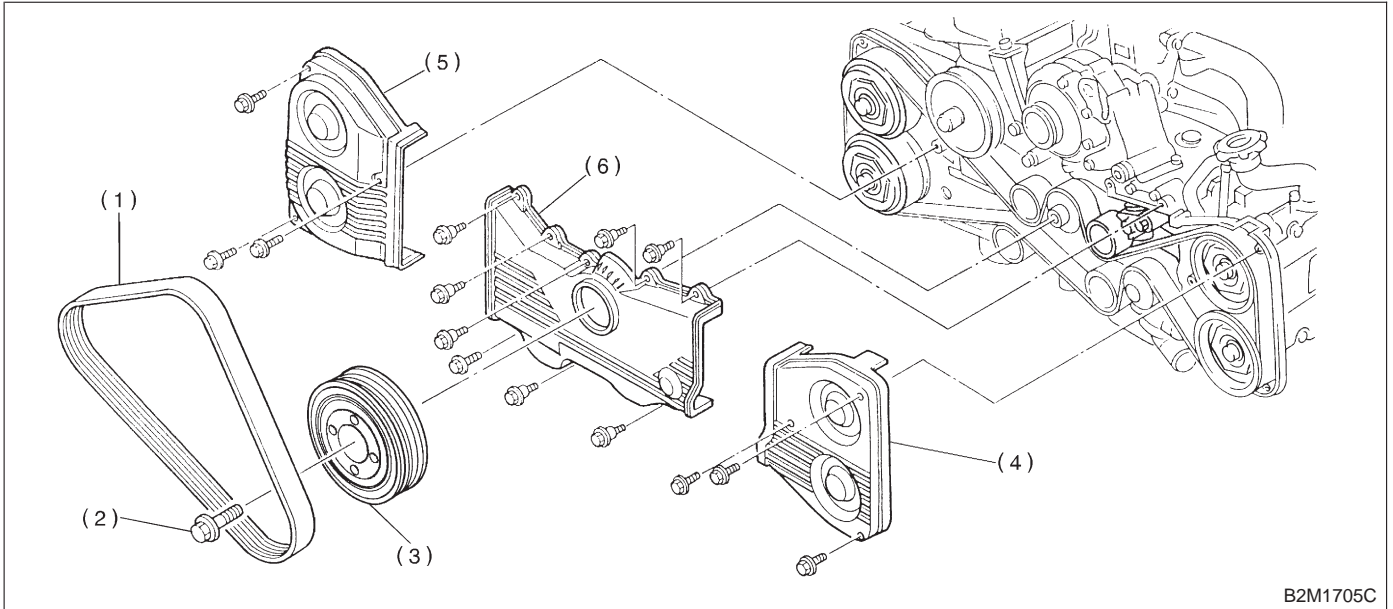


2. Timing Belt

A: REMOVAL

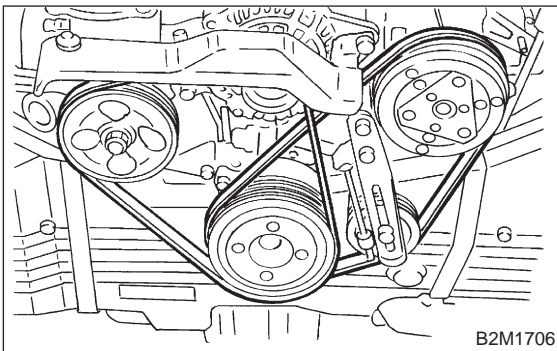
1. CRANKSHAFT PULLEY AND BELT COVER



B2M1705C

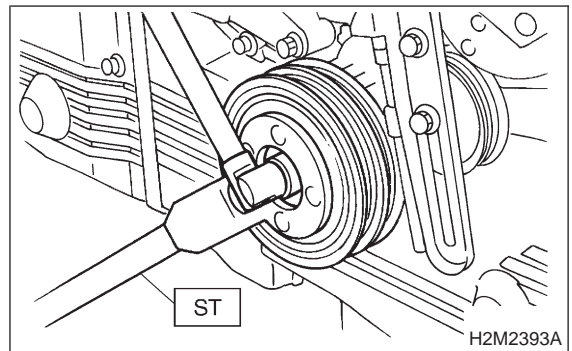
- | | | |
|----------------------------|--------------------------------|---------------------------------|
| (1) V-belt | (3) Crankshaft pulley | (5) Right-hand belt cover No. 1 |
| (2) Crankshaft pulley bolt | (4) Left-hand belt cover No. 1 | (6) Front belt cover |

1) Remove V-belt cover, V-belt and air conditioning compressor drive belt tensioner. <Ref. to 1-5 [G2B0].>



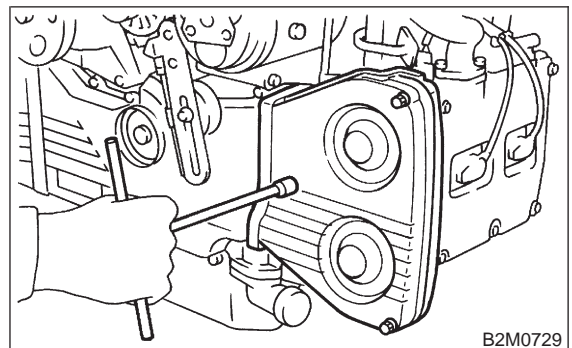
B2M1706

2) Remove pulley bolt. To lock crankshaft, use ST. ST 499977100 CRANKSHAFT PULLEY WRENCH



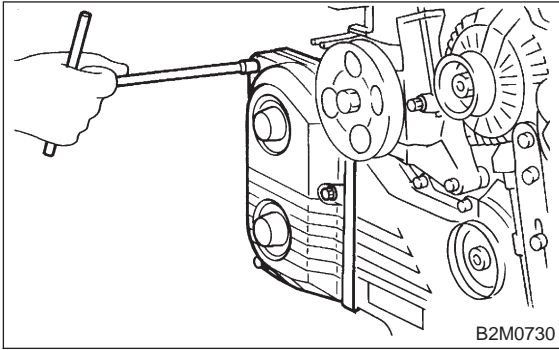
H2M2393A

- 3) Remove crankshaft pulley.
4) Remove left-hand belt cover.

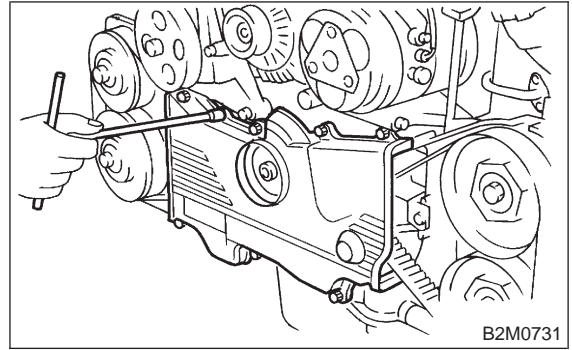


B2M0729

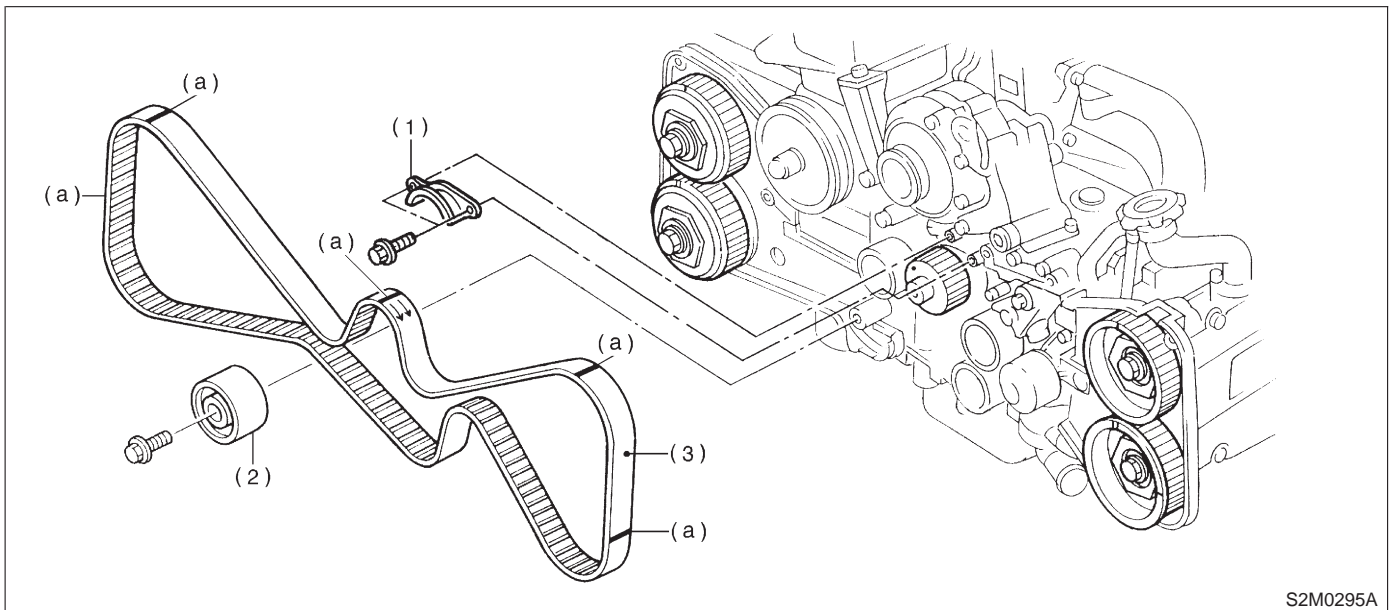
5) Remove right-hand belt cover.



6) Remove front belt cover.



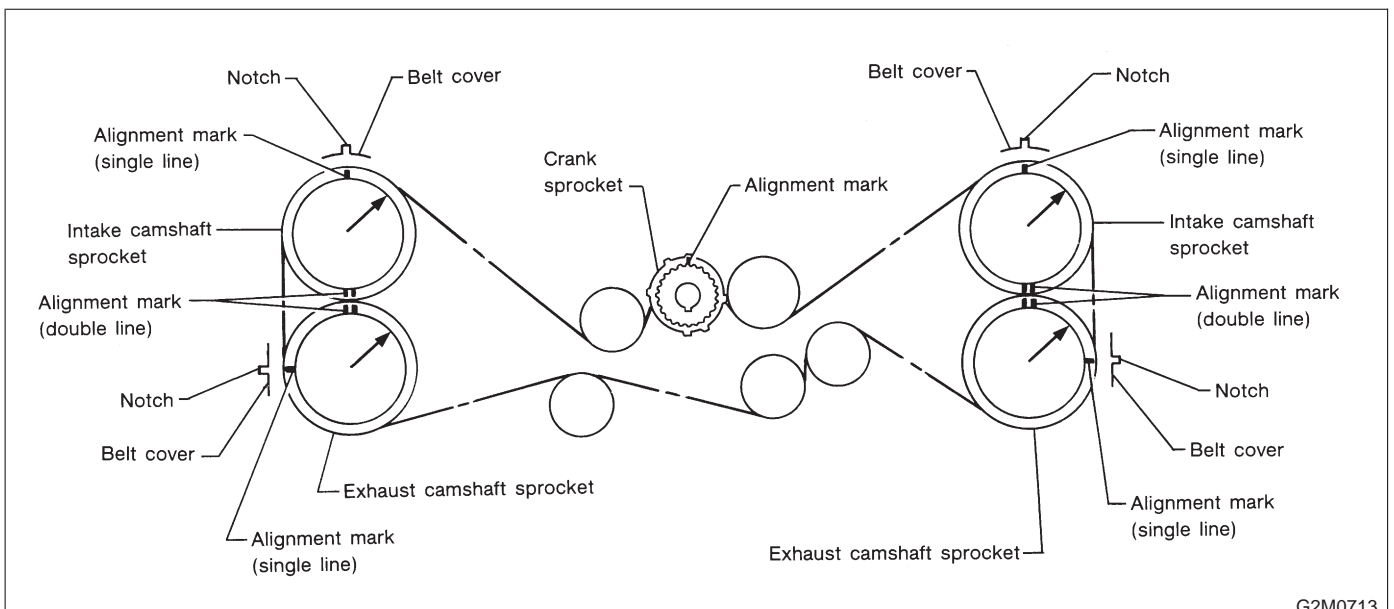
2. TIMING BELT



(1) Timing belt guide (MT vehicles only)

(2) Belt idler
(3) Timing belt

(a) Alignment marks



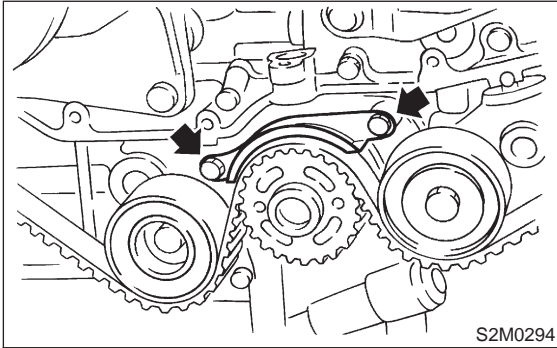
G2M0713

2-3b [W2A2]

2. Timing Belt

SERVICE PROCEDURE

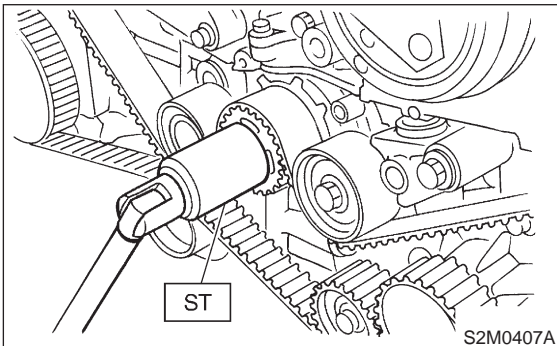
- 1) Remove timing belt guide. (MT vehicles only)



- 2) If alignment mark and/or arrow mark (which indicates rotation direction) on timing belt fade away, put new marks before removing timing belt as follows:

- (1) Turn crankshaft using ST, and align alignment marks on crankshaft sprocket, left-hand intake camshaft sprocket, left-hand exhaust camshaft sprocket, right-hand intake camshaft sprocket and right hand exhaust camshaft sprocket with notches of belt cover and cylinder block.

ST 499987500 CRANKSHAFT SOCKET

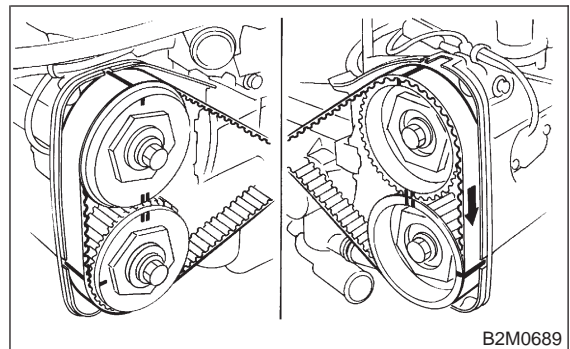
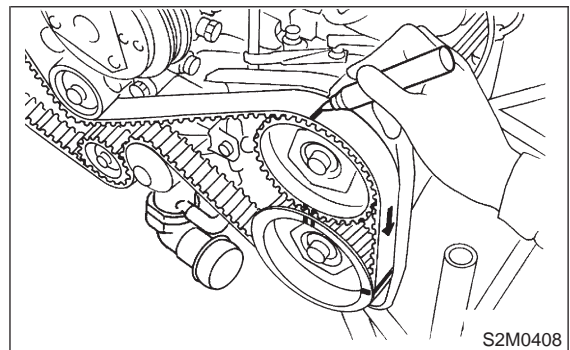
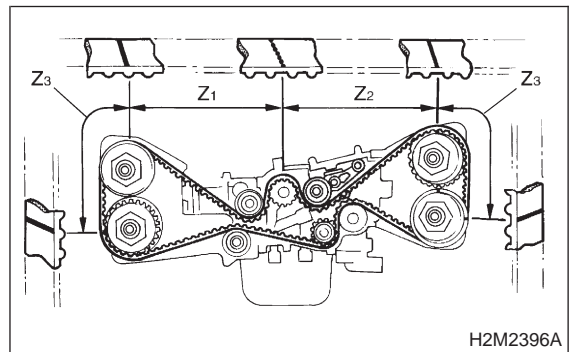


- (2) Using white paint, put alignment and/or arrow marks on timing belts in relation to the sprockets.

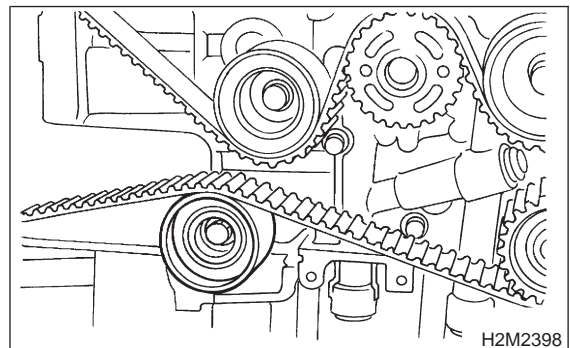
Z_1 : 54.5 tooth length

Z_2 : 51 tooth length

Z_3 : 28 tooth length



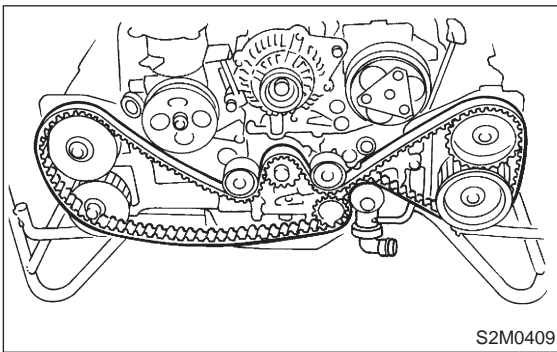
- 3) Remove belt idler.



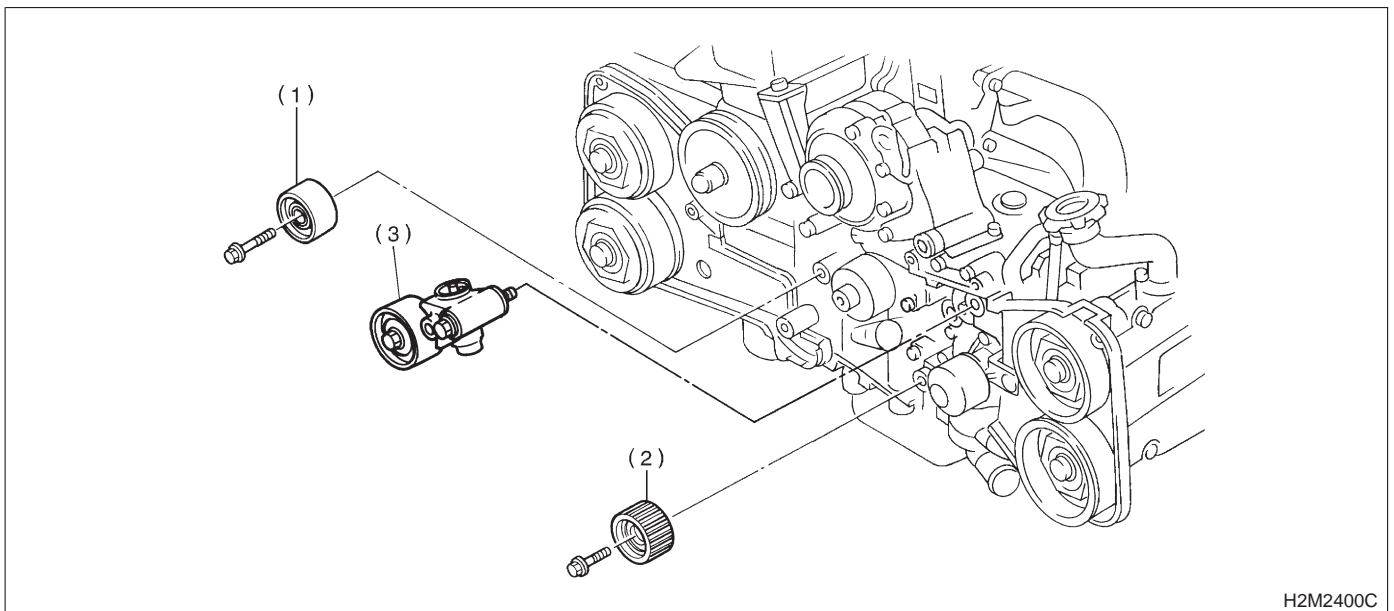
4) Remove timing belt.

CAUTION:

After timing belt has been removed, never rotate intake and exhaust, camshaft sprocket. If camshaft sprocket is rotated, the intake and exhaust valve heads strike together and valve stems are bent.

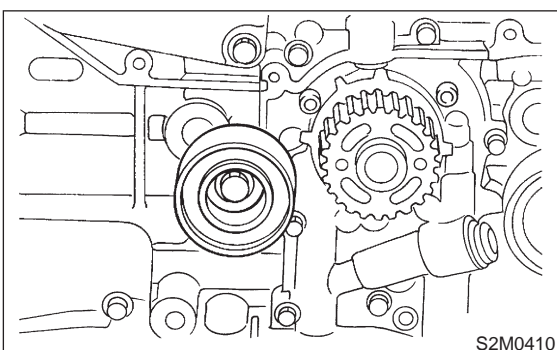


3. BELT IDLER AND AUTOMATIC BELT TENSION ADJUSTER ASSEMBLY

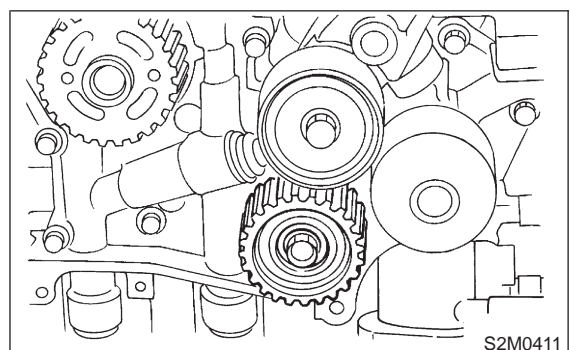


- (1) Belt idler
- (2) Belt idler No. 2
- (3) Automatic belt tension adjuster ASSY

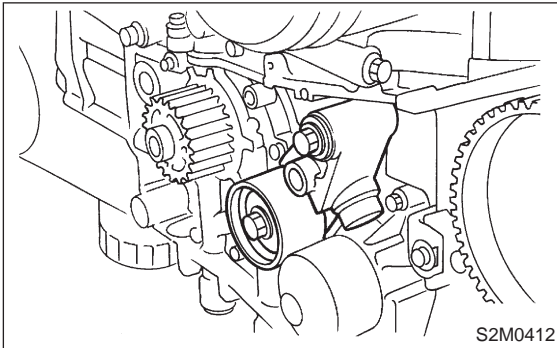
1) Remove belt idler.



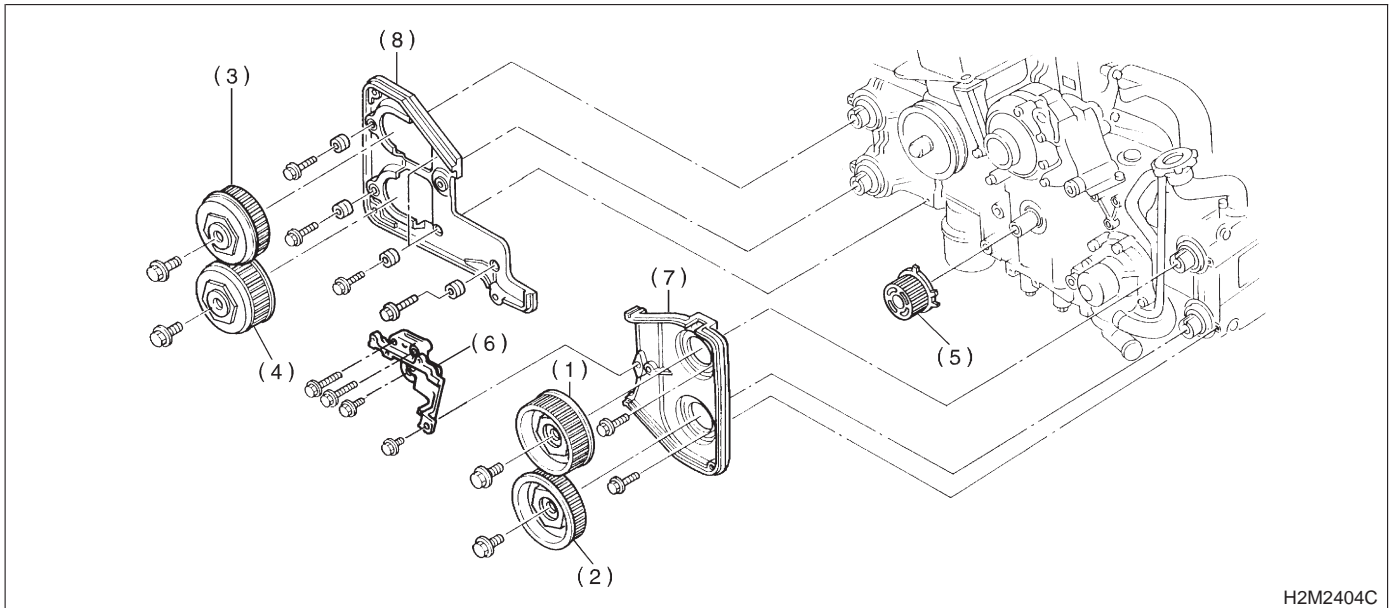
2) Remove belt idler No. 2.



3) Remove automatic belt tension adjuster assembly.



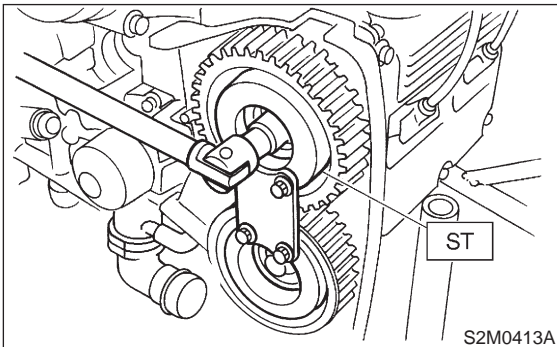
4. SPROCKET



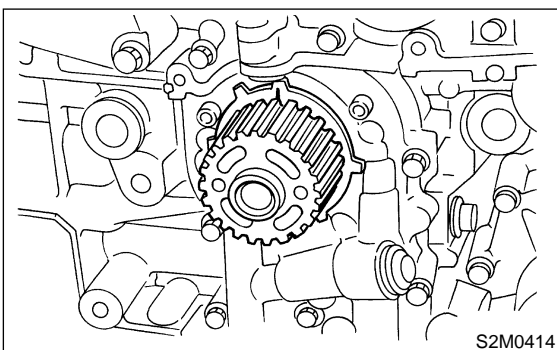
- | | | |
|---|--|---------------------------------|
| (1) Left-hand intake camshaft sprocket | (3) Right-hand intake camshaft sprocket | (5) Crankshaft sprocket |
| (2) Left-hand exhaust camshaft sprocket | (4) Right-hand exhaust camshaft sprocket | (6) Tensioner bracket |
| | | (7) Left-hand belt cover No. 2 |
| | | (8) Right-hand belt cover No. 2 |

- 1) Remove left-hand intake camshaft sprocket.
- 2) Remove left-hand exhaust camshaft sprocket.
- 3) Remove right-hand intake camshaft sprocket.
- 4) Remove right-hand exhaust camshaft sprocket.

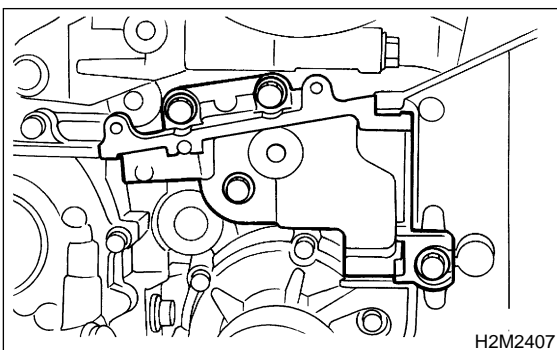
ST 499207300 CAMSHAFT SPROCKET
WRENCH



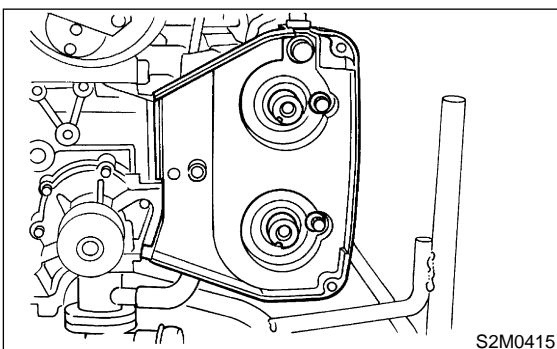
- 5) Remove crankshaft sprocket.



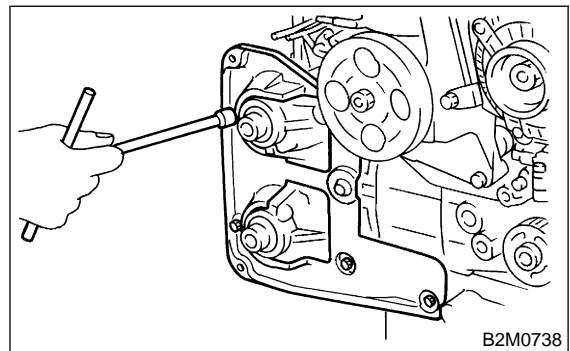
- 6) Remove tensioner bracket.



- 7) Remove left-hand belt cover No. 2.



- 8) Remove right-hand belt cover No. 2.



B: INSPECTION

1. TIMING BELT

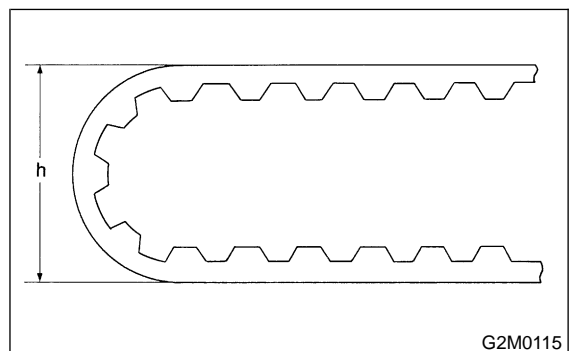
- 1) Check timing belt teeth for breaks, cracks and wear. If any fault is found, replace belt.
- 2) Check the condition of back side of belt; if any crack is found, replace belt.

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 automatic belt tension adjuster assembly.

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.

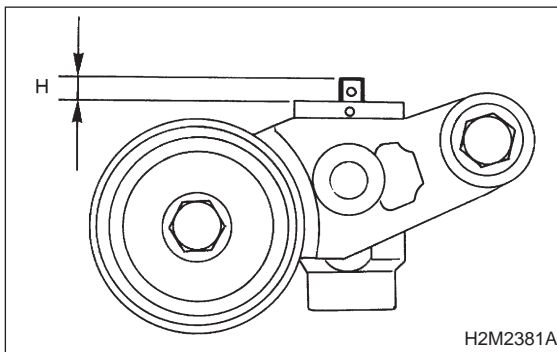
CAUTION:

- 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

$5.7 \pm 0.5 \text{ mm (} 0.224 \pm 0.020 \text{ in)}$

**3. BELT TENSION PULLEY**

1) Check mating surfaces of timing belt and contact point of adjuster rod for abnormal wear or scratches. Replace belt tension pulley if faulty.

2) Check belt tension pulley for smooth rotation. Replace if noise or excessive play is noted.

3) Check belt tension pulley for grease leakage.

4. BELT IDLER

1) Check idler for smooth rotation. Replace if noise or excessive play is noted.

2) Check outer contacting surfaces of idler pulley for abnormal wear and scratches.

3) Check idler for grease leakage.

5. SPROCKET

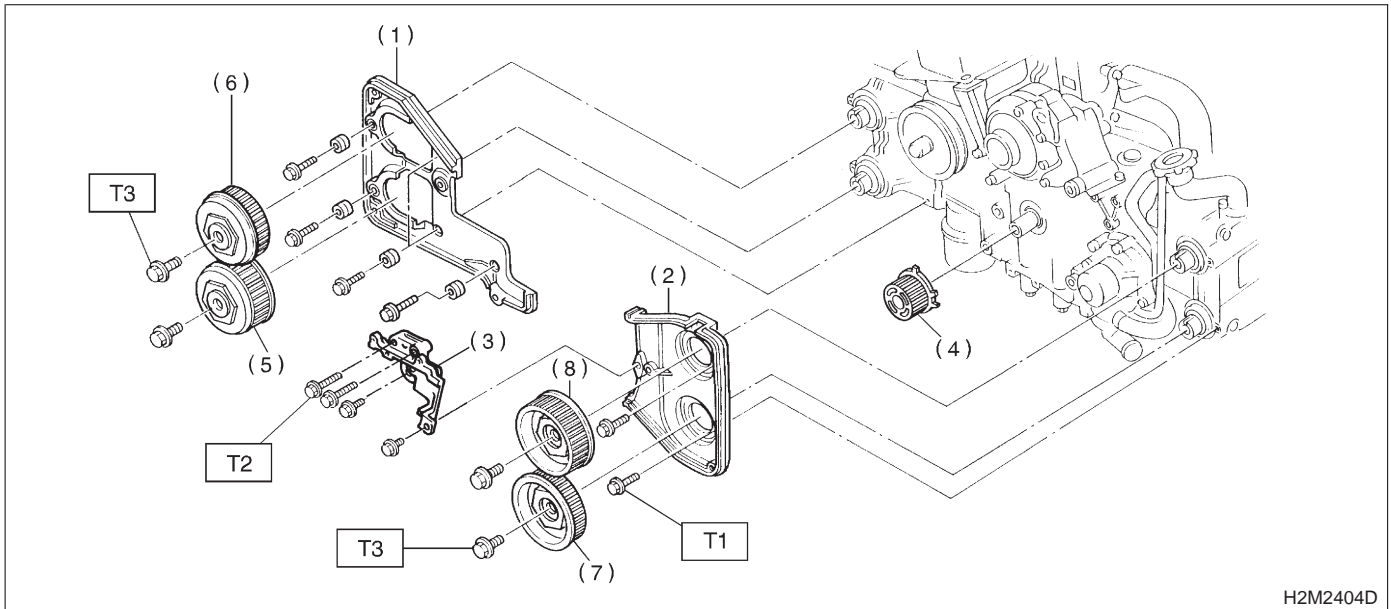
1) Check sprocket teeth for abnormal wear and scratches.

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. SPROCKET



- | | |
|--|---|
| (1) Right-hand belt cover No. 2 | (6) Right-hand intake camshaft sprocket |
| (2) Left-hand belt cover No. 2 | (7) Left-hand exhaust camshaft sprocket |
| (3) Tensioner bracket | (8) Left-hand intake camshaft sprocket |
| (4) Crankshaft sprocket | |
| (5) Right-hand exhaust camshaft sprocket | |

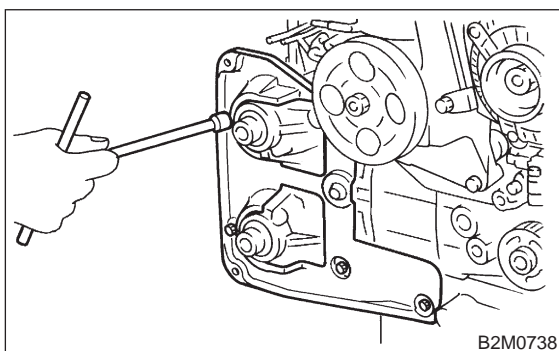
Tightening torque: N·m (kg·m, ft·lb)

T1: 4.9±0.5 (0.5±0.05, 3.6±0.4)

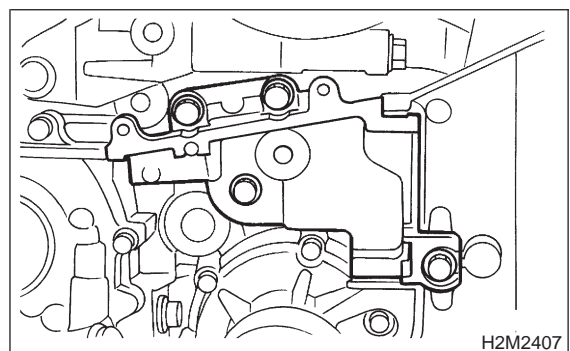
T2: 25±3 (2.5±0.2, 18.1±2.2)

T3: 78±5 (8.0±0.5, 57.9±3.6)

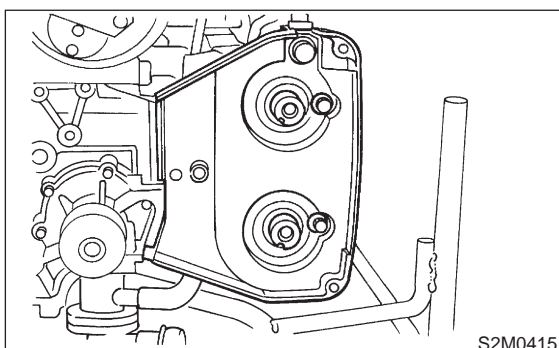
1) Install right-hand belt cover No. 2.



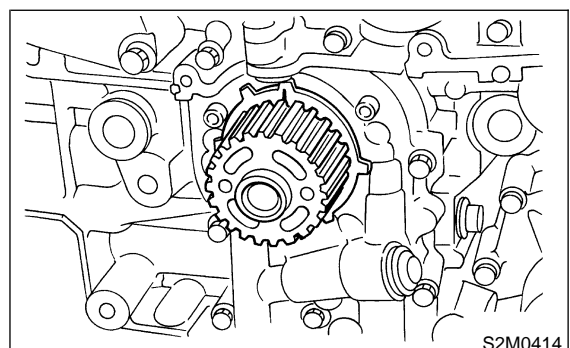
3) Install tensioner bracket.



2) Install left-hand belt cover No. 2.



4) Install crankshaft sprocket.



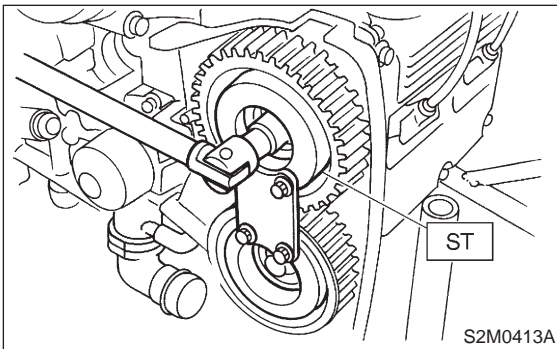
2-3b [W2C2]

2. Timing Belt

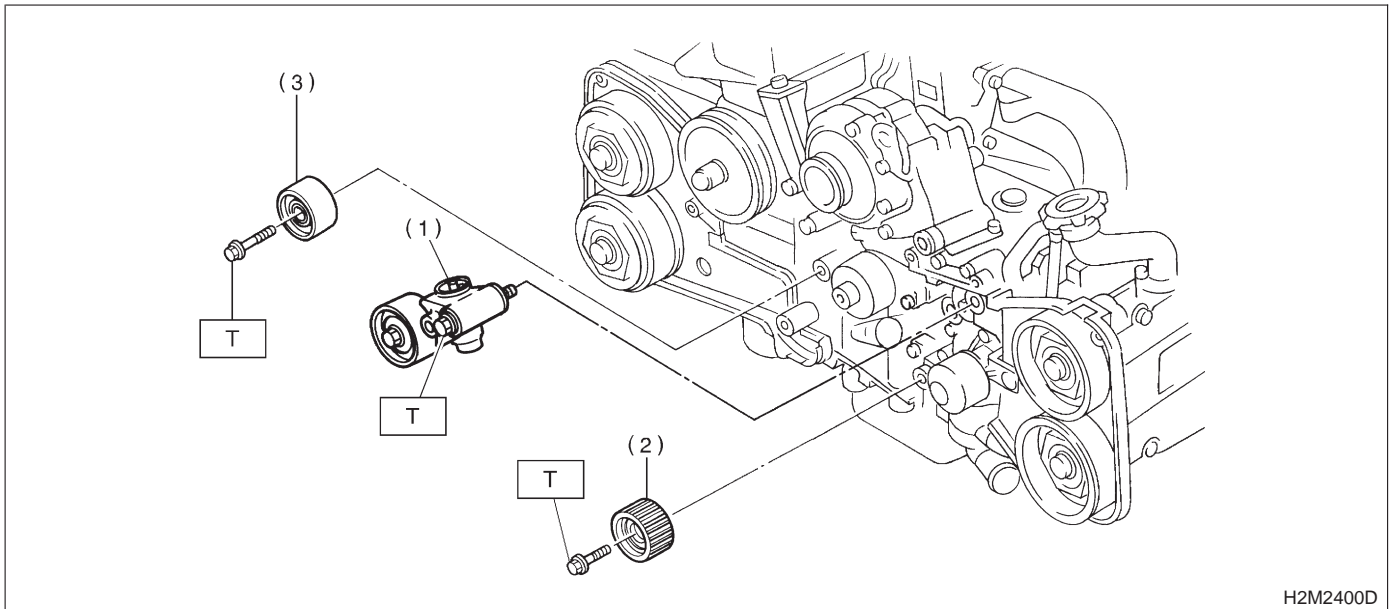
SERVICE PROCEDURE

- 5) Install right-hand exhaust camshaft sprocket. To lock camshaft, use ST.
- 6) Install right-hand intake camshaft sprocket using ST.
- 7) Install left-hand exhaust camshaft sprocket using ST.
- 8) Install left-hand intake camshaft sprocket using ST.

ST 499207300 CAMSHAFT SPROCKET
WRENCH



2. AUTOMATIC BELT TENSION ADJUSTER ASSEMBLY AND BELT IDLER



- | | |
|---|----------------|
| (1) Automatic belt tension adjuster
ASSY | (3) Belt idler |
| (2) Belt idler No. 2 | |

Tightening torque: N·m (kg·m, ft·lb)
T1: 39±4 (4.0±0.4, 28.9±2.9)

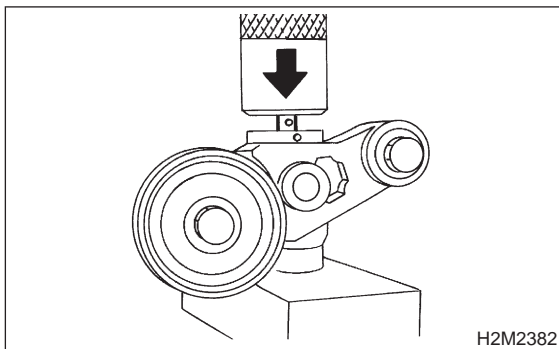
1) Preparation for installation of automatic belt tension adjuster assembly:

CAUTION:

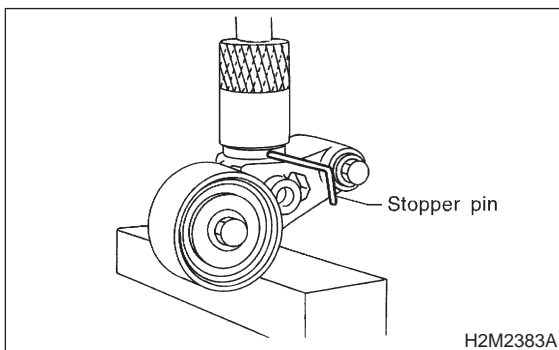
- Always use a vertical type pressing tool to move the adjuster rod down.
- Do not use a lateral type vise.
- Push adjuster rod vertically.
- Be sure to slowly move the adjuster rod down applying a pressure of 294 N (30 kg, 66 lb).
- Press-in the push adjuster rod gradually taking more than three minutes.
- 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.

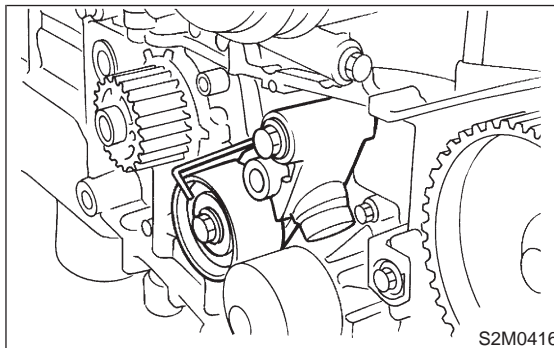
(2) Slowly move the adjuster rod down with a pressure of 294 N (30 kg, 66 lb) until the adjuster rod is aligned with the stopper pin hole in the cylinder.



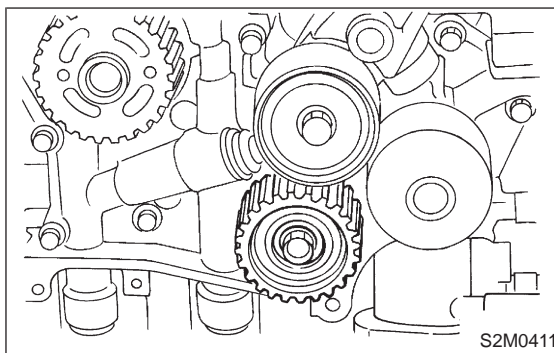
(3) With a 2 mm (0.08 in) dia. stopper pin or a 2 mm (0.08 in) (nominal) dia. hex bar wrench inserted into the stopper pin hole in the cylinder, secure the adjuster rod.



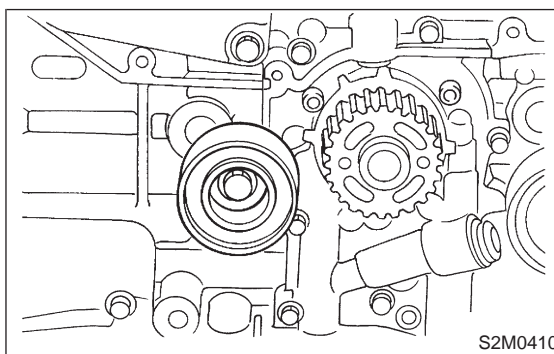
2) Install Automatic belt tension adjuster assembly.



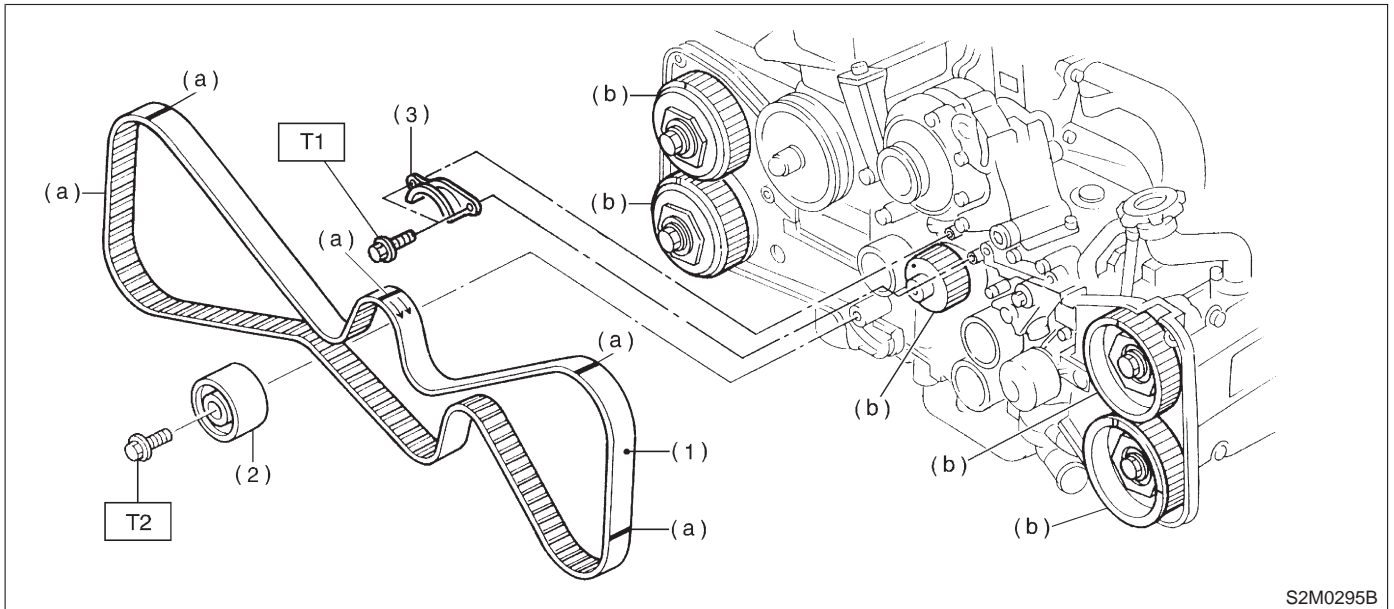
3) Install belt idler No. 2.



4) Install belt idler.



3. TIMING BELT



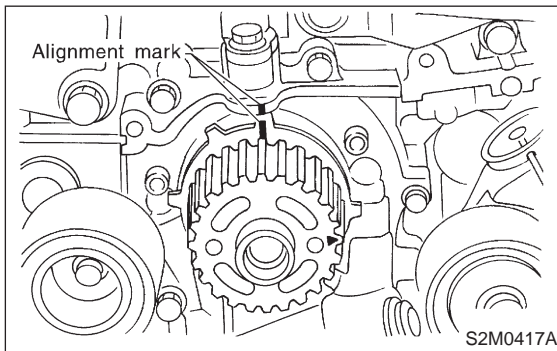
- (1) Timing belt
- (2) Belt idler
- (3) Timing belt guide (MT vehicles only)
- (a) Alignment mark (Timing belt side)
- (b) Alignment mark (Sprocket side)

Tightening torque: N-m (kg-m, ft-lb)

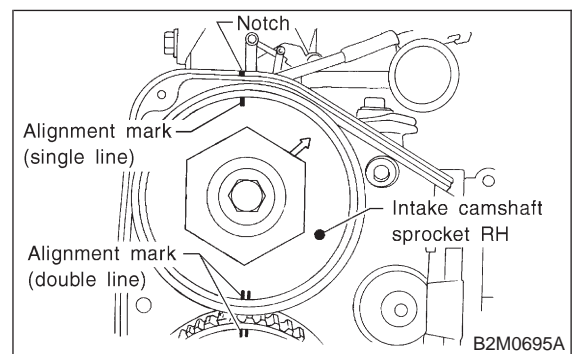
T1: 9.8±1.0 (1.0±0.1, 7.2±0.7)

T2: 39±4 (4.0±0.4, 28.9±2.9)

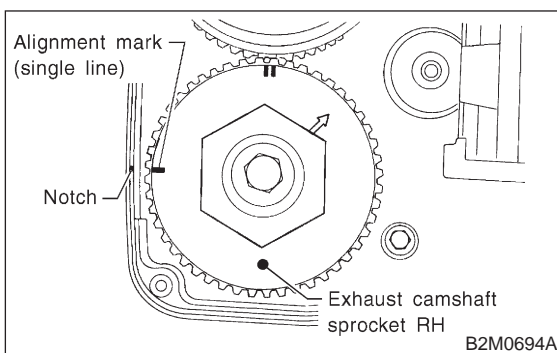
- 1) Crankshaft and camshaft sprocket alignment.
 (1) Align mark on crankshaft sprocket with mark on the oil pump cover at cylinder block.



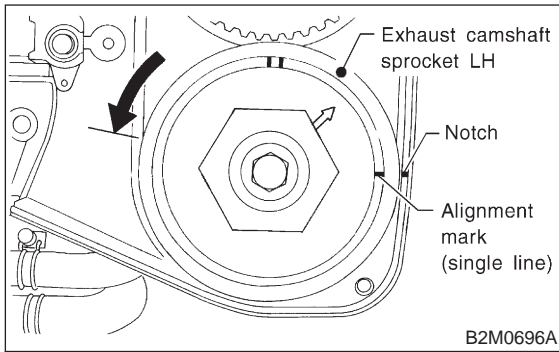
- (3) Align single line mark on right-hand exhaust camshaft sprocket with notch on belt cover.
 (Make sure double lines on intake camshaft and exhaust camshaft sprockets are aligned.)



- (2) Align single line mark on right-hand exhaust camshaft sprocket with notch on belt cover.

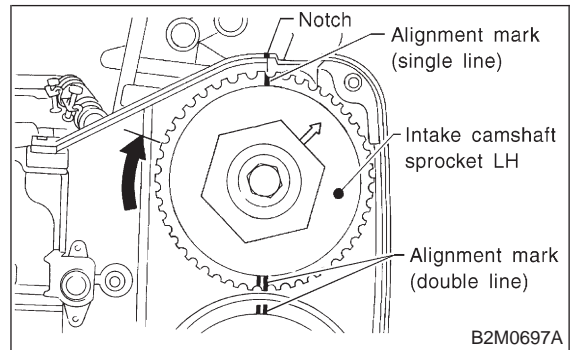


(4) Align single line mark on left-hand exhaust camshaft sprocket with notch on belt cover by turning sprocket counter-clockwise (as viewed from front of engine).

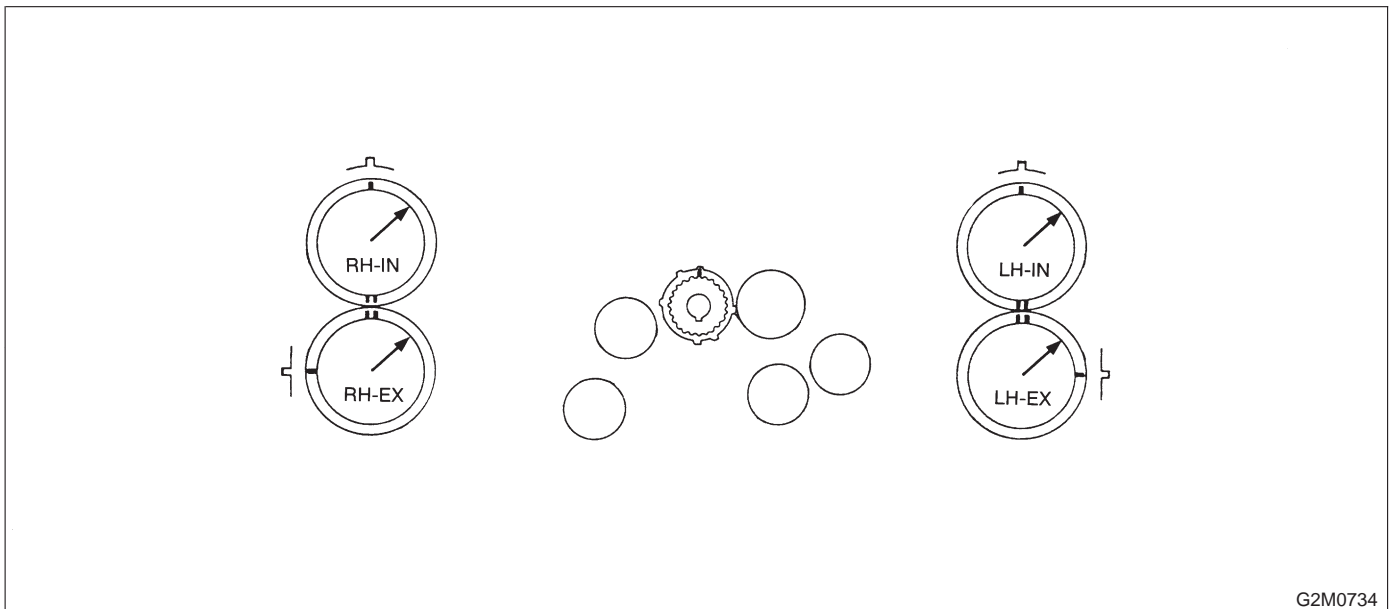


(5) Align single line mark on left-hand intake camshaft sprocket with notch on belt cover by turning sprocket clockwise (as viewed from front of engine).

Ensure double lines on intake and exhaust camshaft sprockets are aligned.

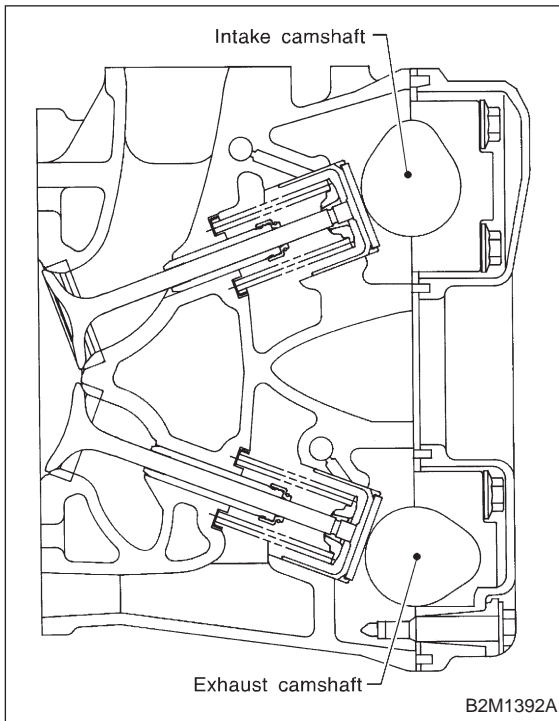


(6) Ensure camshaft and crankshaft sprockets are positioned as shown.

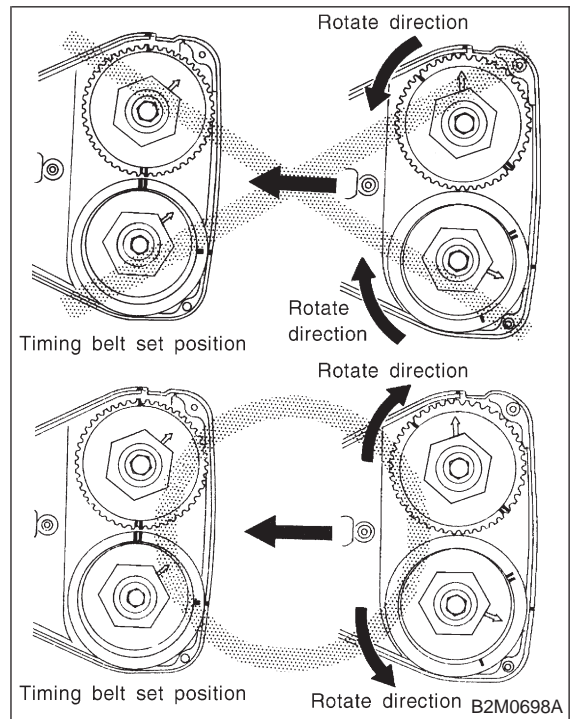


CAUTION:

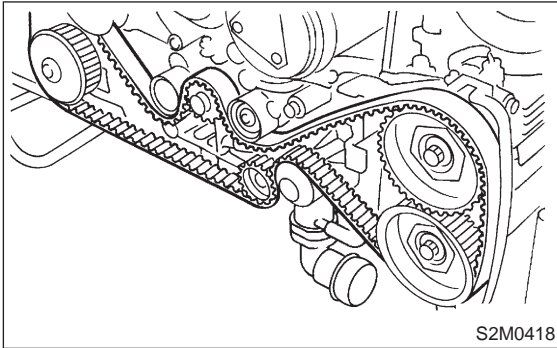
● Intake and exhaust camshafts for this DOHC engine can be independently rotated with timing belts removed. As can be seen from the figure, if intake and exhaust valves are lifted simultaneously, their heads will interfere with each other, resulting in bent valves.



- When timing belts are not installed, four camshafts are held at the “zero-lift” position, where all cams on camshafts do not push intake and exhaust valves down. (Under this condition, all valves remain unlifted.)
- When camshafts are rotated to install timing belts, #2 intake and #4 exhaust cam of left-hand camshafts are held to push their corresponding valves down. (Under this condition, these valves are held lifted.) Right-side camshafts are held so that their cams do not push valves down.
- Left-hand camshafts must be rotated from the “zero-lift” position to the position where timing belt is to be installed at as small an angle as possible, in order to prevent mutual interference of intake and exhaust valve heads.
- Do not allow camshafts to rotate in the direction shown in the figure as this causes both intake and exhaust valves to lift simultaneously, resulting in interference with their heads.



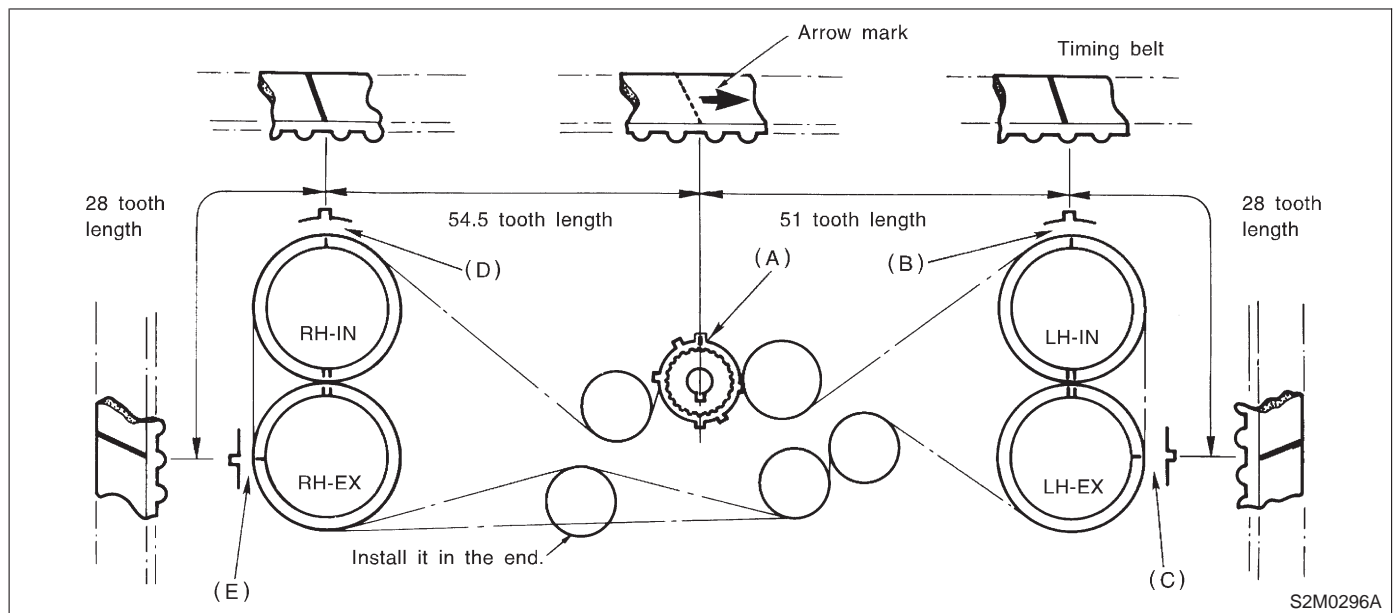
2) Installation of timing belt



Align alignment mark on timing belt with marks on sprockets in the alphabetical order shown in figure. While aligning marks, position timing belt properly.

CAUTION:

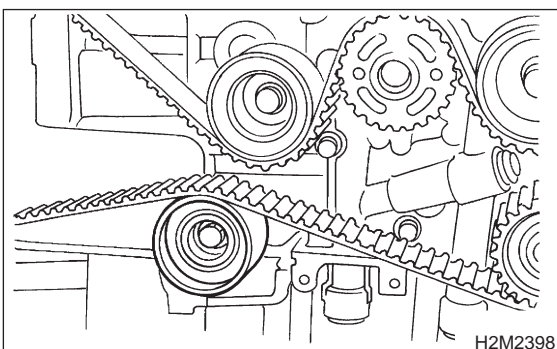
- Disengagement of more than three timing belt teeth may result in interference between the valve and piston.
- Ensure belt's rotating direction is correct.



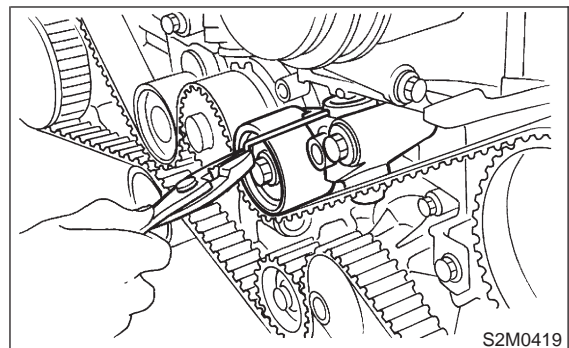
3) Install belt idler.

CAUTION:

Make sure that the marks on timing belt and sprockets are aligned.



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



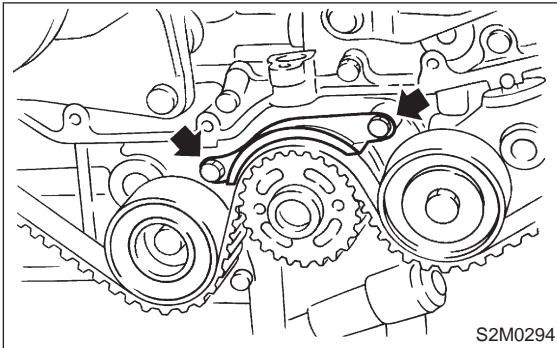
2-3b [W2C4]

2. Timing Belt

SERVICE PROCEDURE

5) Install timing belt guide. (MT vehicles only)

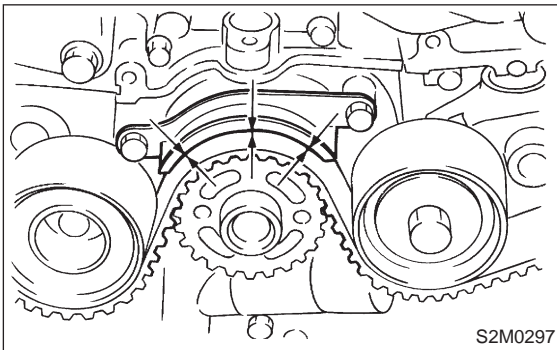
(1) Temporarily tighten remaining bolts.



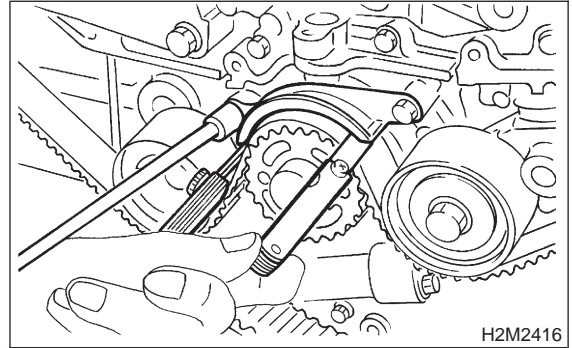
(2) Check and adjust clearance between timing belt and timing belt guide.

Clearance:

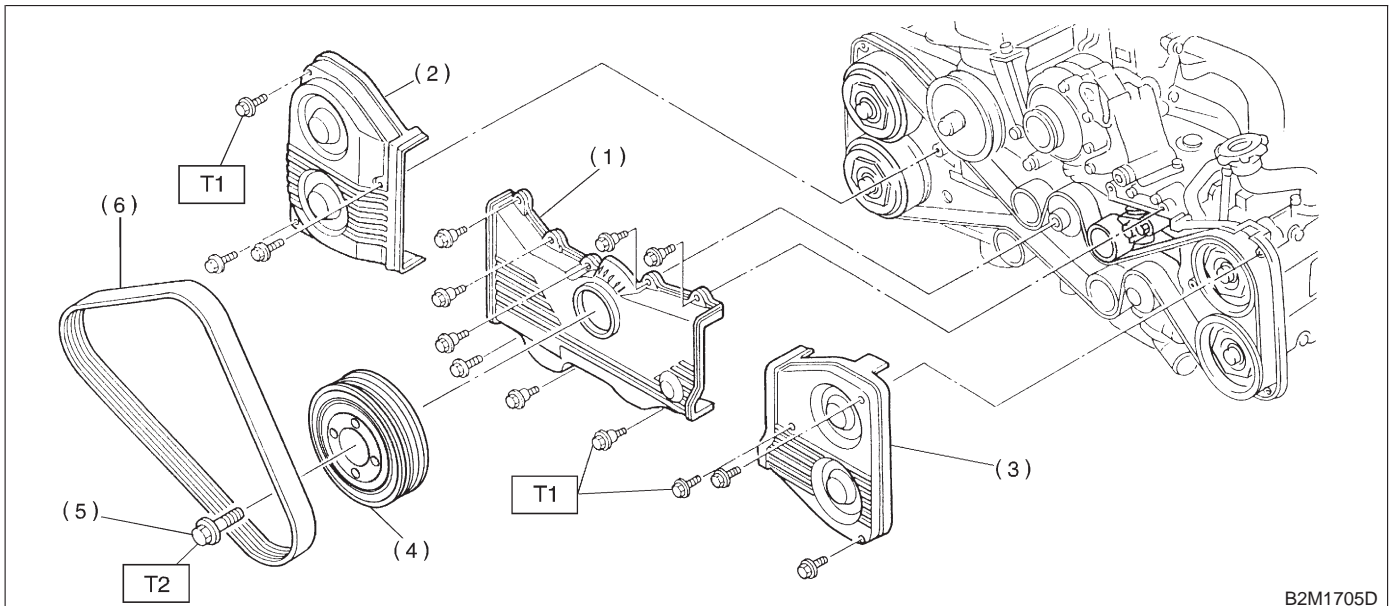
$1.0 \pm 0.5 \text{ mm}$ ($0.039 \pm 0.020 \text{ in}$)



(3) Tighten remaining bolts.



4. CRANKSHAFT PULLEY AND BELT COVER



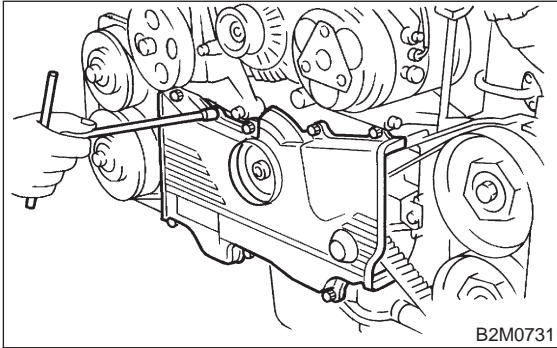
- (1) Front belt cover
- (2) Right-hand belt cover No. 1
- (3) Left-hand belt cover No. 1
- (4) Crankshaft pulley
- (5) Crankshaft pulley bolt

Tightening torque: N-m (kg-m, ft-lb)

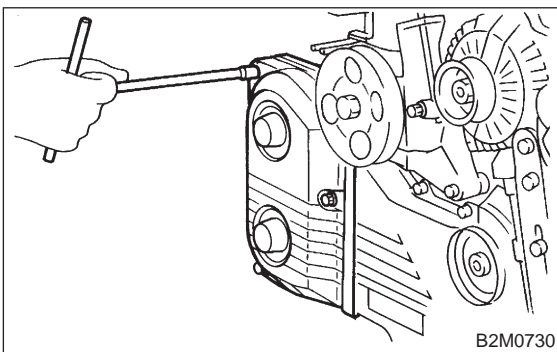
T1: 5 ± 0.5 (0.5 ± 0.05 , 3.6 ± 0.4)

T2: 177 ± 10 (18.0 ± 1.0 , 130 ± 7)

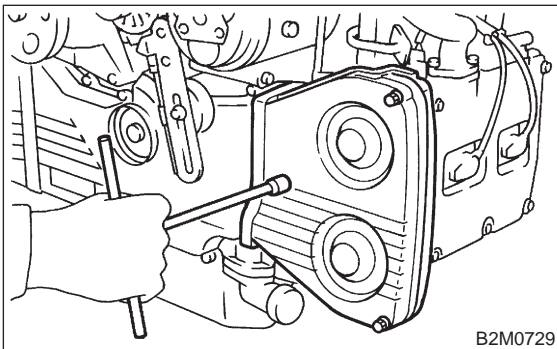
- 1) Install front belt cover.



- 2) Install right-hand belt cover.



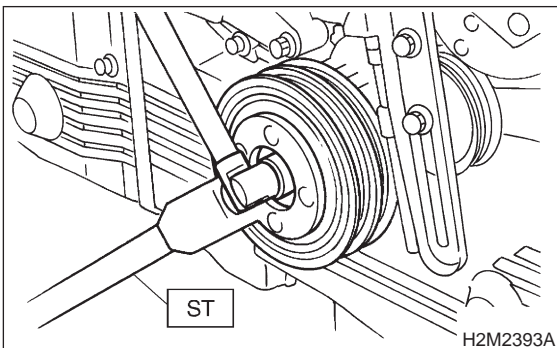
- 3) Install left-hand belt cover.



- 4) Install crankshaft pulley.

- 5) Tighten pulley bolt by using ST.

ST 499977100 CRANKSHAFT PULLEY
WRENCH



- 6) Install V-belt, air conditioning compressor drive belt tensioner and V-belt cover. <Ref. to 1-5 [G2B0].>

CAUTION:

After installing V-belt, check and adjust V-belt tension.

