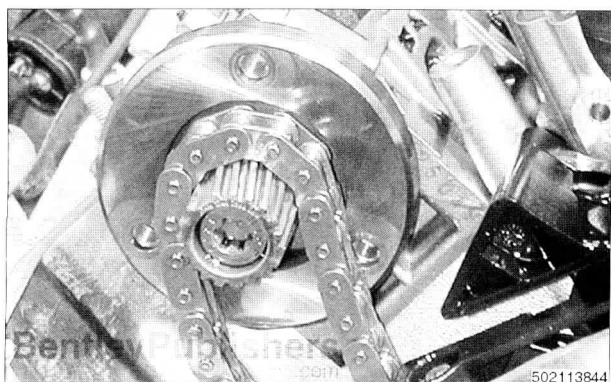
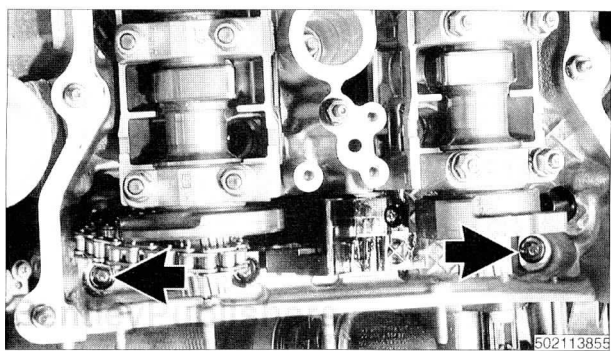


# Camshaft Timing Chain 117-19

Timing chains, removing (M54 engine)



- ◀ Hang timing chain on exhaust camshaft end.



- ◀ Working in cylinder head cavity, remove timing chain cover bolts (arrows).



- ◀ Remove secondary chain lower guide mounting bolts (arrows). Remove chain guide.

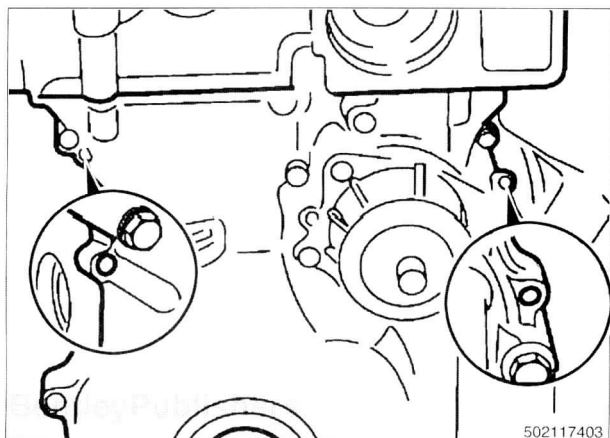
#### NOTE—

- Bolt on intake camshaft side is long and extends into timing chain cover.

- Remove crankshaft vibration damper. See **Vibration damper, removing and installing (M54 engine)** in this repair group.

#### CAUTION—

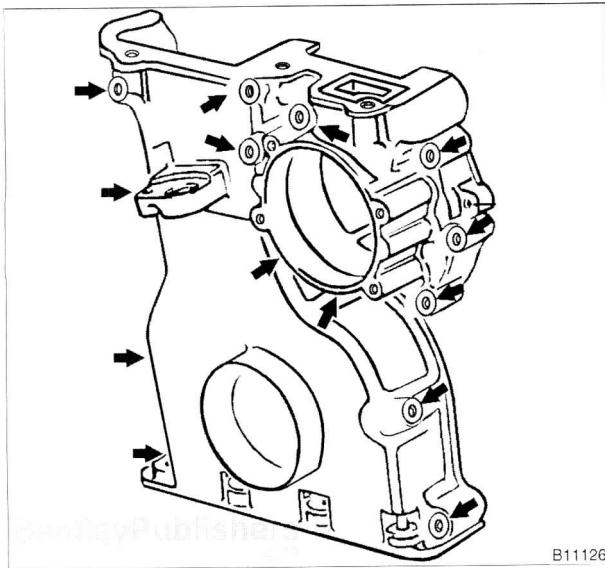
- Do not use flywheel locking tool to hold crankshaft stationary to loosen or tighten vibration damper mounting bolt. Use only the special tools specified, or equivalent hub holding tool.
- Do not allow crankshaft to rotate while timing chains are loosened or removed. The pistons can contact the valves, causing engine damage.



- ◀ Using a 5 mm or smaller drift, drive two locating dowels (insets) in lower timing cover toward rear of car.

# 117-20 Camshaft Timing Chain

## Timing chains, installing (M54 engine)



- Remove timing cover mounting bolts (**arrows**). Slide cover with coolant pump forward to remove.

### CAUTION—

- Use care when removing the cover from the cylinder head gasket. If the cover is stuck, use a sharp knife to separate it from the head gasket.
- If cylinder head gasket is damaged, remove cylinder head and replace head gasket. See **113 Cylinder Head Removal and Installation**.
- Use care when detaching front timing cover from coolant pipe at rear of cover.

### NOTE—

- For clarity, front timing cover is illustrated with coolant pump removed.

- Push primary chain tensioner guide rail aside and remove chain.

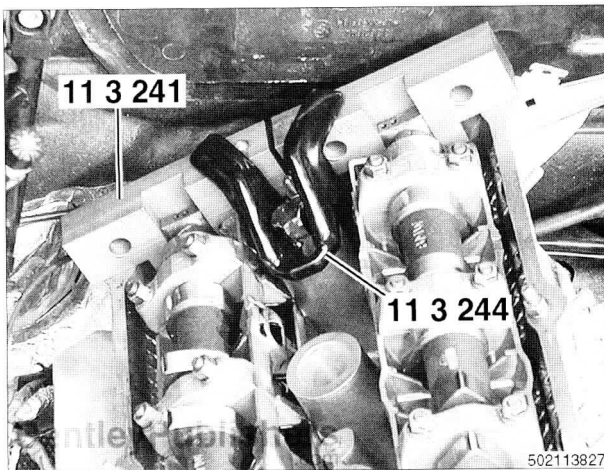
## Timing chains, installing (M54 engine)

- Make sure camshafts are locked in TDC position using BMW special tool set 11 3 240.

- Inspect timing chain sprockets. Inspect guide rail and tensioner rail for damage. Replace any part that is worn or damaged.

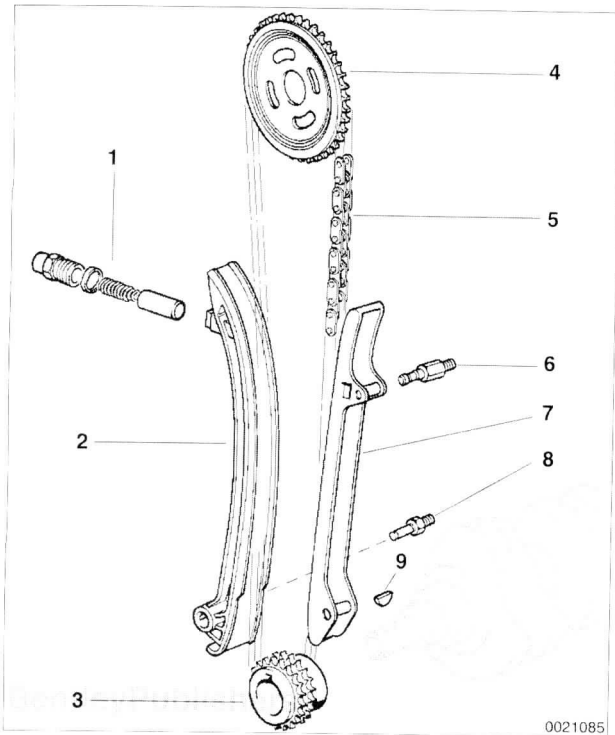
### NOTE—

- If any sprockets are replaced due to wear, also replace chain.



# Camshaft Timing Chain 117-21

Timing chains, installing (M54 engine)



## Primary timing chain assembly

1. Primary chain tensioner
2. Chain tensioner rail
3. Crankshaft sprocket
4. Exhaust camshaft sprocket
5. Primary chain
6. Anchor bolt
7. Guide rail
8. Anchor bolt
9. Woodruff key

- Install primary timing chain to crankshaft sprocket and hang upper end from exhaust camshaft.
- If necessary, replace crankshaft front seal in timing chain cover. See **119 Lubrication System**.
- To install lower timing chain cover:
  - Clean cover and cylinder block sealing surfaces.
  - Use new gaskets and coolant pipe O-ring.
  - Remove timing chain cover dowel pins from engine block.
  - Drive dowels into cover until they just protrude slightly from sealing surface.
  - Apply a small bead of silicon sealer (3-Bond 1209® or equivalent) to corners of cylinder head where timing cover meets cylinder head and engine block.
  - Tap cover into position until firmly seated.
  - Install all bolts hand tight, including two Torx bolts from above.
  - Install secondary chain lower guide.
  - Tighten cover mounting bolts alternately and in stages.

### Tightening torque

|   |                 |
|---|-----------------|
| Lower timing cover to cylinder block (M6) | 10 Nm (7 ft-lb) |
|---|-----------------|

- Install oil pan with new gasket. See **119 Lubrication System**.

### Tightening torques

|                              |                 |
|------------------------------|-----------------|
| Oil pan to engine block (M6) |                 |
| • 8.8 grade                  | 10 Nm (7 ft-lb) |
| • 10.9 grade                 | 12 Nm (9 ft-lb) |