100°

3) 100°.

19 Rear hub

Vehicles with rear disc brakes: tighten hub nut to 250-300 Nm.

20 CO level

Disconnect Lambda sensor and resistance connectors, in engine compartment, adjacent to supplementary air valve.

Measure CO at sample pipe.

24 Camshaft sprocket/gear

Inlet side bolts = 30-33 Nm

Exhaust side nut

Locking tab washer = 59 Nm

Plain round washer = 100 Nm.

26 Camshaft carrier/cap

M8 = 18-22 Nm

M6 = 6-8 Nm.

27 Idle speed and CO level

Disconnect idle speed actuator multi-plug and Lambda probe.

Check idle speed and adjust if necessary at by-pass screw on throttle body.

Check the CO level at sample pipe and adjust as necessary at trimmer screw on bulk head.

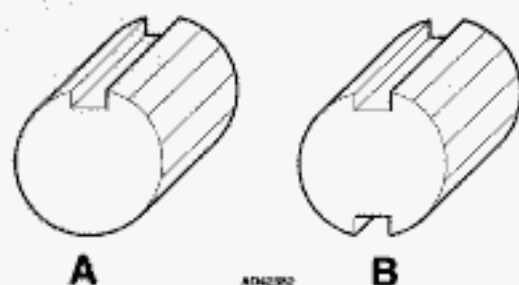
Re-connect idle speed actuator and Lambda probe.

28 Spark plugs

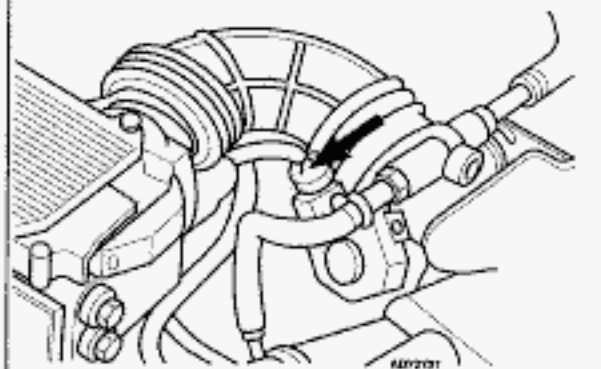
Large plug (M14) = 30 Nm

Small plug (M10) = 11 Nm.

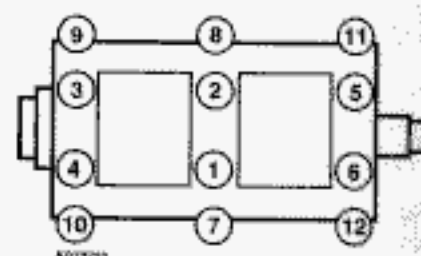
42352



72731



72732



29 Minimum disc thickness

2,4 V6 and 4x4 = 20,2 mm.

30 Carrier to hub

Use new bolts and tighten as follows:

M10 bolts = 53-60 Nm

M12 bolts = 100-110 Nm.

32 Front hub

Tighten nuts in the following stages:

1) 67-74 Nm

2) 62°.

33 Use new bolts.**34 Spark plugs**

Large plugs = 25-35 Nm

Small plugs = 10-12 Nm.

35 Caliper to carrier

Use new bolts and tighten as follows:

GTV models = 22-32 Nm

Spider models = 31-38 Nm.

40 Camshaft sprocket/gear

Inlet = 13-16 Nm

Exhaust = 102-126 Nm.

41 Front hub

A = 266-294 Nm

B = 67-74 Nm + 62°.

Fig. 42352

42 Brake caliper to carrier

Use new bolts.

M8 = 10,5 Nm.

46 Front hub

Use new nuts.

Fig. 42352

A = 380 Nm

B = 70 Nm + 61°.

47 Front hub

Use new nuts.

Fig. 42352

A = 275 Nm

B = 70 Nm + 62°.

49 Minimum pad/shoe thickness

Measurement includes lining and pad/shoe backing plate.

50 Sump bolts

Steel sump = 42-52 Nm.

51 Sump bolts

M6 = 7-9 Nm

M8 = 21-26 Nm.