

## CAMSHAFT

MECHANICAL

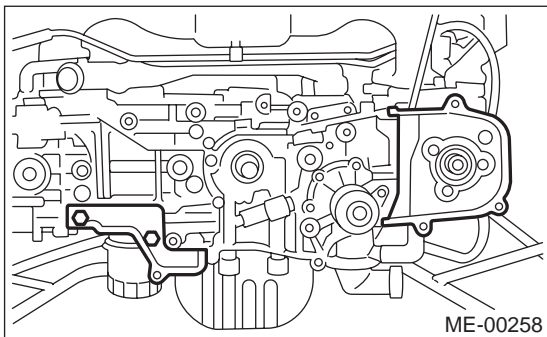
### 19. Camshaft

#### A: REMOVAL

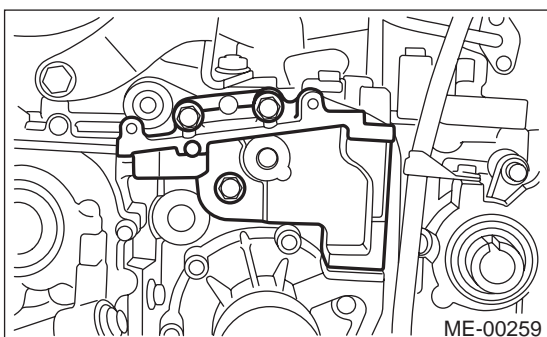
- 1) Remove V-belt. <Ref. to ME(H4SO)-42, INSTALLATION, V-belt.>
- 2) Remove crankshaft pulley. <Ref. to ME(H4SO)-44, REMOVAL, Crankshaft Pulley.>
- 3) Remove belt cover. <Ref. to ME(H4SO)-45, REMOVAL, Belt Cover.>
- 4) Remove timing belt assembly. <Ref. to ME(H4SO)-46, REMOVAL, Timing Belt Assembly.>
- 5) Remove camshaft sprocket. <Ref. to ME(H4SO)-51, REMOVAL, Camshaft Sprocket.>
- 6) Remove crankshaft sprocket. <Ref. to ME(H4SO)-52, REMOVAL, Crankshaft Sprocket.>
- 7) Remove belt cover No. 2 (LH).
- 8) Remove belt cover No. 2 (RH).

#### NOTE:

Do not damage or lose the seal rubber when removing belt covers.

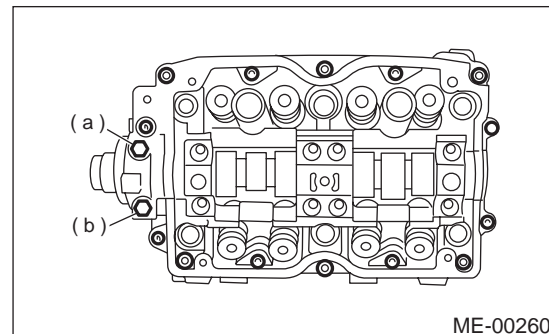


- 9) Remove tensioner bracket.

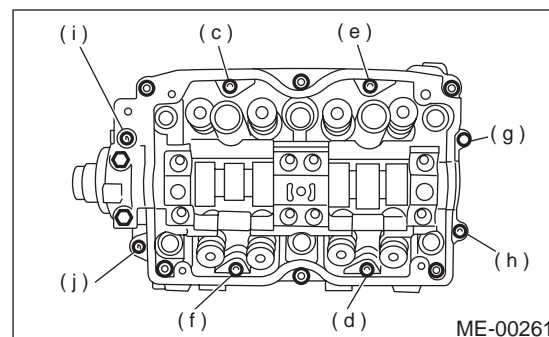


- 10) Remove camshaft position sensor support. (LH side only)
- 11) Remove oil level gauge guide. (LH side only)
- 12) Remove valve rocker assembly. <Ref. to ME(H4SO)-53, REMOVAL, Valve Rocker Assembly.>

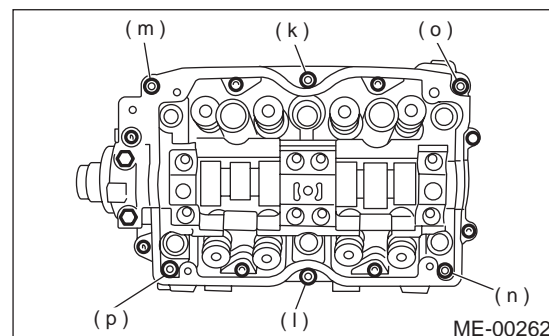
- 13) Remove camshaft cap.
  - (1) Remove bolts (a) through (b) in alphabetical sequence.



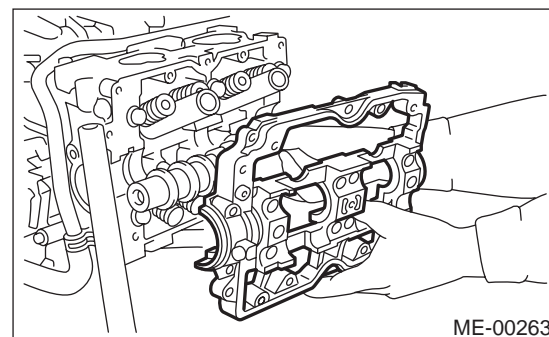
- (2) Equally loosen bolts (c) through (j) all the way in alphabetical sequence.



- (3) Remove bolts (k) through (p) in alphabetical sequence using ST.  
ST 499497000 TORX PLUS



- (4) Remove camshaft cap.



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- 14) Remove camshaft.
- 15) Remove oil seal.
- 16) Remove plug from rear side of camshaft.

**NOTE:**

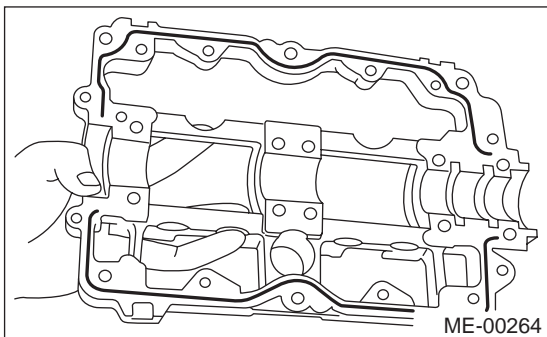
- Do not remove oil seal unless necessary.
- Do not scratch journal surface when removing oil seal.

### B: INSTALLATION

- 1) Apply a coat of engine oil to camshaft journals and install camshaft.
- 2) Install camshaft cap.
  - (1) Apply liquid gasket on the around of camshaft cap.

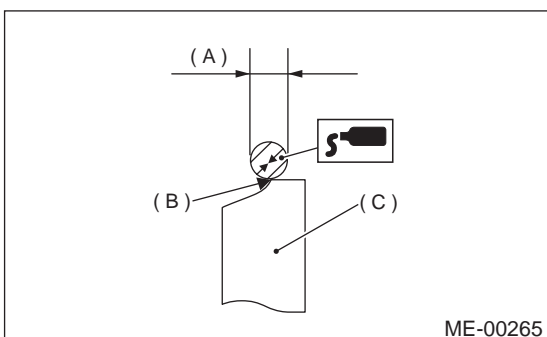
**Liquid gasket:**

**THREE BOND 1280B**  
**P/N K0877YA018**

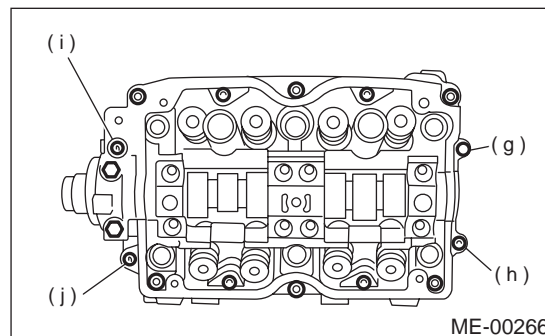


**NOTE:**

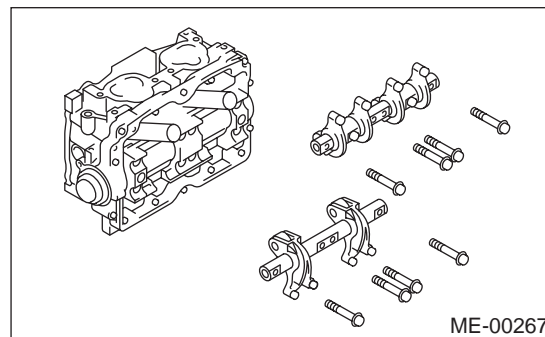
Thinly apply a 3 mm (0.12 in) diameter (A) continuous strip of liquid gasket along edge (B) of camshaft cap (C) mating surface.



- (2) Temporarily tighten bolts (g) through (j) in alphabetical sequence.



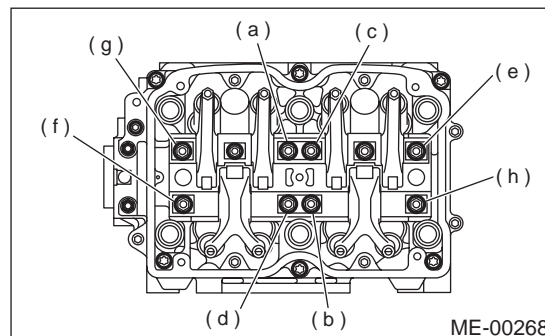
- (3) Install valve rocker assembly.



- (4) Tighten bolts (a) through (h) in alphabetical sequence.

**Tightening torque:**

**25 N·m (2.5 kgf·m, 18.1 ft·lb)**



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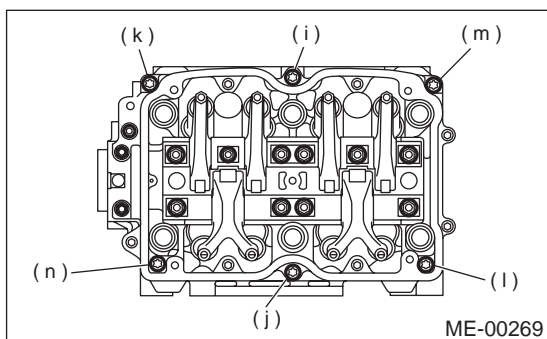
MECHANICAL

- (5) Tighten TORX bolts (i) through (n) in alphabetical sequence using ST.

ST 499427000 TORX PLUS

**Tightening torque:**

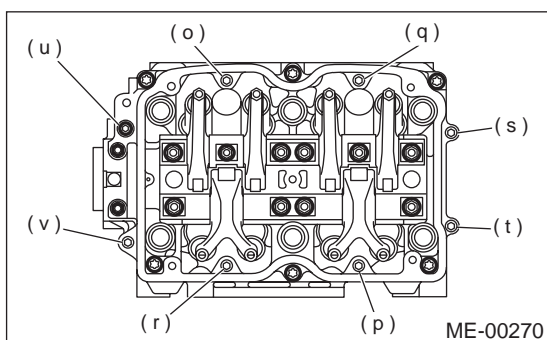
**18 N·m (1.8 kgf-m, 13.0 ft-lb)**



- (6) Tighten bolts (o) through (v) in alphabetical sequence.

**Tightening torque:**

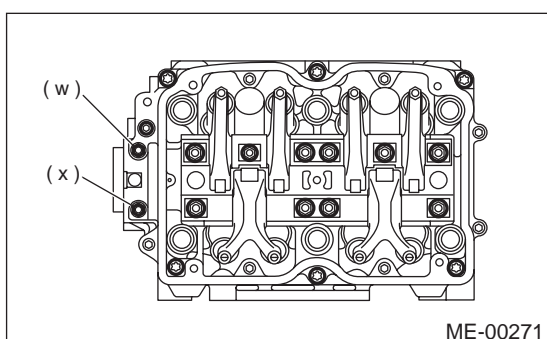
**10 N·m (1.0 kgf-m, 7.2 ft-lb)**



- (7) Tighten bolts (w) through (x) in alphabetical sequence.

**Tightening torque:**

**10 N·m (1.0 kgf-m, 7.2 ft-lb)**



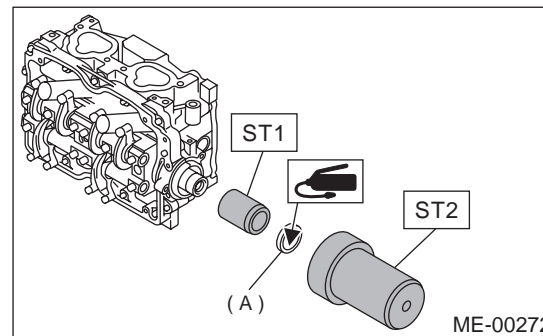
- 3) Apply a coat of grease to oil seal lips and install oil seal (A) on camshaft using ST1 and ST2.

**NOTE:**

Use a new oil seal.

ST1 499597000 OIL SEAL GUIDE

ST2 499587500 OIL SEAL INSTALLER



- 4) Install plug using ST.

ST 499587700 OIL SEAL INSTALLER

- 5) Adjust the valve clearance. <Ref. to ME(H4SO)-31, ADJUSTMENT, Valve Clearance.>

- 6) Install rocker cover and connect PCV hose.

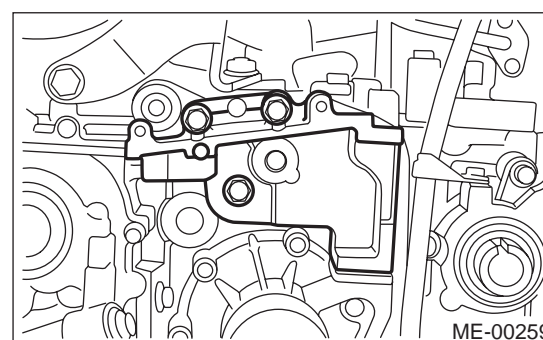
- 7) Install oil level gauge guide. (LH side only)

- 8) Install camshaft position sensor support. (LH side only)

- 9) Install tensioner bracket.

**Tightening torque:**

**25 N·m (2.5 kgf-m, 18.1 ft-lb)**



- 10) Install belt cover No. 2 (RH).

**Tightening torque:**

**5 N·m (0.5 kgf-m, 3.6 ft-lb)**

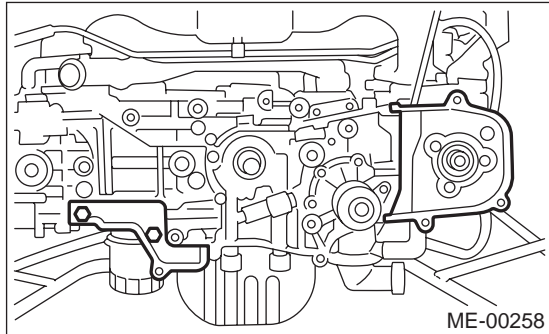
## CAMSHAFT

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11) Install belt cover No. 2 (LH).

**Tightening torque:**

**5 N·m (0.5 kgf-m, 3.6 ft-lb)**



12) Install crankshaft sprocket. <Ref. to ME(H4SO)-52, INSTALLATION, Crankshaft Sprocket.>

13) Install camshaft sprocket. <Ref. to ME(H4SO)-51, INSTALLATION, Camshaft Sprocket.>

14) Install timing belt assembly. <Ref. to ME(H4SO)-47, INSTALLATION, Timing Belt Assembly.>

15) Install belt cover. <Ref. to ME(H4SO)-45, INSTALLATION, Belt Cover.>

16) Install crankshaft pulley. <Ref. to ME(H4SO)-44, INSTALLATION, Crankshaft Pulley.>

17) Install V-belt. <Ref. to ME(H4SO)-42, INSTALLATION, V-belt.>

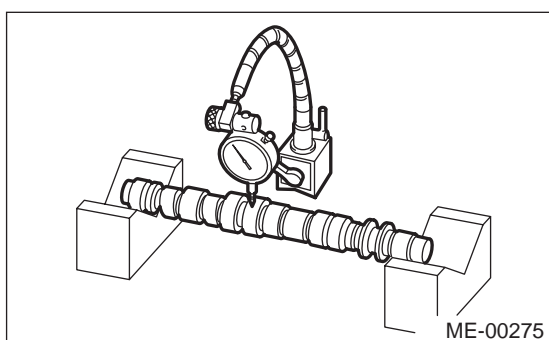
## C: INSPECTION

### 1. CAMSHAFT

1) Measure the bend, and repair or replace if necessary.

**Limit:**

**0.025 mm (0.0010 in)**



2) Check journal for damage and wear. Replace if faulty.

3) Measure outside diameter of camshaft journal and inside diameter of cylinder head journal, and determine the difference between the two (= oil clearance). If oil clearance exceeds specifications, replace camshaft or cylinder head as necessary.

Unit: mm (in)		
Clearance at journal	Standard	0.055 — 0.090 (0.0022 — 0.0035)
	Limit	0.10 (0.0039)
Camshaft journal O.D.		31.928 — 31.945 (1.2570 — 1.2577)
Journal hole I.D.		32.000 — 32.018 (1.2598 — 1.2605)

4) Check cam face condition; remove minor faults by grinding with oil stone. Measure the cam height H; replace if the limit has been exceeded.

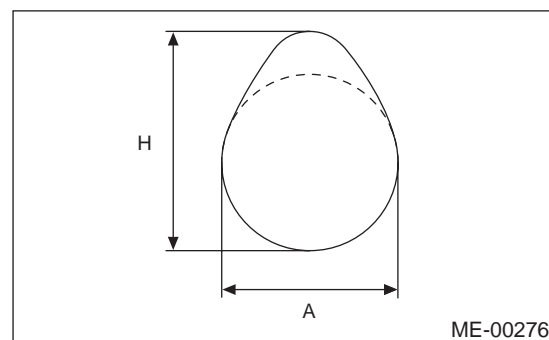
**Cam height: H**

Item	Unit: mm (in)	
Intake	STD	39.485 — 39.585 (1.5545 — 1.5585)
	Limit	39.385 (1.5506)
Exhaust	STD	39.257 — 39.357 (1.5455 — 1.5495)
	Limit	39.157 (1.5416)

**Cam base circle diameter A:**

**IN: 34.00 mm (1.3386 in)**

**EX: 34.00 mm (1.3386 in)**



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### 2. CAMSHAFT SUPPORT

Measure the thrust clearance of camshaft with dial gauge. If the clearance exceeds the limit, replace camshaft support.

**Standard:**

*0.030 — 0.090 mm (0.0012 — 0.0035 in)*

**Limit:**

*0.10 mm (0.0039 in)*

