

**NOTE:** Use illustration for component reference. See [Fig. 12](#) .

1. Remove spark plug wires. Set No. 1 piston at TDC on its compression stroke. Remove vacuum hoses, electrical harness, connectors, and harness clamps. Remove power steering pump, A/C compressor, and alternator belts. Remove power steering reservoir tank and reposition it for clearance. Install engine support eye bracket at right rear of cylinder head, then support engine. Remove upper right engine mount and bracket.
2. Remove rocker cover bolts in reverse order shown. See [Fig. 13](#) . Remove camshaft sprocket cover. Wipe off links of timing chain next to timing marks on sprockets. Put paint marks on timing chain, matching them with timing marks on cam sprockets and idler sprocket. See [Fig. 14](#) .
3. Remove cam sprocket bolts, cam sprockets, upper timing chain guides (if equipped) and upper timing chain. Inspect timing chain roller links for cracks or wear. If timing chain roller links are cracked or worn, replace timing chain.

**CAUTION:** This step is only to be applied when lower cover is not being removed.

4. Support lower timing chain by using a suitable tool as shown to avoid chain tensioner spring from coming out. See [Fig. 15](#) . Remove idler sprocket.

#### Removal (Altima) - Lower Timing Chain

1. Drain coolant by removing cylinder block drain plug and opening radiator drain cock. Drain engine oil. Remove oil pan. See [OIL PAN](#) . Remove power steering pump and position it to side. Remove idler pulley and bracket as well. Set No. 1 piston at TDC on its compression stroke.

**CAUTION:** Be careful not to tear or damage cylinder head gasket.

**NOTE:** Engine may need to be lowered to provide clearance for chain tensioner housing of timing cover to clear frame. Engine height may need to be adjusted when removing cover.

2. Remove crankshaft pulley. Remove oil separator. Remove front cover. Remove following parts;
  - Lower timing chain tensioner (push piston in and insert a suitable pin into hole).
  - Chain tension arm.
  - Lower timing chain guide.
3. Remove upper timing chain. See [REMOVAL \(ALTIMA\) - UPPER TIMING CHAIN](#) . Wipe off links of timing chain next to timing marks on sprockets. Apply paint marks to lower timing chain, matching them with mating marks on crankshaft sprocket and idler sprocket. See [Fig. 17](#) . Remove lower timing chain and sprocket.

#### Installation (Altima) - Lower Timing Chain

**CAUTION: Be careful not to tear or damage cylinder head gasket.**

1. Install crankshaft sprocket, making sure mating marks face front of engine. Install idler sprocket and lower timing chain using mating marks and paint marks made during removal process. Install chain guide and chain tension arm. Install lower chain tensioner and remove pin securing piston into tensioner body

**NOTE: Use Genuine Nissan RTV silicone sealant P/N 999MP-A7007, Three Bond P/N TB1207D or equivalent.**

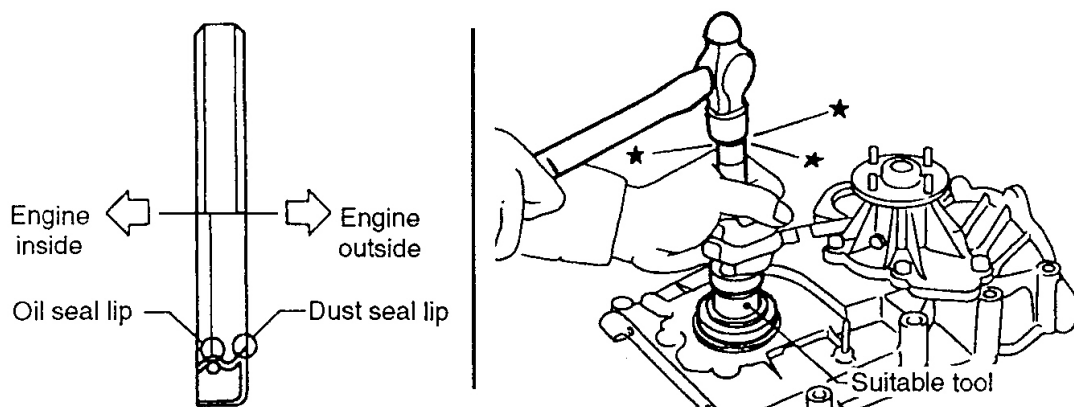
**NOTE: 1998 models use a paper gasket, not RTV silicone, for breather separator.**

2. Using a scraper or other suitable tool remove all traces of liquid gasket from cylinder block, oil separator (pre-1998 models) and front cover mating surfaces. Install new crankshaft seal in front cover. See [Fig. 22](#) . Apply a continuous bead of RTV sealant to breather separator (pre-1998 models), front cover and head gasket surface. See [Fig. 23](#) .

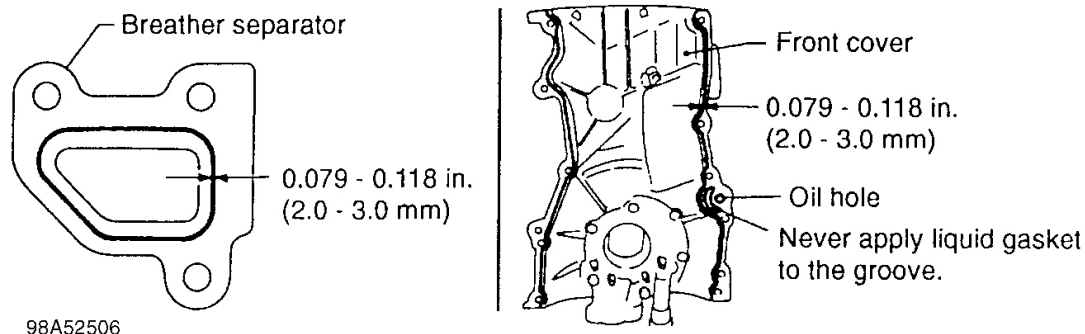
**CAUTION: Be careful not to tear or damage cylinder head gasket.**

- 3.
4. Install front cover to engine. Install oil separator to front cover. Install oil pan. Install following parts:
  - Crankshaft pulley.
  - A/C compressor and idler pulley bracket.
  - Power steering pump.

Tighten all fasteners to specification. See [TORQUE SPECIFICATIONS](#) .



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**Fig. 22: Installing New Crankshaft Seal (Altima & Frontier)****Fig. 23: Applying Sealant to Breather Separator & Front Cover (Altima)****Installation (Altima) - Upper Timing Chain**

**NOTE:** The 2 chain guides for upper timing chain have been deleted. Discard two chain guides and their bolts during any service to timing chain.

1. Install lower timing chain. **INSTALLATION (ALTIMA) - LOWER TIMING CHAIN**. Install upper timing chain and sprockets, using painted reference marks made during removal. See [Fig. 14](#). Install chain tensioner. Remove pin holding piston in bore of tensioner.

**CAUTION:** Be careful not to tear or damage cylinder head gasket.

**CAUTION:** Be careful upper timing chain does not slip or jump when installing camshaft sprocket cover.

**NOTE:** Use Genuine Nissan RTV silicone sealant P/N 999MP-A7007, Three Bond P/N TB1207D or equivalent.

2. Use a scraper to remove all traces of liquid gasket from mating surfaces of engine block and camshaft sprocket cover. Apply a continuous bead of RTV sealant to cover. See [Fig. 19](#). Also place RTV sealant on head gasket surface. Install camshaft sprocket cover.
3. Install rocker cover, tightening bolts in sequence shown. See [Fig. 13](#). Install upper right engine mount and bracket. Install power steering fluid reservoir tank. Install alternator support bracket and alternator. Install alternator, power steering and A/C compressor drive belts. Install vacuum hoses, electrical harnesses and connectors. Tighten all fasteners to specification. See **TORQUE SPECIFICATIONS**.