

## 5. Camshaft

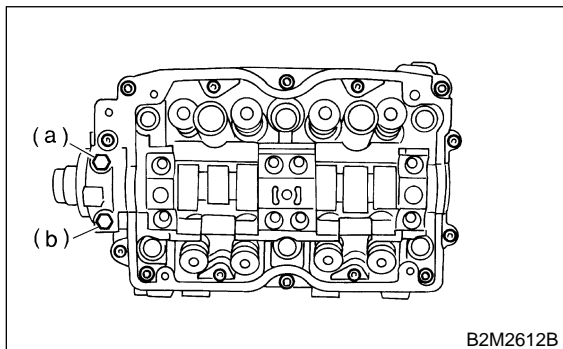
### A: REMOVAL

#### 1. RELATED PARTS

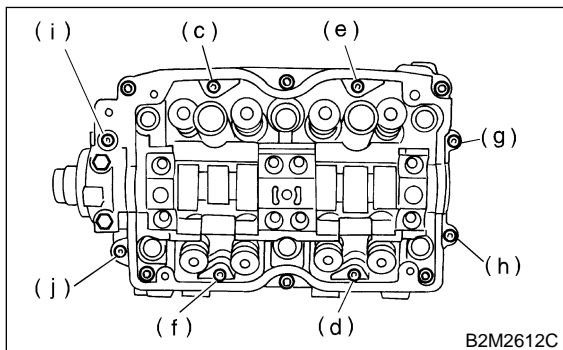
Remove camshaft sprockets, belt cover No. 2 <Ref. to 2-3 [W3A4].> and valve rocker assembly. <Ref. to 2-3 [W4A0].>

#### 2. CAMSHAFT (LH)

- 1) Remove camshaft cap.
  - (1) Remove bolts (a) and (b).

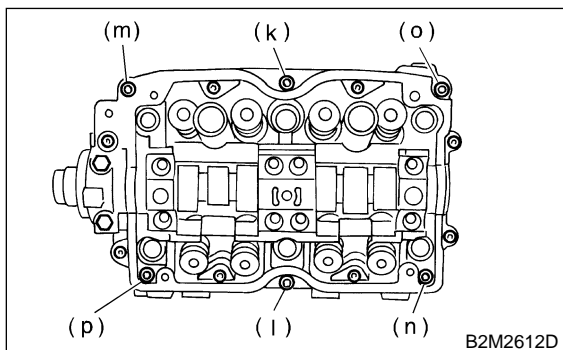


- (2) Equally loosen bolts (c) through (j) all the way in alphabetical sequence.

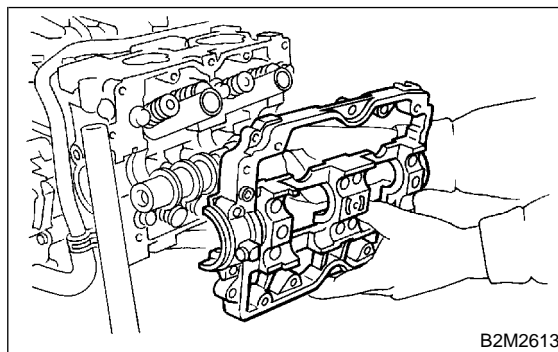


- (3) Remove bolts (k) through (p) in alphabetical sequence using ST.

ST 499497000 TORX PLUS



- (4) Remove camshaft cap.



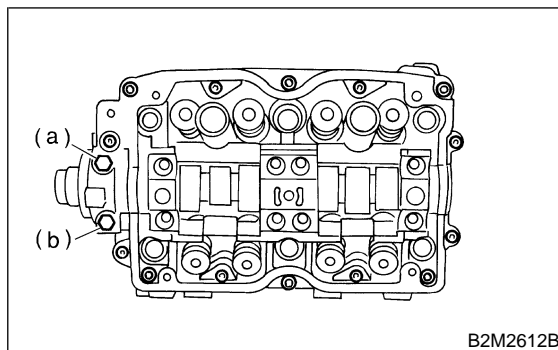
- 2) Remove camshaft (LH).
- 3) Remove oil seal.
- 4) Remove plug from rear side of camshaft (LH).

#### CAUTION:

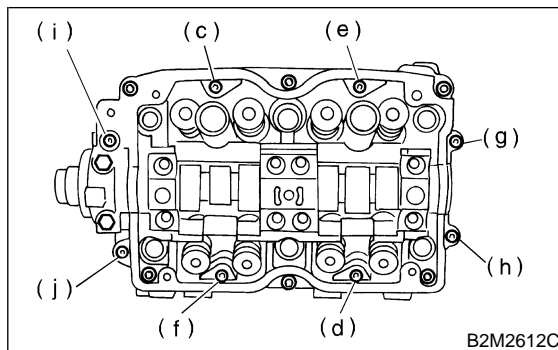
- Do not remove oil seal unless necessary.
- Do not scratch journal surface when removing oil seal.

#### 3. CAMSHAFT (RH)

- 1) Remove camshaft cap.
  - (1) Remove bolts (a) and (b).

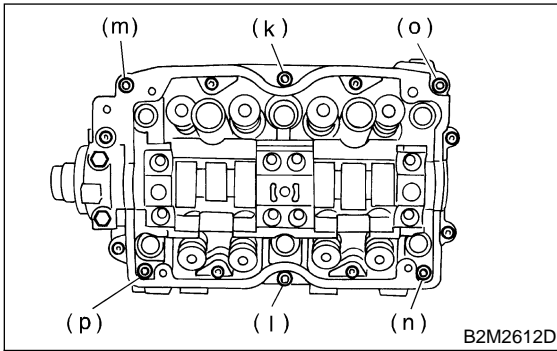


- (2) Equally loosen bolts (c) through (j) all the way in alphabetical sequence.

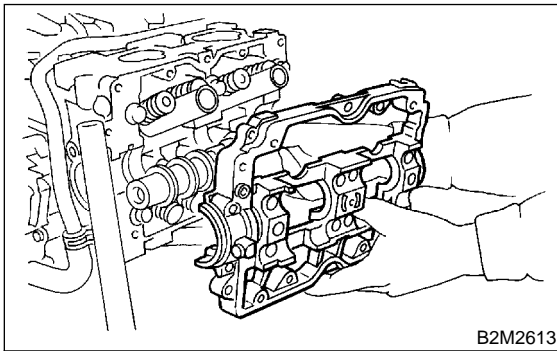


(3) Remove bolts (k) through (p) in alphabetical sequence using ST.

ST 499497000 TORX PLUS



(4) Remove camshaft cap.



- 2) Remove camshaft (RH).
- 3) Remove oil seal.
- 4) Remove plug from rear side of camshaft (RH).

**CAUTION:**

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

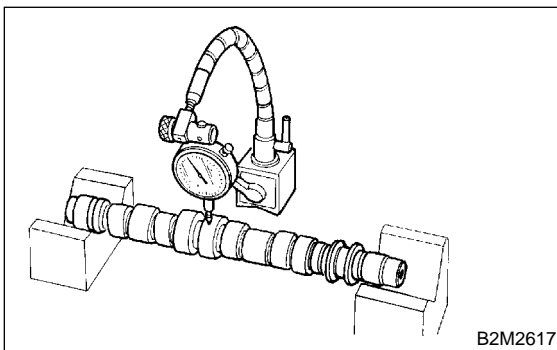
**B: INSPECTION**

**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.

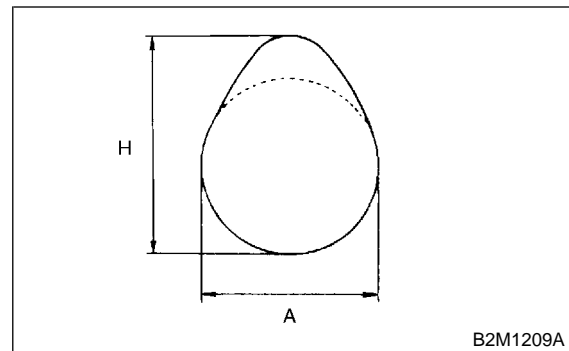
**Cam height H:**

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)**



**2. CAMSHAFT SUPPORT**

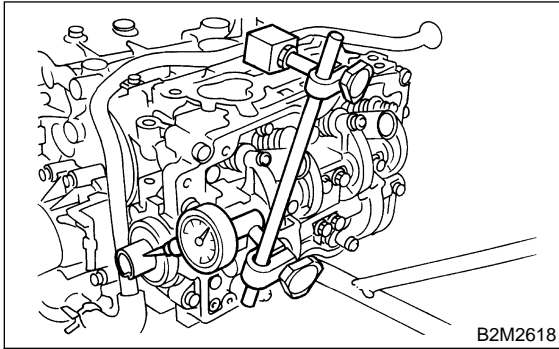
Measure the thrust clearance of camshaft with dial gauge. If the clearance exceeds the limit, replace camshaft support.

**Standard:**

0.030 — 0.090 mm (0.0012 — 0.0035 in)

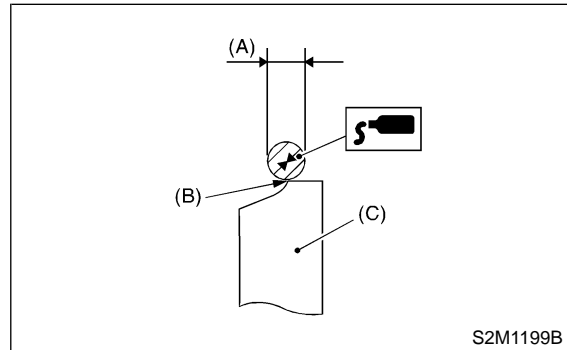
**Limit:**

0.10 mm (0.0039 in)

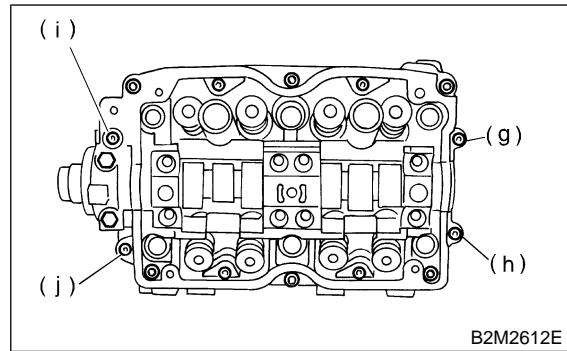


**NOTE:**

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



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



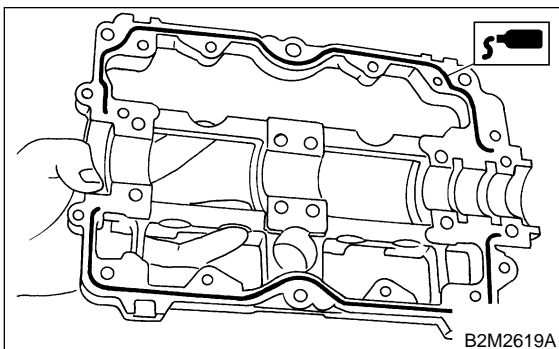
**C: INSTALLATION**

**1. CAMSHAFT (LH)**

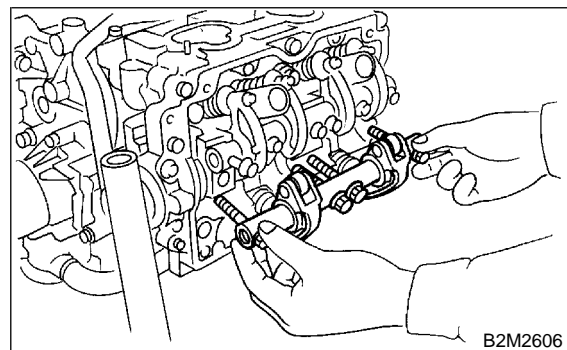
- 1) Apply a coat of engine oil to camshaft journals and install camshaft (LH).
- 2) Install camshaft cap.
  - (1) Apply liquid gasket on the around of camshaft cap.

**Liquid gasket:**

**THREE BOND 1280B**



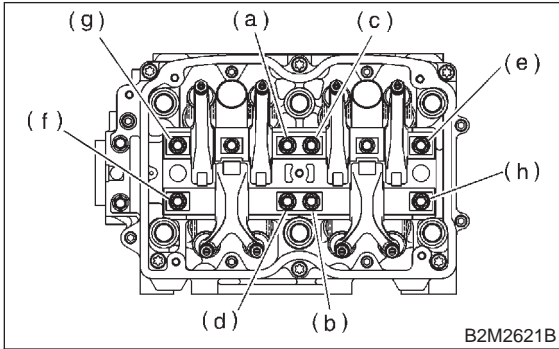
(3) Install valve rocker assembly.  
<Ref. to 2-3 [W4E0].>



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

**Tightening torque:**

**25±2 N-m (2.5±0.2 kg-m, 18.1±1.4 ft-lb)**

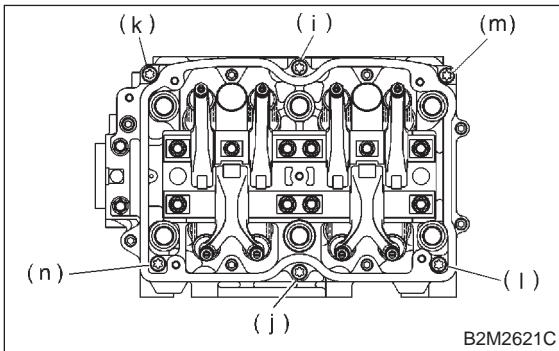


(5) Tighten TORX bolts (i) through (n) in alphabetical sequence using ST.

ST 499497000 TORX PLUS

**Tightening torque:**

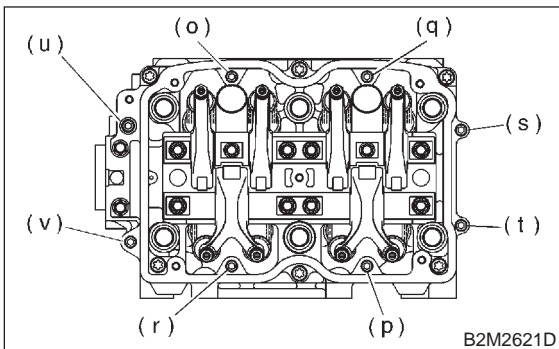
**18±2 N-m (1.8±0.2 kg-m, 13.0±1.4 ft-lb)**



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

**Tightening torque:**

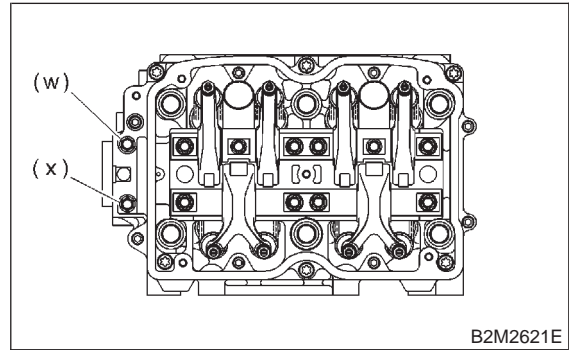
**10±2 N-m (1.0±0.2 kg-m, 7.2±1.4 ft-lb)**



(7) Tighten bolts (w) and (x).

**Tightening torque:**

**10±2 N-m (1.0±0.2 kg-m, 7.2±1.4 ft-lb)**



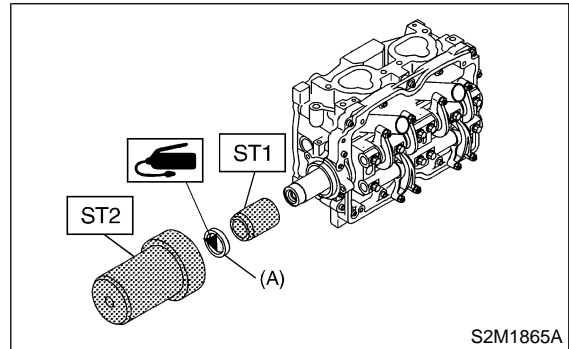
3) Apply a coat of grease to oil seal lips and install oil seal (A) on camshaft using ST1 and ST2.

**CAUTION:**

**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) Install oil level gauge guide.

6) Install camshaft position sensor support.

**2. CAMSHAFT (RH)**

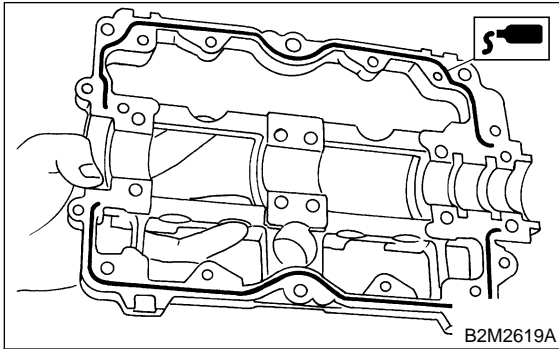
1) Apply a coat of engine oil to camshaft journals and install camshaft (RH).

2) Install camshaft cap.

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

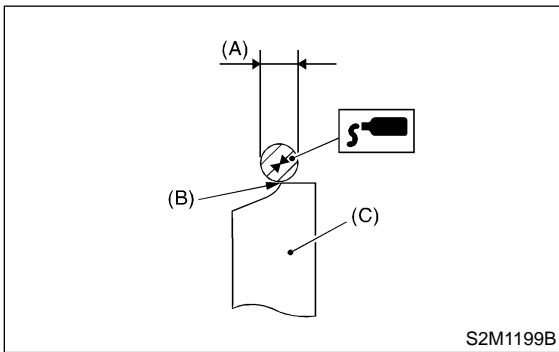
**Liquid gasket:**

**THREE BOND 1280B**

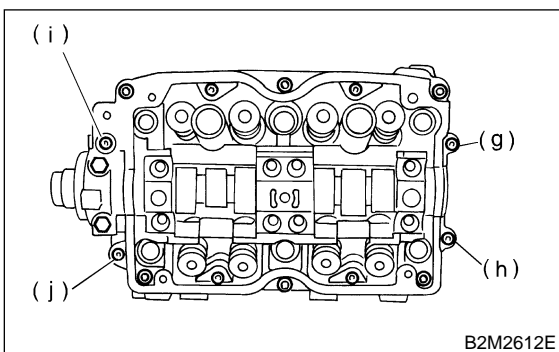


**NOTE:**

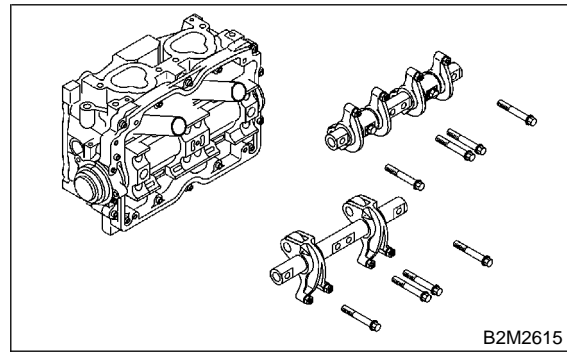
Apply a coat of 3 mm (0.12 in) dia. (A) liquid gasket along edge (B) of camshaft cap (C) mating surface.



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



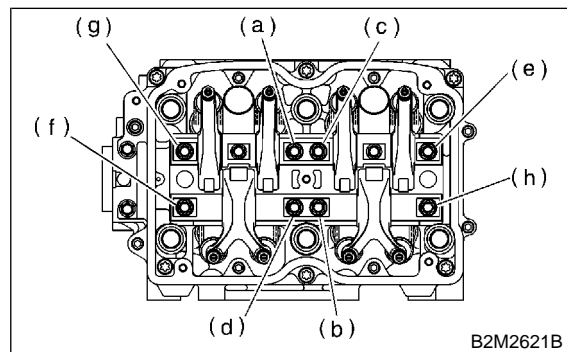
(3) Install valve rocker assembly.  
<Ref. to 2-3 [W4E0].>



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

**Tightening torque:**

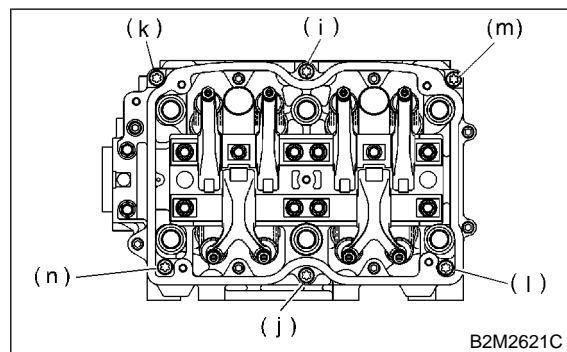
**25±2 N·m (2.5±0.2 kg·m, 18.1±1.4 ft·lb)**



(5) Tighten TORX bolts (i) through (n) in alphabetical sequence using ST.  
ST 499427000 TORX PLUS

**Tightening torque:**

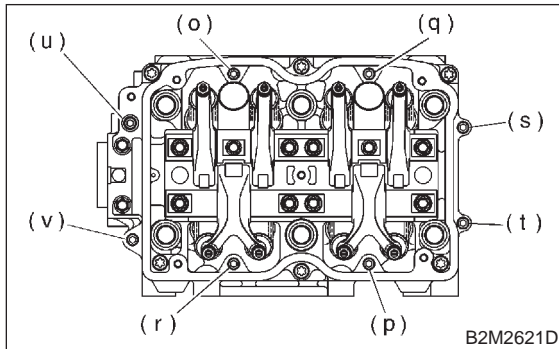
**18±2 N·m (1.8±0.2 kg·m, 13.0±1.4 ft·lb)**



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

**Tightening torque:**

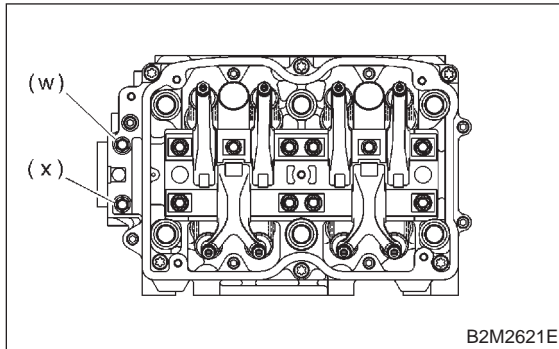
**$10 \pm 2$  N·m ( $1.0 \pm 0.2$  kg·m,  $7.2 \pm 1.4$  ft·lb)**



(7) Tighten bolts (w) and (x).

**Tightening torque:**

**$10 \pm 2$  N·m ( $1.0 \pm 0.2$  kg·m,  $7.2 \pm 1.4$  ft·lb)**



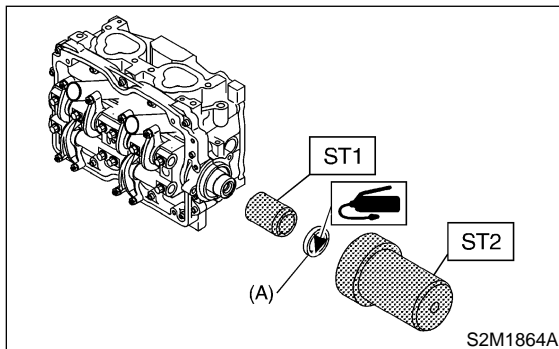
3) Apply a coat of grease to oil seal lips and install oil seal (A) on camshaft using ST1 and ST2.

**CAUTION:**

**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

**3. RELATED PARTS**

1) Adjust the valve clearance. <Ref. to 2-2 [W8B1].>

2) Install rocker cover and connect PCV hose.

3) Install timing belt. <Ref. to 2-3 [W3C0].>