

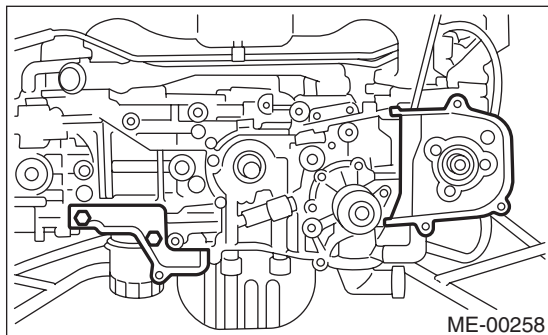
## 19. Camshaft

### A: REMOVAL

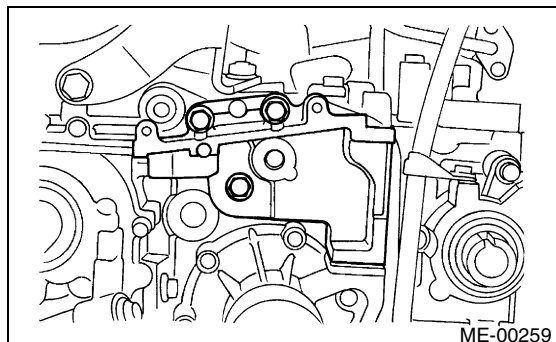
- 1) Remove the V-belt. <Ref. to ME(H4SO)-42, REMOVAL, V-belt.>
- 2) Remove the crankshaft pulley. <Ref. to ME(H4SO)-44, REMOVAL, Crankshaft Pulley.>
- 3) Remove the timing belt cover. <Ref. to ME(H4SO)-45, REMOVAL, Timing Belt Cover.>
- 4) Remove the timing belt. <Ref. to ME(H4SO)-46, REMOVAL, Timing Belt.>
- 5) Remove the camshaft sprocket. <Ref. to ME(H4SO)-51, REMOVAL, Camshaft Sprocket.>
- 6) Remove the crankshaft sprocket. <Ref. to ME(H4SO)-53, REMOVAL, Crankshaft Sprocket.>
- 7) Remove timing belt cover No. 2 (LH).
- 8) Remove timing belt cover No. 2 (RH).

#### NOTE:

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

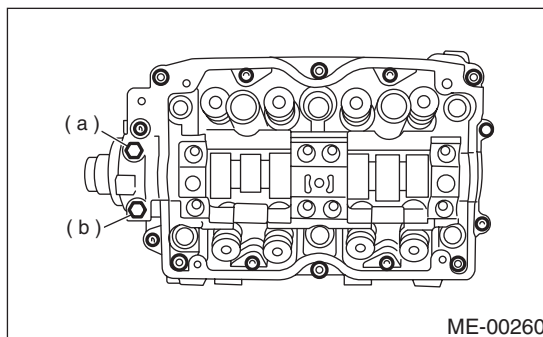


- 9) Remove the tensioner bracket.

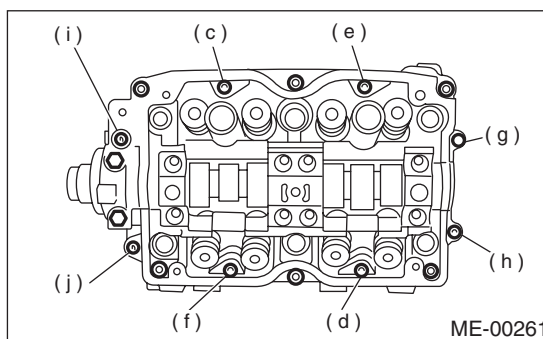


- 10) Remove the camshaft position sensor support. (LH side only)
- 11) Remove the oil level gauge guide. (LH side only)
- 12) Remove the valve rocker assembly. <Ref. to ME(H4SO)-54, REMOVAL, Valve Rocker Assembly.>
- 13) Remove the camshaft cap.

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

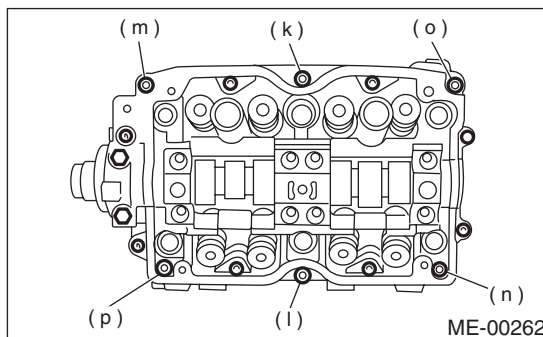


- (2) Equally loosen bolts (c) through (j) all the way in alphabetical sequence.

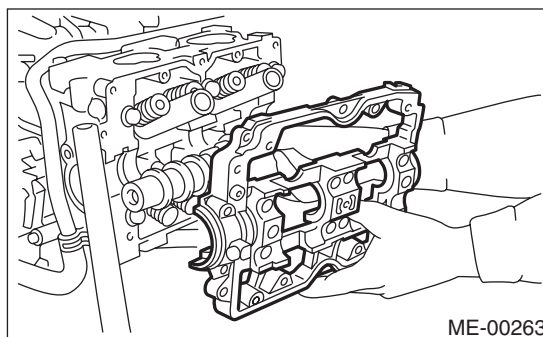


- (3) Remove bolts (k) through (p) in alphabetical sequence using ST.

ST 499497000 TORX PLUS



- (4) Remove the camshaft cap.



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

## CAUTION:

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

## B: INSTALLATION

1) Apply a thin coat of engine oil to the camshaft journals, and then install the camshaft.

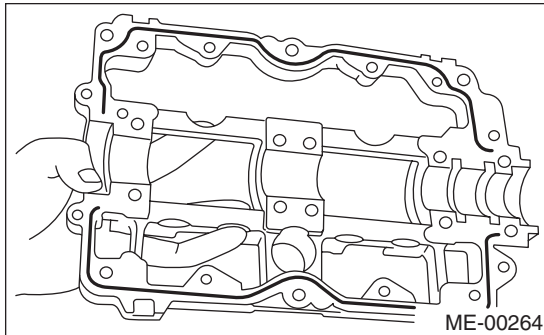
2) Install the camshaft cap.

(1) Apply liquid gasket on the around of camshaft cap.

### Liquid gasket:

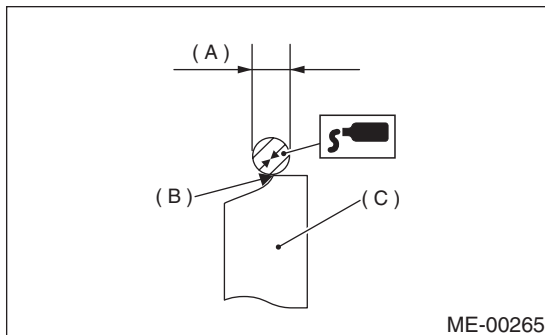
**ThreeBond 1280B**

**P/N K0877YA018**

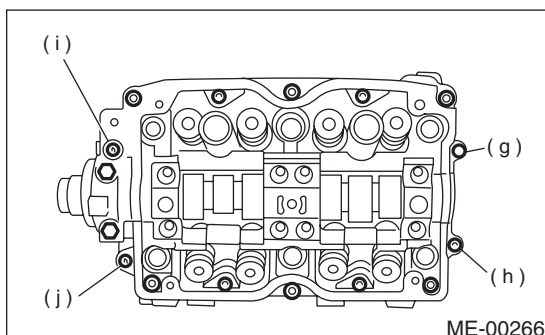


### NOTE:

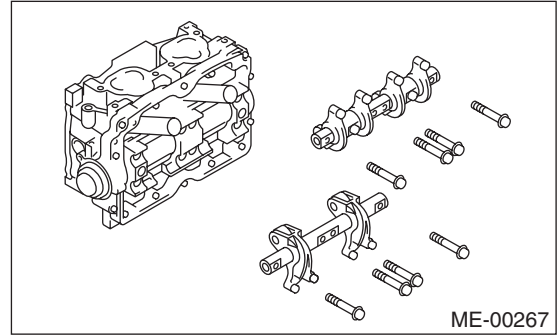
Apply a 3 mm (0.12 in) dia. (A) bead of liquid gasket along edge (B) of the camshaft cap (C) mating surface.



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



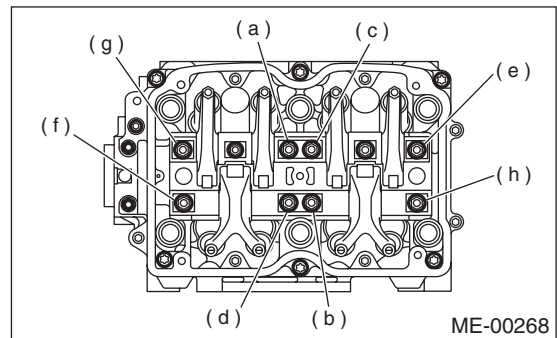
(3) Install the valve rocker assembly.



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

### Tightening torque:

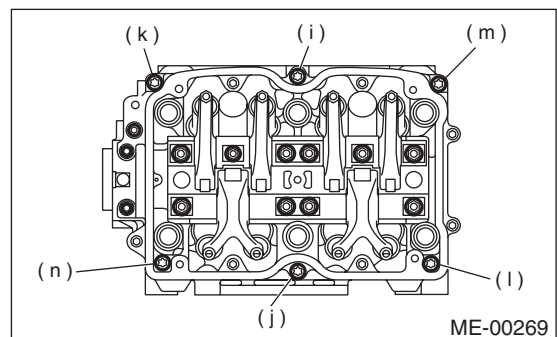
**25 N·m (2.5 kgf-m, 18.1 ft-lb)**



(5) Tighten the TORX bolts (i) through (n) in alphabetical sequence using ST. 499497000 TORX PLUS

### Tightening torque:

**18 N·m (1.8 kgf-m, 13.0 ft-lb)**



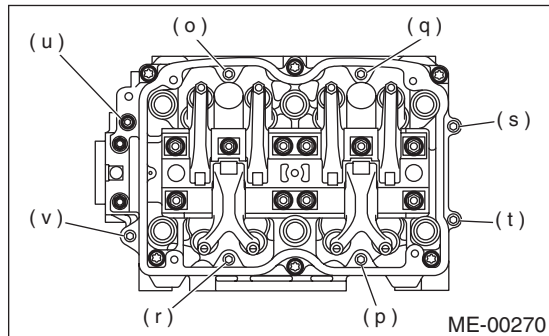
# CAMSHAFT

## MECHANICAL

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

### **Tightening torque:**

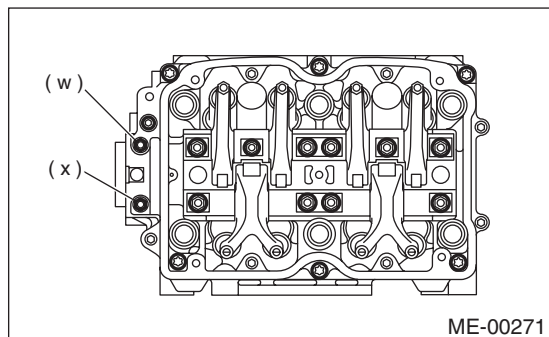
**10 N·m (1.0 kgf-m, 7.2 ft-lb)**



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

### **Tightening torque:**

**10 N·m (1.0 kgf-m, 7.2 ft-lb)**

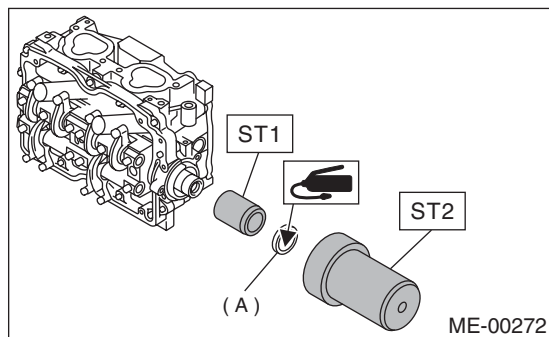


- 3) Apply a thin coat of grease to oil seal lips, and then install the oil seal (A) on camshaft using ST1 and ST2.

### **NOTE:**

Use a new oil seal.

ST1	499597000	OIL SEAL GUIDE
ST2	499587500	OIL SEAL INSTALLER



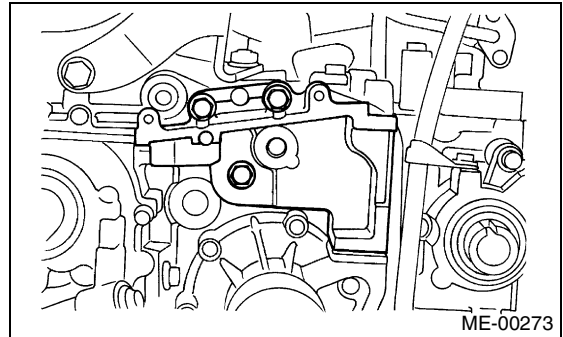
- 4) Install the plug using ST.  
ST 499587700 CAMSHAFT OIL SEAL INSTALLER

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

- 6) Install the rocker cover and connect PCV hose.  
7) Install the oil level gauge guide. (LH side only)  
8) Install the camshaft position sensor support. (LH side only)  
9) Install the tensioner bracket.

### **Tightening torque:**

**25 N·m (2.5 kgf-m, 18.1 ft-lb)**



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

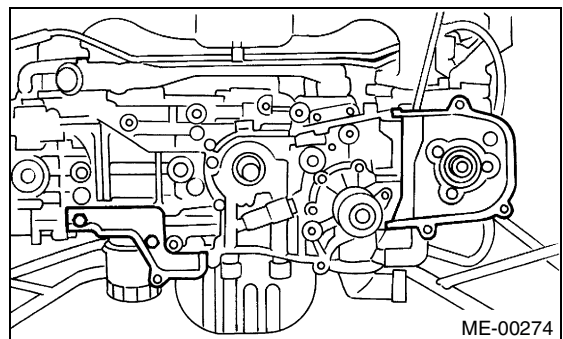
### **Tightening torque:**

**5 N·m (0.5 kgf-m, 3.6 ft-lb)**

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

### **Tightening torque:**

**5 N·m (0.5 kgf-m, 3.6 ft-lb)**



- 12) Install the crankshaft sprocket. <Ref. to ME(H4SO)-53, INSTALLATION, Crankshaft Sprocket.>

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

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

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

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

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

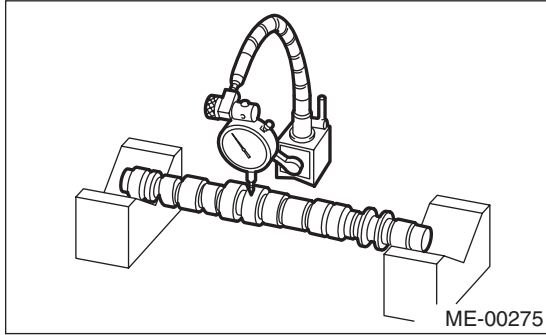
## C: INSPECTION

### 1. CAMSHAFT

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

**Limit:**

**0.025 mm (0.00098 in)**



2) Check the journal for damage and wear. Replace if defective.

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

Unit: mm (in)		
Clearance at journal	STD	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 the cam face condition and remove minor faults by grinding with oil stone. Measure cam height H. Replace if the value exceeds the specified limit.

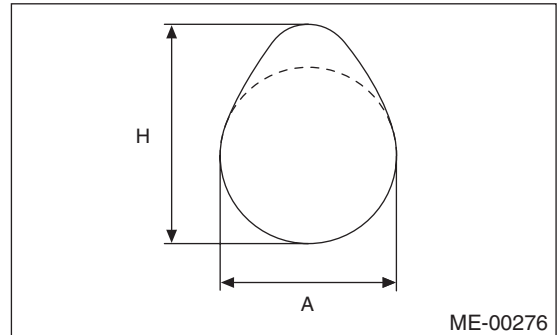
**Cam height: H**

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:**

**Intake; 34.00 mm (1.3386 in)**

**Exhaust; 34.00 mm (1.3386 in)**



### 2. CAMSHAFT SUPPORT

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

**Standard:**

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

**Limit:**

**0.10 mm (0.0039 in)**

