

Porsche 928 Timing Belt Resources – revised 08/11/11

John Pirtle's Guide – done on an 87 MY, so there may be minor variations.

<http://members.rennlist.com/pirtle/tbelt.html>

Tony Harkin's tensioner guide – again, based on 1987 MY.

<http://members.rennlist.com/v1uhoh/timing.htm>

Wally Plumley's Timing Belt Guide:

<http://928oc.org/journal/T-belt1.pdf>

Dwayne's T belt guide:

<http://www.dwaynesgarage.norcal928.org/1987%20Timing%20Belt%20and%20Water%20Pump%20Procedure.htm>

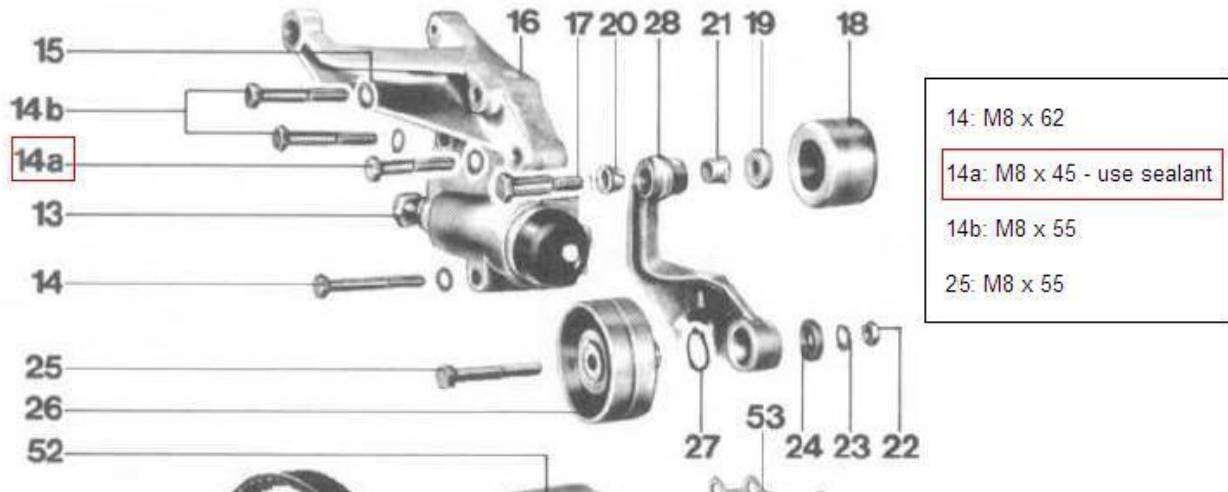
Torque Values in Ft-lbs:

Crank	218
Cam gear	47
Oil Pump Gear	?
Oil hose fitting to radiator side tank	52 – be careful to counter hold inside fitting,
Water pump bolt (M6)	6
Other M8 bolts (13mm head)	15
Other M10 bolts (17mm head)	30

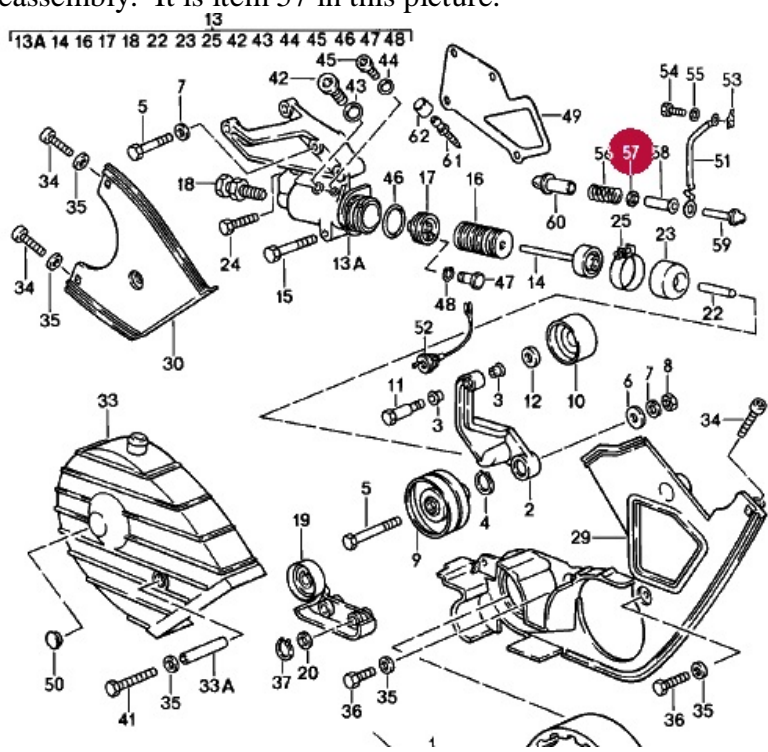
Main hazards & tips that are not covered in the references:

- **Snapped water pump bolts.** These bolts are tiny M6 bolts that are often quite corroded. If one snaps off during removal, which they quite commonly do, you are faced with removing the stub. That usually just snaps off. So, then you are faced with drilling out the old bolt. It's best to try to avoid snapped bolts in the first place. If a bolt doesn't "break free" easily with a wrench but turns with continued resistance, this is a bad sign that it is corroded and may be twisting and ready to snap off. Squirt a good penetrant like Kroil or PB Blaster and wait. Give the bolt a sharp rap on the head with a small hammer and punch to break the corrosion. Gently work the bolt. It would be wise to do the above to all the bolts before trying to loosen them. If the above does not allow you to remove the bolt or snapped bolt stub, consider heating with a torch too. To remove snapped bolts, do **NOT** use E-Z out type extractors. They almost without exception break off and make the situation worse as they are hardened steel. If you can't grab the stub or otherwise get the stub to back out, then you should center punch the bolt and drill it out carefully with progressively larger LEFT-HAND drill bits until a thin shell of the bolt remains. Yes, left-hand drill bits. Harbor Freight and other vendors sell them, but you probably won't find them at the local hardware store. The stub may back out during drilling or can be picked out with a dental pick. Clean up the threads with a tap. If you get away with no snapped water pump bolts, the timing belt job is relatively easy.
- **Getting the water pump bolts mixed up.** There are short and long bolts. If you examine the water pump body, you will be able to spot the thick and thin bosses that match up with the bolts. **One bolt goes through the center timing belt cover on the lower left side of the water pump. If you put that bolt in before you mount the cover, you will be a bit baffled later. MARK THE BOSS THAT TAKES THIS BOLT. Two of the other bosses are for locating pins.**

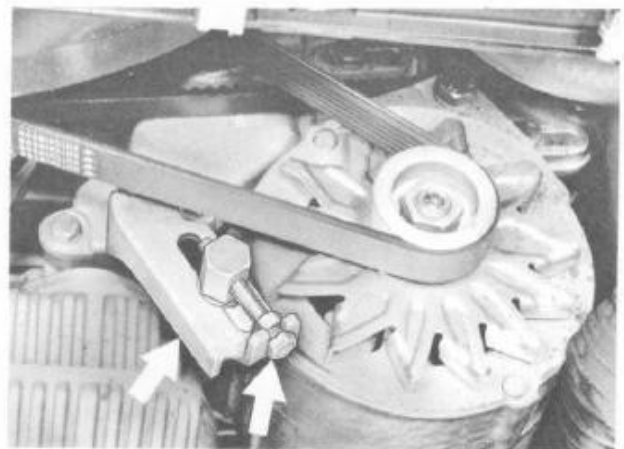
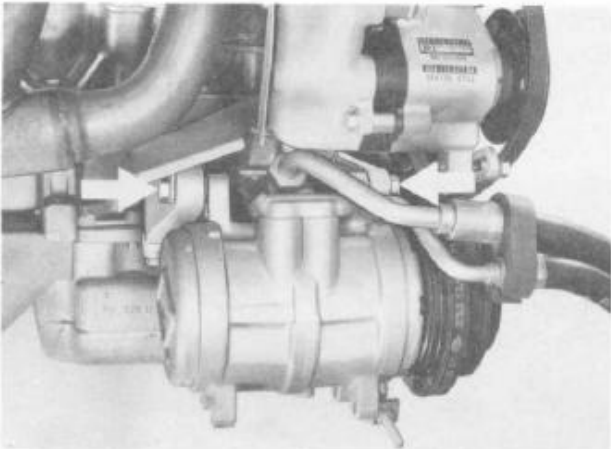
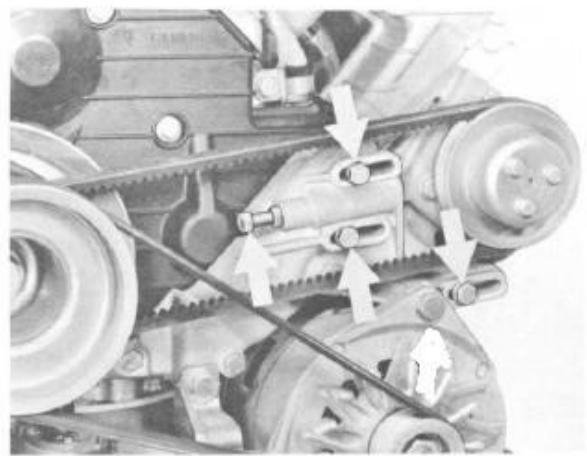
- **Mixing up the bolts on the tensioner body.** There are 4 long bolts that hold the tensioner to the block, plus a 5th holds the air pump to the tensioner. Make sure the keep the bolts sorted by location in the tensioner as they are not all identical. Also, note that **one of the bolts requires sealant** (WSM calls for Loctite 574) or oil may leak out of the block. Here is an annotated diagram that shows bolts in the area:



- **Dropping all the tensioner's internal washers on disassembly.** There is a pattern to the way these washers are stacked inside the tensioner. They will fall out of the tensioner as you remove the internal rod and piston. They should be cleaned, but caution must be observed to get them back together in the opposing packs of 5 washers stacked as shown in the WSM. I don't fully separate them, but just rinse them with brake cleaner while still together on the rod..
- **Dropping the tensioner pin's end washer (on 85+ tensioners) on disassembly.** There is a thick washer on the end of the tensioner assembly between the spring and guide. This falls on the floor as you remove the tensioner and often is not recognized and gets left off on reassembly. It is item 57 in this picture.



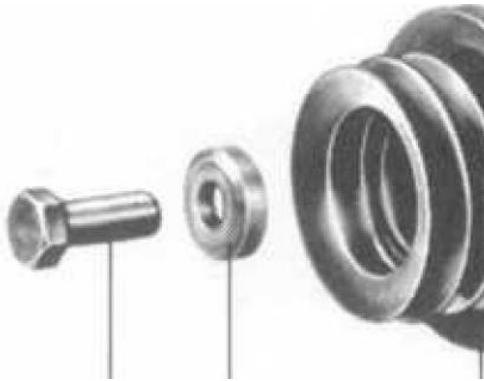
- **Not finding all the bolts that hold the power steering pump bracket and the alternator cassette to the block.** John's guide and the WSM show this, but they are still hard to spot. Here are pictures clipped from the WSM that show them all. Also, pivot bolts for the AC compressor may have to be loosened – there are separate front and rear pivot bolts at the top of the compressor. Same with the pivot bolt at the top of the alternator, although there is just a front bolt.



- **Chipping/breaking the tensioner arm plastic bushings.** These can be hard to install. Chamfering the leading edge and using a C-clamp to press them in can help avoid breaking them. These bushings are critical to the tracking of the arm and belt. Loose ones cause the arm to cant and the belt to mis-track and get destroyed.
- **Getting things backwards or out of order on the tensioner arm roller rebuild.** Use caution to observe the order of washer and spacers. Once apart, it's not exactly obvious how it goes back together, but the WSM diagrams show it pretty clearly.
- **To get the belt off and on there are two wire harness ends that must be removed from the fender walls.** Pirtle's guide shows the more difficult end on the passenger side. Often that DOES NOT have to be removed if the harness has been routed behind the timing belt rather than through it. I've seen it both ways. The other piece that has to be detached is a single wire that goes to a small junction block mounted in front of the power steering fluid reservoir. It has a cap that pops off to reveal the wire junction. **CAUTION: THIS WIRE HAS 12V POWER IF THE BATTERY IS CONNECTED.**
- **Getting the harmonic balancer off:** The key here is to be gentle. The balancer is a snug slip fit on the crank with a keyway. It can feel totally stuck initially, and there is great temptation to get nasty with it or try to pry it off. This will just make things worse. With your hands, try to wiggle the balancer from side to side. There should be very slight play

allowing you to feel it wiggle. If not, then it is stuck and maybe a rap on the side with a wooden mallet to jar it just a bit. If you feel ANY wiggle at all, however slight, you WILL be able to work the balancer off with continued wiggling by hand. So, continue to wiggle and pull it slightly forward. It should start to move forward almost imperceptibly. If you see any movement, then you are on your way. Eventually with enough wiggling, it will move progressively forward and come off. A little penetrant on the crank shaft might help, but little more than gentle persuasion should be needed. If you pry behind the balancer, it may get cocked to one side and jammed. If need be, you can remove the center cover surrounding the balancer and use a large gear puller to remove the balancer.

- **Getting the harmonic balancer on backwards:** Make sure the timing marks can be read from the front. More of an issue with 16 valve motors as they lack a 45 degree BTDC indication. The balancer will fit on backwards and cause you to completely goof up the timing.
- **Getting the crank thrust washer on backwards:** The washer has a **recess** that must face **rearward** over the crank nose which protrudes slightly beyond the alternator pulley. Here is a picture. You can't see the crank nose in this picture:



- **Believe it or not, the timing belt has a rotational direction.** Put it on so you can read the text on the belts outside when you are in front of the motor looking back at it. This is not indicated in the WSM but is mentioned in the MY88 Service Technique guide.
- Whatever you do, with 32 valve motors do not allow the cams to move with the belt off unless the engine is locked at 45 degrees BTDC.
- **Difficulty lining up the new belt so it is correctly timed:** In order to install the new belt, the tension must be very loose. This makes it very hard to judge if you have it on so the cam timing will be correct once the tension is set properly, as the belt will move as snugged up. You can get it closest by pulling as tight as possible from the crank gear over the oil pump gear and installing it on the driver side cam gear. The pull under the water pump to the passenger side as tight as possible, pulling it on the passenger side gear. Then set the tension and check again. You might have gotten lucky. Of course, on 32 valve cars this is done at crank 45 BTDC and cam 22.5 BTDC. After you get the front covers installed and crank pulleys and bolt on and torqued down and remove the flywheel lock, rotate the crank and check everything at TDC, including the tension. If the timing marks do NOT line up, then what I do is release most of the tension and “walk” the belt over the cam gear teeth on the gear that is not on-time. This is a process of creating a “hump” of slack on the side of the gear in the direction in which the gear needs to be moved to get it on-time. Use a wrench on the bolt to pull it into the hump. You might need to use a wrench on the opposite gear to generate enough slack in the hump. At some point, the gear will skip a tooth into the hump slack. Snug back up the tension and recheck. Some people remove the belt from the gear, move the gear and slip it back on rather than try to walk it.

- **Getting some wrong parts:** Use our beloved 928 specialty vendors for parts and this is unlikely to happen. Use Autozone for things like water pumps, and it will.

PARTS: Any of the 928 specialty parts house will have a kit set up.

PART	MODEL YEARS			
	78-82	83-84	85-86	87-95
Timing Belt	928.105.157.00	928.105.157.50	928.105.157.50	928.105.157.50
Water Pump	928.106.915.AX	928.106.015.KX	928.106.015.KX	928.106.015.MX
Tensioner boot	928.105.552.02	928.105.552.06	928.105.552.08	928.105.552.08
Boot clamp	999.512.344.02	999.512.344.02	999.512.344.02	999.512.344.02
Tensioner arm bushings (2)	999.924.002.40 (77-81) 999.924.003.40 (82)	999.924.003.40	928.105.613.40	928.105.613.40
Tensioner arm idler	928.105.571.00	928.105.571.00* 928.105.571.02*	928.105.571.02	928.105.571.04
Tensioner Main Roller	928.105.512.12	928.105.512.12	928.105.512.12	928.105.512.12
Flywheel Lock Tool	000.721.916.10	000.721.916.11	000.721.916.11	000.721.916.11
Tensioner Gasket	NA	928.105.611.05	928.105.611.05	928.105.611.05
Tensioner Piston O-Ring	NA	999.701.650.40	999.701.650.40	999.701.650.40
Lower Idler	NA	928.105.067.00	928.105.067.00	928.105.067.01

*Depends on engine number. Check with supplier.

Some of the parts like the lower idler may not need replacement after cleaning them up.

Might as well replace the dipstick seal:

- **Oil Dipstick Tube O-ring - 900.174.044.40 - \$2-3** The dipstick is removed as part of the job. *NOTE: Put a plug in the dipstick hole in the oil pan to prevent coolant from getting into the pan when you pull off the water pump!*

Also, **with 85+ cars**, it's best to replace the solid bridge contact band on the tensioner arm with an updated braided wire replacement. The solid bridge tends to break over time and the more flexible wire replacement does not.

- **Timing Belt Tensioner Grounding Strap 85-88 - 928.105.615.01 - \$29**

Also, **with 85+ cars**, a sensor wire passes through the timing cover and clips to a spade at the top of the tensioner arm. **MAKE SURE that spade is positioned to the rear of the arm if you remove it to replace the strap mentioned above.** If the spade instead is positioned to the front of the arm, the timing belt cover can work the wire off the spade while driving. This will cause a false tension warning.

Nice to have handy:

- **Camshaft Timing Sprocket** These cam gears are aluminum with anodized coating. After the coating wears through, the underlying aluminum wears rapidly; the teeth become sharp-edged and dished out in the middle and will damage the belt if not replaced. Replace if coating is worn more than in the tiniest spots. Extensive wear is primarily a sign of excessive belt tension.
 - o **77-82: 928.105.545.04**
 - o **83-84: 928.105.545.10 (Euro 84-85)**
 - o **85-95: 928.105.530.01**
- **Oil Pump Sprocket** The factory gear is aluminum and is subject to wear. The replacement is steel. **TIP:** Loosen the oil pump gear nut before relieving tension on the timing belt unless you have a gear holder.
 - o **77-82: 928.207.207.04**

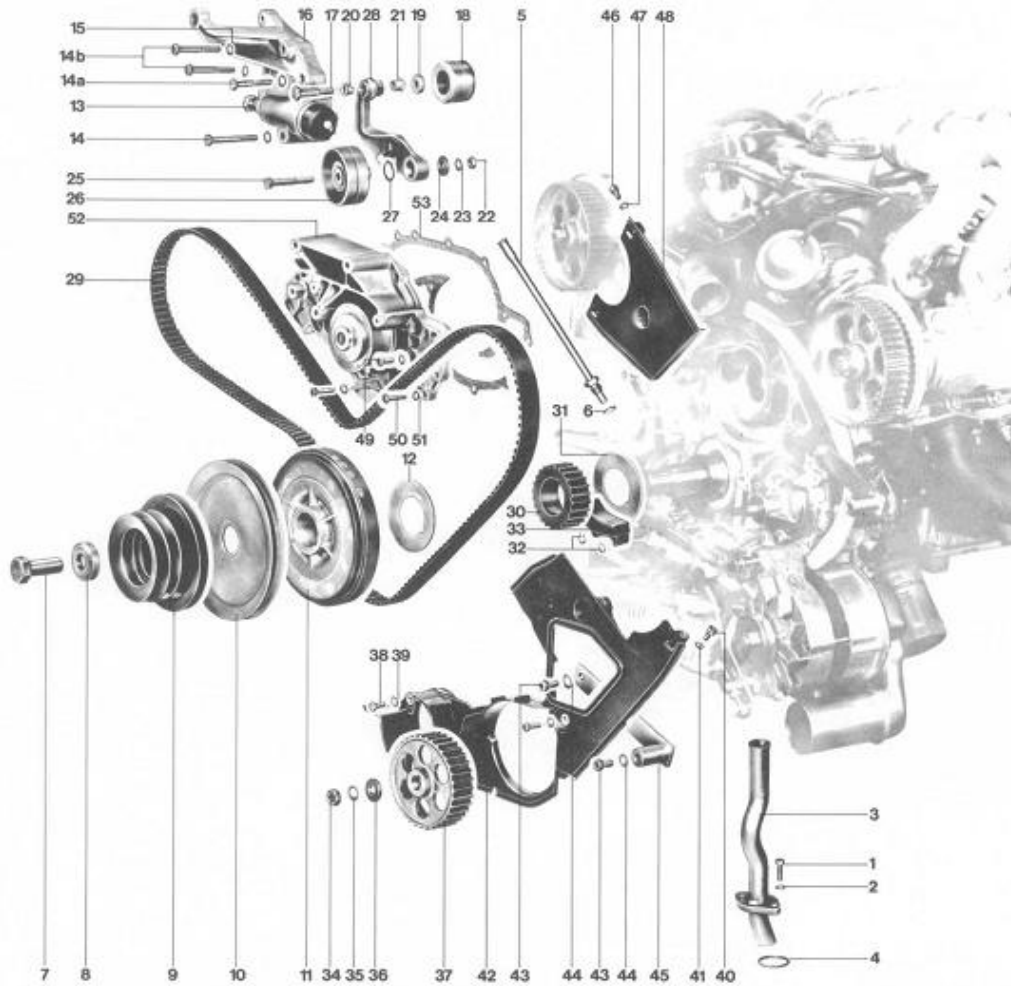
- **83-95: 928.107.107.13**
- **Oil Pump Seals** If the car is over 100K miles and there or there is any hint of a leak, this is the time to do the oil pump seal and o-ring.
 - **Front Seal - 999.113.275.40**
 - **O-RING - 999.701.633.40**
- **Crank Sprocket Steel**; rarely wear out
 - **77-80: 928.105.125.03**
 - **83-95: 928.105.125.12**
- **Crankshaft SEAL - Front** If the car is over 100K miles and there or there is any hint of a leak, this is the time to do this seal.
 - **77-80: 999.13.231.40**
 - **81-95: 999.113.263.40**

Good time to do these as they will be removed as part of the timing belt job.

- Accessory belts:
 - **Belt - Air Conditioner**
 - **77-78: 999.192.146.50**
 - **78-79: 999.192.127.50** [78 from Engine #828 0813 (5-Speed) #828 9103 (Auto)]
 - **80-89/90-91(S4): 999.192.305.50**
 - **90-95 (GT, GTS): 999.192.335.50**
 - **Belt – Alternator**
 - **77-81: 999.192.135.50**
 - **82-83: 999.192.214.50**
 - **84: 999.192,259.50**
 - **85-91/92-95: 999.192.266.50 (92-92: 5-speed only)**
 - **92-95 (Auto only): 999.192.347.50**
 - **Belt - Fan/Air Pump**
 - **77-78: 999.192.157.50**
 - **79 & 83-86: 999.192.160.50**
 - **80-82: 999.192.120.50**
 - **87-95: 999.192.306.50**
 - **Belt - Power Steering**
 - **77-84: 999.192.128.50**
 - **85-95: 999.192.286.50**
- Coolant hoses:
 - **Radiator Hose - Lower**
 - **77-86: 928.106.239.08**
 - **87-95: 928.106.239.09**
 - **Radiator Hose – Upper**
 - **77-84: 928.106.238.06**
 - **85-95: 928.106.238.08**
 - **Consider all the coolant hoses...**

Engine Block Coolant Drain Plug Seal 77-95 - 900.123.055.30 The block drains are a bit hard to get to and can be stubborn. They are under the exhaust outlets halfway down each side of the block. In soft water areas, I don't drain the block but flush the heck out of it with soft tap water and a garden hose until very clear. This leaves 2 gallons of water in the block to which you add 2+ gallons of coolant when things are reassembled. Others may criticize this and insist on draining the block and using distilled water. I would agree with this for most areas of the country where water is more mineral-laden. Soft water with low mineral content will not cause a problem for the cooling system. Now, to the relevant WSM pages, starting on the next page.

REMOVING AND INSTALLING CAMSHAFT DRIVE BELT AND WATER PUMP



No.	Description	Qty.	Note When:		Special Instructions
			Removing	Installing	
1	Bolt M 6 x 20	2			
2	Washer	2			
3	Oil tube	1			
4	Seal	1		Replace	
5	Guide tube for oil dipstick	1			
6	Seal 14 x 18, aluminum	1		Replace	
7	Bolt	1			
8	Thrust washer	1			
9	Pulley	1			
10	Pulley	1			
11	Vibration damper	1			
12	Collar washer	1			
13	Adjusting screw	1			
14	Bolt M 8 x 62	1			
14a	Bolt M 8 x 45	1		Install with Loctite 574	
14b	Bolt M 8 x 55	2			
15	Washer	4			
16	Tensioning roller housing	1			see Page 15-24
17	Shaft bolt	1			
18	Roller	1		Check for easy move- ment, turning by hand. Roller must turn easily without restriction at any point	

No.	Description	Qty.	Note When:		Special Instructions
			Removing	Installing	
19	Washer	1			
20	Nylon bushing	1		Check, replacing if necessary	
21	Nylon bushing	1		Check, replacing if necessary	
22	Nut	1			
23	Washer	1			
24	Washer 9 x 25 x 3,5	1			
25	Bolt M 8 x 55	1			
26	Tensioning roller	1		Check for easy movement, turning by hand. Tensioning roller must turn easily and without restriction at any point.	
27	Circlip 20 x 1.75	1		Position correctly	
28	Tensioning roller carrier	1			
29	Camshaft drive belt	1		Check, replacing if necessary	
30	Sprocket	1			
31	Collar washer	1			
32	Circlip 8 x 0.8	2			
33	Slide	1			
34	Nut M 10	1			
35	Washer	1			
36	Washer 10.5	1			
37	Oil pump sprocket	1			
38	Bolt	2			
39	Washer	2			

INSTALLING CAMSHAFT DRIVE BELT AND ADJUSTING TIMING

Note:

Make sure new drive belts are retightened after driving car approx. 1,000 km.

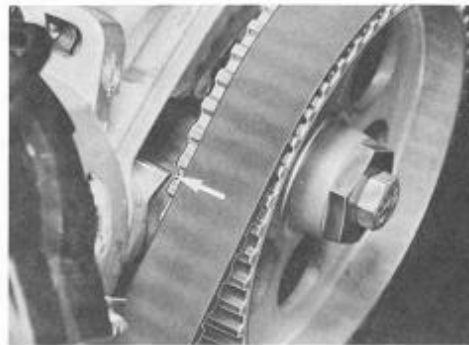
Installing Camshaft Drive Belt

1. Line up TDC mark on vibration damper with red indicator on cover by turning crankshaft clockwise.

**Note:**

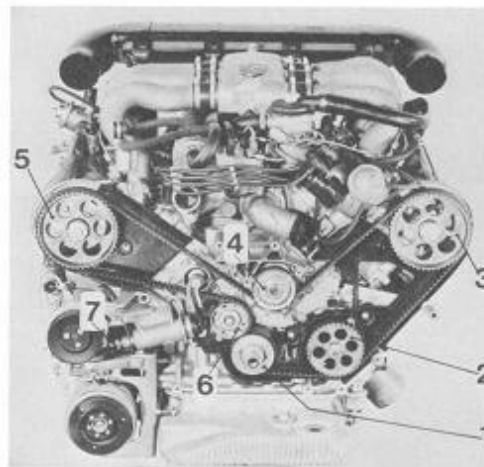
Vibration damper must be removed again for installation of the camshaft drive belt afterwards.

2. Turn both camshafts until notches in both camshaft sprockets are aligned with marks cast on the camshaft bearing caps.



3. Install camshaft drive belt, always pre-loaded by hand, in the following order.

First on sprocket (1), oil pump sprocket (2), then over sprocket (3) of left camshaft (cyl. 5 through 8), bottom of water pump sprocket (4) and on sprocket (5) of cyl. 1 through 4, and finally over camshaft drive belt tensioning roller (6).

**Note:**

Should the teeth of a hand-tightened camshaft drive belt not match the sprocket pitch accurately enough, turn pertinent camshaft sprocket counter-clockwise carefully until teeth match.

4. Tighten camshaft drive belt to specifications with special tool 9131.



6. Check position of marks.



5. Turn engine clockwise two turns to align red indicator and TDC mark.

Note:

Never turn engine anticlockwise, since this could destroy the camshaft drive belt tensioner.

7. Now tighten camshaft drive belt again.

8. Turn engine clockwise two turns to align red indicator and TDC mark.

9. Recheck.

TOOTHED DRIVE BELTS WITH HTD TEETH Beginning with 1983 Models

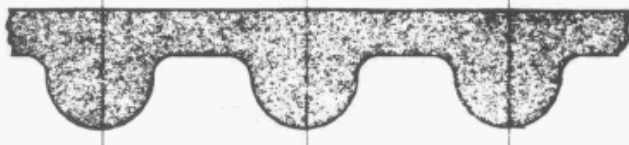
Note:

The shape of teeth on drive belts for camshaft sprockets, oil pump sprocket and crankshaft sprocket has been changed to High Torque Drive (HTD).

Old Tooth Shape

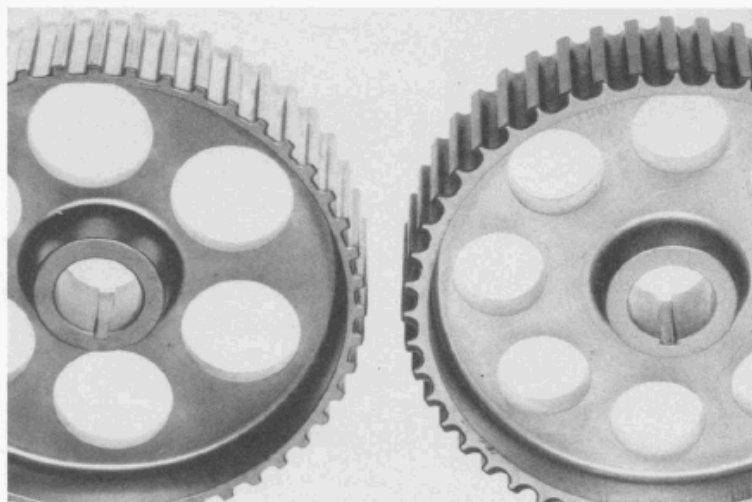


HTD Tooth Shape



Old Camshaft Sprocket

HTD Camshaft Sprocket

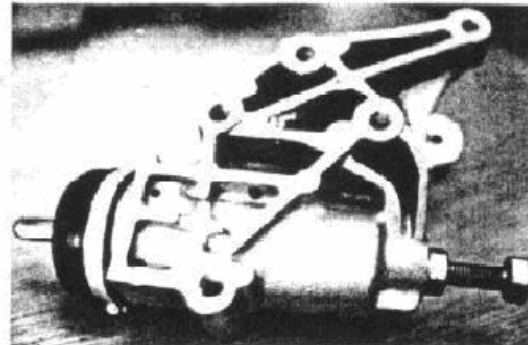
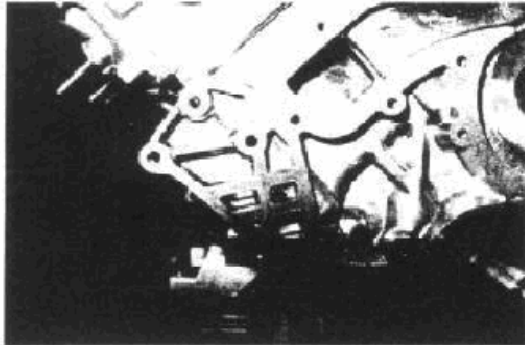


Note: New HTD drive belts can also be used on older engines, if above mentioned sprockets with new tooth shape are used at same time.
Sprockets with different teeth shape should never be mixed.

ENGINE – VALVE DRIVE

MAINTENANCE INSTRUCTIONS

The new toothed drive belt tensioning mechanism is filled with engine oil. The pockets in the engine block and tension roller housing are used as oil chambers. This improves the heat transfer between the engine block and tension roller housing and activates the bimetal diaphragm springs.



This requires that the sealing surfaces of both parts be in perfect condition. The sealing surface of the tensioning roller housing must be treated with Loctite No. 574 during assembly.

Tensioning roller housings are supplied as replacement parts without the oil filling. The oil can only be added after installation on the engine block.

To guarantee complete filling of the damping chamber, it is necessary that air be pumped out of the damping chamber by pumping action of the tensioning roller carrier (9) with a loosely installed toothed drive belt and an open oil filler bolt (17) and bleeder (16),

This procedure can be supported by tilting the engine on an assembly stand until the cylinder chamber of the tensioning roller housing is horizontal. A small air trap behind the rubber cap (15) is not dangerous, but in fact desired as a compressible pressure compensation.

The oil level must be checked at 20,000 kilometer intervals during inspection work. Oil does not have to be added, if oil can be seen after unscrewing the filler bolt (17). However, if oil does have to be added, also unscrew the bleeder screw (16) in addition to the oil filler bolt.

If the hydraulic damping fails because of insufficient oil, the toothed belt tensioning mechanism will function as the former system without damping.

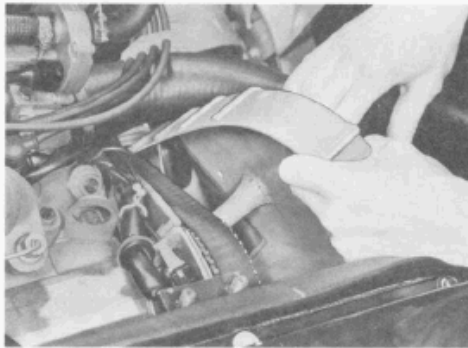
Note:

The new toothed drive belt tensioning system can also be applied in older models, if the pertinent sealing surfaces of the engine block are not damaged.

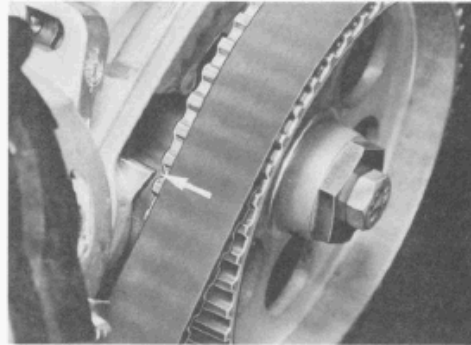
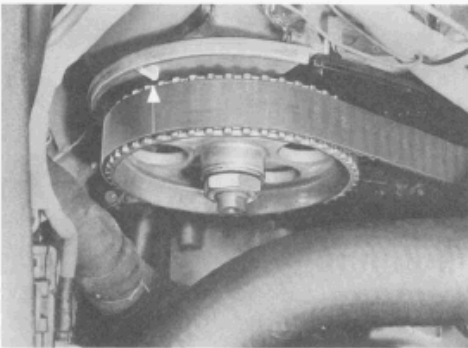
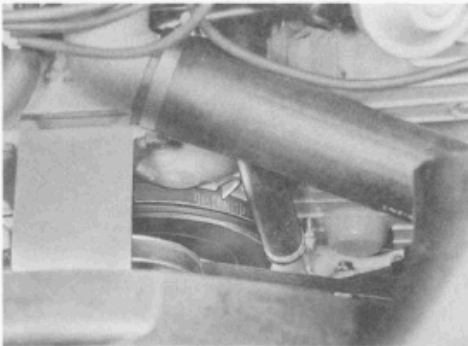
CHECKING AND ADJUSTING DRIVE BELT

Checking

1. Loosen and remove drive belt cover upper sections on both sides.

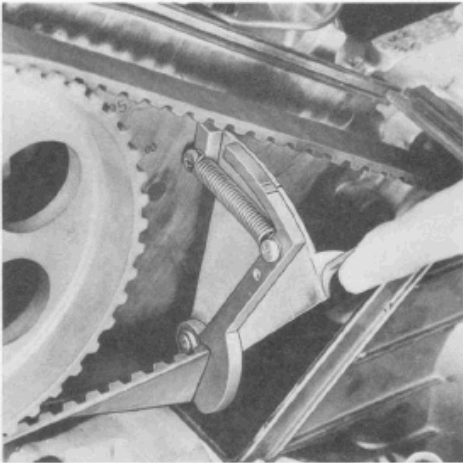


2. Turn engine in direction of rotation to TDC (cylinder 1). In this position marks on camshaft sprockets must be aligned with marks on flange bearings.



3. Turn engine two more turns until TDC mark is reached again and check drive belt for damage and wear at the same time.
4. Check drive belt tightness between tension roller and camshaft sprocket on relaxed section of belt with Special Tool 9131. Drive belt tightness is correct when right mark is between both left marks and special tool rests on rear drive belt cover. (Engine must be positioned for this test as described in point 2.)

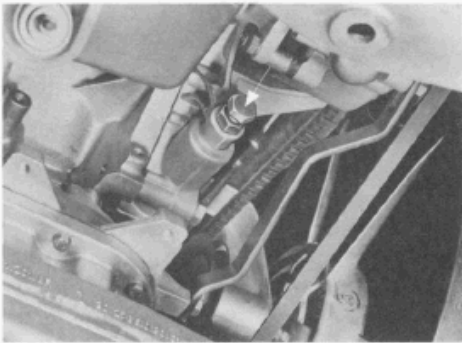




Adjusting

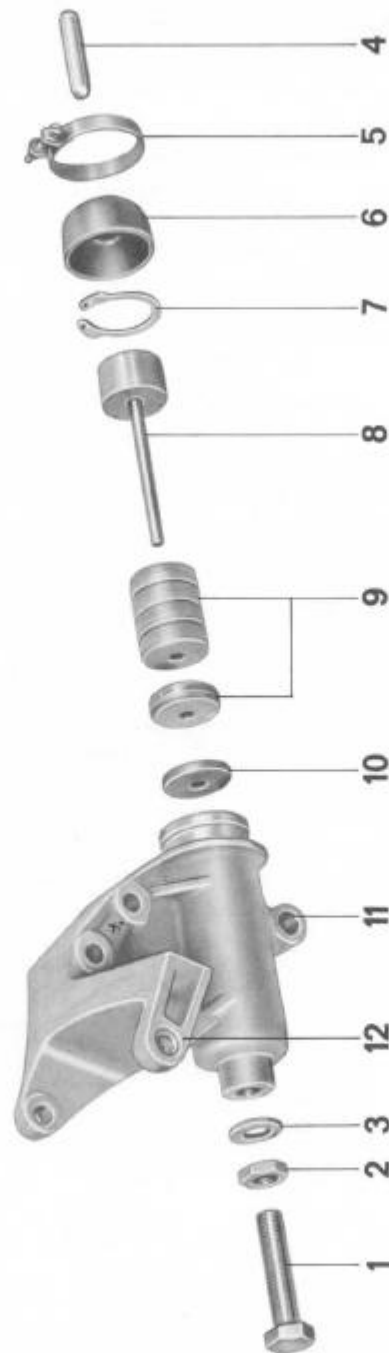
Note

Drive belt adjusting screw is located on bottom of engine at front right-hand side.



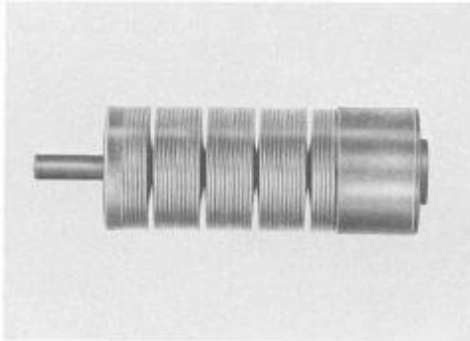
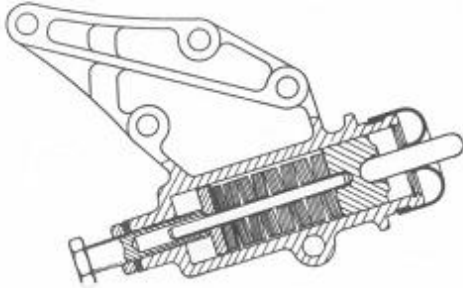
Loosen locknut of adjusting screw and turn adjusting screw until drive belt tightness is correct. Tighten locknut. Turn engine two turns and recheck tightness of drive belt.

Screw tightened — tightens belt
Screw loosened — loosens belt

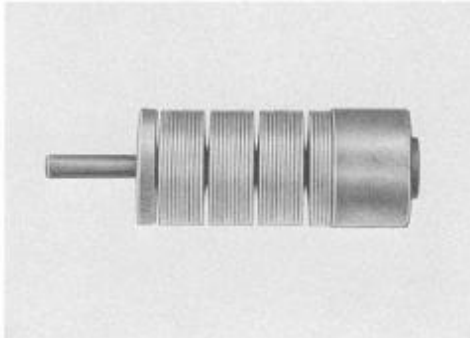


No.	Description	Qty.	Note When		Special Instructions
			Removing	Installing	
1	Adjusting screw	1			
2	Nut M 12 x 1.5	1		Lock after adjusting	
3	Unitec circlip	1		Check, replacing if necessary	
4	Push rod	1			
5	Hose clamp	1			
6	Bellow	1		Check, replacing if necessary	
7	Circlip	1	Position correctly		
8	Piston	1			
9	Bimetal plate (8 plate sets of 5 each, coated alternately) (7 plate sets of 5 each, coated alternately)	40			see page 15 - 12
		35		Watch arrangement	
10	Support disc	1			
11	Tensioning roller housing	1		Fill one third of housing with transmission oil SAE 90	
12	Key	1			

INSTALLATION NOTES

Arrangement of Bimetal Plate Sets
for Tensioning Roller

Install 8 plate sets of 5 each with coated surface alternately.



Install 7 plate sets of 5 each with coated surface alternately.

Note

Use correct adjusting screw to match number of plate sets.

8 plate sets = adjusting screw 928.105.075.00

7 plate sets = adjusting screw 928.105.075.01

Installing Tensioning Roller Housing

1. Fill one third of housing with SAE 90 transmission oil.
2. Hold housing at an angle and slide in entire piston with bimetal plate sets and support disc.
3. Push piston in housing until oil leaves the discharging bore and piston is felt to be against the stop.
4. Oil level should reach upper edge of tensioning roller housing. Add oil while holding the tensioning roller housing upright, if necessary.

BLEEDING TENSIONING ROLLER HOUSING (TOOTHED BELT TENSIONER)

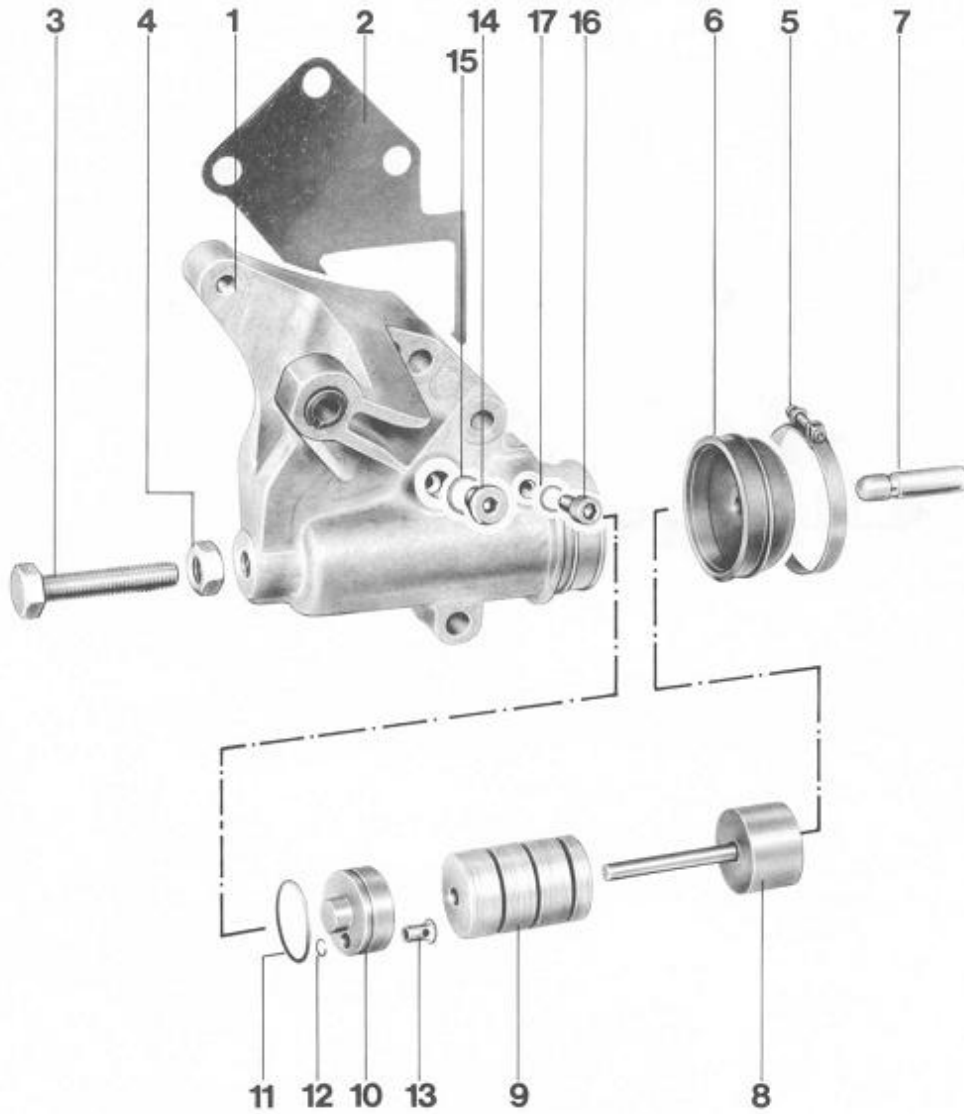
1. Tighten toothed belt as specified.
2. Remove oil filler plug (1) and bleeder screw (2).



3. Pour oil from oil can into oil filler opening, slowly, until oil runs out of bleeder screw bore.
4. Screw in and tighten oil filler plug and bleeder screw.

DISASSEMBLING AND ASSEMBLING TENSIONING ROLLER HOUSING

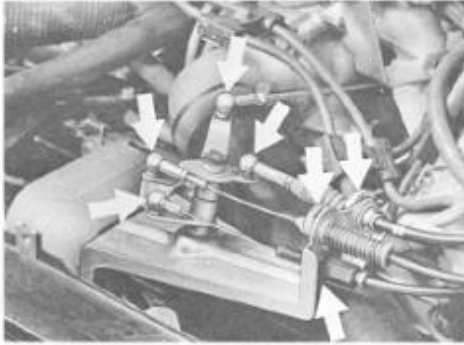
Beginning with 1983 Models



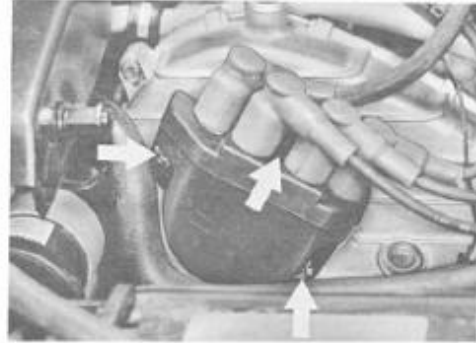
No.	Description	Qty.	Note When:		Special Instructions
			Removing	Installing	
1	Tensioning roller housing	1		Lubricate guide sleeve with oil	
2	Gasket	1		Replace	
3	Adjusting screw	1			
4	Nut M 12 x 1.5	1		Lock nut after adjusting, while holding adjusting screw	
5	Hose clamp	1			
6	Dust cover	1			
7	Push rod	1		Install in dust cover while still removed; make sure of correct fit in groove	
8	Piston	1			
9	Bimetal disc set	35		7 sets of 5 each, coated alternately	
10	Valve carrier	1			
11	O-ring 27.5 x 1.5	1		Replace	
12	Snap ring	1		Position correctly	
13	Valve	1		Check that valve carrier moves easily	
14	Oil filler plug M 10 x 1	1			
15	Seal A 10 x 13.5	1		Replace	
16	Bleeder screw M 6 x 10	1			
17	Seal A 6.5 x 9.5	1		Replace	

REPLACING TOOTHED BELT (32 VALVE ENGINE)

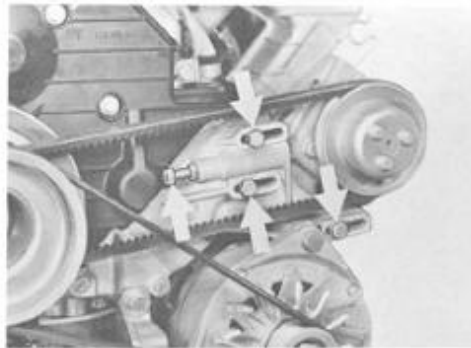
1. Remove air cleaner intake hoses.
2. Unscrew air guide on radiator at top and bottom, and remove.
3. Loosen and take off drive belts for alternator, power pump, air pump and air conditioner compressor.
4. Disconnect cables for throttle, cruise control and automatic transmission. Remove retainers and clamp on console and place cables outside.



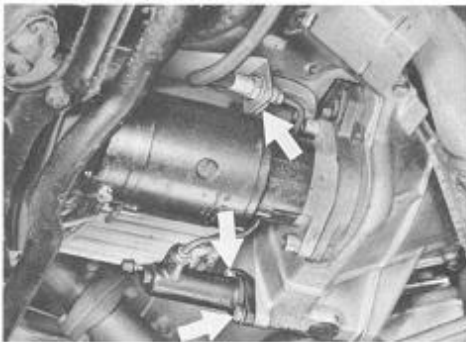
5. Loosen and remove fan console on engine.
6. Pull off left and right ignition leads on distributor cap. Unscrew and place distributor cap aside.



7. Take off both distributor rotors. Disconnect plugs for A/C compressor and toothed belt tightness indicator.
8. Unscrew toothed belt cover upper section on both sides and take off righthand upper section.
9. Unscrew power pump on console and let it hang down on its hoses.



10. Remove clutch slave cylinder. Take off clamp on clutch hose holder and remove push rod. Let cylinder with connected line hang down.



Note

Never operate clutch pedal after removing the slave cylinder.

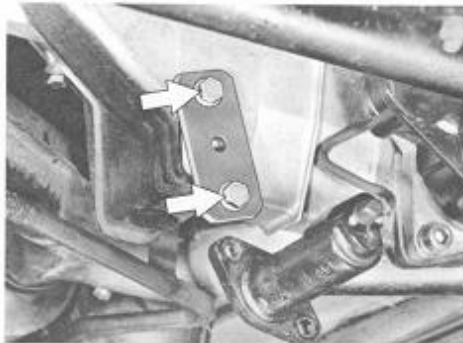
11. Align mark for 45° before TDC (cyl. 1) on vibration damper with red needle by turning crankshaft clockwise.



Note

Camshafts may be turned without damaging the valves after aligning the 45° mark.

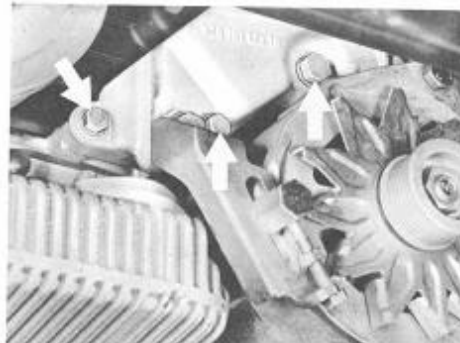
12. Mount Special Tool 9161 / 1 with original screws to hold the crankshaft.



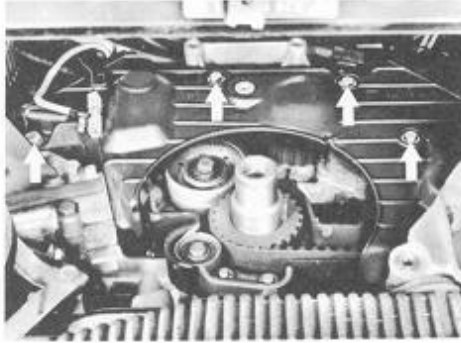
13. Unscrew bolt (wrench size 27 mm) on crankshaft and take off both pulleys, vibration damper and collar.

14. Loosen and unscrew guide tube for oil dipstick.

15. Unscrew console with alternator on engine.



16. Undo center toothed belt cover, remove left-hand upper section and center toothed belt cover.



17. Slacken toothed belt by turning toothed-belt tensioner.
18. Unbolt and remove tensioning roller bracket.



19. Remove toothed-belt from right-hand side over cylinder 1 - 4 camshaft sprocket, water-pump sprocket, cylinder 5 - 8 camshaft sprocket, oil-pump sprocket and crankshaft sprocket.

Installing

1. Installation of toothed belt is the reverse of the above sequence.
2. Turn camshafts to mark and hold firmly in this position.
3. Then turn engine in direction of rotation to ignition TDC (cyl. no. 1).

Note

Damage may be caused to the valves if the camshafts move suddenly.

4. Once the toothed belt is in position, adjust the settings. See page 15 - 101 to 15 - 104.

Special note on toothed belt and drive belt

As a rule, make sure the toothed belt and drive belt are **not kinked** during assembly, packing and storage. Improper handling may cause preliminary damage to the camshaft toothed belt that may be the cause for incipient damage.