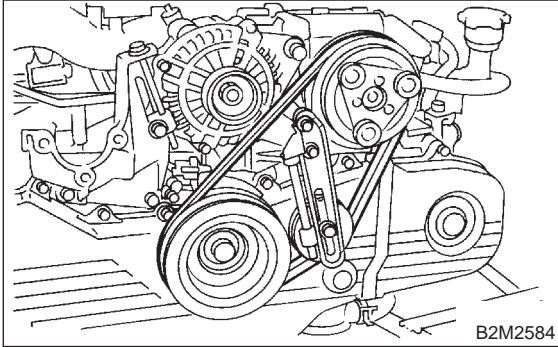


3. Timing Belt

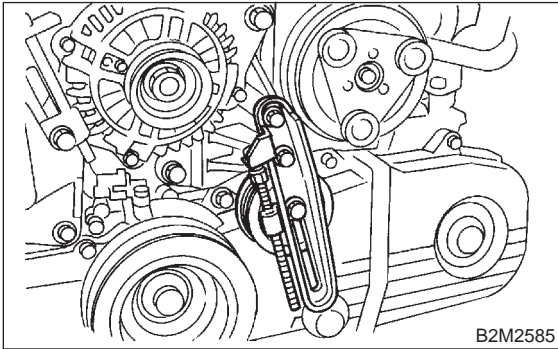
A: REMOVAL

1. CRANKSHAFT PULLEY AND BELT COVER

1) Remove A/C belt. (With A/C model)

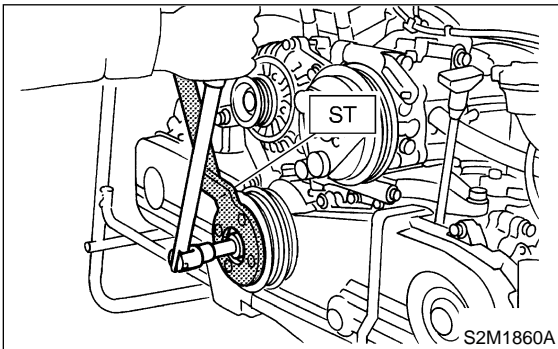


2) Remove A/C belt tensioner. (With A/C model)



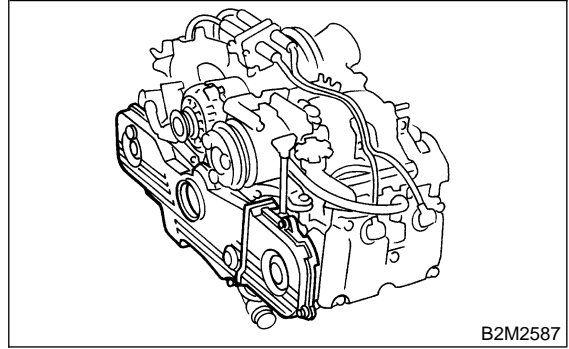
3) Remove crankshaft pulley bolt. To lock crankshaft, use ST.

ST 499977100 CRANKSHAFT PULLEY WRENCH



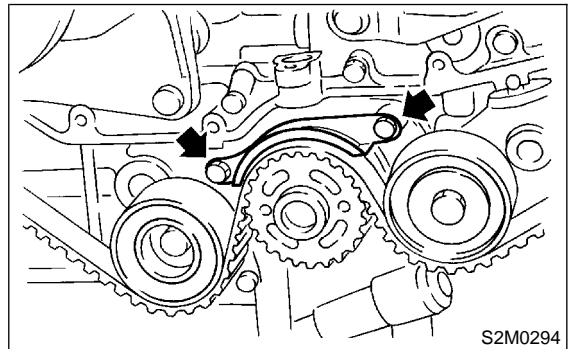
4) Remove crankshaft pulley.
5) Remove belt cover (LH).

6) Remove front belt cover.



2. TIMING BELT

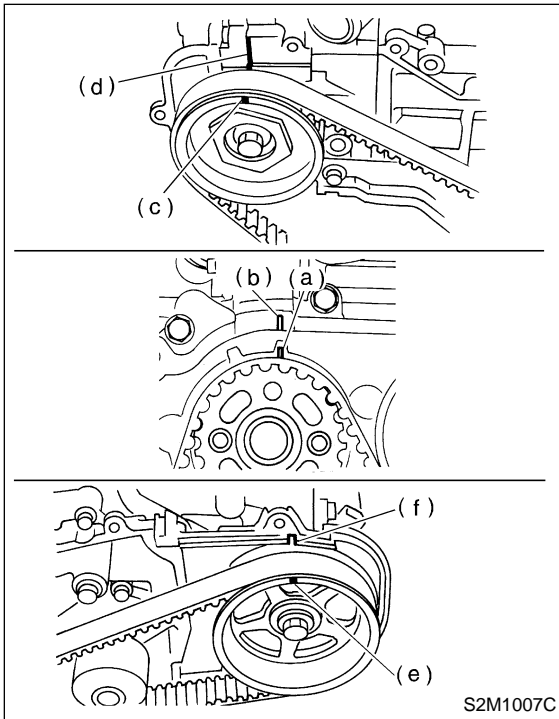
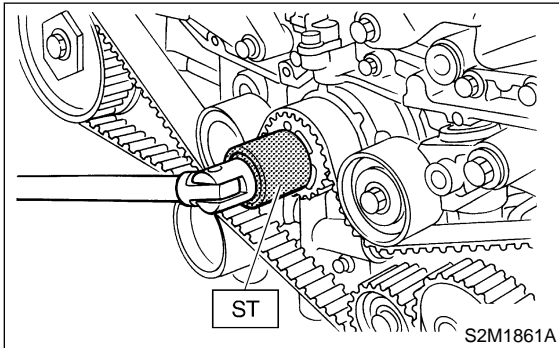
1) Remove timing belt guide. (MT vehicles only)



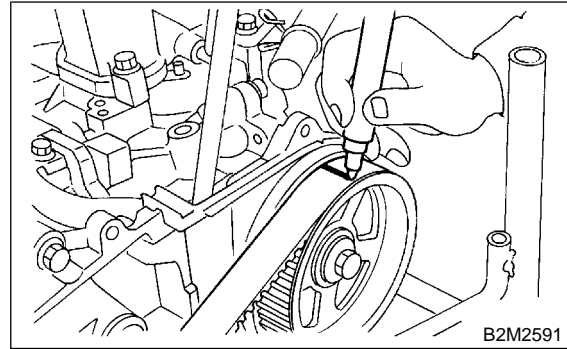
2) If alignment mark (a) and/or arrow mark (which indicates rotation direction) on timing belt fade away, put new marks before removing timing belt as shown in procedures below.

(1) Turn crankshaft using ST. Align mark (a) of sprocket to cylinder block notch (b) and ensure that right side cam sprocket mark (c), cam cap and cylinder head matching surface (d) and/or left side cam sprocket mark (e) and belt cover notch (f) are properly adjusted.

ST 499987500 CRANKSHAFT SOCKET



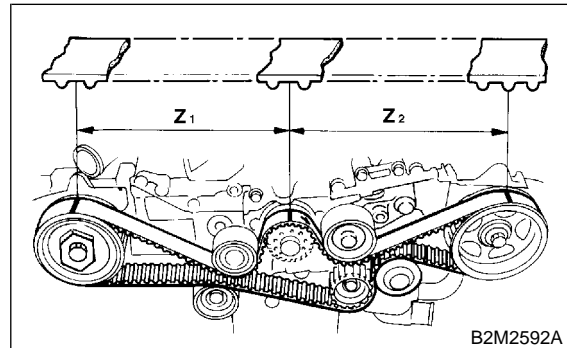
(2) Using white paint, put alignment and/or arrow marks on timing belts in relation to the crank sprocket and cam sprockets.



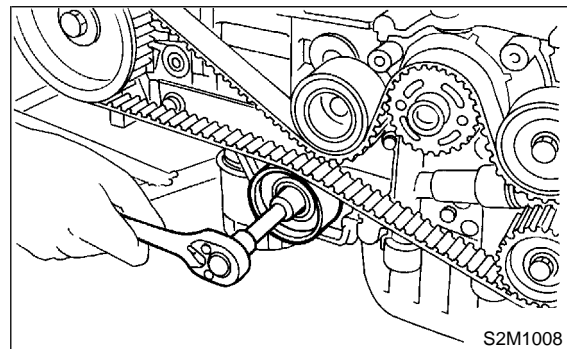
Specified data:

Z₁: 44 tooth length

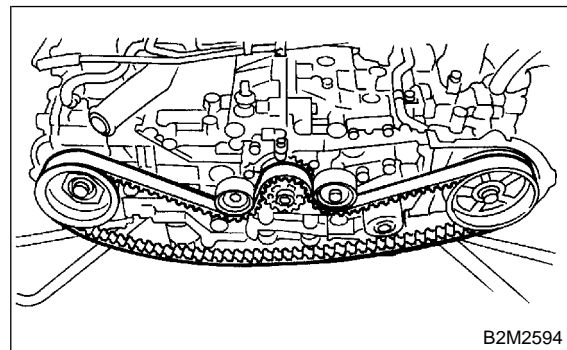
Z₂: 40.5 tooth



- 3) Remove belt idler (No. 2).
- 4) Remove belt idler No. 2.

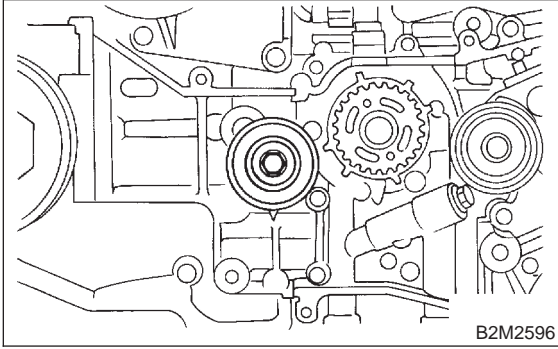


- 5) Remove timing belt.

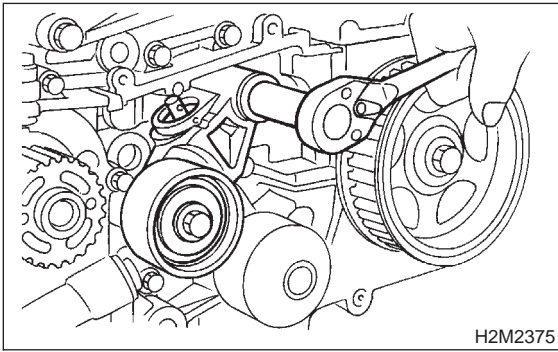


3. BELT IDLER AND AUTOMATIC BELT TENSION ADJUSTER ASSEMBLY

- 1) Remove belt idler (No. 1).

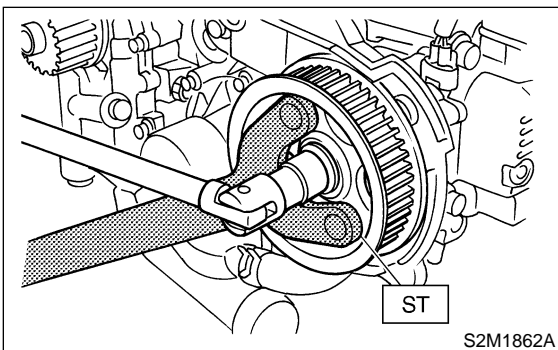


- 2) Remove automatic belt tension adjuster assembly.

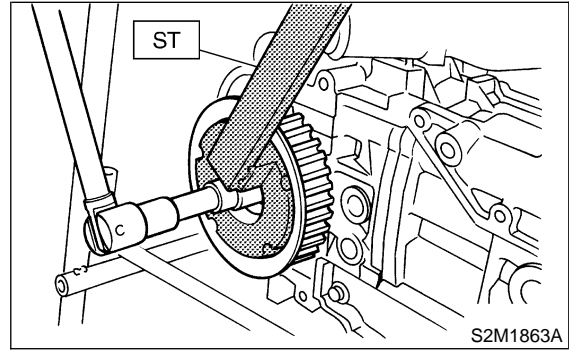


4. CAMSHAFT AND CRANKSHAFT SPROCKET

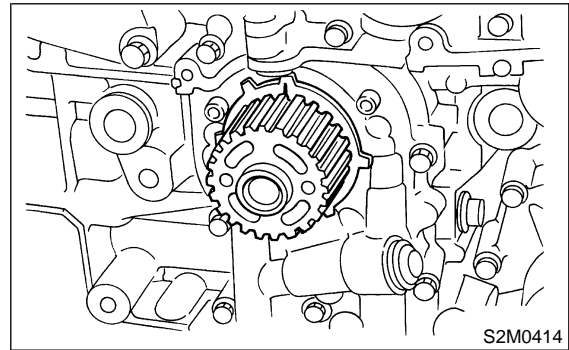
- 1) Remove camshaft position sensor.
- 2) Remove camshaft sprocket No. 2. To lock camshaft, use ST.
ST 499207100 CAMSHAFT SPROCKET WRENCH



- 3) Remove camshaft sprocket No. 1. To lock camshaft, using ST.
ST 499207400 CAMSHAFT SPROCKET WRENCH

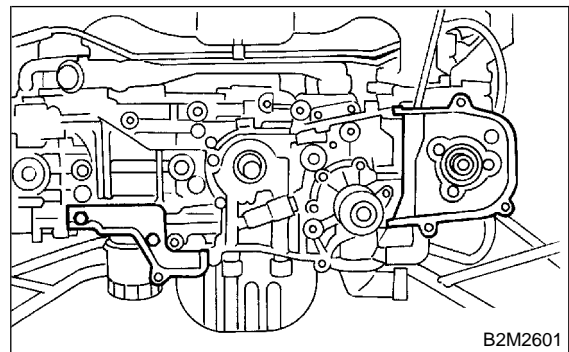


- 4) Remove crankshaft sprocket.

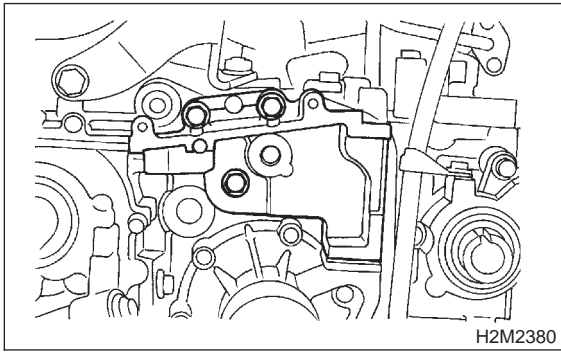


- 5) Remove belt cover No. 2 (LH).
- 6) Remove belt cover No. 2 (RH).

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



7) Remove tensioner bracket.



B: INSPECTION

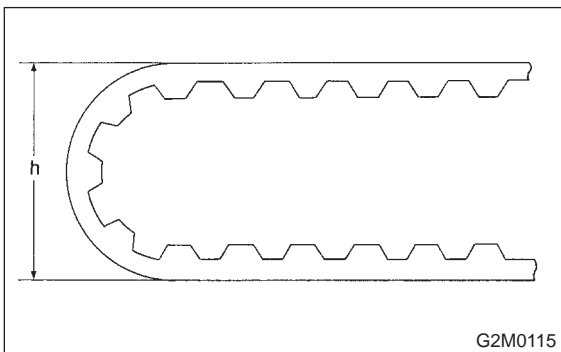
1. TIMING BELT

- 1) Check timing belt teeth for breaks, cracks, and wear. If any fault is found, replace belt.
- 2) Check the condition of back side of belt; if any crack is found, replace belt.

CAUTION:

- Be careful not to let oil, grease or coolant contact the belt. Remove quickly and thoroughly if this happens.
- Do not bend the belt sharply.

Bending radius h:
60 mm (2.36 in) or more



2. AUTOMATIC BELT TENSION ADJUSTER

- 1) Visually check oil seals for leaks, and rod ends for abnormal wear or scratches. If necessary, replace faulty parts.

CAUTION:

Slight traces of oil at rod's oil seal does not indicate a problem.

- 2) Check that the adjuster rod does not move when a pressure of 294 N (30 kg, 66 lb) is applied to it. This is to check adjuster rod stiffness.
- 3) If the adjuster rod is not stiff and moves freely when applying 294 N (30 kg, 66 lb), check it using the following procedures:

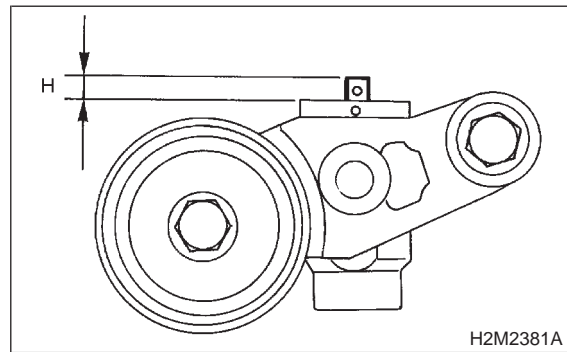
- (1) Slowly press the adjuster rod down to the end surface of the cylinder. Repeat this motion 2 or 3 times.
- (2) With the adjuster rod moved all the way up, apply a pressure of 294 N (30 kg, 66 lb) to it. Check adjuster rod stiffness.
- (3) If the adjuster rod is not stiff and moves down, replace the automatic belt tension adjuster assembly with a new one.

CAUTION:

- Always use a vertical type pressing tool to move the adjuster rod down.
- Do not use a lateral type vise.
- Push adjuster rod vertically.
- Press-in the push adjuster rod gradually taking more than three minutes.
- Do not allow press pressure to exceed 9,807 N (1,000 kg, 2,205 lb).
- Press the adjuster rod as far as the end surface of the cylinder. Do not press the adjuster rod into the cylinder. Doing so may damage the cylinder.

- 4) Measure the extension of rod beyond the body. If it is not within specifications, replace with a new one.

Rod extension H:
5.7±0.5 mm (0.224±0.020 in)



3. BELT TENSION PULLEY

- 1) Check mating surfaces of timing belt and contact point of adjuster rod for abnormal wear or scratches. Replace automatic belt tension adjuster assembly if faulty.
- 2) Check tension pulley for smooth rotation. Replace if noise or excessive play is noted.
- 3) Check tension pulley for grease leakage.

4. BELT IDLER

- 1) Check belt idler for smooth rotation. Replace if noise or excessive play is noted.
- 2) Check belt outer contacting surfaces of idler pulley for abnormal wear and scratches.
- 3) Check belt idler for grease leakage.

5. CAMSHAFT AND CRANKSHAFT SPROCKET

- 1) Check sprocket teeth for abnormal wear and scratches.
- 2) Make sure there is no free play between sprocket and key.
- 3) Check crankshaft sprocket notch for sensor for damage and contamination of foreign matter.

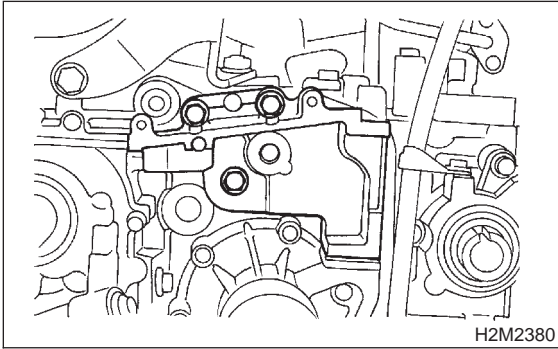
C: INSTALLATION

1. CAMSHAFT AND CRANKSHAFT SPROCKET

- 1) Install tensioner bracket.

Tightening torque:

$25 \pm 3 \text{ N}\cdot\text{m}$ ($2.5 \pm 0.3 \text{ kg}\cdot\text{m}$, $18.1 \pm 2.2 \text{ ft}\cdot\text{lb}$)



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

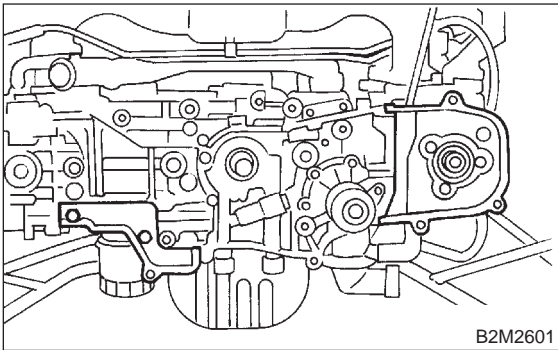
Tightening torque:

$5 \pm 1 \text{ N}\cdot\text{m}$ ($0.5 \pm 0.1 \text{ kg}\cdot\text{m}$, $3.6 \pm 0.7 \text{ ft}\cdot\text{lb}$)

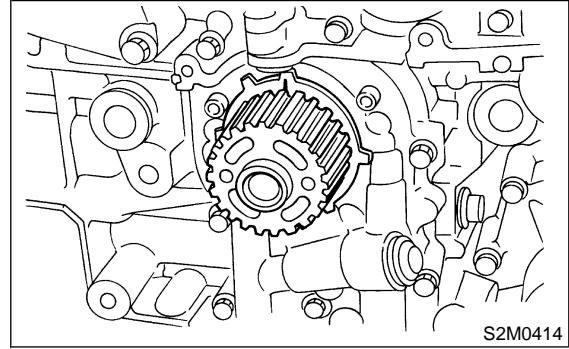
- 3) Install belt cover No. 2 (LH).

Tightening torque:

$5 \pm 1 \text{ N}\cdot\text{m}$ ($0.5 \pm 0.1 \text{ kg}\cdot\text{m}$, $3.6 \pm 0.7 \text{ ft}\cdot\text{lb}$)



- 4) Install crankshaft sprocket.



- 5) Install camshaft sprocket No. 1. To lock camshaft, use ST.

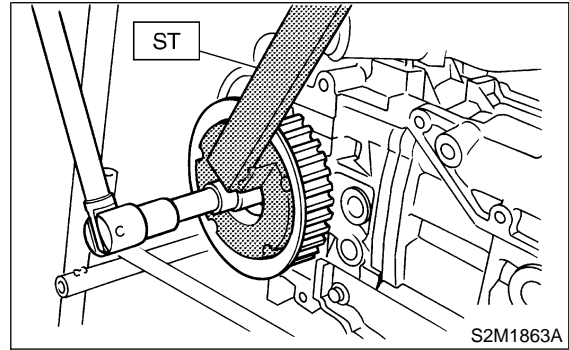
ST 499207400 CAMSHAFT SPROCKET WRENCH

Tightening torque:

$78 \pm 5 \text{ N}\cdot\text{m}$ ($8.0 \pm 0.5 \text{ kg}\cdot\text{m}$, $57.9 \pm 3.6 \text{ ft}\cdot\text{lb}$)

CAUTION:

Do not confuse left and right side camshaft sprockets during installation.



6) Install camshaft sprocket No. 2. To lock camshaft, use ST.

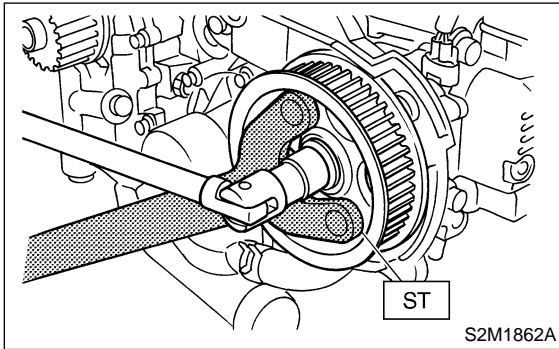
ST 499207100 CAMSHAFT SPROCKET WRENCH

Tightening torque:

$78 \pm 5 \text{ N}\cdot\text{m}$ ($8.0 \pm 0.5 \text{ kg}\cdot\text{m}$, $57.9 \pm 3.6 \text{ ft}\cdot\text{lb}$)

CAUTION:

Do not confuse left and right side camshaft sprockets during installation. The camshaft sprocket No. 2 is identified by a projection used to monitor camshaft position sensor.



7) Install camshaft position sensor.

2. AUTOMATIC BELT TENSION ADJUSTER ASSEMBLY AND BELT IDLER

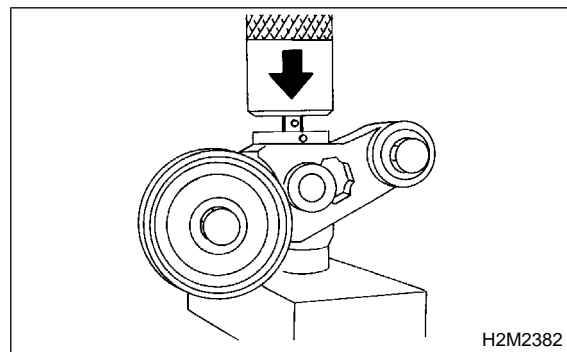
1) Preparation for installation of automatic belt tension adjuster assembly;

CAUTION:

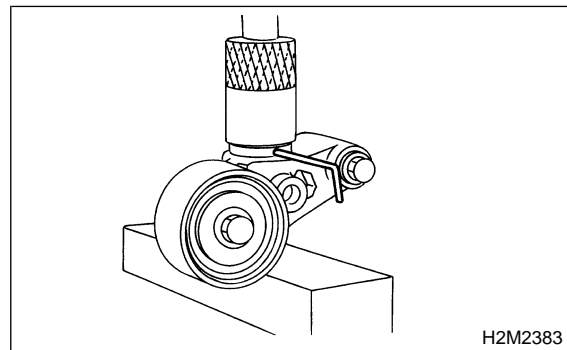
- Always use a vertical type pressing tool to move the adjuster rod down.
- Do not use a lateral type vise.
- Push adjuster rod vertically.
- Be sure to slowly move the adjuster rod down applying a pressure of 294 N (30 kg, 66 lb).
- Press-in the push adjuster rod gradually taking more than three minutes.
- Do not allow press pressure to exceed 9,807 N (1,000 kg, 2,205 lb).
- Press the adjuster rod as far as the end surface of the cylinder. Do not press the adjuster rod into the cylinder. Doing so may damage the cylinder.
- Do not release press pressure until stopper pin is completely inserted.

(1) Attach the automatic belt tension adjuster assembly to the vertical pressing tool.

(2) Slowly move the adjuster rod down with a pressure of 294 N (30 kg, 66 lb) until the adjuster rod is aligned with the stopper pin hole in the cylinder.



(3) With a 2 mm (0.08 in) dia. stopper pin or a 2 mm (0.08 in) (nominal) dia. hex bar wrench inserted into the stopper pin hole in the cylinder, secure the adjuster rod.

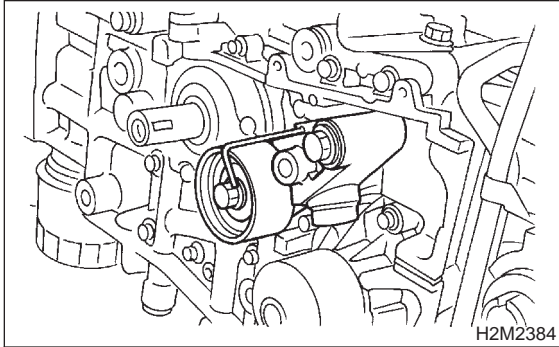


3. Timing Belt

2) Install automatic belt tension adjuster assembly.

Tightening torque:

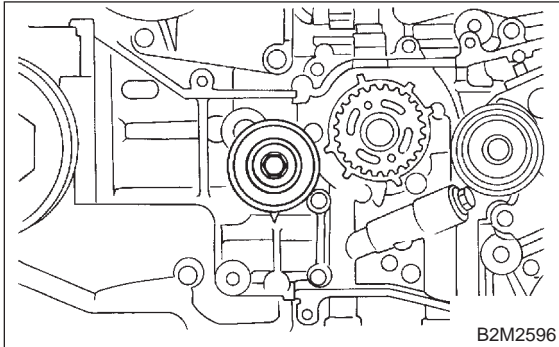
39±4 N·m (4.0±0.4 kg·m, 28.9±2.9 ft·lb)



3) Install belt idler (No. 1).

Tightening torque:

39±4 N·m (4.0±0.4 kg·m, 28.9±2.9 ft·lb)

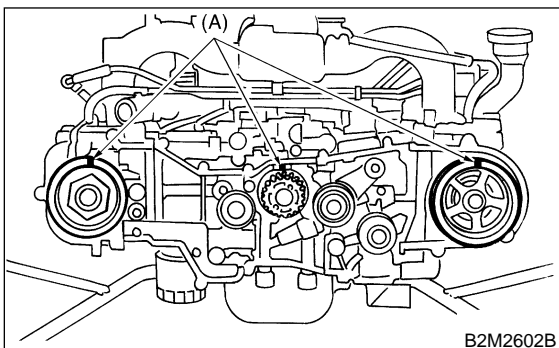


3. TIMING BELT

1) Installation of timing belt

(1) Turn camshaft sprocket No. 2 using ST1, and turn camshaft sprocket No. 1 using ST2 so that their alignment marks (A) come to top positions.

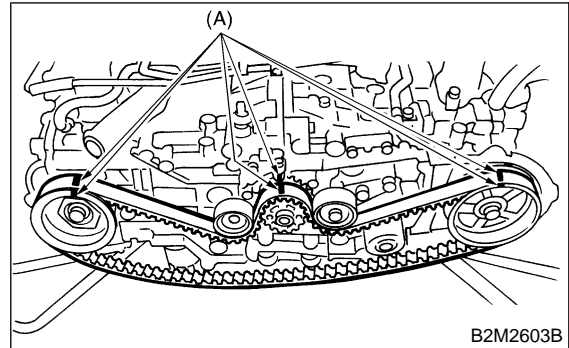
- ST1 499207100 CAMSHAFT SPROCKET WRENCH
- ST2 499207400 CAMSHAFT SPROCKET WRENCH



(2) While aligning alignment mark (A) on timing belt with marks on sprockets, position timing belt properly.

CAUTION:

Ensure belt's rotating direction is correct.



2) Install belt idler No. 2.

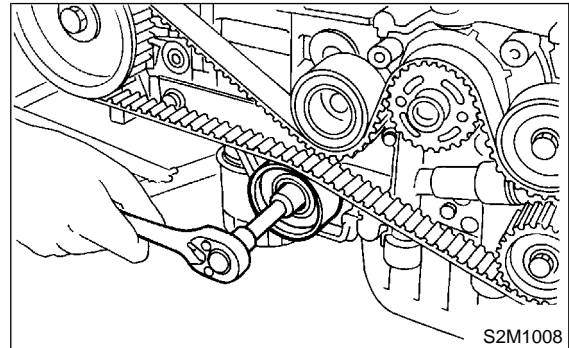
Tightening torque:

39±4 N·m (4.0±0.4 kg·m, 28.9±2.9 ft·lb)

3) Install belt idler (No. 2).

Tightening torque:

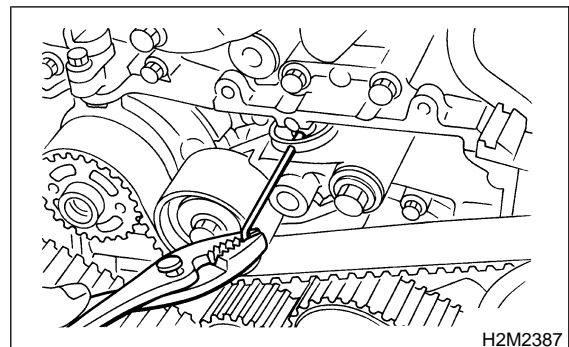
39±4 N·m (4.0±0.4 kg·m, 28.9±2.9 ft·lb)



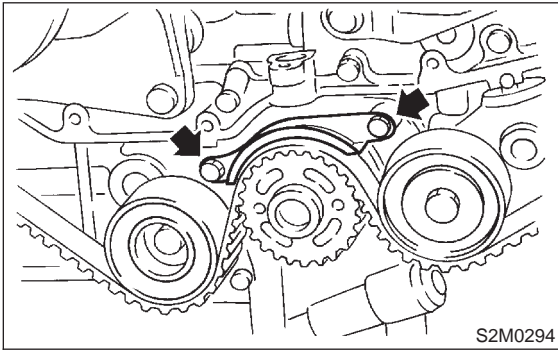
4) After ensuring that the marks on timing belt and camshaft sprockets are aligned, remove stopper pin from belt tensioner adjuster.

CAUTION:

After properly installing timing belt, remove rocker cover and ensure that the valve lash adjuster contains no air.



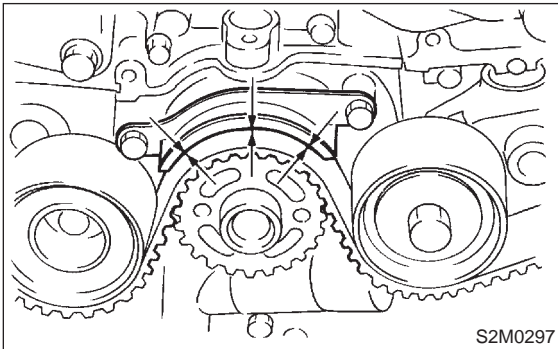
- 5) Install timing belt guide. (MT vehicles only)
(1) Temporarily tighten remaining bolts.



- (2) Check and adjust clearance between timing belt and timing belt guide by using thickness gauge.

Clearance:

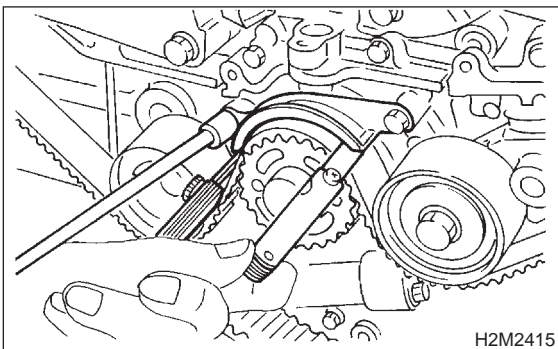
$1.0 \pm 0.5 \text{ mm}$ ($0.039 \pm 0.020 \text{ in}$)



- (3) Tighten remaining bolts.

Tightening torque:

$9.8 \pm 1.0 \text{ N-m}$ ($1.0 \pm 0.1 \text{ kg-m}$, $7.2 \pm 0.7 \text{ ft-lb}$)



4. CRANKSHAFT PULLEY AND BELT COVER

- 1) Install front belt cover.

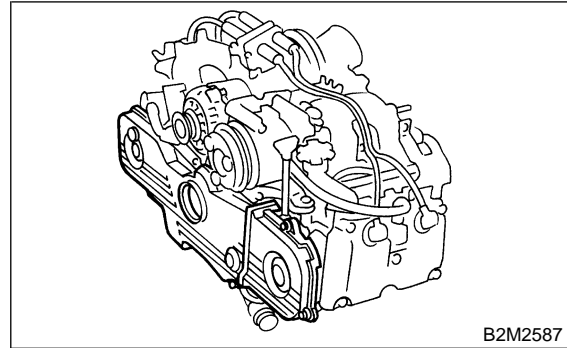
Tightening torque:

$5 \pm 1 \text{ N-m}$ ($0.5 \pm 0.1 \text{ kg-m}$, $3.6 \pm 0.7 \text{ ft-lb}$)

- 2) Install belt cover (LH).

Tightening torque:

$5 \pm 1 \text{ N-m}$ ($0.5 \pm 0.1 \text{ kg-m}$, $3.6 \pm 0.7 \text{ ft-lb}$)



- 3) Install crankshaft pulley.

- 4) Install pulley bolt.

To lock crankshaft, use ST.

ST 499977100 CRANKSHAFT PULLEY WRENCH

- (1) Clean the crankshaft pulley thread using an air gun.

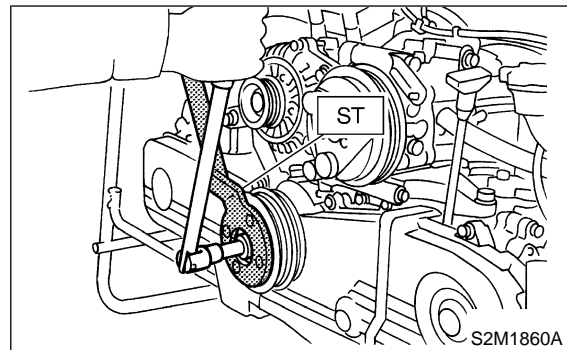
- (2) Apply engine oil to the crankshaft pulley bolt seat and thread.

- (3) Tighten the bolts temporarily with tightening torque of 44 N-m (4.5 kg-m, 33 ft-lb).

- (4) Tighten the crankshaft pulley bolts.

Tightening torque:

$177 \pm 5 \text{ N-m}$ ($18.0 \pm 0.5 \text{ kg-m}$, $130.2 \pm 3.6 \text{ ft-lb}$)



- 5) Confirm that the tightening angle of the crankshaft pulley bolt is 65 degrees or more. If not, conduct the following procedures (1) through (4).

CAUTION:

If the tightening angle of crankshaft pulley bolt is less than 45 degrees, the bolt should be damaged. In this case, the bolt must be replaced.

4. Valve Rocker Assembly

- (1) Replace the crankshaft pulley bolts and clean them.

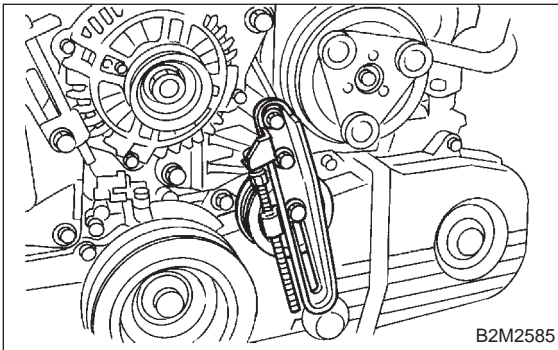
Crankshaft pulley bolt:
12369AA011

- (2) Clean the crankshaft thread using an air gun.
- (3) Tighten the bolts temporarily with tightening torque of 44 N·m (4.5 kg-m, 33 ft-lb).
- (4) Tighten the crankshaft pulley bolts keeping them in an angle between 65 degrees and 75 degrees.

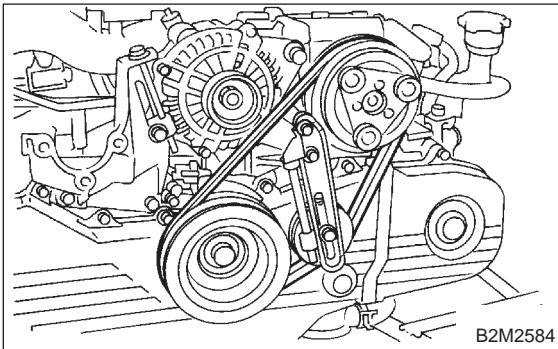
CAUTION:

Conduct the tightening procedures by confirming the turning angle of the crankshaft pulley bolt referring to the gauge indicated on the belt cover.

- (6) Install A/C belt tensioner. (With A/C model)



- (7) Install A/C belt. (With A/C model)



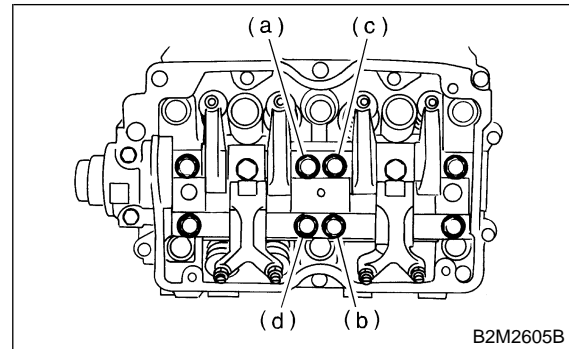
4. Valve Rocker Assembly

A: REMOVAL

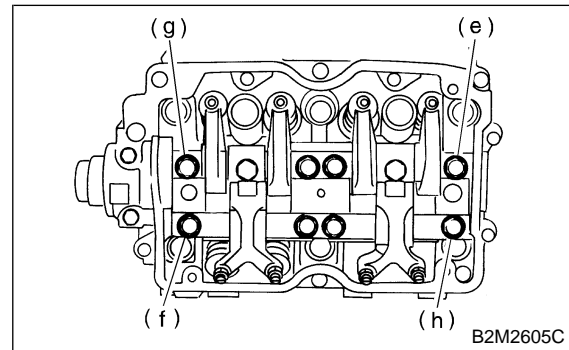
- 1) Disconnect PCV hose and remove rocker cover.
- 2) Loosen bolt which secures rocker shaft support.
- 3) Removal of valve rocker assembly
 - (1) Remove bolts (a) through (d) in alphabetical sequence.

CAUTION:

Leave two or three threads of bolt (a) engaged to retain valve rocker assembly.



- (2) Equally loosen bolts (e) through (h) all the way, being careful that knock pin is not gouged.



- (3) Remove valve rocker assembly.

