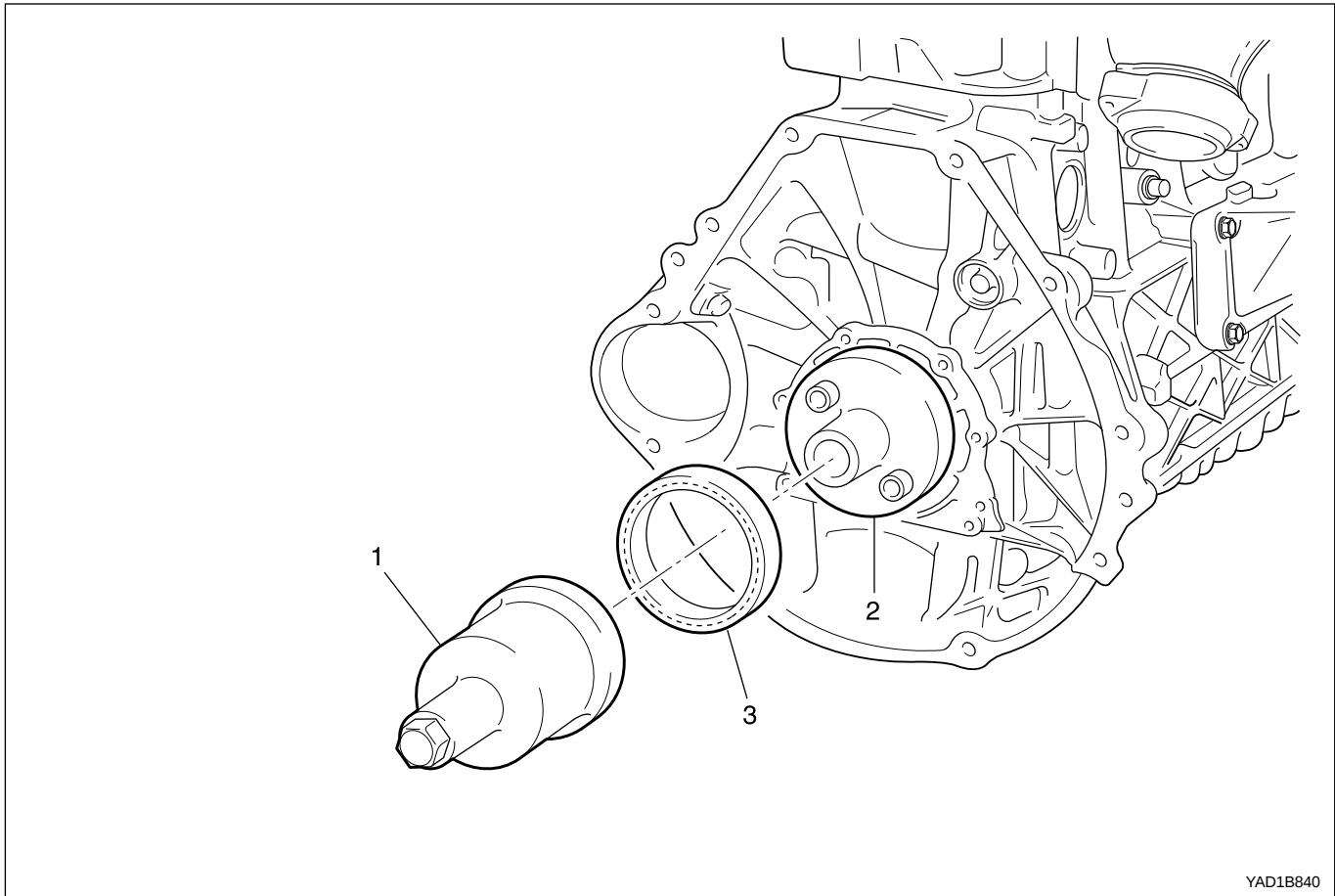


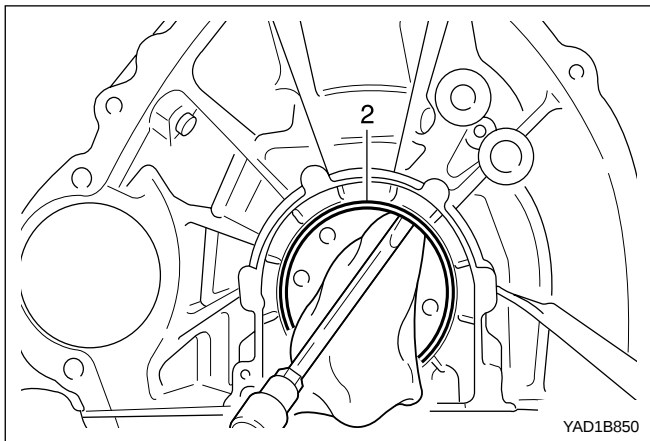
CRANKSHAFT REAR RADIAL SEAL

Preceding Work: Removal of flywheel or drive plate



- 1 Special Tool
- 2 Special Tool

- 3 Crankshaft Rear Seal



Tools Required

601 589 03 43 00 Crankshaft Rear Seal Installer

Replacement Procedure

1. Remove the radial seal with a screw driver.

Notice: Use a clean cloth not to damage the radial seal mounting hole and the crankshaft.

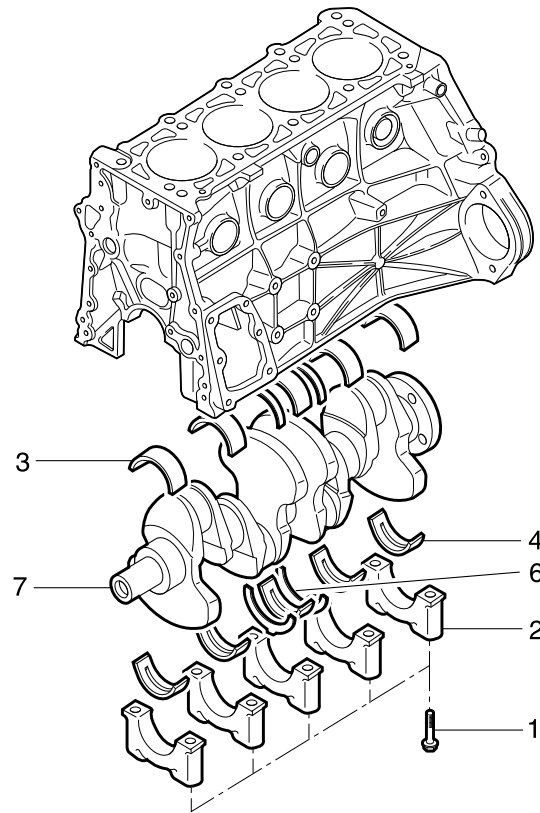
2. Install the special tool (2) to the crankshaft.
3. Apply the engine oil on the special tool (2).

Notice: Do not use the grease.

4. Install the radial seal on the inner parts assembler.
5. Press in the special tool (1) until the radial seal is stopped.
6. Check for leaks while operating the engine..

CRANKSHAFT

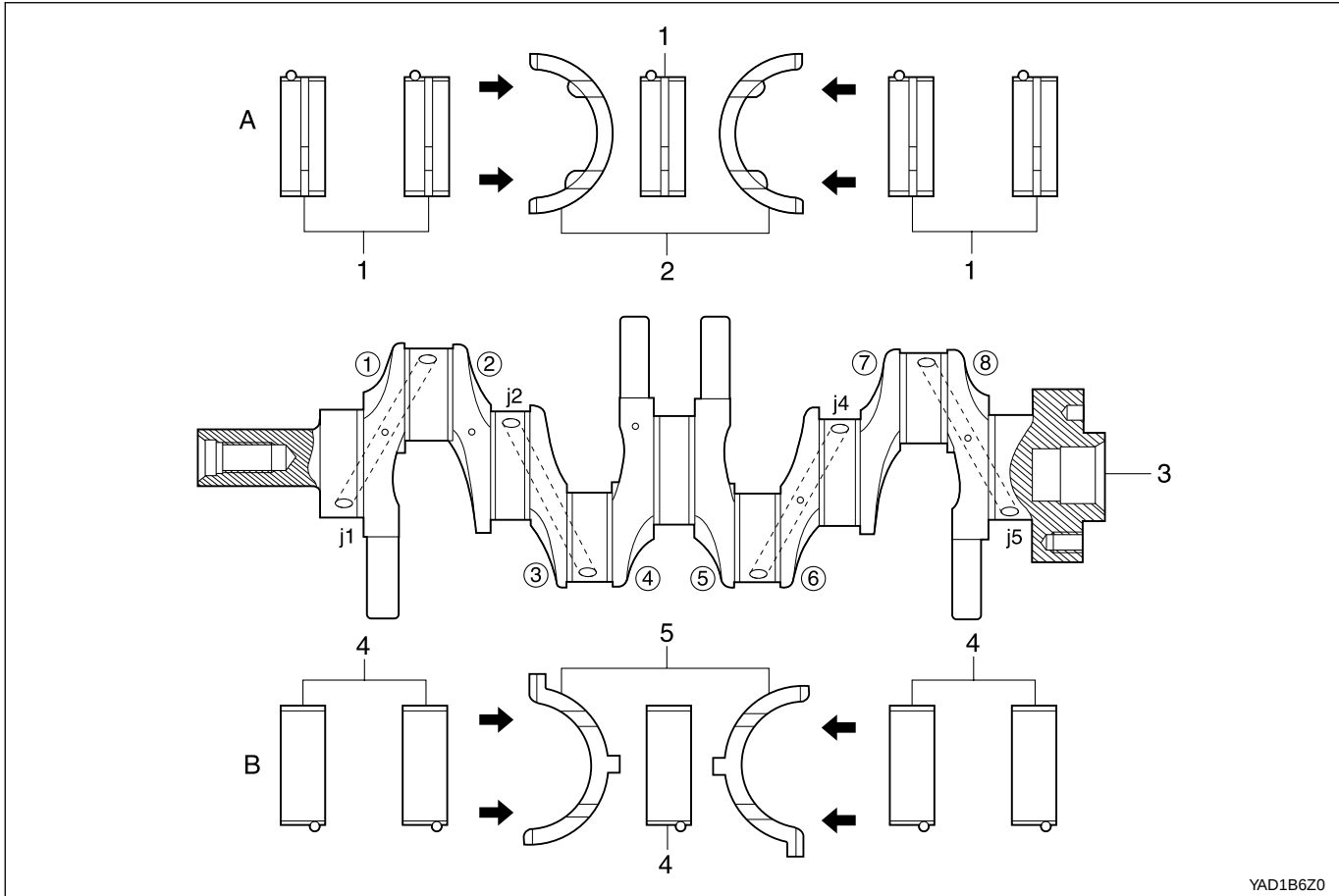
Preceding Work: Removal of engine
 Removal of cylinder head
 Removal of timing gear case cover
 Removal of crankcase sealing rear cover
 Removal of oil pan
 Removal of baffle plate
 Removal of oil pump



YAD1B6Y0

- | | |
|--|------------------------|
| 1 Bearing Cap Bolt (M8 X 55 - 10 pieces) | 4 Lower Main Bearing |
| 1ststep 55 N•m (41 lb-ft) | 5 Upper Thrust Bearing |
| 2nd step 90 °rotation added | 6 Lower Thrust Bearing |
| 2 Bearing Cap | 8 Crankshaft. |
| 3 Upper Main Bearing | |

Arrangement of the Thrust Bearing and the Main Bearing



YAD1B6Z0

- 1 Upper Main Bearing
- 2 Upper Thrust Bearing
- 3 Crankshaft
- 4 Lower Main Bearing
- 5 Lower Thrust Bearing

- A Crankcase Side
- B Bearing Cap Side (Oil Pan Side)

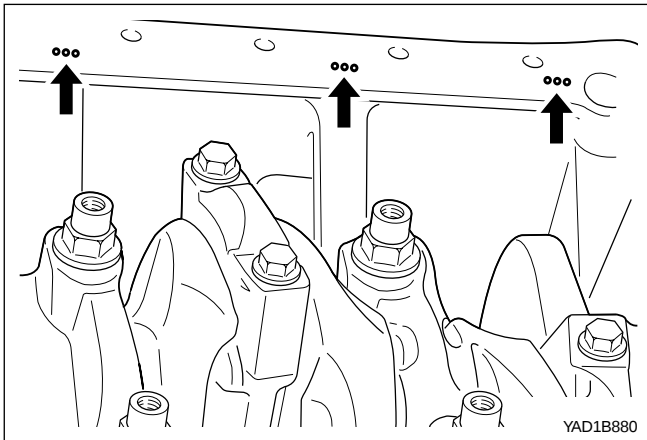
(1) - (8) Weight Balance/Color Marking Point

j1 - j5 Journal Main Bearing #1 - #5

- Color Dot Marking

The color dot marking are put on the (1), (2), (4), (6), (8), and it indicates the diameter of crankshaft journal by color as below.

Color Dot Marking	Crankshaft Journal Diameter (mm)
Blue	57.960 - 57.965
Yellow	57.955 - 57.960
Red	57.950 - 57.955
White	57.945 - 57.950
Violet	57.940 - 57.945



Selection of Crankshaft Main Bearing

1. Crankcase Side

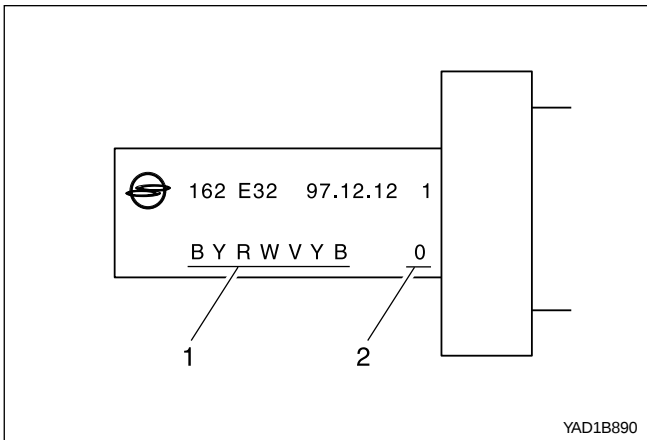
There are seven punching marks on the mating surface to oil pan. This mark is correspondent to the bearing distinguished by color. Select the relevant bearing according to the punching mark when repaired.

Purching Mark	Bearing Color Selected
B	Blue
Y	Yellow
R	Red

2. Crankshaft Bearing Cap Side

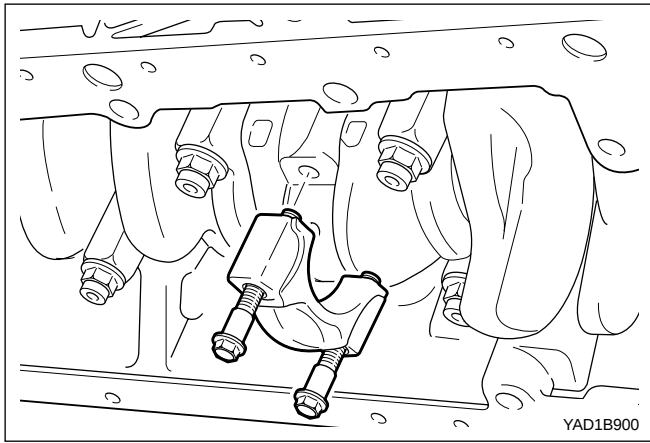
Select the crankshaft main bearing according to the marking letter on the crank shaft main journal when repaired.

Marking Letter	Bearing Color Selected
B	Blue
Y	Yellow
R	Red
W	White
V	Violet



Service Data

Crankshaft Standard and Repair Size	Crankshaft Bearing Journal Diameter	Crankshaft Bearing Diameter	Crankshaft Journal Width at fit bearing	Connecting Rod Bearing Journal Diameter	Connecting Rod Bearing Journal Width
Standard size	57.940 - 57.965	58	24.50 - 24.533	47.935 - 47.965	27.958 - 28.042
1st repair size	57.705 - 57.715	-	-	47.700 - 47.715	-
2nd repair size	57.450 - 57.465			47.450 - 47.465	
3rd repair size	57.205 - 57.215			47.200 - 47.215	
4th repair size	56.955 - 56.965			46.950 - 46.965	



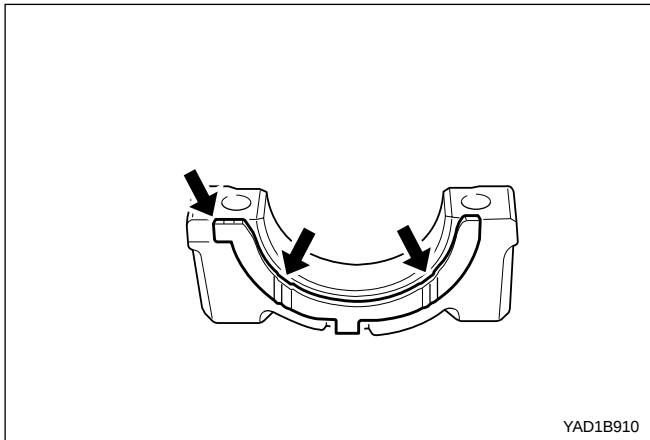
Removal & Installation Procedure

1. Unscrew the connecting rod bearing cap bolt and remove the bearing cap.

Installation Notice

Tightening Torque	40 N•m (30 lb-ft) + 90°
-------------------	-------------------------

- Make sure that the upper and lower bearing shells do not change each other.
- Coat the bearing shell with engine oil.
- Install the bearing cap according to the consecutive number.



2. Unscrew the crankshaft bearing cap bolts and separate the upper and lower bearing shells and thrust washers.

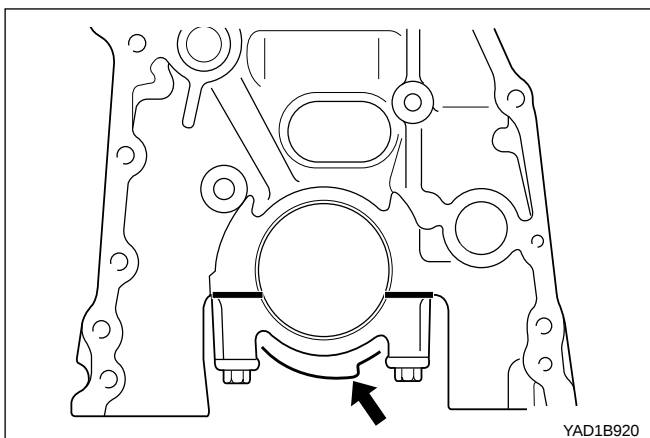
Installation Notice

Tightening Torque	55 N•m (41 lb-ft)+ 90°
-------------------	------------------------

- Remove the bearing cap from front (pulley side) to rear.
- Make sure that the upper and lower bearing shells do not change each other and coat with engine oil.
- The oil grooves (arrows) in the thrust washers must face outward and insert the thrust bearing into the bearing cap.
- There are five kinds of thrust washers by thickness. Select the proper washer when repaired.

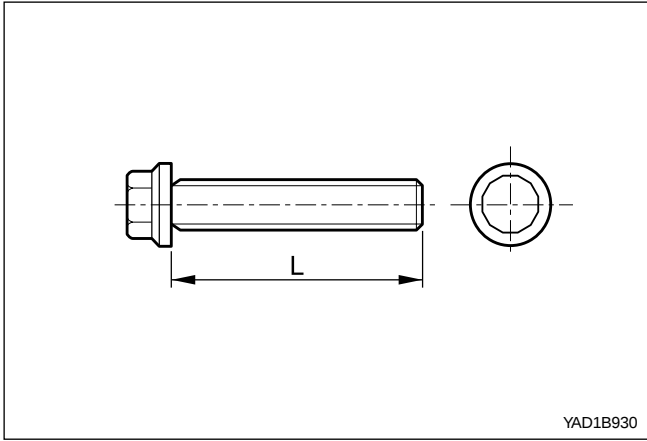
Part No. : 601 030 00 62 2.15 mm
 Part No. : 601 030 01 62 2.20 mm
 Part No. : 601 030 02 62 2.25 mm
 Part No. : 601 030 03 62 2.30 mm
 Part No. : 601 030 04 62 2.40 mm

3. Remove the crankshaft.
4. Installation should follow the removal procedure in the reverse order.
5. After completion of the installation, check for the rotating condition of the crankshaft.



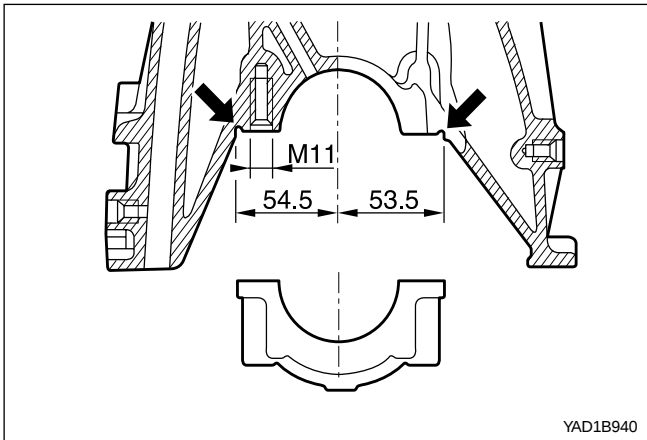
Notice:

- Make sure the crankshaft bearing cap properly seated in place in the crankcase side. When perfectly installed, the projected part (arrow) locates in the left side (intake manifold side).
- Assemble so that the projected part of the cap and crankcase face the same direction.

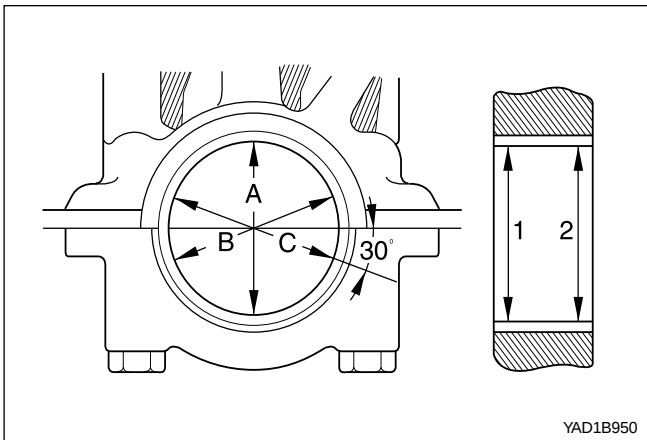


Inspection

1. If the length 'L' of the crankshaft bearing cap bolt exceeds 63.8 mm, replace it.



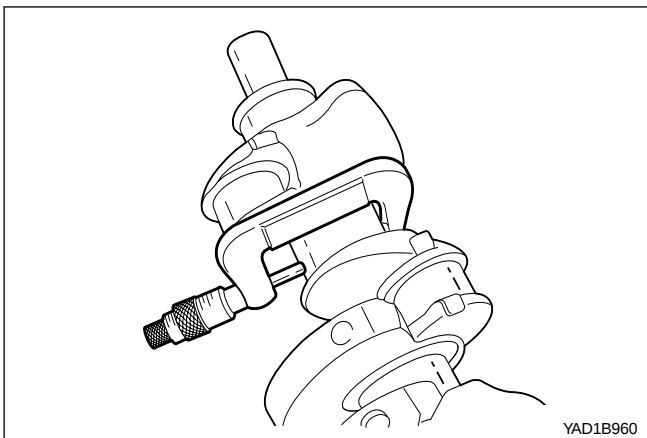
2. Make sure the crankshaft bearing cap is properly seated on the cylinder block (arrows).



3. Measure and record the inner diameter of the crankshaft bearing.

Notice:

- Measure at 2 points (1, 2).
- Measure 'A', 'B' and 'C' as shown. If average value of 'B' and 'C' is less than value 'A', then the average value of 'B' and 'C' is actual average value. If average value of 'B' and 'C' is more than value 'A' is actual average value.



4. Measure and record the diameter of the crankshaft bearing journal.

Notice:

- Record the mean value when measured at 3 points (A,B,C).
- Measure the inner diameter of bearing and the diameter of journal and if it is out of the standard data, replace the bearing shell.

Service Data Standard (Crankshaft Main Bearing Gap)

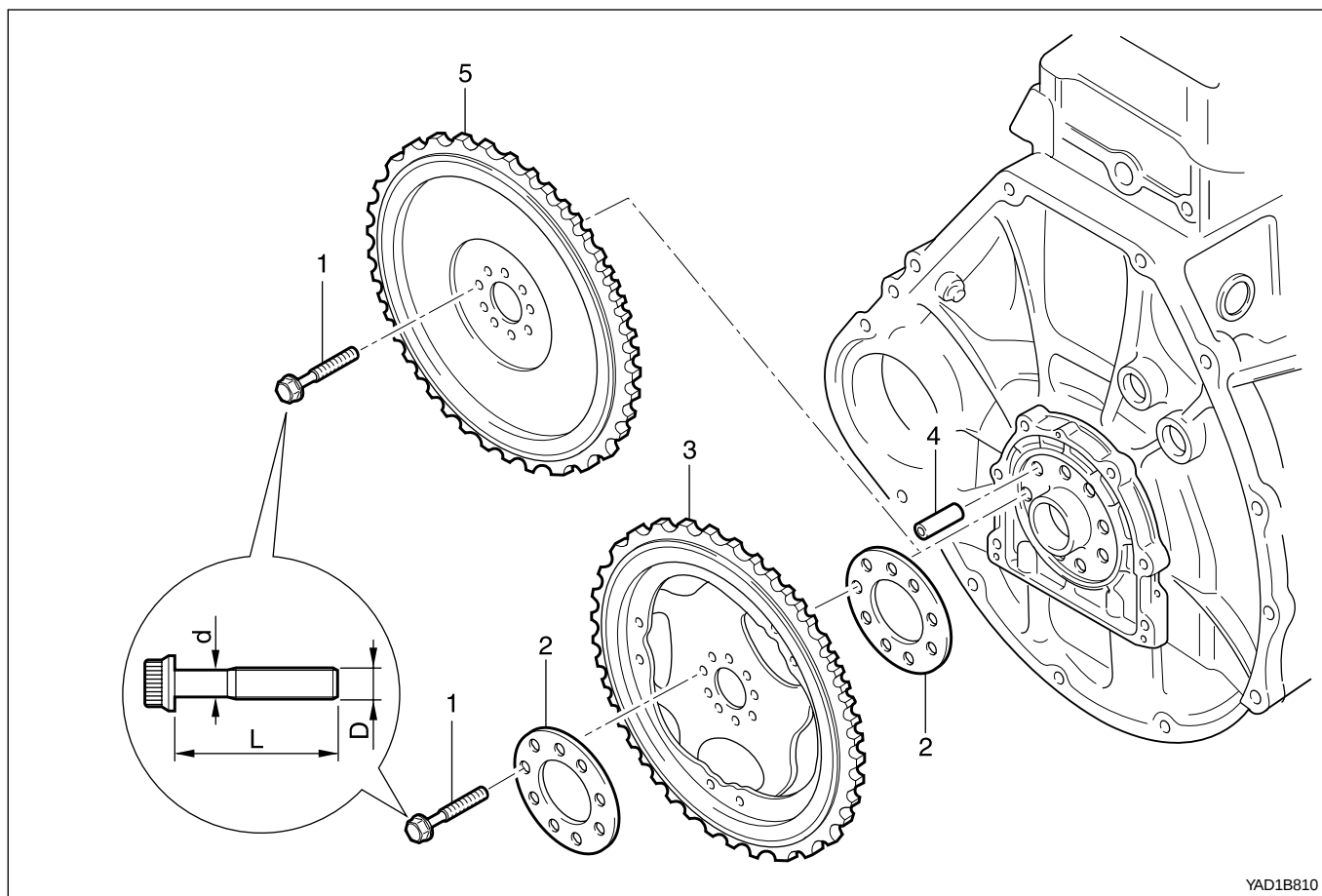
Item	Measuring Position	Gap (mm)
Main Bearing Journal (NO.1,5,7)	Radial	Static condition : 0.015 - 0.039 Dynamic condition : 0.031 - 0.051 (Consider the expansion 0.011 - 0.016)
	Axial	0.010 - 0.0254

(Connecting Rod Bearing Gap)

Item	Item	Gap (mm)
Connection Rod Bearing	Radial	0.020 - 0.065

FLYWHEEL / DRIVEN PLATE

Preceding Work: Removal of manual or automatic transmission



- 1 Flywheel Mounting Bolt (M10 x 22, 8 pieces)
 1st step 45 + 5 N•m (33 + 3.7 lb-ft)
 2nd step 90° + 10°
- 2 Plate

- 3 Driven Plate (A/T)
 4 Dowel Pin
 5 Flywheel (M/T)

Service Data Standard (Stretch Bolt)

Normal Size	D	-	M x 15
Stretch Side Diameter	d	When New	8.5 - 0.2 mm
		Min. Diameter	8.0 mm
Bolt Length	L	When New	21.8 - 22.2 mm
Tightening Torque	1st step 45 + 5 N•m (33 + 37 lb-ft), 2nd step 90° + 10°		

Removal & Installation Procedure

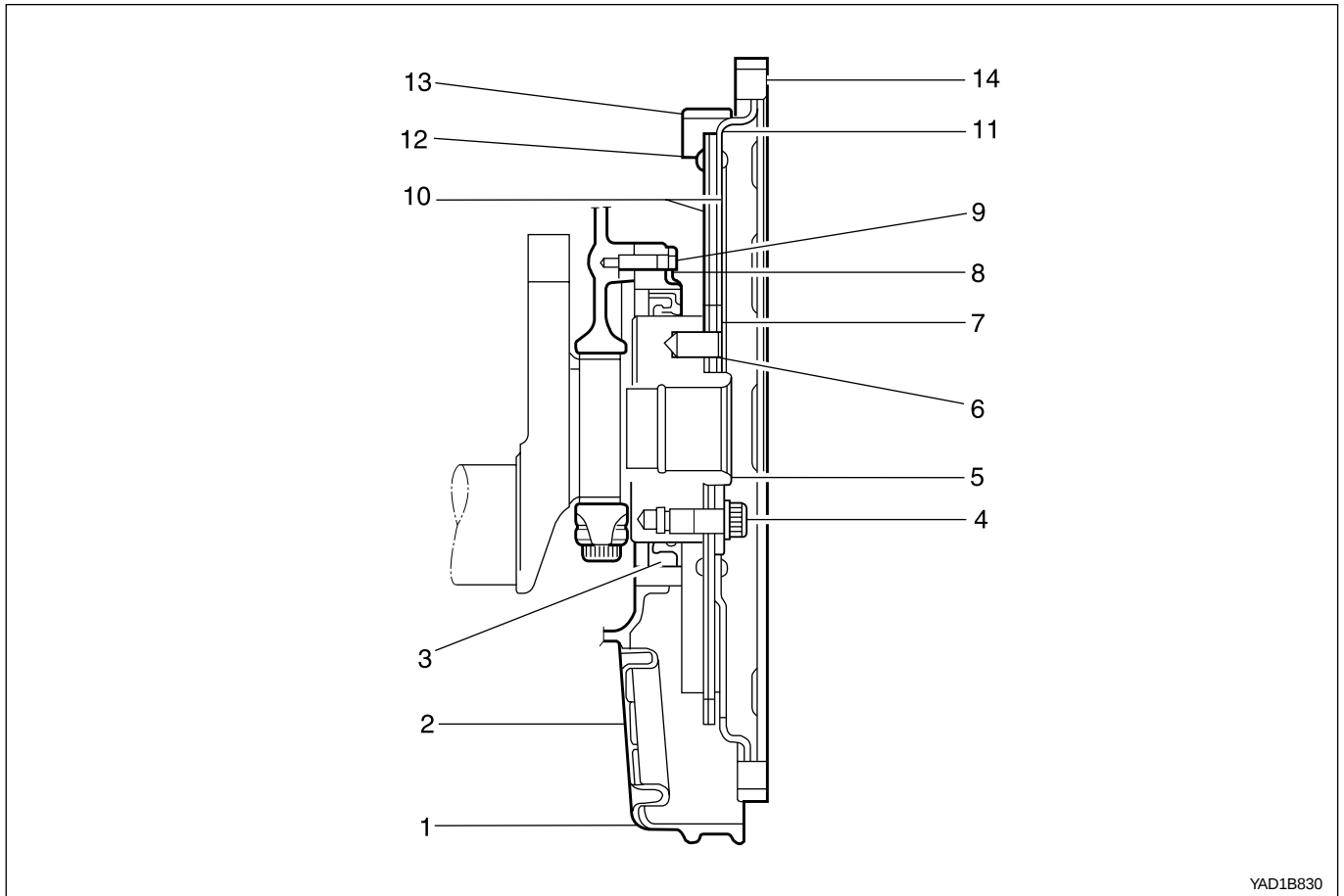
1. Unscrew the flywheel mounting bolt.

Installation Notice

Tightening Torque	1st step: 45 + 5 N•m (33 + 3.7 lb-ft)
	2nd step: 90° ± 10°

- Replace the bolt when the stretch side diameter (d) of the flywheel mounting bolt is less than 8.0mm.
 - For the flywheel mounting bolt tightening, keep the socket wrench and Tommy-bar to be 90° and tighten as specified.
2. Remove the flywheel for manual transmission vehicles, or the driven plate (3), and plate (2) for Auto transmission vehicle.
 3. Installation should follow the removal procedure in the reverse order.

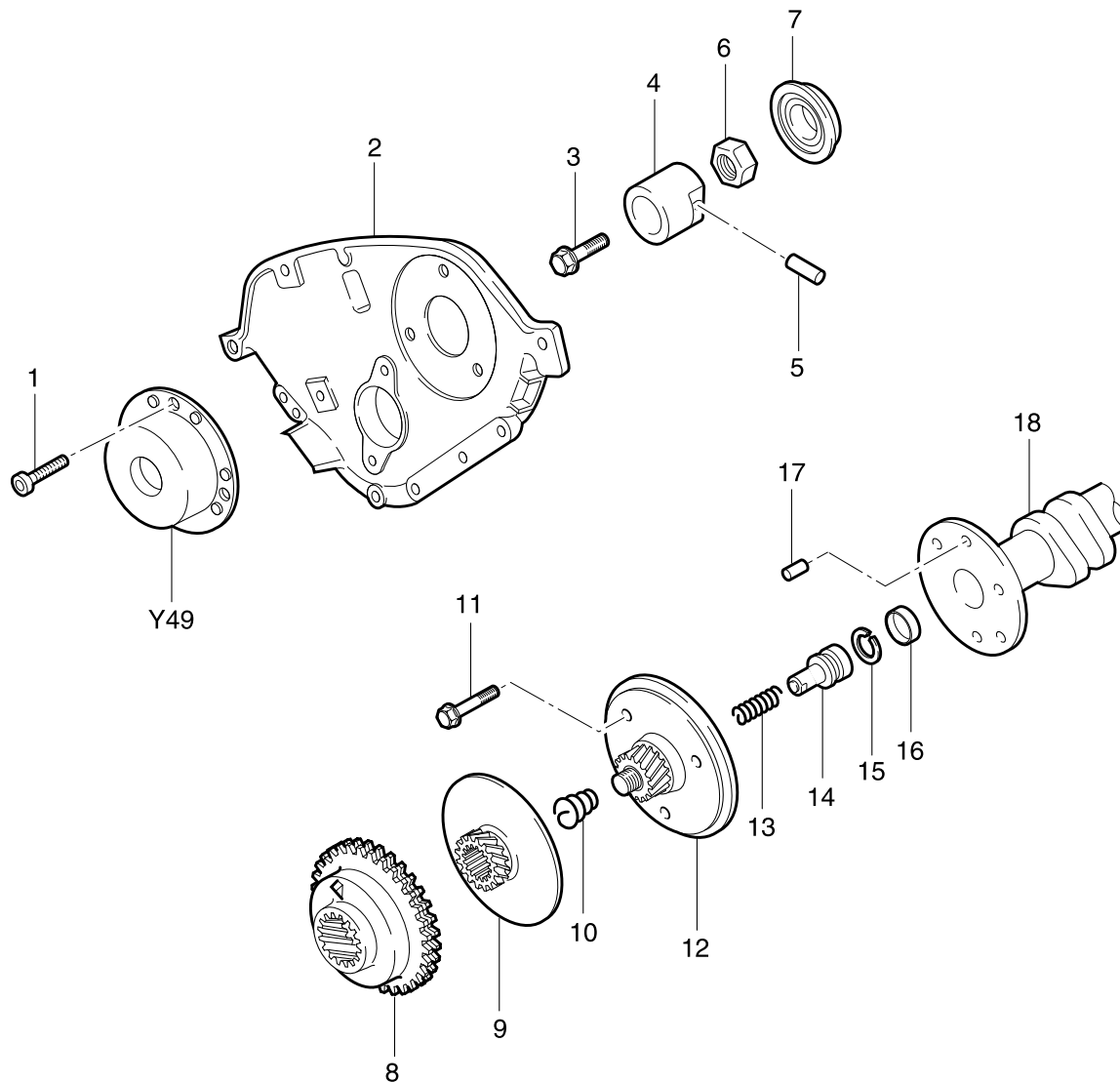
Sectional View



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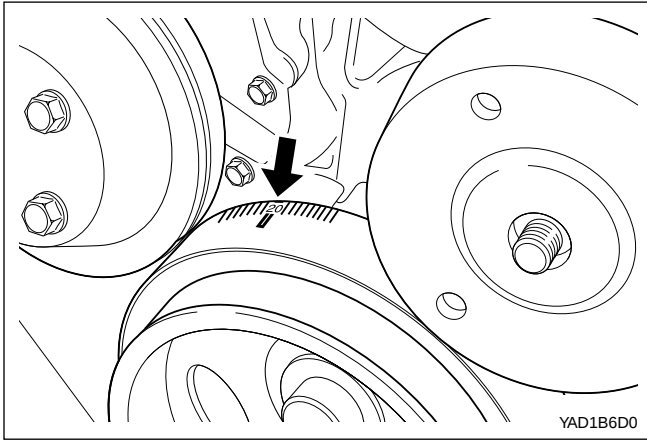
- | | |
|-------------------------------|----------------------|
| 1 OilPan | 8 Washer |
| 2 Cover | 9 Bolt |
| 3 Radial Seal | 10 Front Drive Plate |
| 4 Bolt | 11 Rear Drive Plate |
| 5 Crankshaft | 12 Rivet |
| 6 Dowel Pin | 13 Segment |
| 7 Washer (Thickness : 3.5 mm) | 14 Ring Gear |

CAMSHAFT ADJUSTER



YAD1B7A0

- | | |
|--|--|
| 1 Bolt (M6 X 16, 3 pieces)
..... 9 - 11 N•m (80 - 97 lb-in) | 11 Flange Bolt (M7 X 13, 3 pieces)
..... 1st Step 18 - 22 N•m (13 - 16 lb-ft)
2nd Step 60 ° ± 5 ° Rotation Added |
| 2 Cylinder Head Front Cover | 12 Flange Shaft |
| 3 Bolt 35 N•m (26 lb-ft) | 13 Compression Spring |
| 4 Armature | 14 Control Piston |
| 5 Roll Pin | 15 Circlip |
| 6 Nut (M20 X 1.5) 60 - 70 N•m (44 - 52 lb-ft) | 16 Oil Gallery |
| 7 Seal Cover | 17 Straight Pin |
| 8 Camshaft Sprocket | 18 Intake Camshaft |
| 9 Adjust Piston | Y49 Magnetic Actuator (2 - Pin Connector) |
| 10 Conical Spring | |

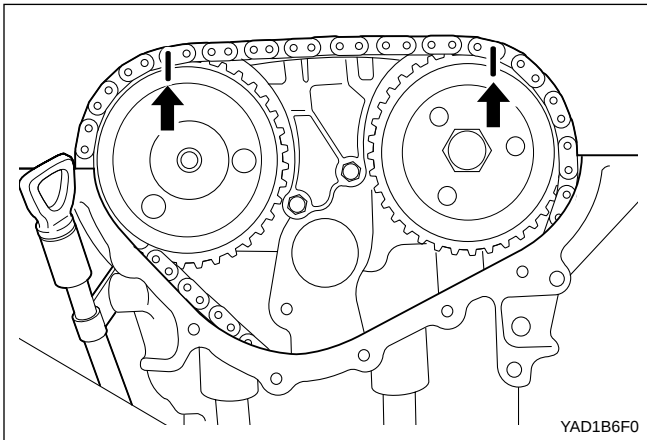


Removal & Installation Procedure

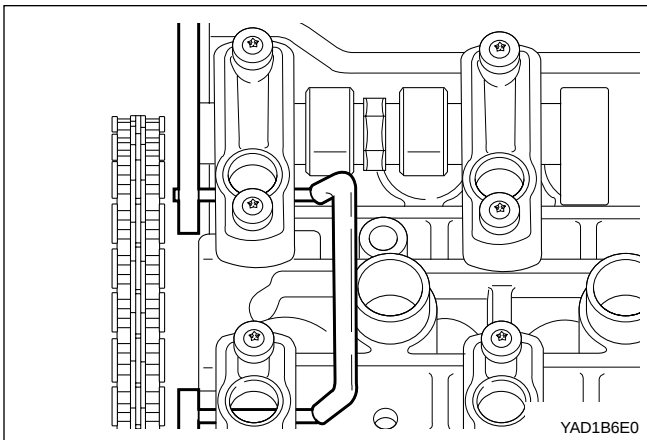
1. Turn the crankshaft and position the no.1 cylinder piston at ATDC 20 °.

Notice: Turn the crankshaft in the direction of engine rotation.

2. Remove the cylinder head front cover.

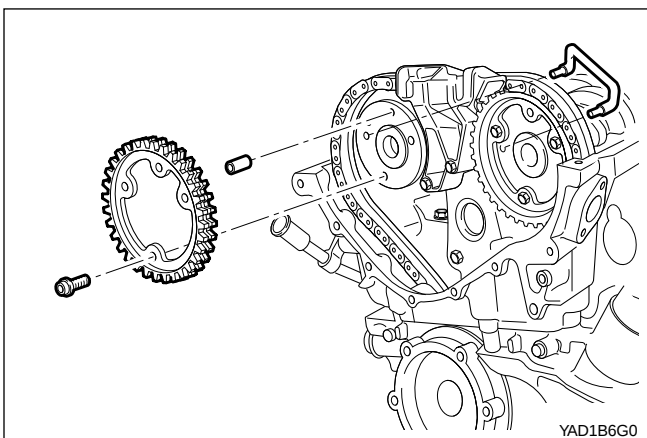


3. Put the alignment marks (arrows) on the camshaft sprocket and the timing chain.



4. Insert the holding pin 111 589 03 15 00 into the no.1 and no.6 bearing cap hole on camshaft to secure intake and exhaust camshaft.

5. Remove the chain tensioner.

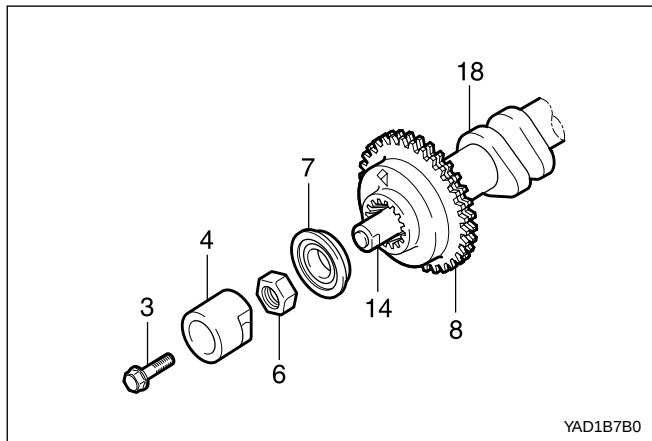


6. Unscrew the exhaust sprocket bolt and remove the exhaust camshaft sprocket.

Installation Notice

Tightening Torque	1st step: 18 - 22 N•m (13 - 16 lb-ft)
	2nd step: 60° ± 5°

Notice: The flange bolt is designed to be used only once, so always replace with new one.



7. Unscrew the bolt (3) from the armature (4) and remove the roll pin, and remove the armature.

Installation Notice

Tightening Torque	35 N•m (26 lb-ft)
-------------------	-------------------

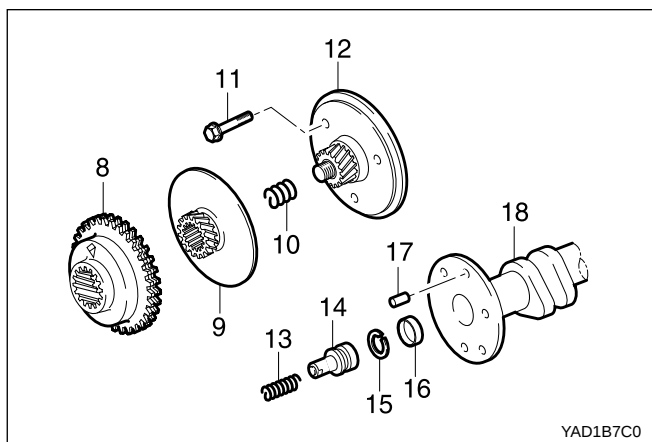
8. Unscrew the nut (6) and remove the seal cover (7).

Installation Notice

Tightening Torque	60 - 70 N•m (44 - 52 lb-ft)
-------------------	--------------------------------

Notice: Put the locking slot of nut toward armature.

9. Take off the timing chain from intake camshaft sprocket.



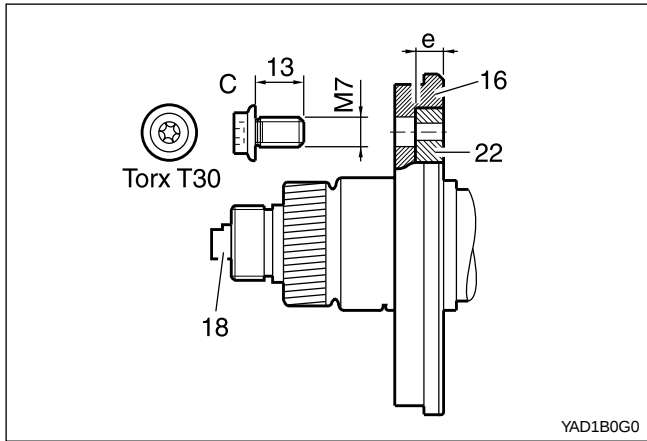
10. Remove the adjuster piston (9) and conical spring (10) from intake camshaft sprocket.
11. Unscrew the bolt (11) and remove the flange shaft.

Installation Notice

Tightening Torque	1st step: 18 - 22 N•m (13 - 16 lb-ft)
	2nd step: 60° ± 5°

Notice: The flange bolt is designed to be used only once, so always replace with new one.

12. Installation should follow the removal procedure in the reverse order.
13. Check and adjust the camshaft timing.



CAMSHAFT SPROCKET BOLT

Intake Flange Shaft Bolt

Tightening Torque	1st step: 18 - 22 N•m (13 - 16 lb-ft)
	2nd step: 60° ± 5°

Notice: The sprocket bolts are designed to be used only once, so always replace with new one.

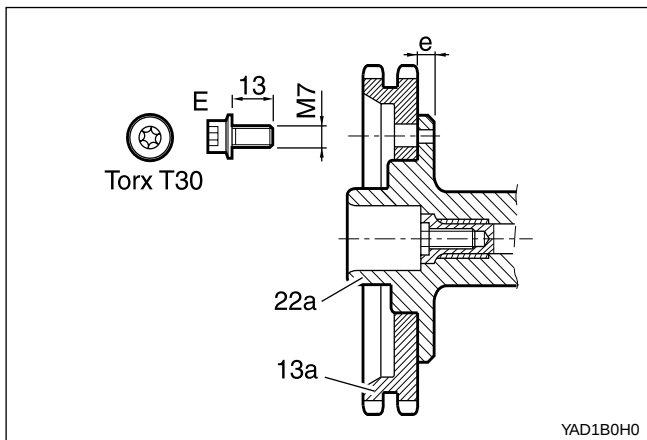
C. M7 x 13 Collar Bolt Torx-T30

e. 6.8 mm

16. Flange Shaft

18. Control Piston

22. Intake Camshaft



Exhaust Camshaft Sprocket Bolt

Tightening Torque	1st step: 18 - 22 N•m (13 - 16 lb-ft)
	2nd step: 60° ± 5°

Notice: The sprocket bolts are designed to be used only once, so always replace with new one.

E. M7 x 13 Collar Bolt Torx-T30

e. 6.8 mm

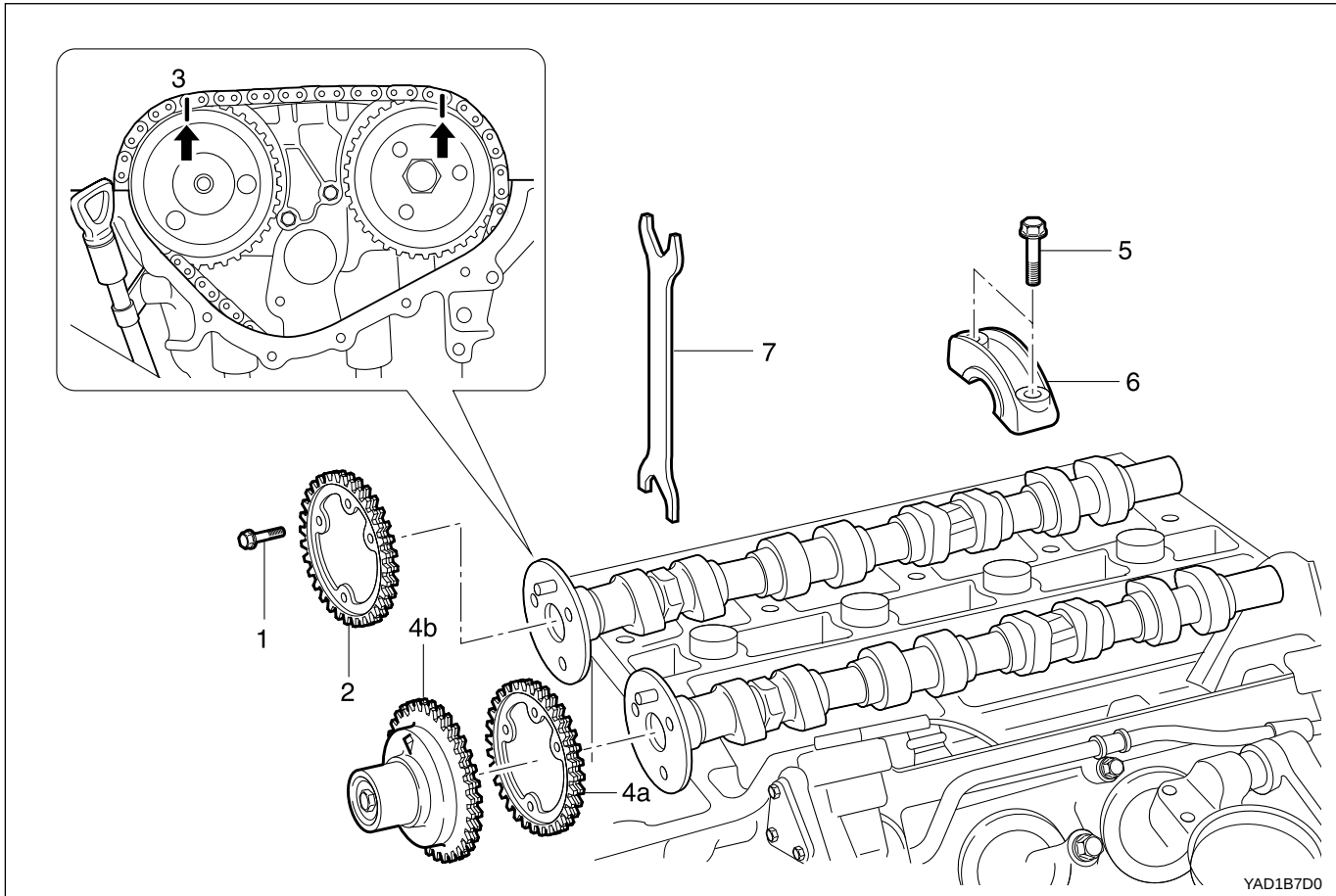
13a. Camshaft Sprocket

22a. Exhaust Camshaft

CAMSHAFT

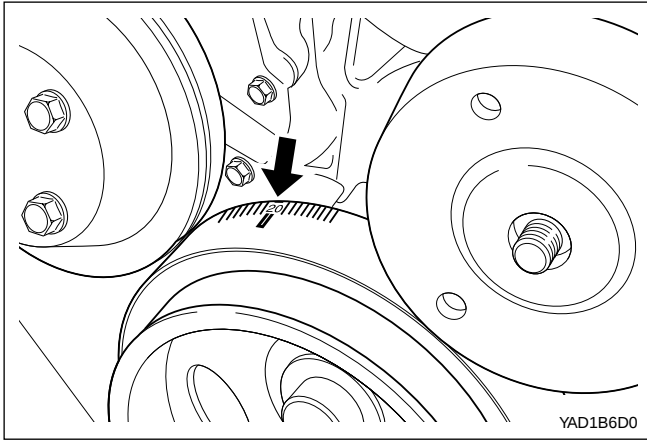
Preceding Work: Removal of cylinder head cover

Removal of camshaft adjust actuator and cylinder head front cover



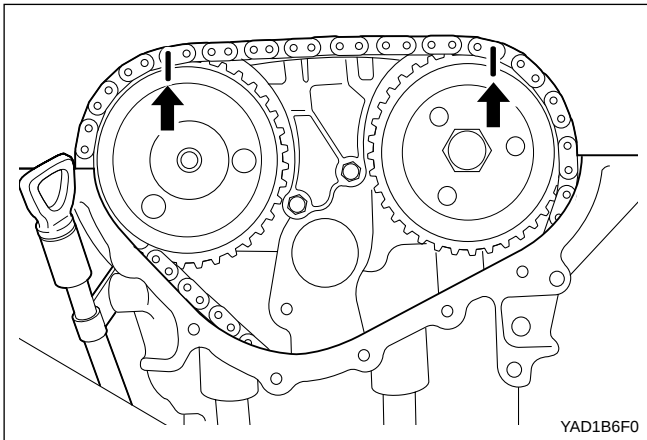
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- | | |
|--|--|
| 1 Bolt (M7 X 13, 3 pieces) | 4b Camshaft Adjuster and Camshaft Sprocket (E23) |
| 1st Step 18 - 22 NSm (13 - 16 lb-ft) | 5 Bearing Cap Bolt (20 pieces) |
| 2nd Step 60 ° ± 5 ° Rotation Added | 22.5 - 27.5 N•m (16.6 - 20.3 lb-ft) |
| 2 Exhaust Camshaft Sprocket | 6 Camshaft Bearing Cap |
| 3 Timing Chain | 7 Wrench |
| 4a Intake Camshaft Spocket (E20) | |



Removal & Installation Procedure

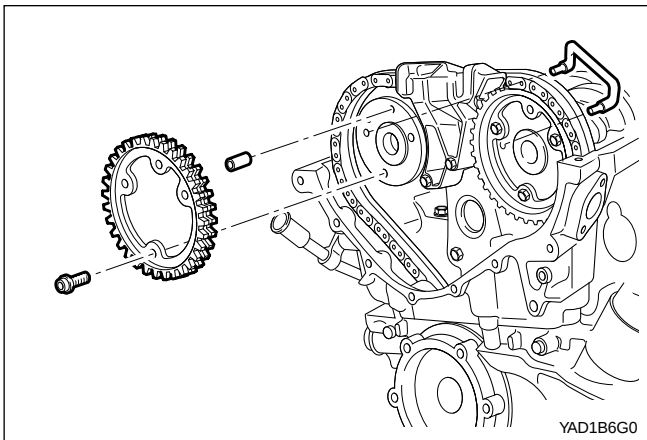
1. Turn the crankshaft and position the no.1 cylinder piston at ATDC 20 °.



2. Put the alignment marks (arrows) on the camshaft sprocket and the timing chain.
3. Remove the chain tensioner.

Installation Notice

Tightening Torque	Screw Plug	40 N•m (30 lb-ft)
	Tensioner Assembly	72 - 88 N•m (53 - 65 lb-ft)



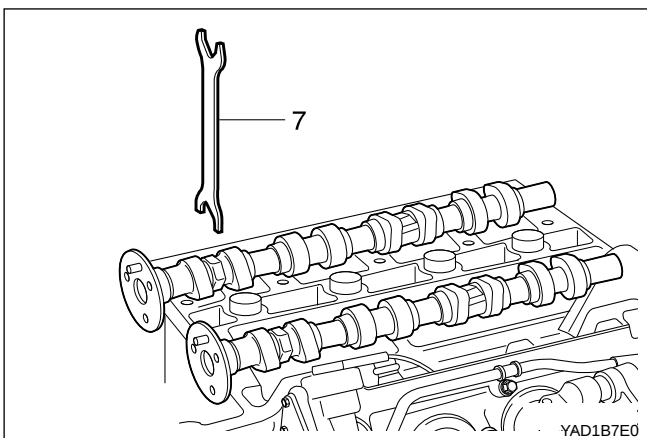
4. Remove the exhaust camshaft sprocket.

Installation Notice

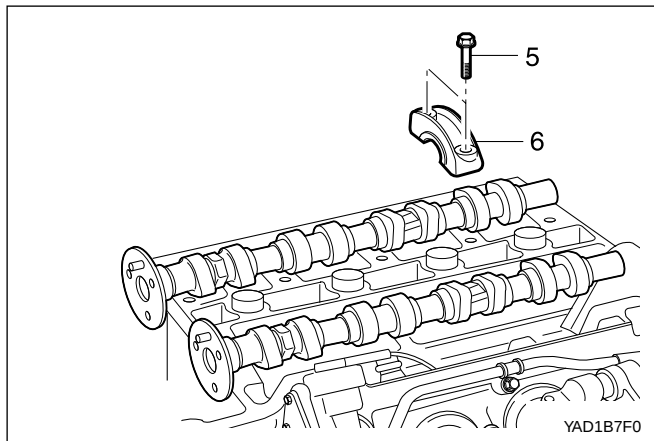
Tightening Torque	1st step: 18 - 22 N•m (13 - 16 lb-ft)
	2nd step: 60° ± 5°

Notice: The sprocket bolt is designed to be used only once, so always replace with new one.

5. Take off the timing chain from intake camshaft sprocket, and secure it not to fall down into the timing gear case.



6. Using the wrench (7), turn the camshaft until there is no resistance in camshaft bearing area.



7. Remove the bearing cap, and remove the intake and the exhaust camshaft.

Installation Notice

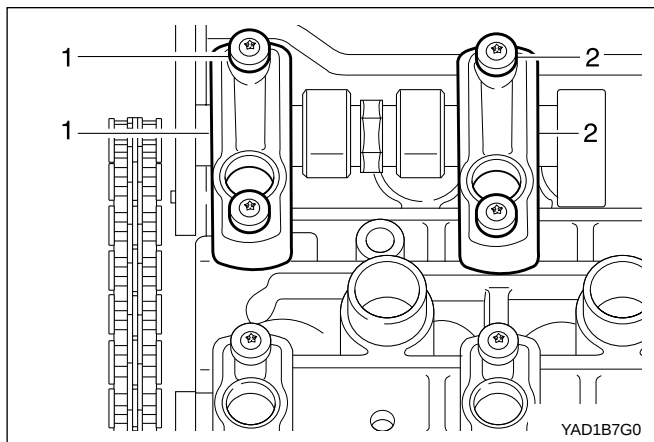
Tightening Torque	60 - 70 N•m (44 - 52 lb-ft)
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Notice: Check the numbers on the bearing cap not to be mixed up.

8. Apply the engine oil on the valve tappet and camshaft bearing.
9. Installation should follow the removal procedure in the reverse order.

Notice:

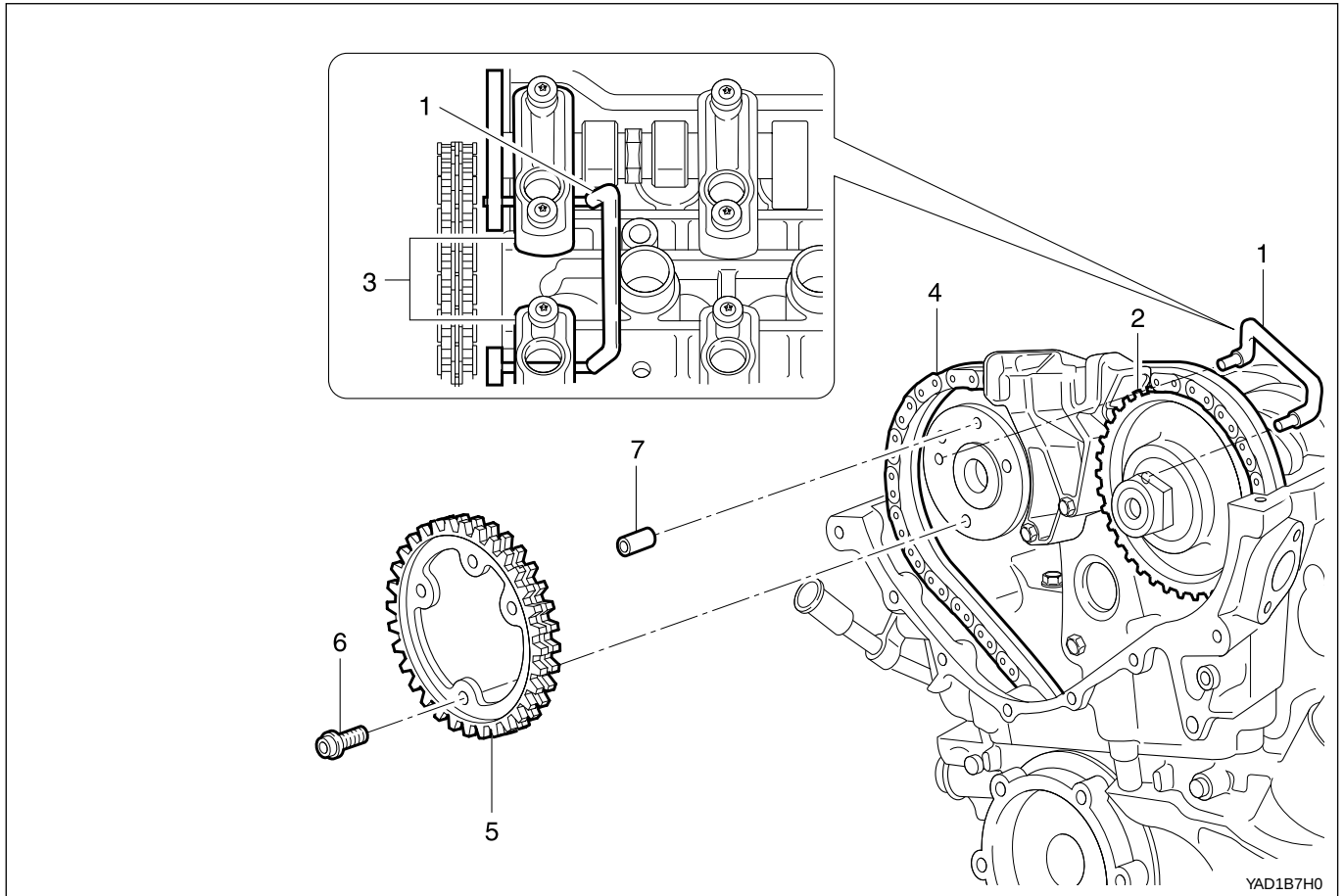
- Base circle of cam should contact with the valve tappet.
- Install the camshaft bearing caps according to the numbers on the cylinder head cast and bearing cap.



10. Check the camshaft timing position.

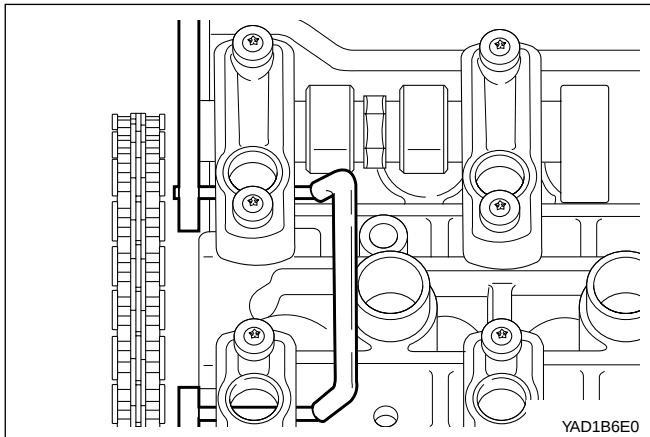
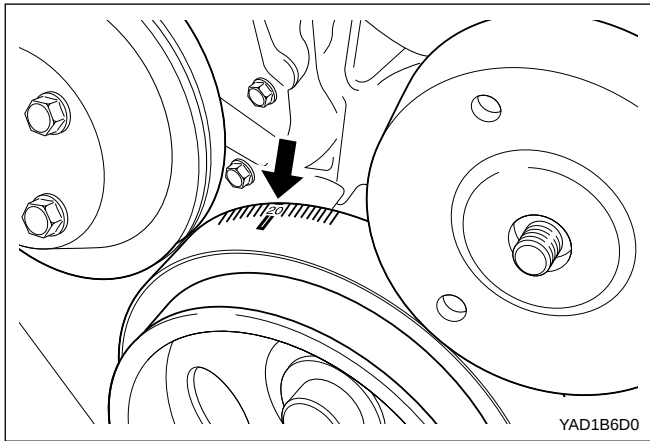
CAMSHAFT TIMING POSITION

Preceding Work: Removal of cylinder head cover
Removal of cylinder head front cover



- 1 Holding Pin 111 589 03 15 00
- 2 Intake Camshaft Sprocket
- 3 Camshaft Bearing Cap
- 4 Timing Chain
- 5 Exhaust Camshaft Sprocket

- 6 Bolt (M7 X 13, 3 pieces)
..... 1st step 18 - 22 NSm (13 - 16 lb-ft)
2nd step 60 ° ± 5 ° rotation added
- 7 StratePin



Tools Required

111 589 03 15 00 Holding Pin

Inspection Procedure

1. Position the NO.1 cylinder piston to ATDC 20° by turning the crankshaft.

Notice: When the ATDC 20° mark on vibration damper is aligned with timing gear case cover, the intake and ex-haust cam of cylinder will make the slope to the center and will face up. In this way, the insert hole in NO.1 and NO.4 camshaft bearing cap will match in line with the flange hole for camshaft sprocket.

2. Check the timing as below procedure;
 - Check if the holding pin 111 589 03 15 00 can be inserted into the NO.1 and NO.4 bearing cap hole.
 - At this condition, check if the ATDC 20° mark on vibration damper aligns with the marker on the timing gear case.

Adjustment Procedure

1. Position the NO.1 cylinder to ATDC 20°.
2. Remove the chain tensioner.
3. Remove the exhaust camshaft sprocket.
4. Adjust the timing position with inserting the holding pin 111 589 03 15 00 into the NO.1 and NO.4 camshaft bearing cap hole and flange hole while rotating the camshaft by using wrench.
5. Install the chain to the intake camshaft sprocket.
6. Install the chain to the exhaust camshaft sprocket and tighten the bolt.

Installation Notice

Tightening Torque	1st step: 18 - 22 N•m (13 - 16 lb-ft)
	2nd step: 90° ± 5°

The sprocket bolt is designed to be used only once, so replace with new one.

7. Install the chain tensioner.

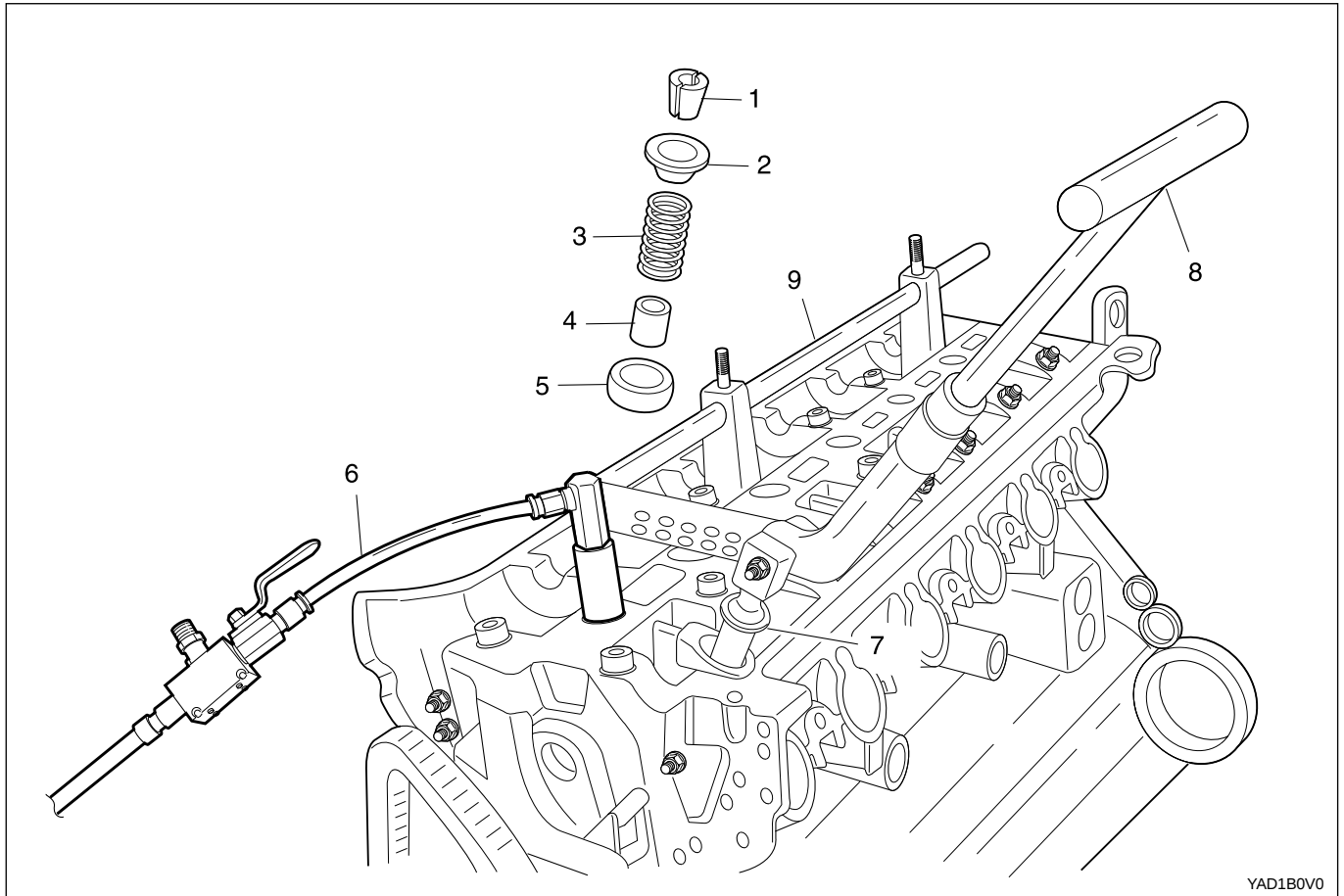
Installation Notice

Tightening Torque	Screw Plug	40 N•m (30 lb-ft)
	Tensioner Assembly	72 - 88 N•m (53 - 65 lb-ft)

8. Check the camshaft timing.

VALVE SPRING

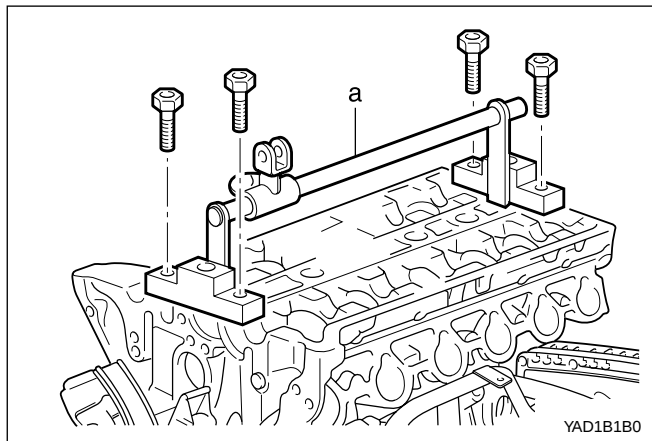
Preceding Work: Removal of camshaft
Removal of spark plug



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- 1 Valve Cotter
- 2 Valve Spring Retainer
- 3 Valve Spring
- 4 Valve Stem Seal
- 5 Lower Retainer

- a Lever Pusher 111 589 18 61 00
- b Thrust Piece 111 589 25 63 00
- c Connecting Hose DW 110 - 090
- d Supporting Bar 111 589 01 59 00



Tools Required

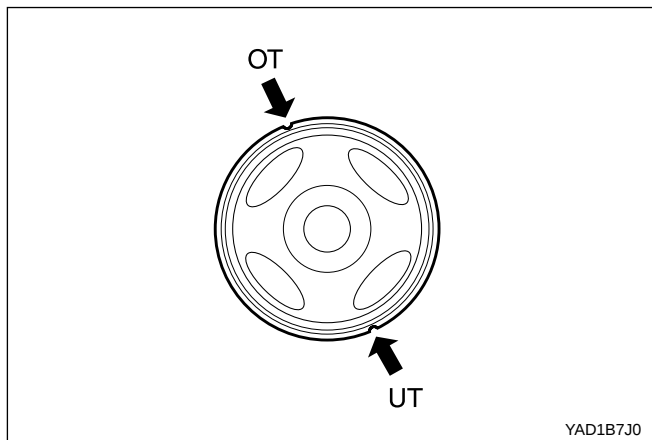
111 589 01 59 00	Supporting Bar
111 589 18 61 00	Lever Pusher
111 589 25 63 00	Thrust Piece
602 589 00 40 00	Engine Lock
DW110 - 090	Connecting Hose
DW110 - 100	Valve Tappet Remover

Removal & Installation Procedure

1. Place the supporting bar 111 589 01 59 00 (a) at the camshaft bearing cap and tighten them with the bearing cap bolt.

Installation Notice

Tightening Torque	22.5 - 27.5 N•m (16.6 - 20.3 lb-ft)
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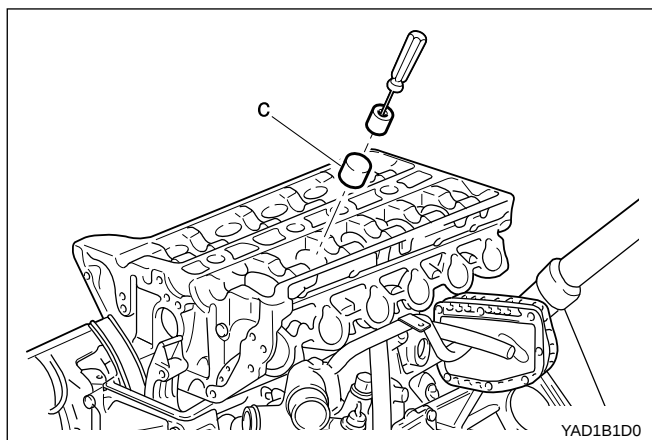


2. Turn the crankshaft to position the each cylinder piston at TDC.

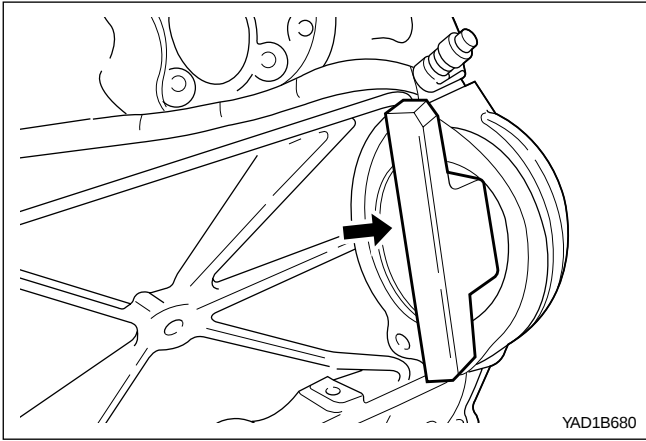
Tightening Torque	1st step: 18 - 22 N•m (13 - 16 lb-ft)
	2nd step: 90° ± 5°

Notice:

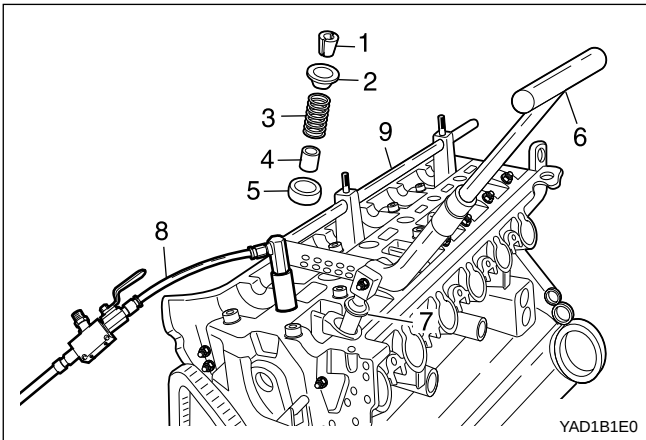
- Remove the valve spring only at TDC.
- Always rotate the crankshaft by holding the chain to prevent from timing chain damage and tangling, and for smooth rotation.



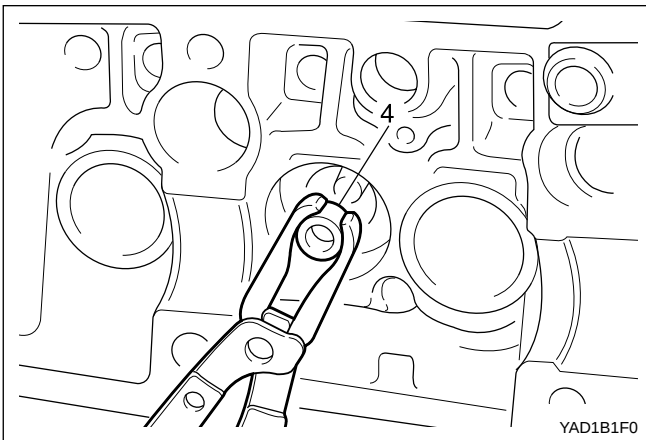
3. Remove the valve tappet using the valve tappet remover DW110 - 100.
4. Install the connecting hose DW110 - 090 (c) to the spark plug hole.



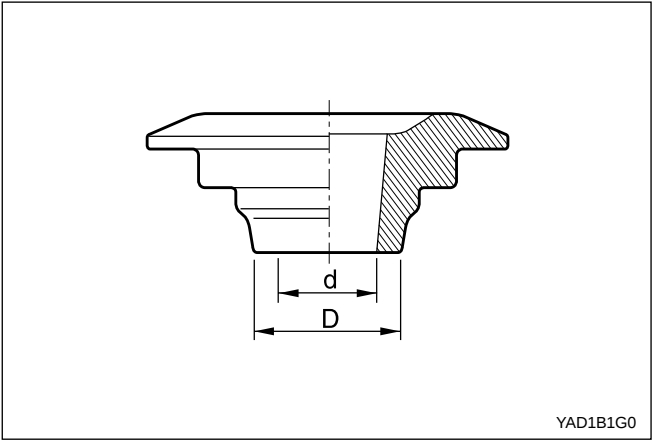
5. Install the engine lock 602 589 00 40 00 to the ring gear to prevent the crankshaft from rotating.
6. Blow up with compressed air.



7. Install the supporting bar 111 589 01 59 00 (d) and the lever pusher 111 589 18 61 00 (a).
8. Mount the thrust piece 111 589 25 63 00 (b) vertically to the valve spring retainer (2).
9. Press the valve spring (3) by using the lever pusher 111589 18 61 00 (a).
10. Remove the valve cotter (1) using the pincette.
11. Remove the upper retainer (2) and the valve spring (3).



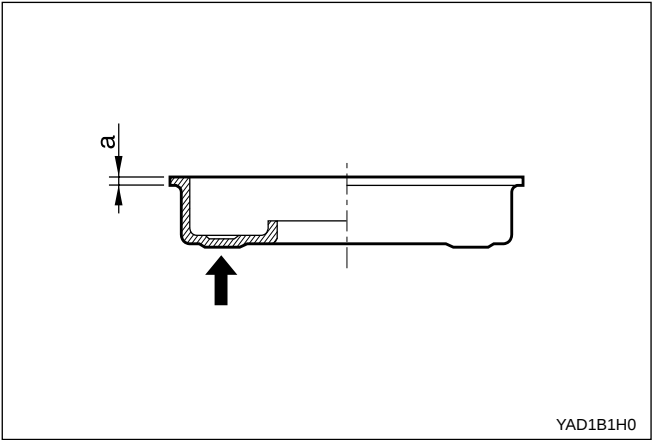
12. Remove the valve stem seal (4) and replace if necessary.
Notice: Check the valve stem seal for damage and replace if necessary.
13. Remove the lower retainer (5).
Notice: Check the retainer for damages and replace with a new one if necessary.
14. Installation should follow the removal procedure in the reverse order.



Test (Upper and Lower Valve Tappet and Valve Cotter)

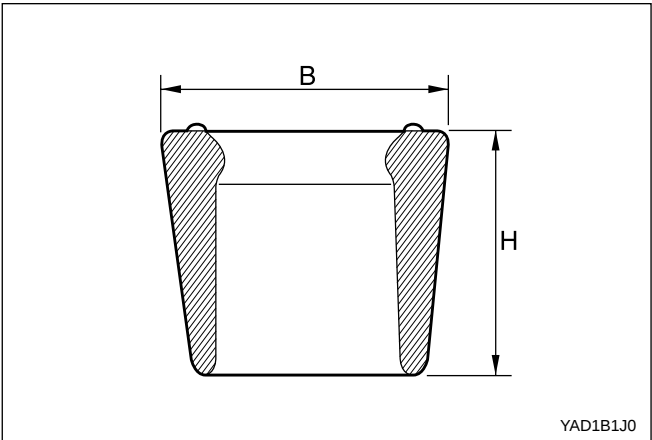
- Upper Valve Spring Retainer

Size (mm)	(d)	8.5
	(D)	12.3



- Lower Valve Spring Retainer

Size (mm)	(a)	0.8 - 1.0
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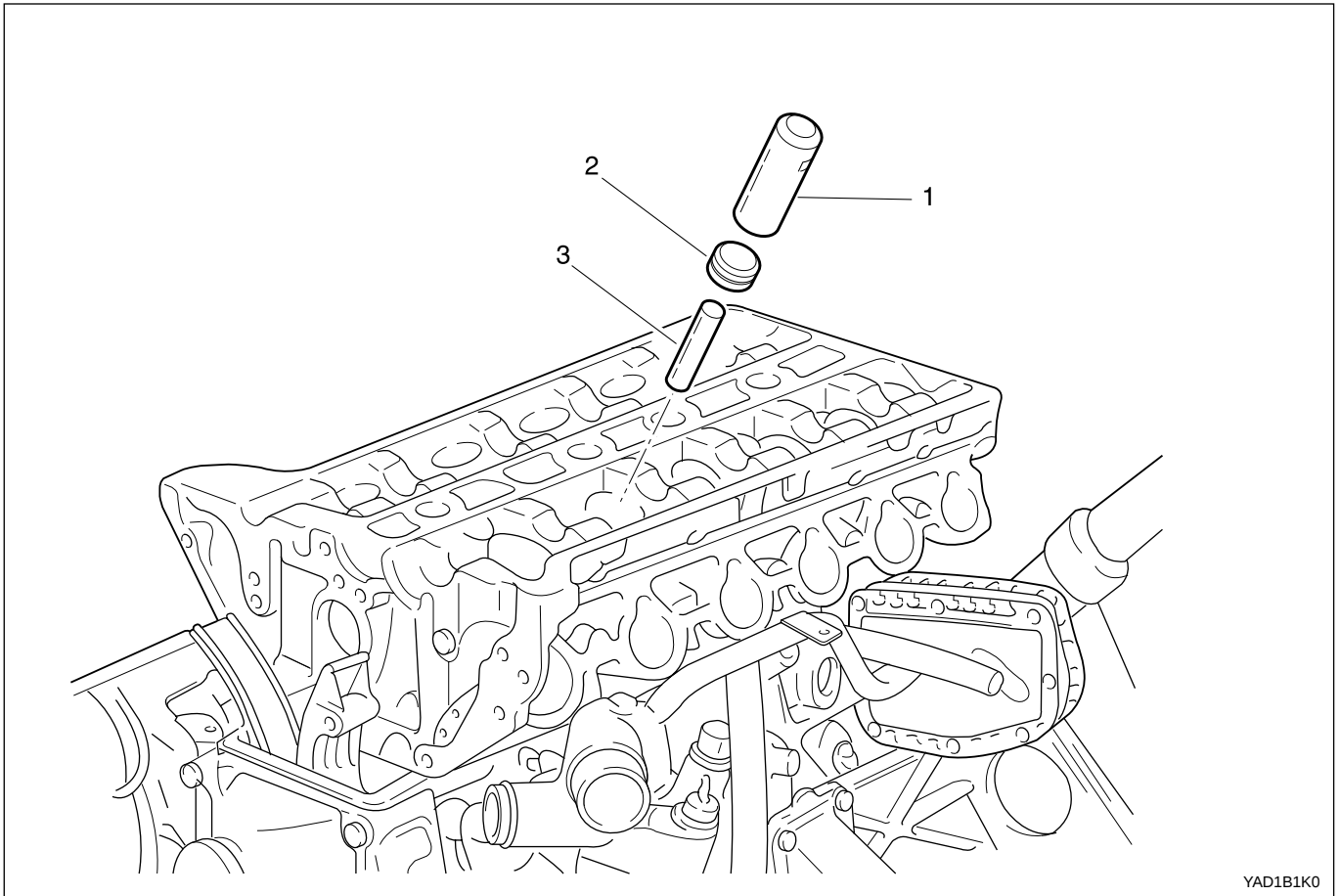


- Valve Cotter

Size (mm)	(B)	9.0
	(H)	9.2 - 9.8

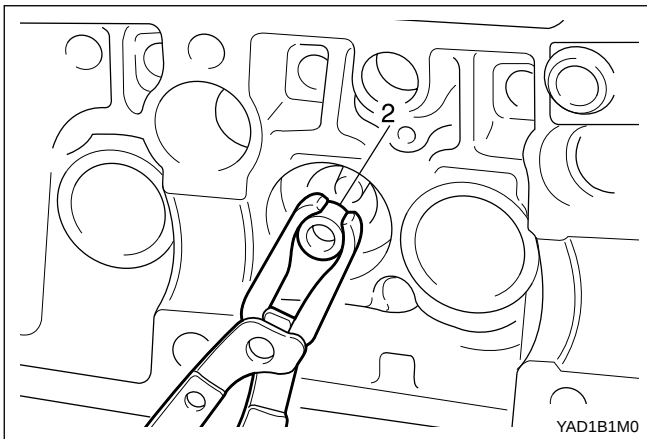
VALVE STEM SEAL

Preceding Work: Removal of valve spring



- 1 Drift 119 589 00 43 00
- 2 Valve Stem Seal

- 3 Protective Sleeve



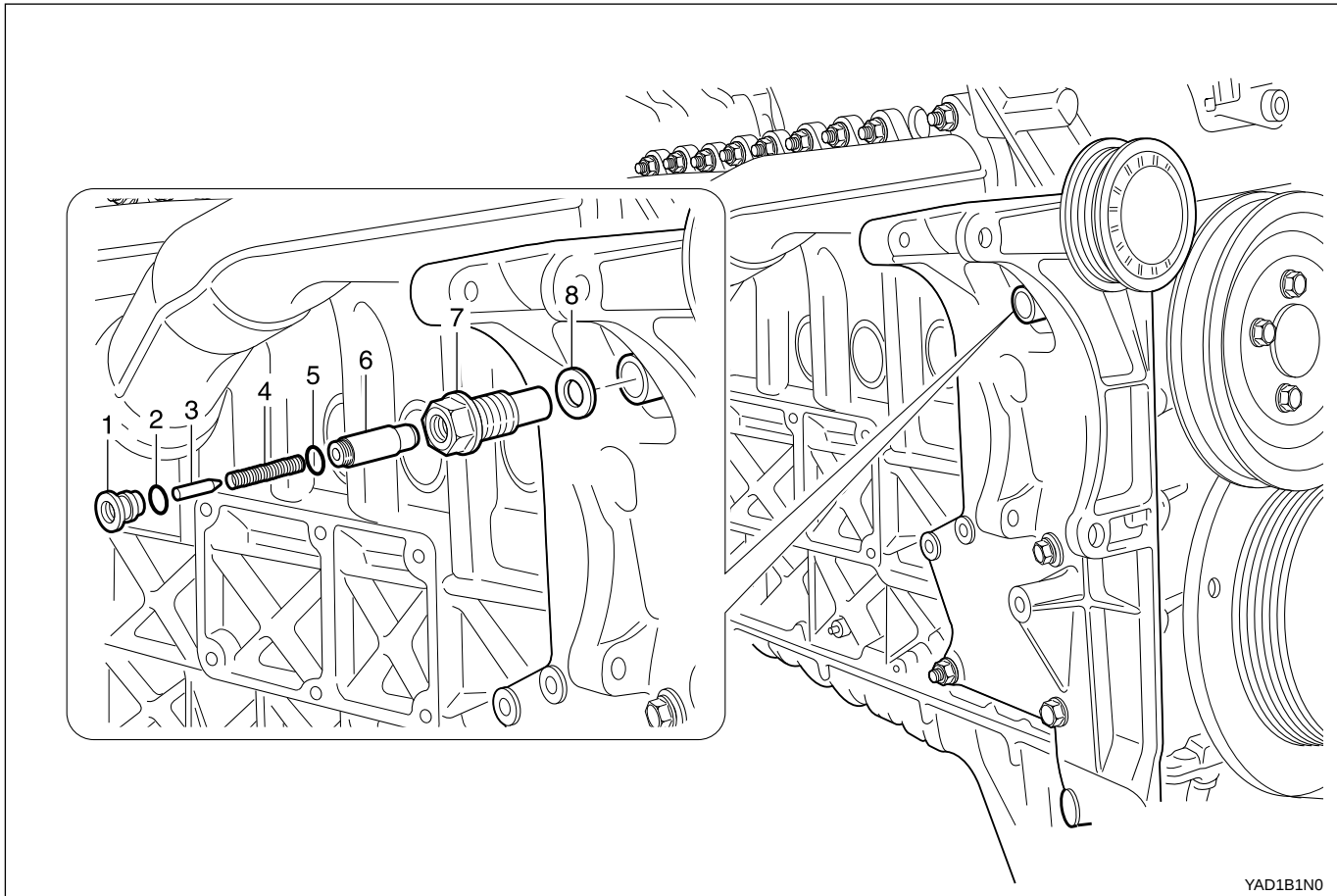
Tools Required

119 589 00 43 00 Drift

Replacement Procedure

1. Remove the valve stem seal (2) using the pliers.
Notice: Check the valve stem seal for damage and replace if necessary.
2. Coat the valve stem seal with oil and assemble it with the protective sleeve.
3. Insert the valve stem seal by pressing it with the drift 119 589 00 43 00.

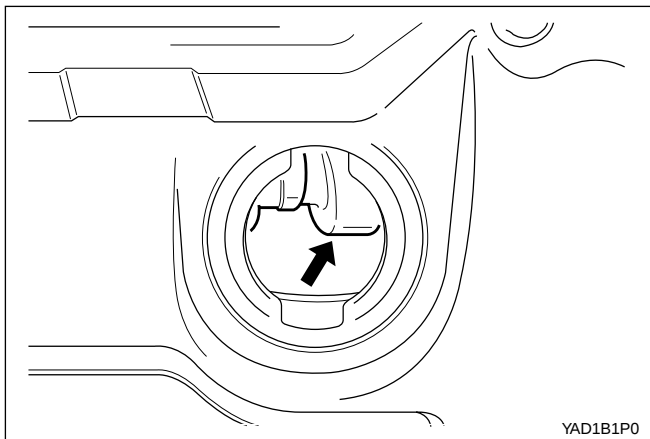
CHAIN TENSIONER



YAD1B1N0

- | | | |
|---|--------------------|-------------------|
| 1 | Screw Plug | 40 N•m (30 lb-ft) |
| 2 | Seal | |
| 3 | Filler Pin | |
| 4 | Compression Spring | |
| 5 | Snap Ring | |

- | | |
|---|-----------------------------------|
| 6 | Thrust Pin |
| 7 | Chain Tensioner Housing |
| | 72 - 88 N•m (53 - 65 lb-ft) |
| 8 | Seal |



YAD1B1P0

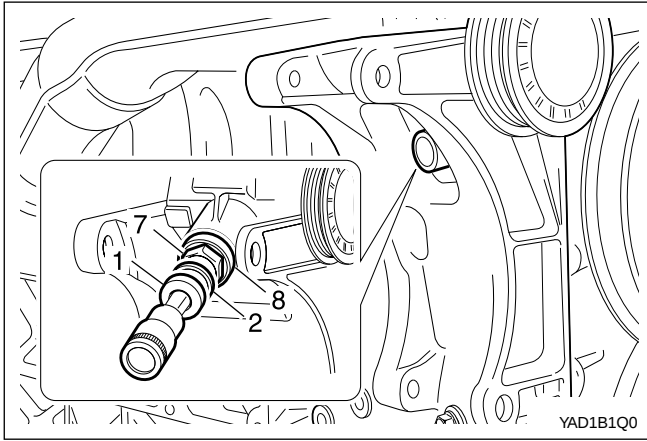
Removal Procedure

1. Position the number 1 cylinder to ATDC 20 °.

Notice: Remove the oil filler cap at adjustment position, and check whether the intake camshaft cam's lobe (arrow) stays in the upper side.

2. Cover the generator with a clean cloth.
3. Release the tension by unscrewing the screw plug once.

Notice: In case that the tension is reduced by unscrewing the screw plug, reinstall after completely removing the chain tensioner. If the chain tensioner is tightened again without completely reducing its tension, then the snap ring doesn't return to the original position and the tension gets exceeded.

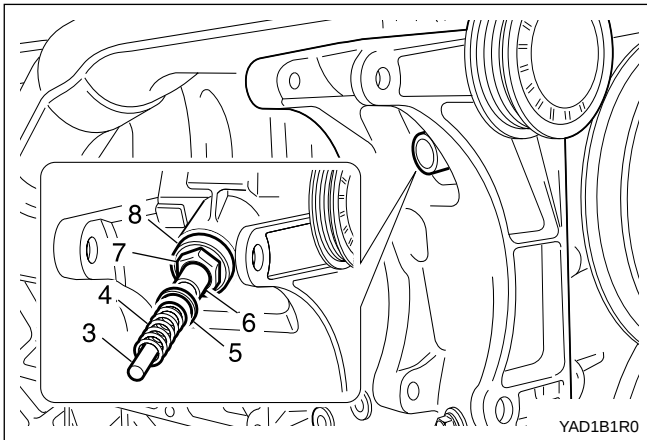


4. Carefully unscrew the screw plug (1), and remove the seal (2).

Notice:

- For the removal of screw plug, be careful that it can be jumped out due to the force of compression spring.
- Remove the screw plug only when the seal and compression spring are damaged.

5. Carefully remove the filler pin (3), compression spring (4), snap ring (5), and the thrust pin (6).



6. Remove the chain tensioner housing (7) and the seal (8).

Installation Procedure

1. Connect the thrust pin (6) and the snap ring (5) to the chain tensioner housing (7).

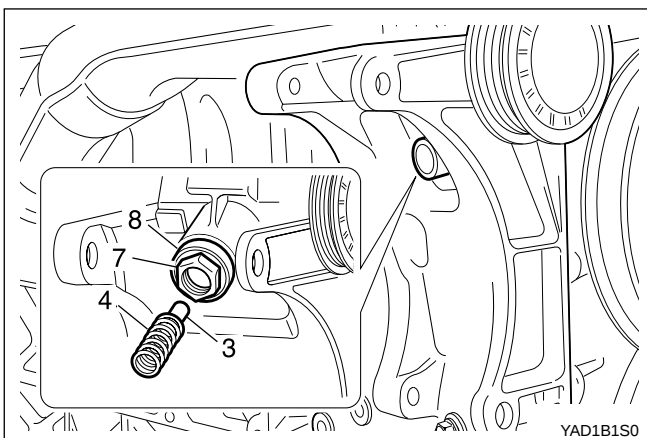
Notice: When connecting the thrust pin, push in the thrust pin far enough so that it doesn't protrude at the chain tensioner housing.

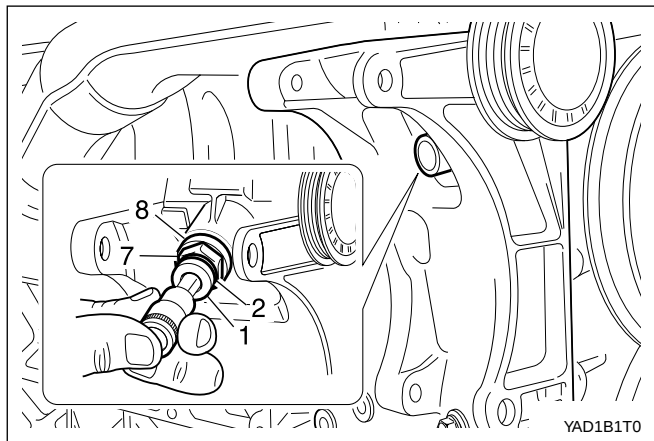
2. Install the chain tensioner housing (7), thrust pin (6), snap ring (5), and the seal (8).

Installation Notice

Tightening Torque	72 - 88 N•m (53 - 65 lb-ft)
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3. Insert the compression spring (4) with the filler pin (3) into chain tensioner housing.





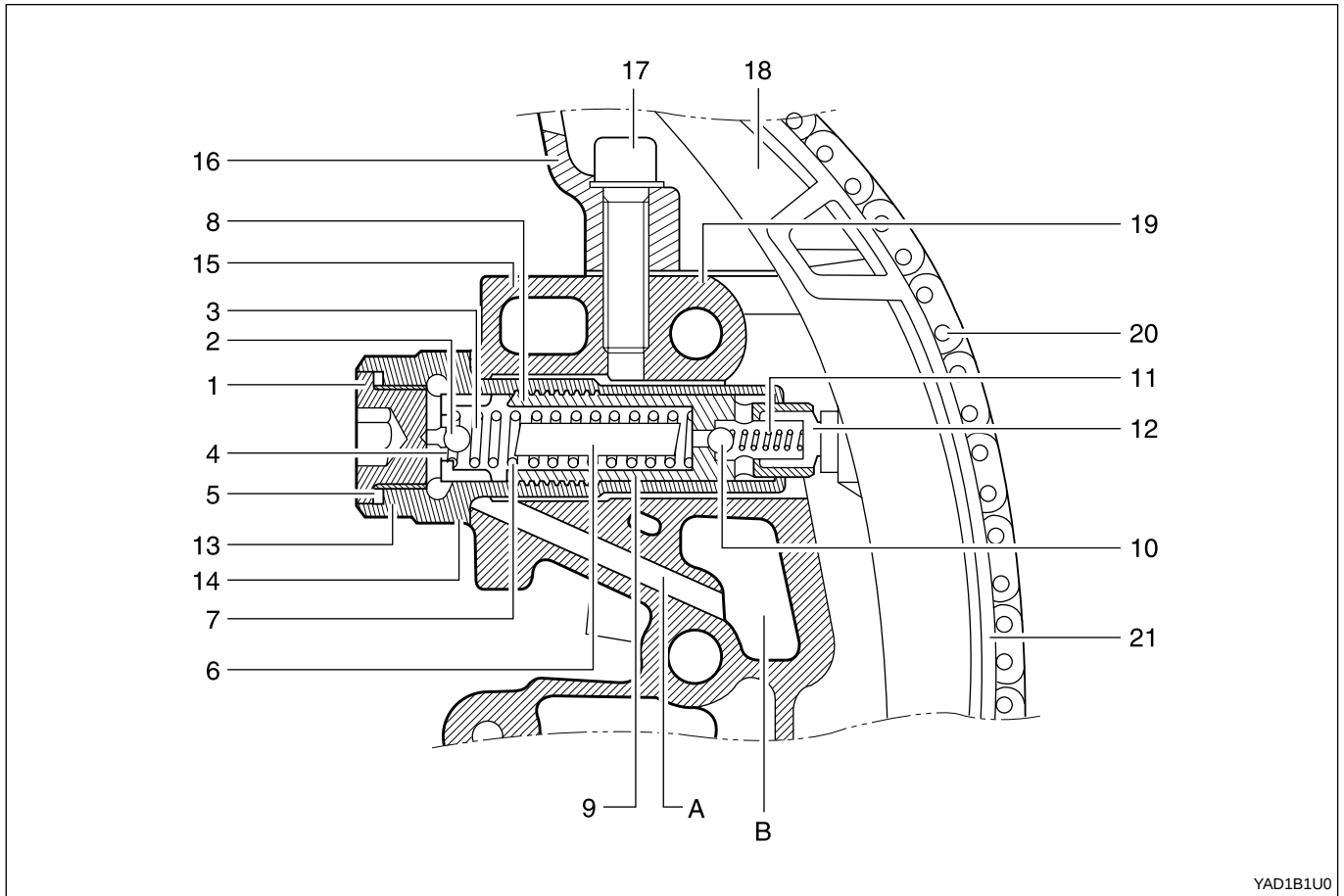
4. Lightly apply the grease to the seal (2) and install the screw plug (1).

Installation Notice

Tightening Torque	40 N•m (30 lb-ft)
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5. Check for leaks by operating the engine.

Sectional View

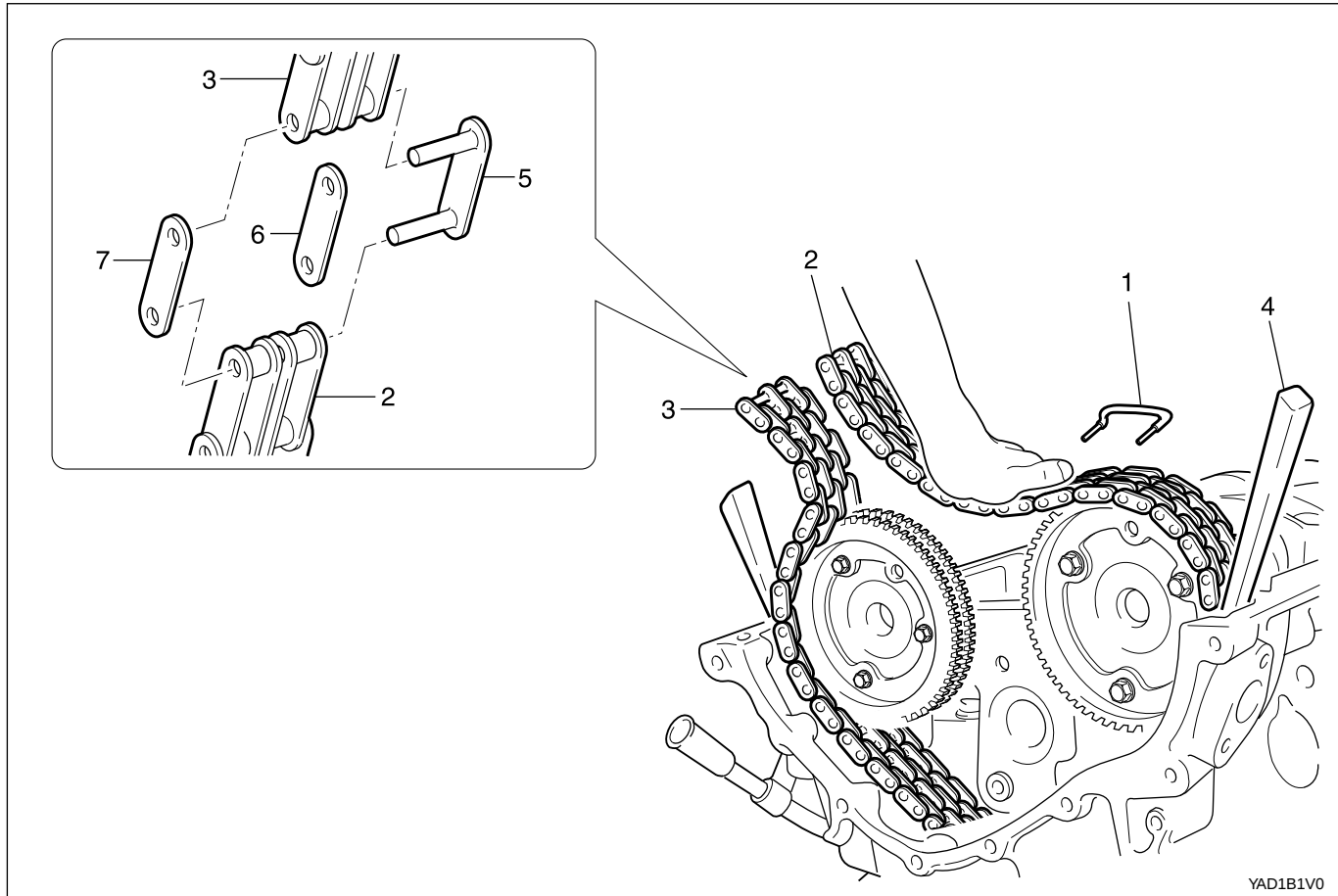


YAD1B1U0

- | | |
|---------------------------|---|
| 1 Screw Plug | 13 Chain Tensioner Housing |
| 2 Ball (Nonreturn Valve) | 14 Seal |
| 3 Compression Spring | 15 Timing Gear Case Cover |
| 4 Ball Guide | 16 Cylinder Head |
| 5 Seal (Aluminum) | 17 Bolt / Washer |
| 6 Filler Pin | 18 Tensioning Rail |
| 7 Compression Spring | 19 Cylinder Head Gasket |
| 8 Snap Ring | 20 Timing Chain |
| 9 Thrust Pin | 21 Tensioning Rail Base (Sliding Surface) |
| 10 Ball (Nonreturn Valve) | |
| 11 Compression Spring | A Oil Supply Hole |
| 12 Thrust Piece | B Chain Tensioner Oil Storage Hole |

TIMING CHAIN

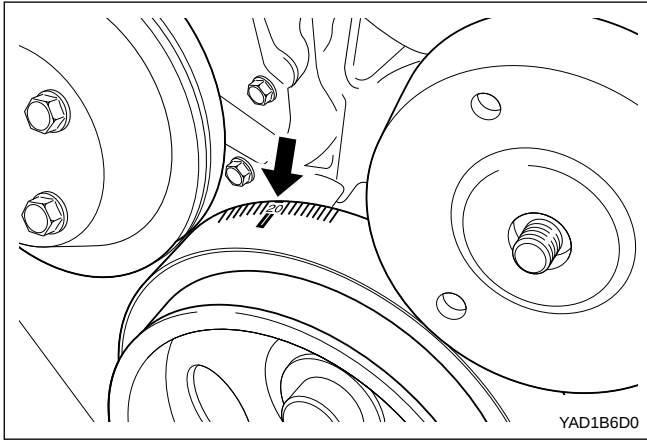
Preceding Work: Removal of cylinder head cover
Removal of spark plug



YAD1B1V0

- 1 Pin
- 2 New Timing Chain
- 3 Timing Chain (Used)
- 4 Wedge

- 5 Link
- 6 Center Plate
- 7 Outer Plate



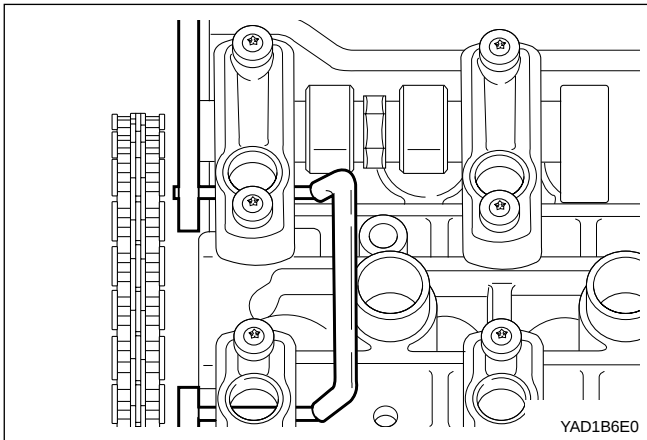
Tools Required

000 589 58 43 00 Chain Assembly

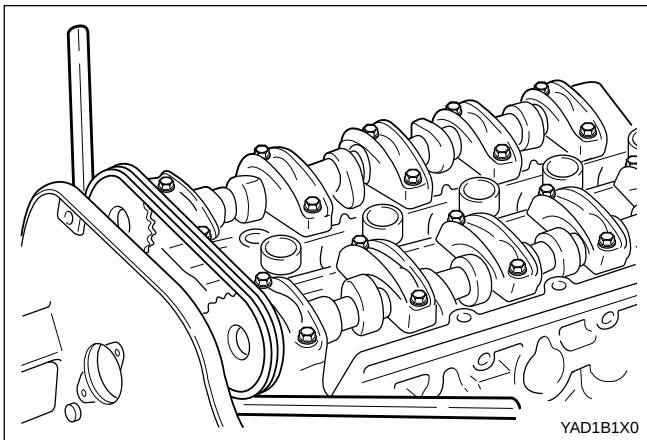
111 589 03 15 00 Holding Pin

Replacement Procedure

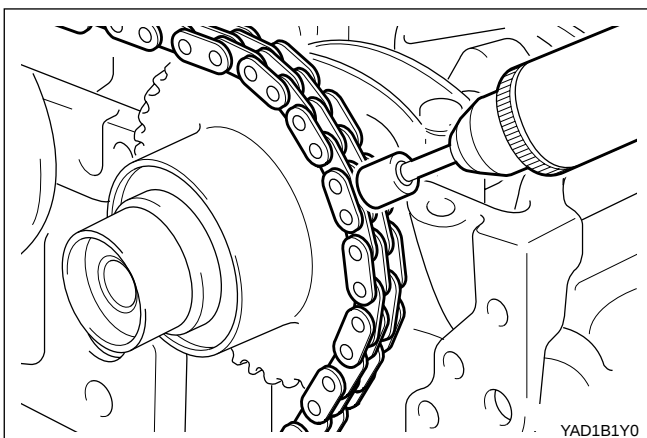
1. Position the NO.1 cylinder to ATDC 20 °.



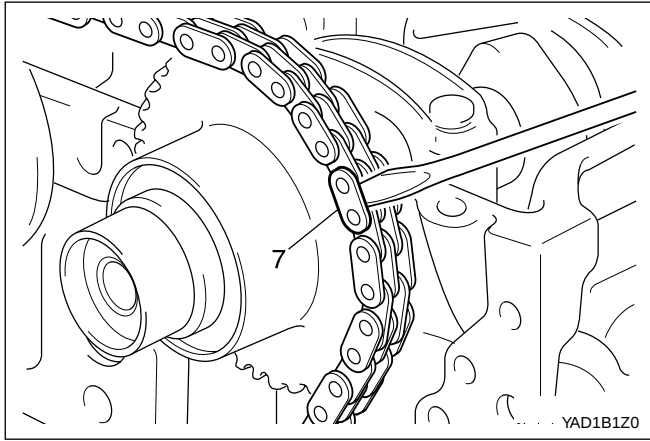
2. Insert the holding pin 111 589 03 15 00 to the intake and exhaust camshaft flange not to rotate camshaft.
3. Remove the chain tensioner.



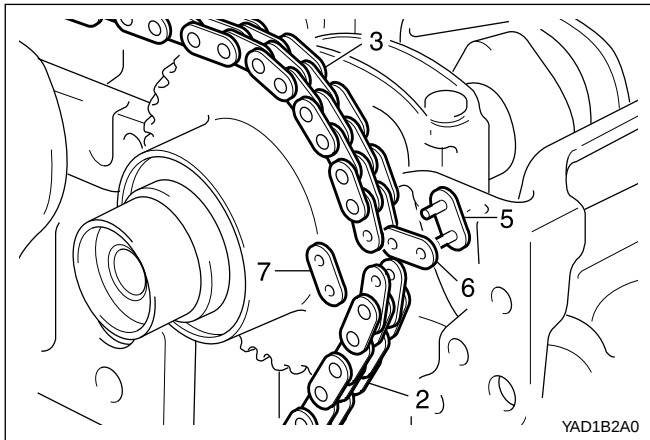
4. Mount the wedges to both sides of the camshaft sprocket as shown in the figure.



5. Cover the chain housing with a clean cloth, and grind off the timing chain pin from the intake camshaft sprocket with the grinder.



6. Remove the outer plate (7) with the screw driver and remove the link (5).



7. Connect the new timing chain (2) to the used timing chain (3) with the link (5), center plate (6), thickness 1.6 mm), and the outer plate (7).

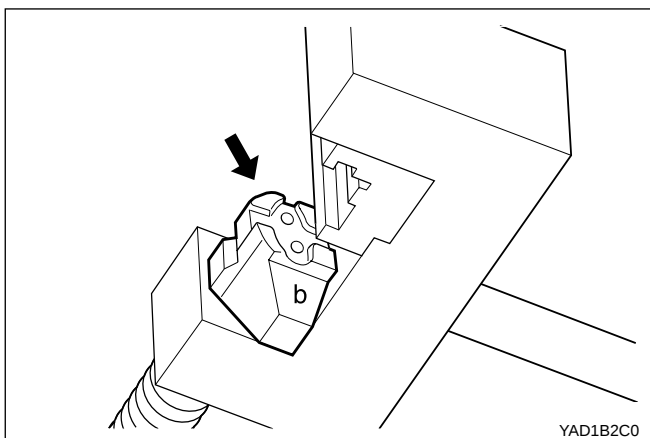
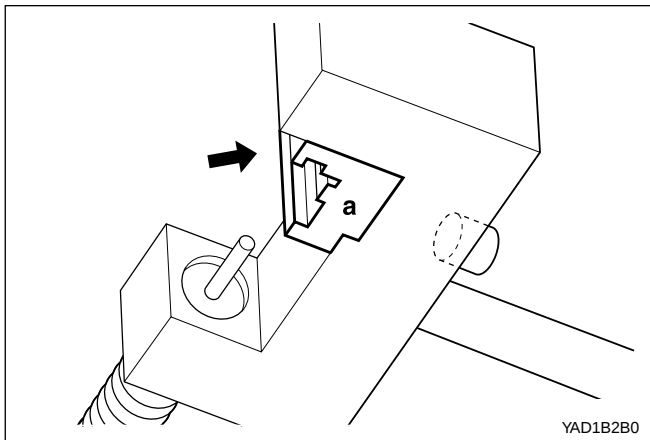
8. Rotate the crankshaft in the direction if engine revolution by pressing the new timing chain against the exhaust camshaft sprocket to prevent it to be tangled.

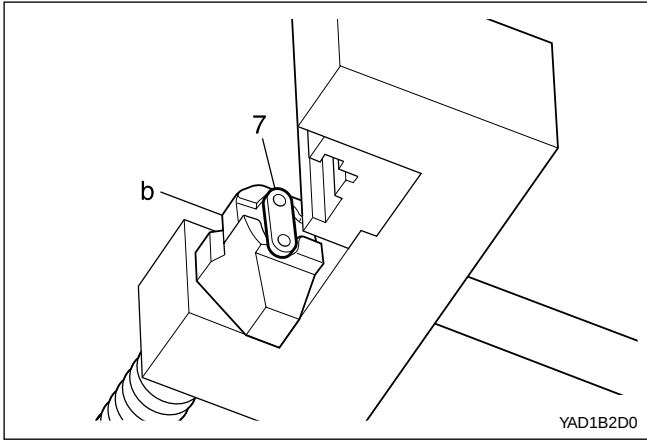
Notice: Be sure to remove the wedge before cranking the engine.

9. Take out the used timing chain out from the chain housing.

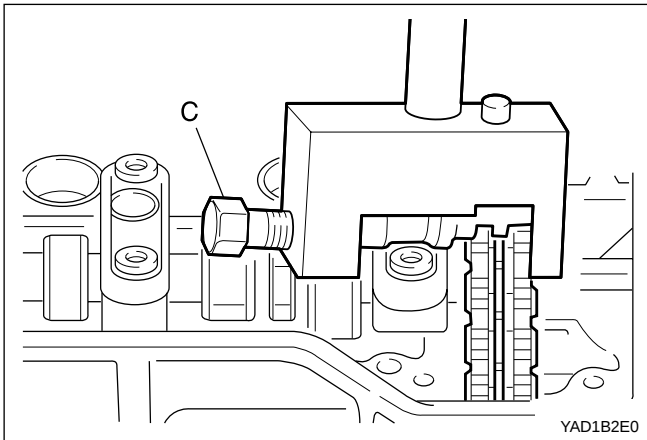
10. Connect both separators of the new timing chain with the link (5) and the center plate (6).

11. Install the jaw (a) and the thrust piece (b) to the assembly tool as shown in the figures.

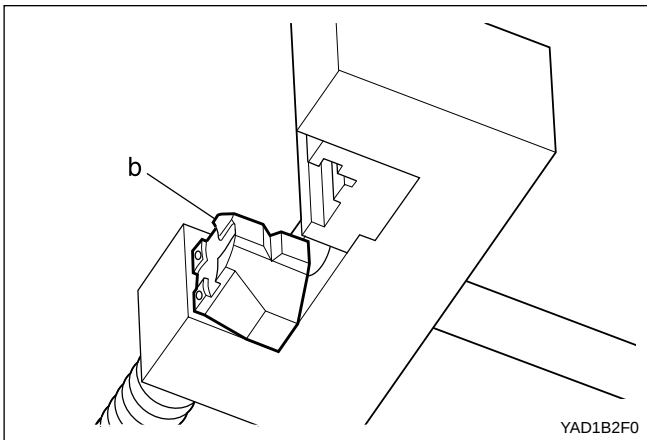




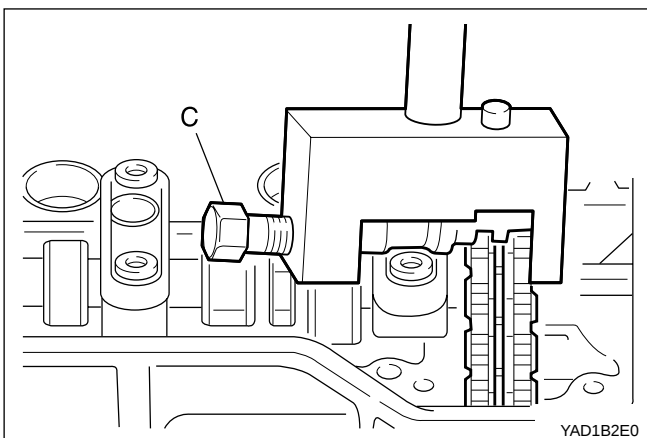
12. Place the outer plate (7, thickness 1.2 mm) inside the thrust piece (b).



13. Install the chain assembly 000 589 58 43 00 above the link and tighten the spindle (c) until a block is felt.
14. Place the chain assembly 000 589 58 43 00.



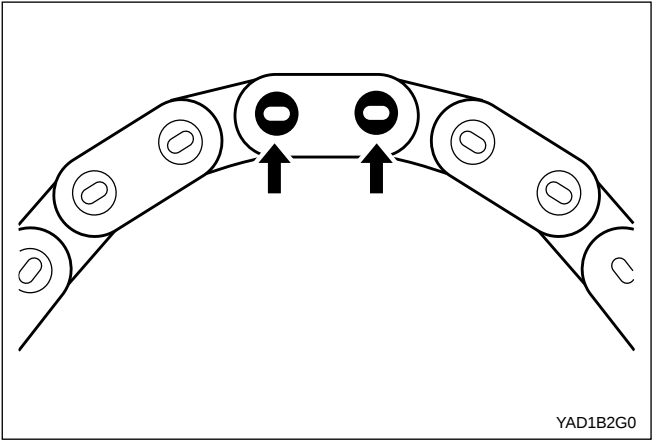
15. Replace the thrust piece (b) as shown in the figure.



16. Install the chain assembly 000 589 58 43 00 to the link pin and tighten the spindle (c).

Installation Notice

Tightening Torque	30 N•m (22 lb-ft)
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- 17. Rivet the link pin.
Check the condition and it again if necessary.
- 18. Install the chain tensioner.

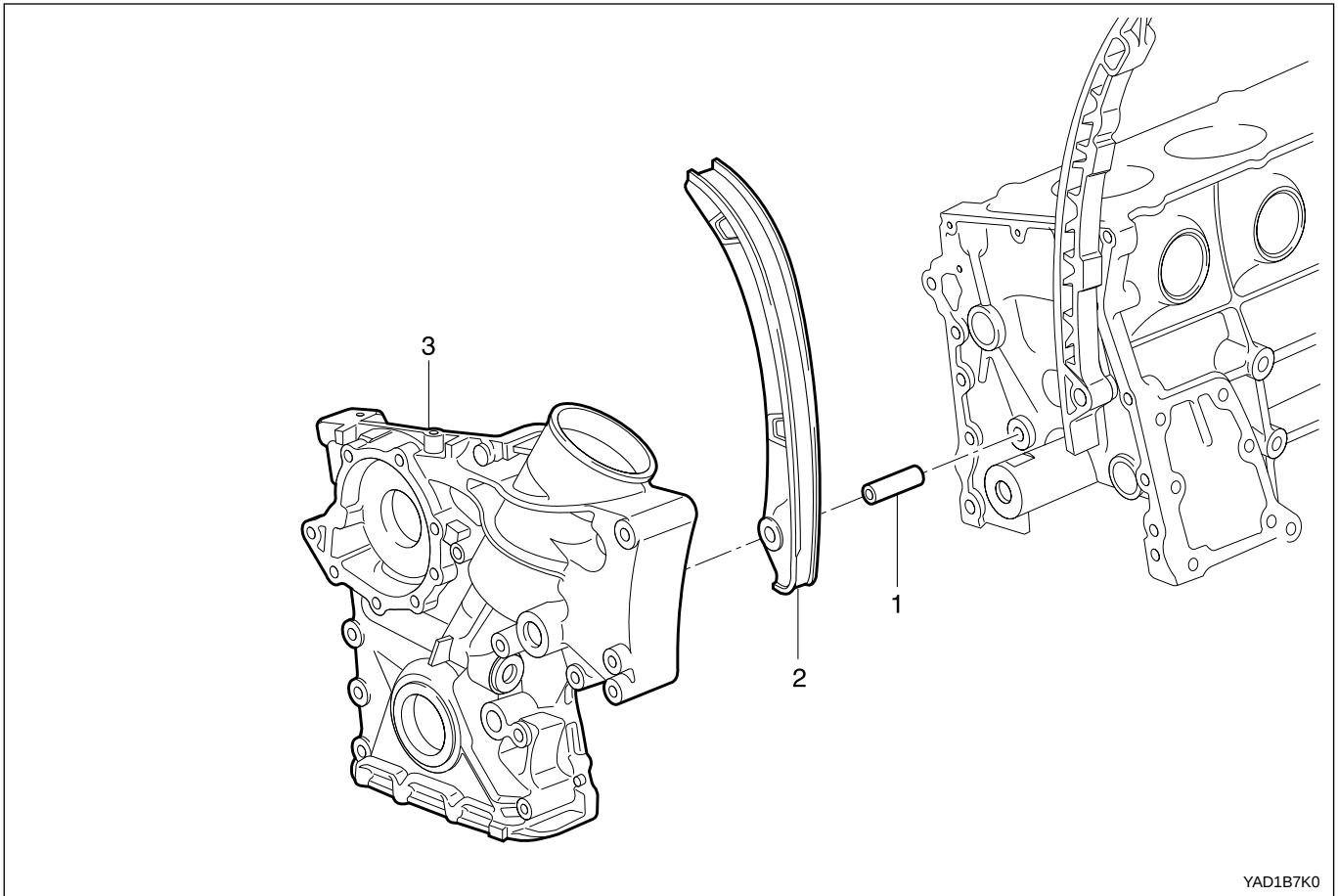
Installation Notice

Tightening Torque	Screw Plug	40 N•m (30 lb-ft)
	Tensioner Assembly	72 - 88 N•m (53 - 65 lb-ft)

- 19. Check the camshaft timing position.

TENSIONING RAIL

Preceding Work: Removal of cylinder head



YAD1B7K0

- 1 Sliding Rail Pin
- 2 Sliding Rail

- 3 Timing Gear Case Cover

Removal & Installation Procedure

1. Remove the timing gear case cover (3).

Notice: Be careful not to damage the gasket.

2. Remove the sliding rail (1) from the sliding rail pin (2).

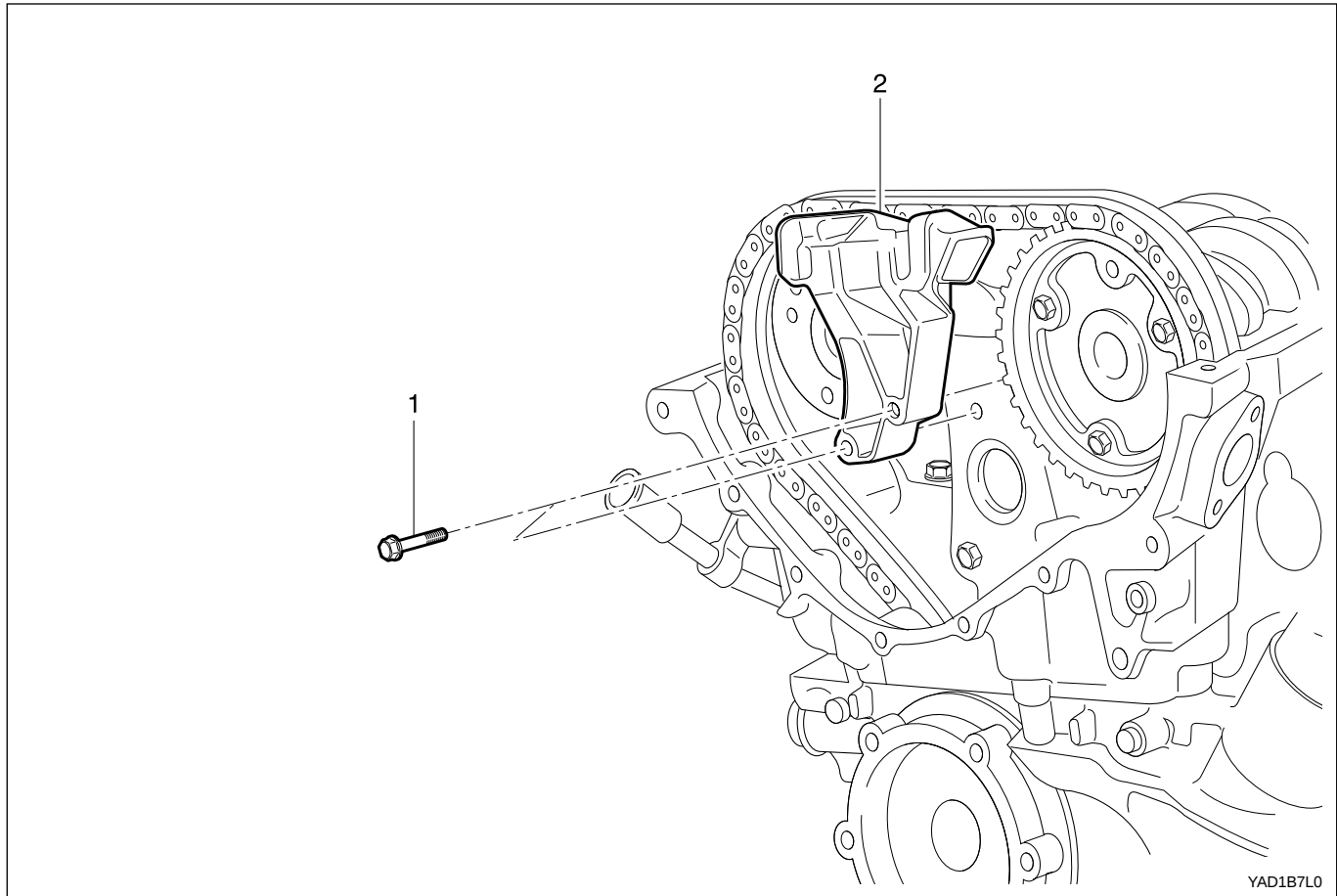
Notice:

- Replace the plastic guide (2) if it is damaged.
- For installation, exactly align the plastic guide (2) with the sliding rail (1).

3. Installation should follow the removal procedure in the reverse order.

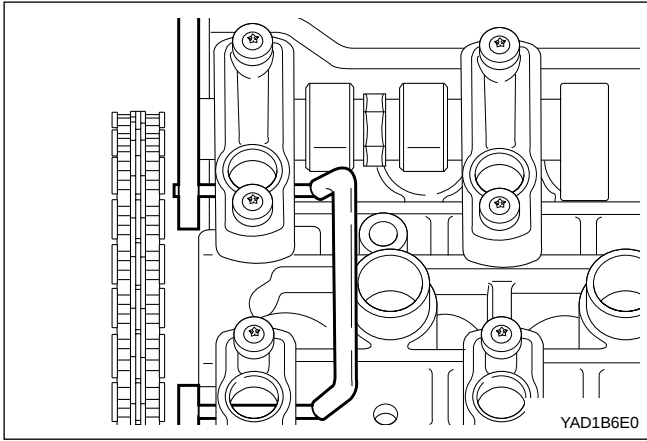
CYLINDER HEAD GUIDE RAIL

Preceding Work: Removal of cylinder head front cover



1 Bolt (M6 X 45, 2 pieces)
..... 9 - 11 N•m (80 - 97 lb-in)

2 Guide Rail



Tools Required

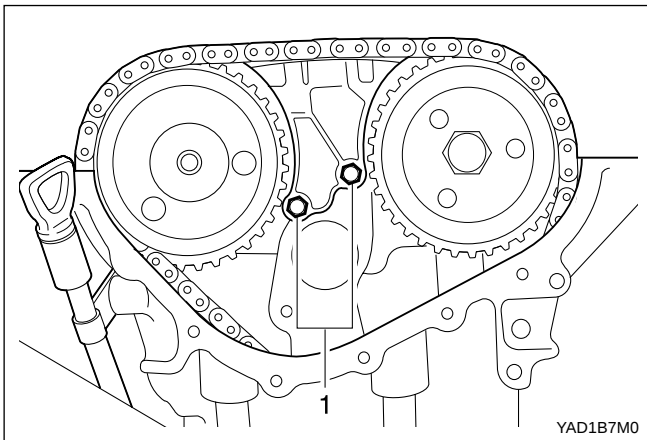
111 589 03 15 00 Holding Pin

Removal & Installation Procedure

1. Position the number 1 cylinder to ATDC 20° guide rail.
2. Install the holding pin 111 589 03 15 00 into the no.1 and no.6 bearing cap hole.
3. Remove the chain tensioner.

Installation Notice

Tightening Torque	Screw Plug	40 N•m (30 lb-ft)
	Tensioner Assembly	72 - 88 N•m (53 - 65 lb-ft)



4. Unscrew the bolt (1) and remove the guide rail.

Installation Notice

Tightening Torque	9 - 11 N•m (80 - 97 lb-ft)
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5. Installation should follow the removal procedure in the reverse order.