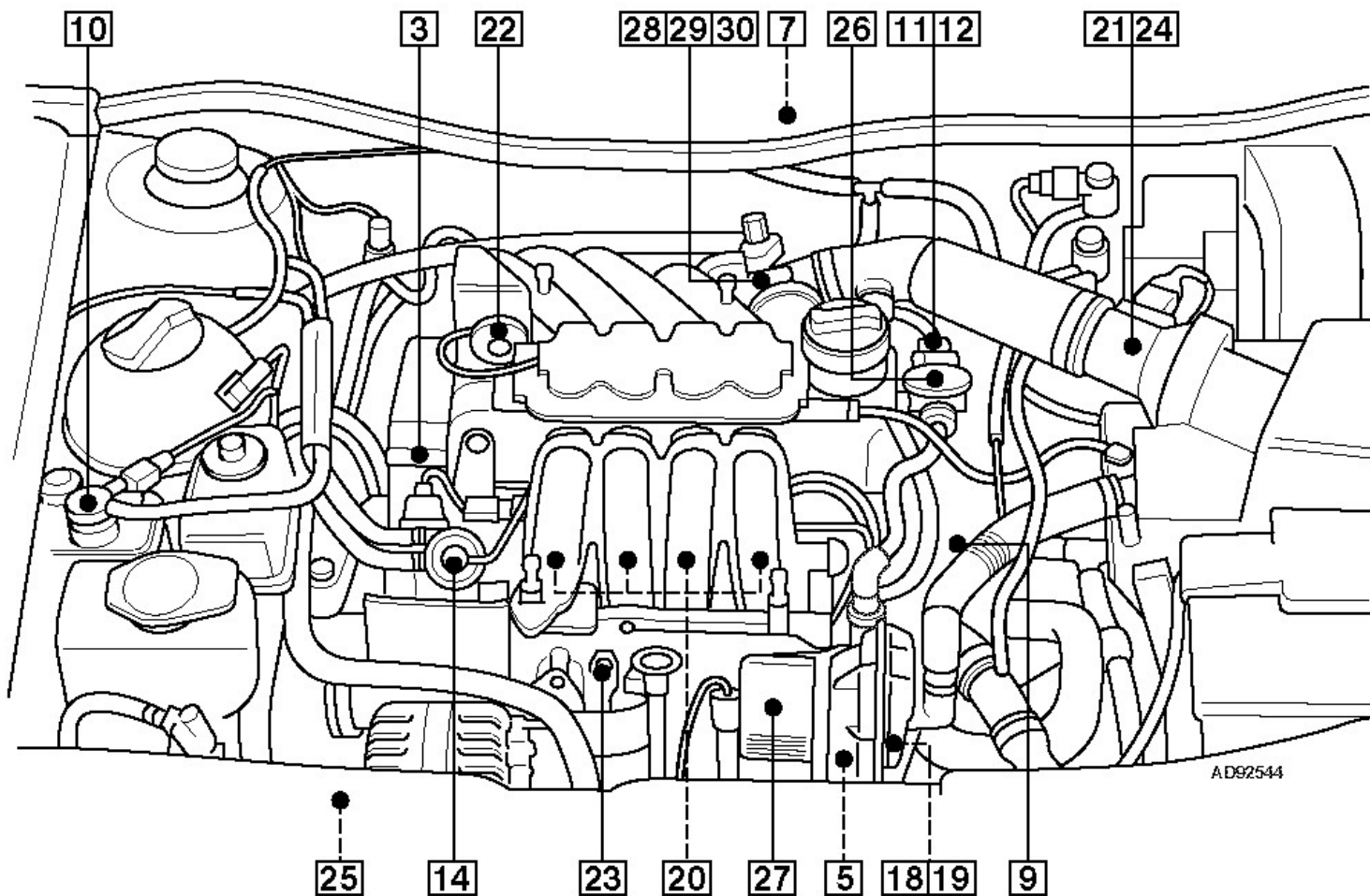




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1	Accelerator pedal position (APP) sensor 1/2 - above pedal
2	Brake pedal position (BPP) switch - above pedal
3	Camshaft position (CMP) sensor
4	Clutch pedal position (CPP) switch - above pedal
5	Crankshaft position (CKP) sensor
6	Data link connector (DLC) - centre console
7	Engine control module (ECM)
8	Engine control (EC) relay - fascia relay plate 2, position 4
9	Engine coolant temperature (ECT) sensor
10	Evaporative emission (EVAP) canister purge valve
11	Exhaust gas recirculation (EGR) valve actuator
12	Exhaust gas recirculation (EGR) valve position sensor
13	Fuel filter - near tank, RH
14	Fuel pressure regulator
15	Fuel pump - in tank
16	Heated oxygen sensor (HO2S) 1 - before cat
17	Heated oxygen sensor (HO2S) 2 - after cat
18	Ignition amplifier
19	Ignition coil
20	Injectors
21	Intake air temperature (IAT) sensor - in MAF sensor
22	Intake manifold air control solenoid
23	Knock sensor (KS)
24	Mass air flow (MAF) sensor
25	Power steering pressure (PSP) switch - on power steering pump
26	Secondary air injection (AIR) solenoid
27	Secondary air injection (AIR) pump
28	Throttle motor
29	Throttle motor position sensor 1/2
30	Throttle control unit
31	Vehicle speed sensor (VSS) - transmission





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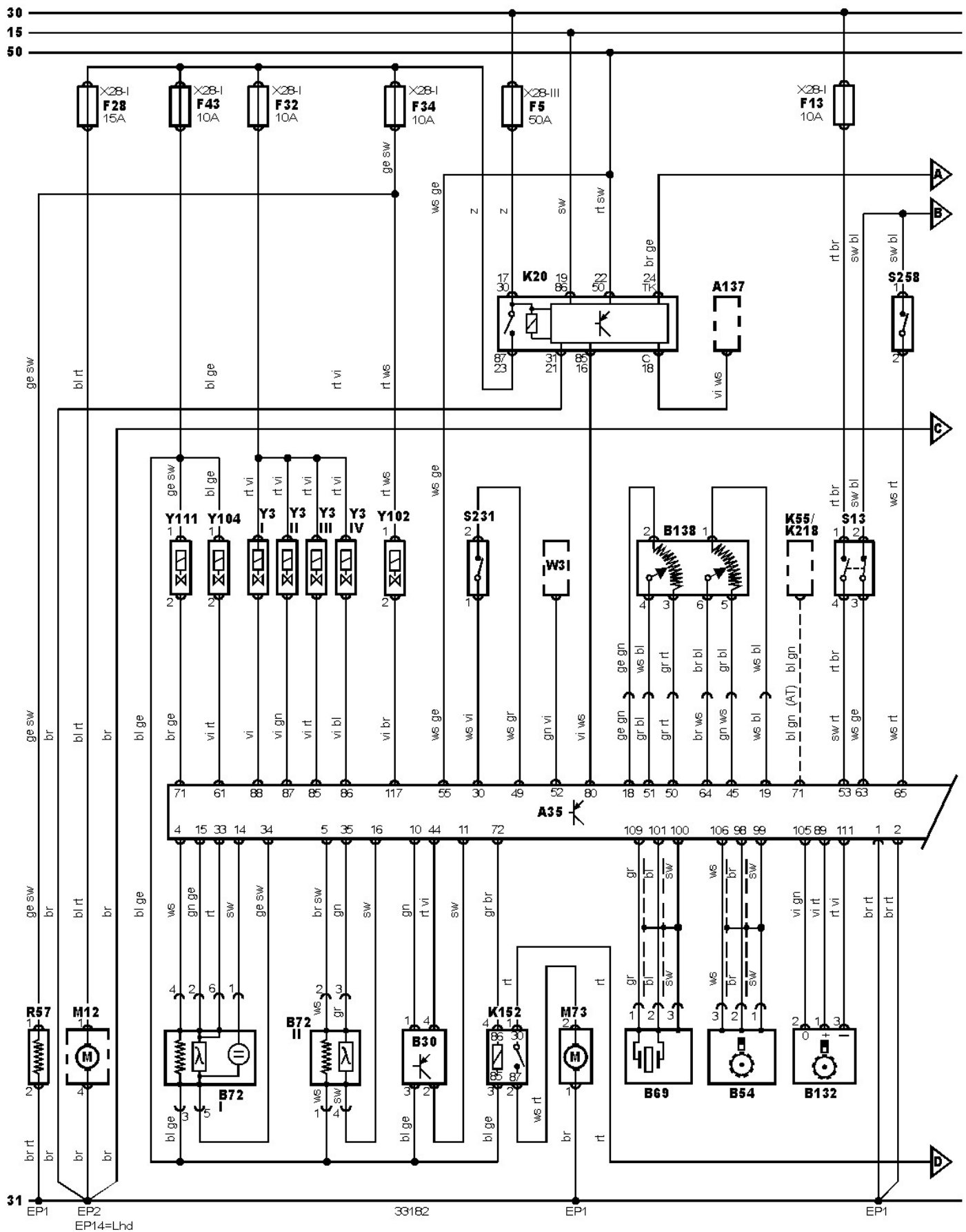
A16	ABS control module
A63	AC control module
B161	AC refrigerant pressure sensor
R79	AC/heater air mix flap potentiometer
S292	AC/heater function control panel
B138	Accelerator pedal position (APP) sensor
A137	Airbag control module
G1	Alternator
31	Battery -
30	Battery +
S13	Brake pedal position (BPP) switch
B132	Camshaft position (CMP) sensor
S258	Clutch pedal position (CPP) switch
R57	Crankcase breather heater
B54	Crankshaft position (CKP) sensor
S79	Cruise control master switch
S80	Cruise control selector switch
X1	Data link connector (DLC)
A130	Diagnostic module
A35	Engine control module (ECM)
K46	Engine control relay
A95	Engine coolant blower motor control module
Y36	Engine coolant heater regulator valve
B24	Engine coolant temperature (ECT) sensor
B4	Engine coolant temperature gauge sensor
R96	Engine coolant thermostat
H63	Engine malfunction indicator lamp (MIL)
Y104	Evaporative emission (EVAP) canister purge valve
Y28	Exhaust gas recirculation (EGR) solenoid
B149	Exhaust gas recirculation (EGR) valve position sensor
M12	Fuel pump
K20	Fuel pump relay
F	Fuse
B72	Heated oxygen sensor (HO2S)
T1	Ignition coil
15	Ignition switch - ignition ON
50	Ignition switch - start signal
A162	Immobilizer control module
Y3	Injector
A5	Instrument panel
A75	Instrumentation control module

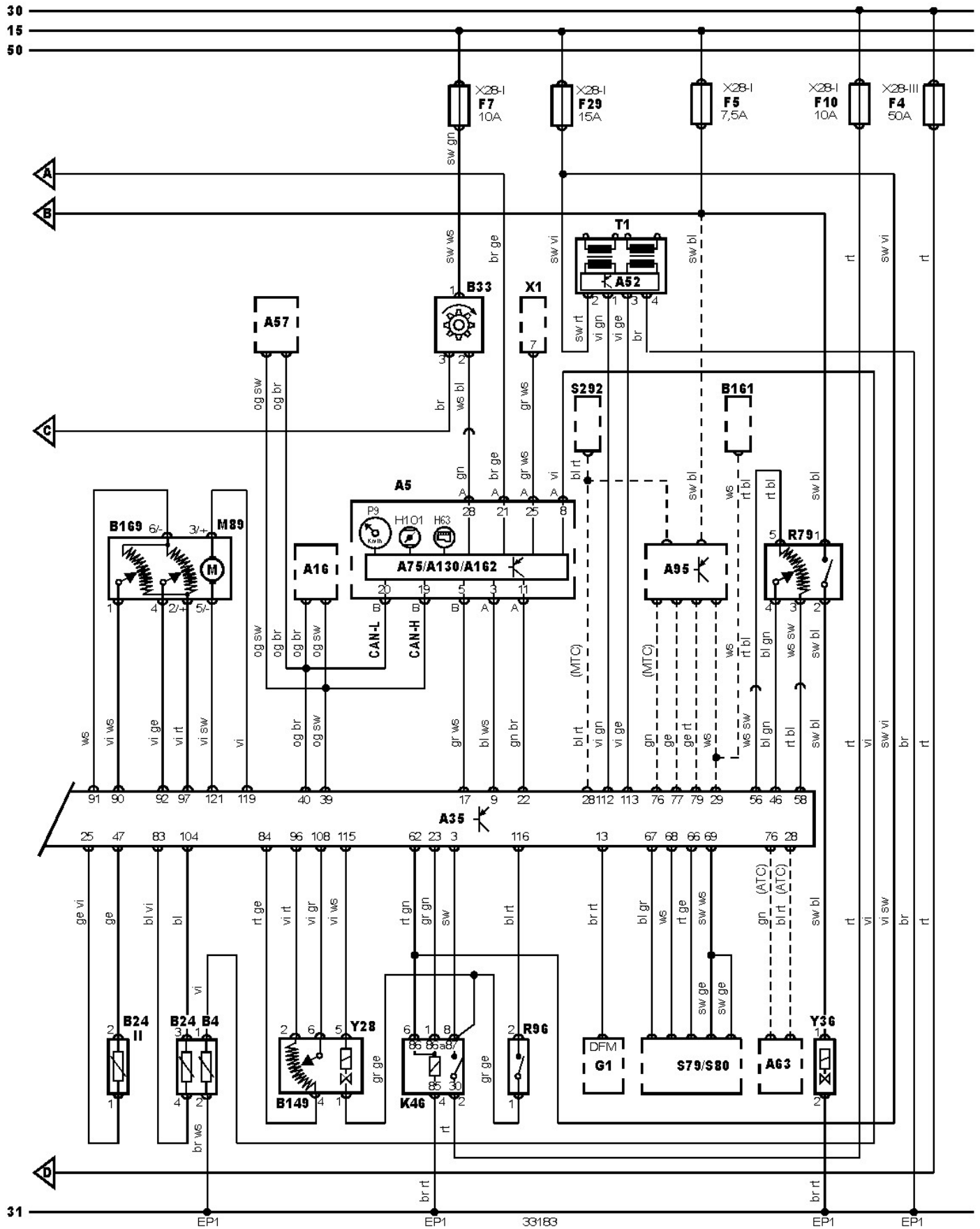


Y102	Intake manifold air control solenoid
B69	Knock sensor (KS)
B30	Mass air flow (MAF) sensor
S231	Power steering pressure (PSP) switch
K218	Reversing lamp relay
M73	Secondary air injection (AIR) pump
K152	Secondary air injection (AIR) pump relay
Y111	Secondary air injection (AIR) solenoid
W3	Spare cable, engine rear bulkhead
K55	Starter motor inhibitor switch relay
H101	Throttle control system warning lamp
B169	Throttle motor position sensor
M89	Throttle position motor
A57	Transmission control module (TCM)
B33	Vehicle speed sensor (VSS)
P9	Vehicle speedometer

bl = blue	br = brown	el = cream	ge = yellow
gn = green	gr = grey	nf = neutral	og = orange
rs = pink	rt = red	sw = black	vi = violet
ws = white	hbl = light blue	hgn = light green	rbr = maroon
x = braided cable	y = high tension	z = non-cable connection	

NOTE: In certain diagrams (Citroen, Peugeot & Renault), colour codes are replaced by numbers which are used to identify a particular cable and not the colour. In this instance, the cables will be numbered at each end close to the harness connector.





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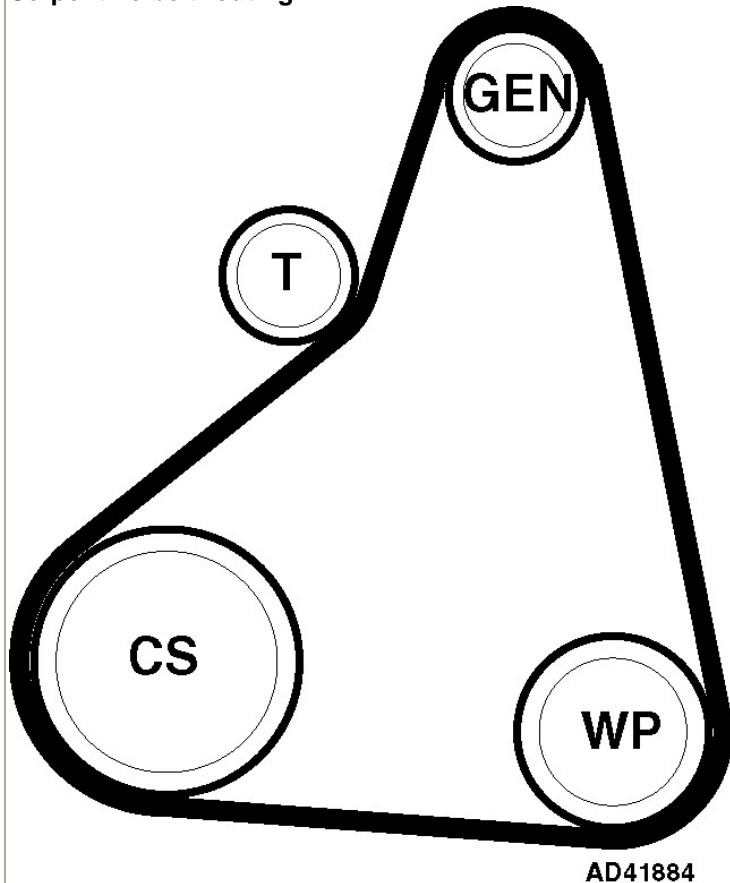
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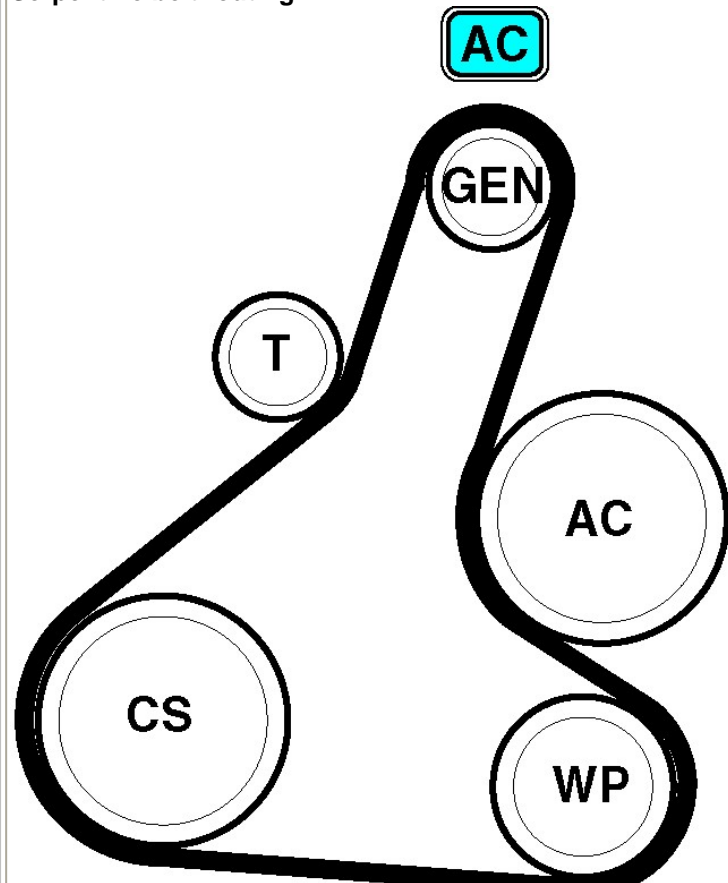
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Serpentine belt routing

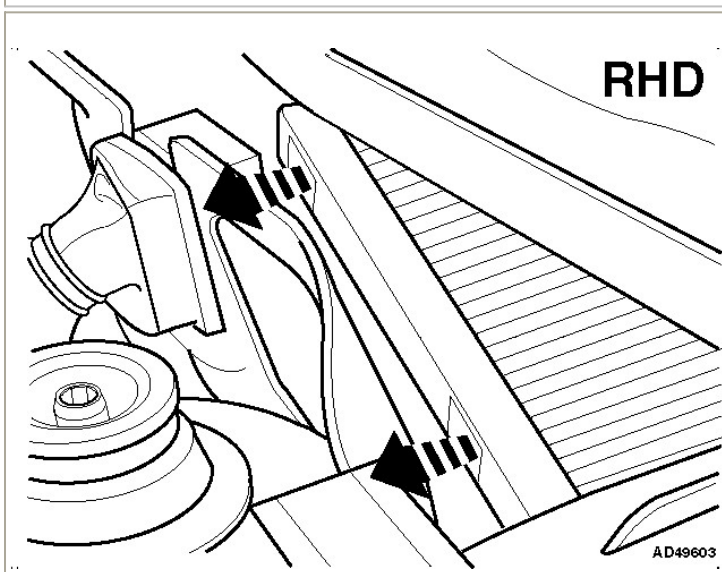


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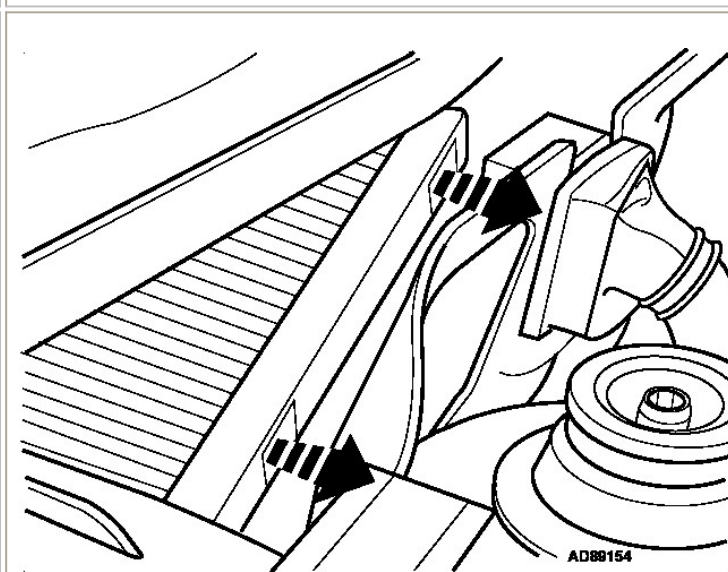
Serpentine belt routing



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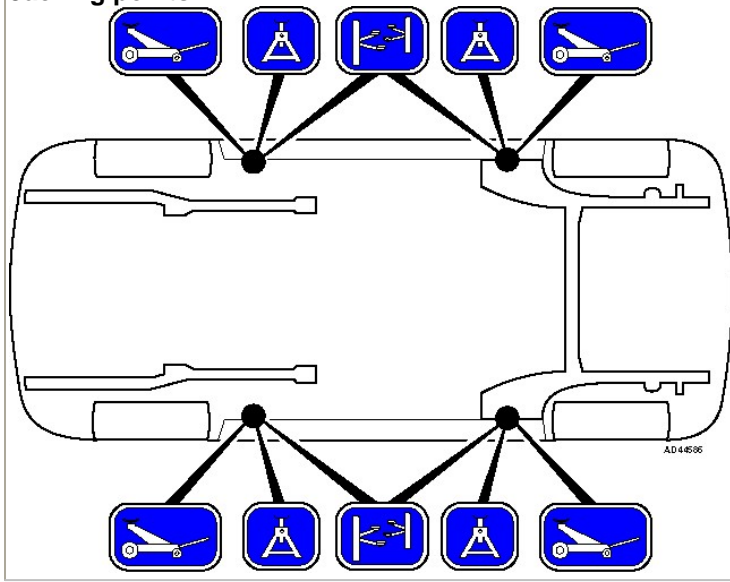


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Jacking points





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Notes		Specified value	Measured value
Vehicle identification			
	No. of cylinders	Type 4/OHC	
	Capacity (Fiscal)	cc 1595	
	Compression ratio	:1 10,2	
	Suitable for unleaded petrol	Yes	
	Minimum octane rating	RON 95	
	Ignition system	Make Siemens	
	Ignition system	Type Simos 3.3	
	Ignition system	Description Map-DIS	
	Trigger location	Cam/ Crankshaft	
	Fuel system	Make Siemens	
	Fuel system	Type Simos 3.3	
	Fuel system	Description MFI-s	
	Air metering	Type Mass	
	Combined ignition and fuel ECM	Yes	
	Diagnostic socket	Yes	
Ignition system			
	Ignition coil supply voltage	+ with ballast V 11,0	
	Secondary resistance	Ohm 4000-6000	
	Firing order	1-3-4-2	
Tuning and emissions			
89	Tuning conditions		
	Ignition timing - basic BTDC	°Engine/rpm Not adjustable	
	Ignition advance checks	°Engine/rpm ECM Controlled	
	Idle speed	rpm 640-920 Not adjustable	
	Oil temperature for CO test	°C 80	
	CO level at idle speed - tailpipe	Vol. % CO 0,5 Max Not adjustable	
	HC level at idle speed	ppm 100	
	CO2 level at idle speed	Vol. % CO2 14,5-16	
	O2 level at idle speed	Vol. % O2 0,1-0,5	
	Increased idle speed for CO test	rpm 2500-4800	
	CO content at increased idle speed	Vol. % 0,3	
	Lambda at increased idle	λ 0,97-1,03	
Spark plugs			
	Spark plugs	Original equipment NGK	
	Spark plug	Type BKUR6ET-10	
	Electrode gap	mm 0,9-1,1	
	Spark plugs	Make Beru	
	Spark plug	Type 14FGH-7	
	Electrode gap	mm 0,9-1,1	
	Spark plugs	Make Bosch	
	Spark plug	Type F7HPP222	
	Electrode gap	mm 1,0	
	Spark plugs	Make Champion	

Manufacturer: Volkswagen

Model: Golf (98-06) 1,6

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Engine code: AVU

Output: 75 (102) 5600

09/05/2008

Tuned for: R-Cat

Year: 2000-03

V7.210-LIKAD041991

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Spark plug	Type	RC8VTYC4	
Spark plugs	Make	NGK	
Spark plug	Type	BKUR6ET-10	
Electrode gap	mm	0,9-1,1	

Fuel system

System pressure	bar	3,0	
Regulated pressure with vacuum	bar	2,5	
Engine coolant temperature (ECT) sensor	Ohm/°C	275-375/80	
Crankshaft position (CKP) sensor/engine speed (RPM) sensor	Ohm	730-1000	
Injector	Ohm	12-17	
Lambda sensor (Oxygen) heater	Ohm	1-5	

Service checks and adjustments

Valve clearance -INLET	mm	Hydraulic	
Valve clearance -EXHAUST	mm	Hydraulic	
Compression pressure	bar	7,5-13	
Oil pressure	bar/rpm	2,7-4,5/2000	
Radiator cap	bar	1,4-1,6	

Lubricants and capacities

Engine oil options

	Ambient temperature range		All temperatures	
	Engine oil grade	SAE	0W/30	
281	Engine oil classification	OEM	VW 503.00	
	Ambient temperature range		All temperatures	
	Engine oil grade	SAE	0W/30	
	Engine oil classification	OEM	VW 502.00	
	Ambient temperature range		All temperatures	
	Engine oil grade	SAE	5W/30, 5W/40	
	Engine oil classification	OEM	VW 502.00	
	Ambient temperature range		All temperatures	
	Engine oil grade	SAE	5W/30	
281	Engine oil classification	OEM	VW 504.00	
	Ambient temperature range		All temperatures	
	Engine oil grade	SAE	10W/30, 10W/40	
	Engine oil classification	OEM	VW 502.00	
	Engine with filter(s)	litres	4,5	

Other lubricants and capacities

	Manual gearbox oil grade	SAE	75W/90 Synthetic	
	Manual gearbox	litres	1,9	
	Automatic transmission fluid	Type	Dexron II	
	Automatic transmission (drain & refill)	litres	3,0	
	Differential oil grade - front	SAE	75W/90 Synthetic	
	Differential front/AT	litres	0,75 (AT)	
	Cooling system	litres	5,0	
	Brake fluid	Type	DOT 4	
	Brake fluid	litres	1,0	
	Power steering fluid	Type	G 002 000	
	Power steering fluid	litres	0,7-0,9	

Tightening torques

	Cylinder head instructions			
--	----------------------------	--	--	--

Cylinder head

		Renew bolts	Yes	
		Tighten	40 Nm	
		Tighten	90°	
		Tighten	90°	

Other engine tightening torques

	Main bearings	Renew bolts/nuts	Yes	
	Main bearings	Stage 1	40 Nm	

	Main bearings	Stage 2	90°	
	Big end bearings	Renew bolts/nuts	Yes	
	Big end bearings	Stage 1	30 Nm	
	Big end bearings	Stage 2	90°	
	Oil pump to cylinder block		15 Nm	
	Sump bolts		15 Nm	
	Sump drain bolt		30 Nm	
62	Flywheel/driveplate			
	Clutch to flywheel		20 Nm	
61	Crankshaft pulley/damper centre bolt			
	Camshaft sprocket/gear		100 Nm	
	Camshaft carrier/cap		20 Nm	
	Camshaft/rocker cover		10 Nm	
	Inlet manifold to cylinder head		15 Nm	
113	Exhaust manifold to cylinder head		25 Nm	
113	Exhaust downpipe to manifold		40 Nm	
	Water pump		15 Nm	
	Spark plugs		25 Nm	
	Fuel rail		10 Nm	
	Camshaft position (CMP) sensor		10 Nm	
	Engine coolant temperature (ECT) sensor		35 Nm	
	Lambda sensor (Oxygen)		50 Nm	
	Knock sensor (KS)		20 Nm	
	Engine oil pressure switch		25 Nm	
Chassis tightening torques				
205	Front hub			
206	Rear hub			
	Steering wheel		55 Nm	
113	Steering rack/box mounting		20 Nm+90°	
113	Steering track rod end		45 Nm	
	Brake disc to hub	Front	4 Nm	
	Brake caliper to carrier	Front	30 Nm	
	Brake disc to hub	Rear	4 Nm	
113	Brake caliper to carrier	Rear	35 Nm	
	Brake caliper carrier to hub	Rear	65 Nm	
	Back plate to hub	Rear	60 Nm	
	ABS sensor	Front	10 Nm	
	ABS sensor	Rear	10 Nm	
	Road wheels		120 Nm	
Starting and charging				
	Battery	V/RC(Ah)	12/55 (36)	
	Maximum cranking amps	A	97-119	
	Alternator output at engine speed	A/V/rpm	55/14/3000	
Brake disc and drum dimensions				
	Minimum disc thickness - ventilated	Front	19 mm	
	Minimum disc thickness	Rear	7 mm	
150	Minimum pad thickness	Front	7 mm	
150	Minimum pad thickness	Rear	7 mm	
	Parking brake travel	No. of notches	3-4	
Air conditioning				
	Air conditioning refrigerant	Type	R134a	
	Air conditioning refrigerant quantity	grams	775±25	
249	Air conditioning oil	Type	G052 154 A2	
250	Air conditioning oil quantity	cm ³	135±15	

Autodata Note 89

Idle speed and ignition timing

Manufacturer: Volkswagen

Model: Golf (98-06) 1,6

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Engine code: AVU

Output: 75 (102) 5600

09/05/2008

Tuned for: R-Cat

Year: 2000-03

V7.210-LIKAD041991

Autodata

Use VAG 1551/2 or equivalent equipment, then follow procedure for checking basic setting.

Autodata Note 281

Engine oil classification

Longlife oil

Autodata Note 62

Flywheel bolts

Use new bolts and tighten to 60 Nm + 90°.

Autodata Note 61

Crankshaft pulley (sprocket)

Use new bolt (if fitted with hexagonal bolt replace with double hexagonal bolt and omit washer). Tighten to 90 Nm + 90°.

Autodata Note 113

Use new nuts/bolts.

Autodata Note 205

Front hub

Multi-point nut:

Use new nut and tighten in the following stages:

- 1) 200 Nm
- 2) Slacken off 180°
- 3) 50 Nm + 60°.

Hexagonal bolt:

Use new bolt and tighten in the following stages:

- 1) 250 Nm + 90°
- 2) Slacken off 180°
- 3) 250 Nm + 90°.

Autodata Note 206

Rear hub

FWD:

Use new nut and tighten to 175 Nm.

4WD:

Tighten in the following stages:

- 1) 200 Nm
- 2) Slacken off 180°
- 3) 50 Nm + 60°.

Autodata Note 150

Minimum pad/shoe thickness

Measurement includes lining and pad/shoe backing plate.

Autodata Note 249

Oil type

Zexel compressor = G052 154 A2/G052 300 A2

Denso compressor = G052 300 A2

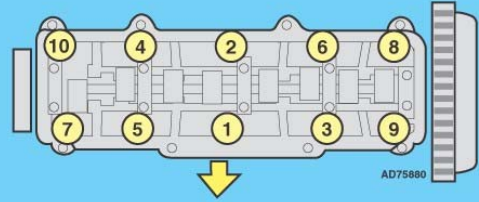
Autodata Note 250

Oil quantity

Zexel compressor = $115 \pm 20 \text{ cm}^3$

Denso compressor = $140 \pm 10 \text{ cm}^3$.

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Important note

Important note

The intervals and procedures given are subject to alteration by the manufacturer at any time. Check the regularly updated Timing Belts section on our website to ensure that you are kept informed of any changes that may occur between issues of the Autodata CD.

<http://www.autodata-cd.com>

Timing belt replacement intervals

Where possible the recommended intervals have been compiled from vehicle manufacturers' information. In a few instances no recommendation has been made by the manufacturer and the decision to replace the belt must be made from the evidence of a thorough examination of the condition of the existing belt.

Apart from the visible condition of the belt, which is explained fully in the General Instructions/Toothed Timing Belts section, there are several other factors which must be considered when checking a timing belt:

1. Is the belt an original or a replacement.
2. When was the belt last replaced and was it at the correct mileage.
3. Is the service history of the vehicle known.
4. Has the vehicle been operated under arduous conditions which might warrant a shorter replacement interval.
5. Is the general condition of other components in the camshaft drive, such as the tensioner, pulleys, and other ancillary components driven by the timing belt, typically the water pump, sound enough to ensure that the life of the replacement belt will not be affected.
6. If the condition of the existing belt appears good, can you be satisfied that the belt will not fail before the next check or service is due.
7. If the belt does fail, have you considered the consequences. If the engine is an INTERFERENCE type then considerable expensive damage may well be the result.
8. The cost of replacing a belt as part of a routine service could be as little as 5 to 10% of the repair cost following a belt failure. Make sure your customer is aware of the consequences.
9. If in doubt about the condition of the belt - RENEW it.
10. Refer to the Toothed Timing Belts/Service Replacement section for further information relating to arduous or adverse operating conditions, inspection and service replacement.

Replacement Interval Guide

Replacement Interval Guide

Volkswagen recommend check at the first 60,000 miles and then every 20,000 miles (replace if necessary).
No manufacturer's recommended replacement interval.

The previous use and service history of the vehicle must always be taken into account.

Check For Engine Damage

Check For Engine Damage

CAUTION: This engine has been identified as an INTERFERENCE engine in which the possibility of valve-to-piston damage in the event of a timing belt failure is **MOST LIKELY** to occur.
A compression check of all cylinders should be performed before removing the cylinder head(s).

Repair Times - hrs

Repair Times - hrs

With 02K transmission	
Remove and install	2,75
With 02M transmission	
Remove and install	2,75

Special Tools

Special Tools

- Auxiliary drive belt tensioner locking pin - Volkswagen No.T10060.
- Two-pin wrench - Volkswagen No.T10020.

Special Precautions

Special Precautions

- Disconnect battery earth lead.
- DO NOT turn crankshaft or camshaft when timing belt removed.
- Remove spark plugs to ease turning engine.
- Turn engine in normal direction of rotation (unless otherwise stated).
- DO NOT turn engine via camshaft or other sprockets.
- Observe all tightening torques.

Removal

Removal

1. Raise and support front of vehicle.
2. Remove:
 - Engine cover.
 - RH engine undershield.
 - Auxiliary drive belt. Use tool No.T10060.
 - Auxiliary drive belt tensioner [1] .
 - Coolant expansion tank. DO NOT disconnect hoses.
 - PAS reservoir. DO NOT disconnect hoses.
 - Timing belt upper cover [2] .
3. Turn crankshaft to TDC on No.1 cylinder.
4. Ensure timing marks aligned [3] or [4] .
5. Ensure camshaft sprocket timing mark aligned [5] .

6. Support engine.
7. Remove:
 - RH engine mounting bolts [6], [7] & [8] .
 - RH engine mounting.
8. Remove:
 - Crankshaft pulley bolts [9] .
 - Crankshaft pulley [10] .
 - Timing belt centre cover [11] .
 - Timing belt lower cover [12] .
9. Remove:
 - RH engine mounting bracket bolts [13] .
 - RH engine mounting bracket.
10. Slacken tensioner nut [14] . Turn tensioner clockwise away from belt. Lightly tighten nut.
11. Remove timing belt.

NOTE: Mark direction of rotation on belt with chalk if belt is to be reused.

Installation



Installation

1. Ensure camshaft sprocket timing marks aligned [5] .
2. Ensure timing marks aligned [4] .
3. Fit timing belt to crankshaft sprocket and water pump sprocket.
4. Fit timing belt to tensioner pulley and camshaft sprocket.

NOTE: Ensure belt is taut between sprockets on non-tensioned side.
5. Slacken tensioner nut [14] .
6. Ensure tensioner retaining lug is properly engaged [15] .
7. Turn tensioner 5 times fully anti-clockwise and clockwise from stop to stop. Use tool No.T10020.
8. Turn tensioner fully anti-clockwise then slowly clockwise until pointer [16] aligned with notch [17] in baseplate. Use tool No.T10020.

NOTE: Engine must be COLD.
9. Tighten tensioner nut [14] . Tightening torque: 20 Nm.
10. Turn crankshaft two turns clockwise to TDC on No.1 cylinder.

NOTE: Turn crankshaft last 45° smoothly without stopping.
11. Ensure timing marks aligned [3] or [4] .
12. Ensure camshaft sprocket timing marks aligned [5] .
13. Ensure pointer [16] aligned with notch [17] in baseplate.
14. If not: Repeat tensioning procedure.
15. Install:
 - Timing belt lower cover [12] .
 - Timing belt centre cover [11] .
 - Crankshaft pulley [10] .
 - Crankshaft pulley bolts [9] .
16. Install:
 - RH engine mounting bracket.
 - RH engine mounting bracket bolts [13] .
17. Tighten RH engine mounting bracket bolts to 45 Nm [13] .
18. Fit engine mounting.
19. Tighten:
 - Engine mounting bolts [8] . Tightening torque: 40 Nm + 90° . Use new bolts.
 - Engine mounting bolts [7] . Tightening torque: 25 Nm.
 - Engine mounting bolts [6] . Tightening torque: 100 Nm.
20. Check engine mounting alignment:
 - Engine mounting clearance: 14 mm [18] .
 - Engine mounting clearance: 10 mm minimum [19] .
 - Ensure engine mounting bolts [6] aligned with edge of mounting [20] .

21. Tighten crankshaft pulley bolts [9] . Tightening torque: 25 Nm.
22. Apply firm thumb pressure to belt at . Pointer [16] and notch [17] must move apart.
23. Release thumb pressure from belt at .
24. Turn crankshaft two turns clockwise to TDC on No.1 cylinder.
NOTE: Turn crankshaft last 45° smoothly without stopping.
25. Ensure pointer [16] aligned with notch [17] in baseplate.
26. Install components in reverse order of removal.

