Learning Objectives

- R & R timing cover
- R & R timing cover seal
- Inspect a timing chain and sprockets
- Service a timing chain/belt tensioner
- Properly align timing marks
- Check timing gears for wear
- Describe safety practices while servicing engine front end assemblies
Engine Front End

V-type, diesel engine with timing chain

Engine Parts That May Need Servicing
Chapter 52

1. Automakers recommend replacing the timing belt at about 50,000 miles or 80,000km.

2. Timing gear backlash is amount of clearance between the timing gear teeth.
Timing Gear Clearance

Largest feeler gauge that fits in teeth indicates clearance.
Chapter 52

3. The crankshaft cover seal keeps engine oil from leaking out from between the crankshaft snout and the engine front cover.

4. Use a seal alignment tool (usually a manufactures “special tool”) to center the seal around the crankshaft,
Installing a Timing Cover Seal

- Seal driver tool
- Front oil seal
Timing Gear Cover

Seal alignment tool
Chapter 52

5. Inspect the timing belt for signs of deterioration, cracks, hardening, softening, fraying or splitting.

6. Engine break-in is done to seat and seal new piston rings.
Inspecting Timing Belts

A—Do not bend, twist, or turn belt excessively. Oil and water will deteriorate belt. Fix all engine leaks.

B—Belt breakage may be caused by sprocket or tensioner problem. Check these parts before installing new belt.

C—If timing belt teeth are missing, check for locked component. Oil pump, injection pump, etc., could be frozen.

D—If there is wear or cracks on smooth side of belt, check idler or tensioner pulley.

E—With damage or wear on one side of belt, check belt guide and pulley alignment.

F—Wear on timing belt teeth may be caused by timing sprocket problem. Inspect sprockets carefully. Oil contamination will also cause this trouble.
Belt Tensioner

Inspecting the belt tensioner

Feel and listen for dry bearings

Spin belt tensioner
Piston Assembly

- Valve reliefs
- Top compression ring
- Second compression ring
- Oil ring
- Slipper skirt
- Piston head
- Ring lands
- Piston pin
- Pin boss
- Connecting rod
Adjusting Belt Tension

Pry bar

Move tensioner away from belt to relieve tension

Pry here to increase tension
Chapter 52

7. Timing marks will be either lines, circles, dots, or other shapes indented or cast into the timing gears and or sprockets.

8. The timing belt cover is made of sheet metal or plastic, and does not contain an oil seal or a gasket.
Set the camshaft gear mark at 6 o’clock position and the crankshaft gear at 12 o’clock position.
The camshaft sprocket mark is aligned with the belt marking and the timing mark on the engine.
9. The engine front cover, also known as the timing cover, encloses timing chain mechanism or the timing gears and requires a seal and gaskets.

10. Timing gear runout (or wobble) is measured with a dial indicator.
Timing Cover

Engine timing cover (interior side)
Timing Gear Runout

Measuring timing gear runout using a dial indicator.
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