

Last Modified: 12-04-2024	6.11:8.1.0	Doc ID: RM100000002BG8V
Model Year Start: 2023	Model: Prius Prime	Prod Date Range: [03/2023 -]
Title: M20A-FXS (ENGINE MECHANICAL): CAMSHAFT: INSTALLATION; 2023 - 2024 MY Prius Prius Prime [03/2023 -]		

INSTALLATION

CAUTION / NOTICE / HINT

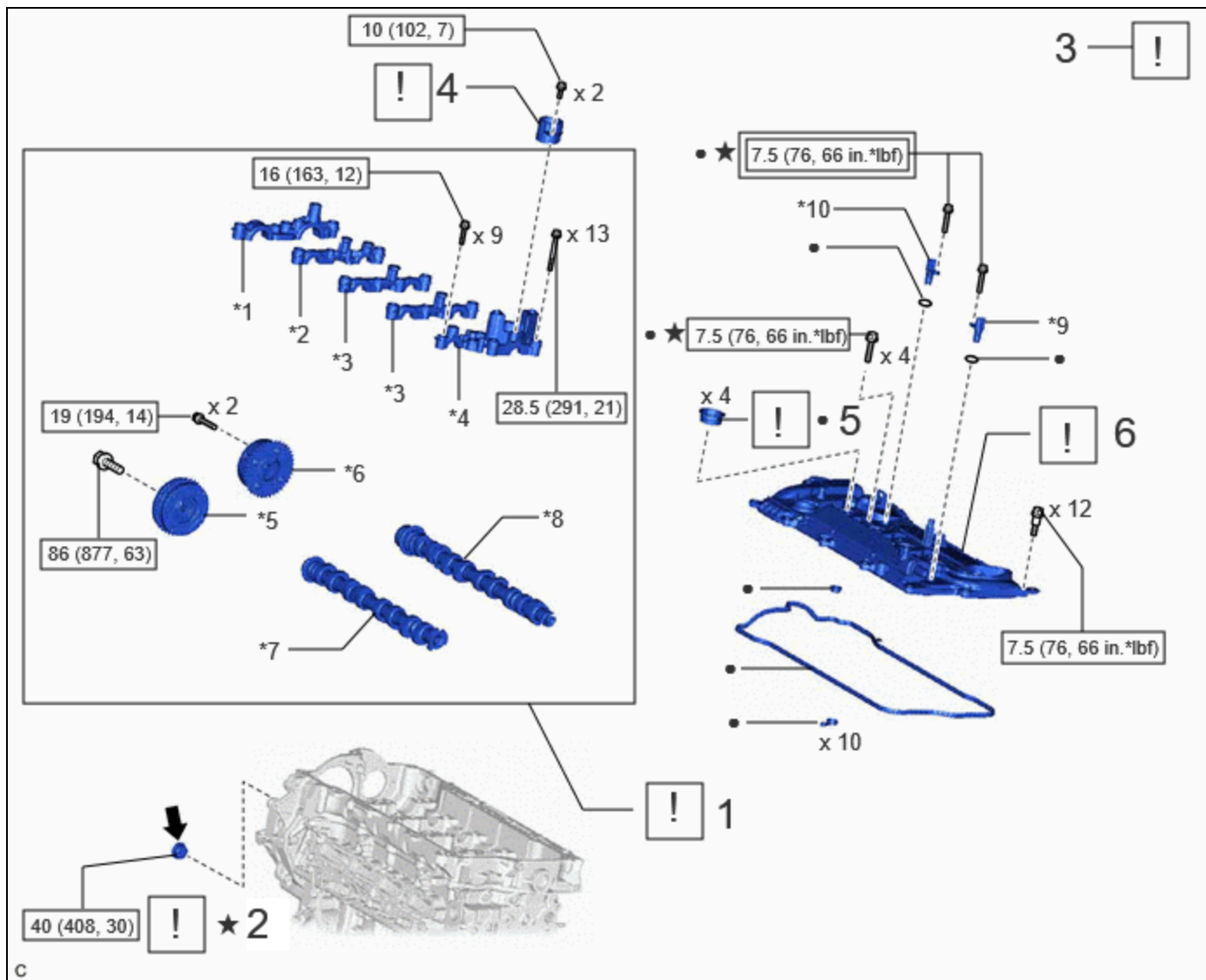
NOTICE:




This procedure includes the installation of small-head bolts. Refer to Small-Head Bolts of Basic Repair Hint to identify the small-head bolts.




Click here [INFO](#)

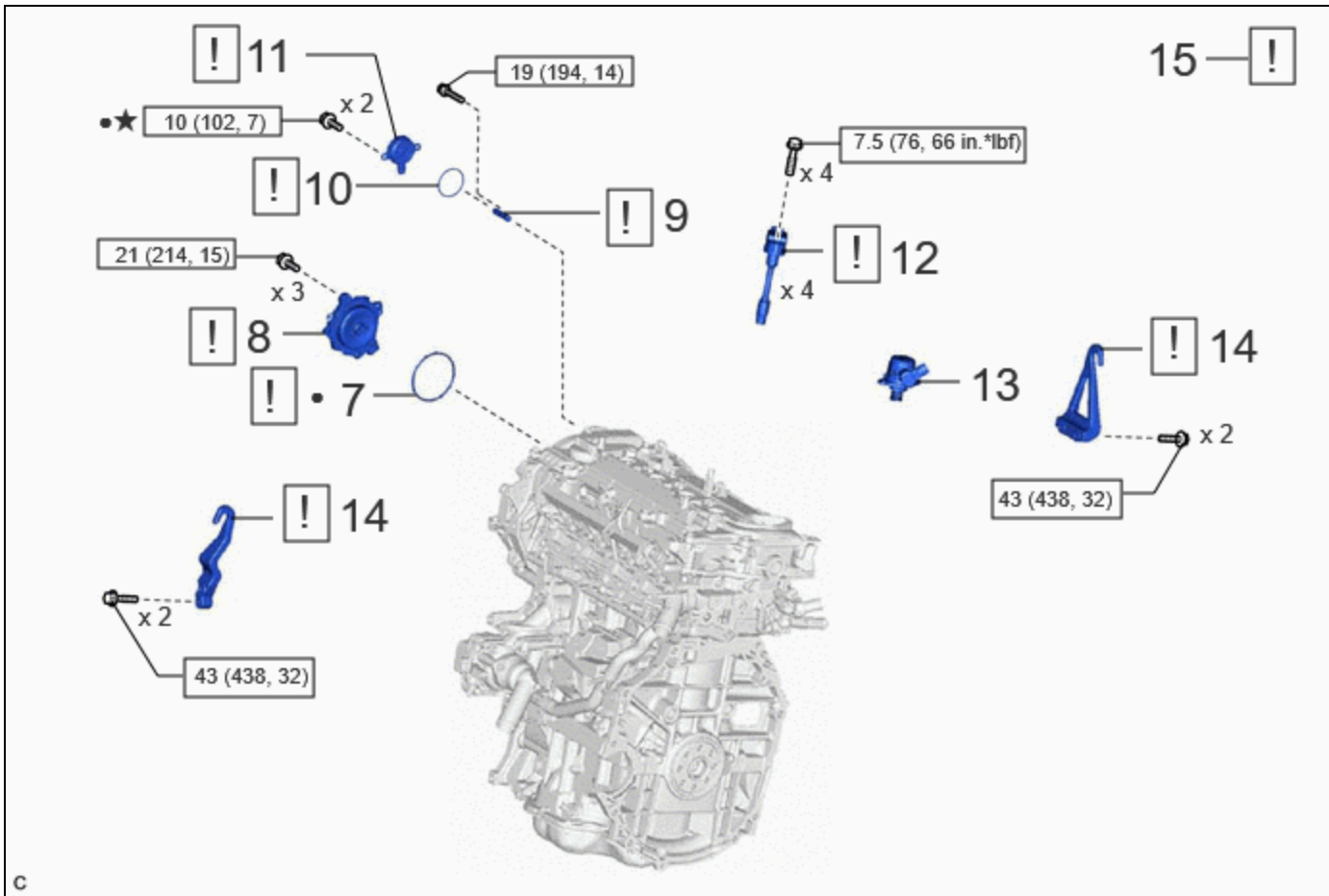
CAUTION / NOTICE / HINT

COMPONENTS (INSTALLATION)



	PROCEDURE	PART NAME CODE			
1	CAMSHAFT	-	INFO	-	-
2	STRAIGHT SCREW PLUG	-	INFO	-	-
3	SET NO. 1 CYLINDER TO TDC (COMPRESSION)	-	INFO	-	-
4	FUEL PUMP LIFTER GUIDE	23477	INFO	-	-
5	SPARK PLUG TUBE GASKET	11193	INFO	-	-
6	CYLINDER HEAD COVER SUB-ASSEMBLY	11201	INFO	-	-

*1	NO. 1 CAMSHAFT BEARING CAP	*2	NO. 2 CAMSHAFT BEARING CAP
*3	NO. 3 CAMSHAFT BEARING CAP	*4	NO. 4 CAMSHAFT BEARING CAP
*5	CAMSHAFT TIMING GEAR ASSEMBLY	*6	CAMSHAFT TIMING EXHAUST GEAR ASSEMBLY
*7	INTAKE CAMSHAFT SUB-ASSEMBLY	*8	EXHAUST CAMSHAFT SUB-ASSEMBLY
*9	CAMSHAFT POSITION SENSOR (for Intake Side)	*10	CAMSHAFT POSITION SENSOR (for Exhaust Side)
	Tightening torque for "Major areas involving basic vehicle performance such as moving/turning/stopping": N*m (kgf*cm, ft.*lbf)		N*m (kgf*cm, ft.*lbf): Specified torque
•	Non-reusable part		Adhesive 1324
★	Precoated part	-	-



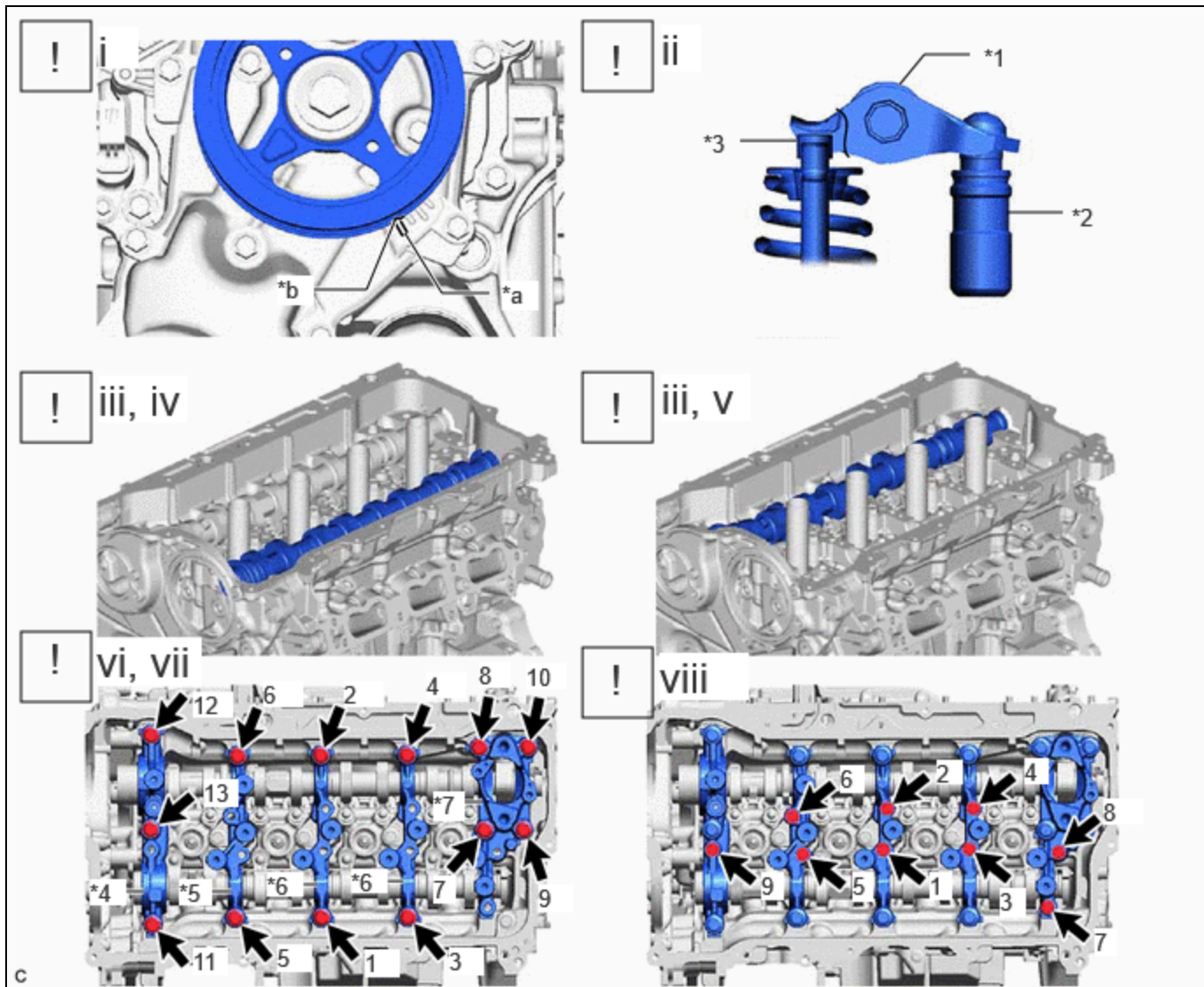
PROCEDURE		PART NAME CODE			
7	CAM TIMING CONTROL MOTOR O-RING	13090E	INFO	-	-
8	CAM TIMING CONTROL MOTOR WITH EDU ASSEMBLY	13090D	INFO	-	-
9	CAMSHAFT TIMING VALVE ASSEMBLY	135A0B	INFO	-	-
10	CAM TIMING OIL CONTROL SOLENOID O-RING	15370A	INFO	-	-
11	CAM TIMING OIL CONTROL SOLENOID ASSEMBLY	15370	INFO	-	-
12	IGNITION COIL ASSEMBLY	19500	INFO	-	-
13	FUEL (ENGINE ROOM SIDE) PUMP ASSEMBLY (for High Pressure)	23100X	-	-	-
14	ENGINE HANGERS	-	INFO	-	-
15	REMOVE ENGINE ASSEMBLY FROM ENGINE STAND	-	INFO	-	-

	N*m (kgf*cm, ft.*lbf): Specified torque		• Non-reusable part
--	---	--	---------------------

★	Precoated part	-	-
---	----------------	---	---

PROCEDURE

1. INSTALL CAMSHAFT



*1	No. 1 Valve Rocker Arm Sub-assembly	*2	Valve Lash Adjuster Assembly
*3	Valve Stem Cap	*4	No. 1 Camshaft Bearing Cap
*5	No. 2 Camshaft Bearing Cap	*6	No. 3 Camshaft Bearing Cap
*7	No. 4 Camshaft Bearing Cap	-	-
*a	"0" Timing Mark	*b	Timing Mark

- (1) Turn the crankshaft clockwise to align the timing mark (cutout) on the crankshaft pulley assembly with the "0" timing mark on the No. 2 timing chain cover assembly.
- (2) Check that the No. 1 valve rocker arm sub-assembly is correctly installed as shown in the illustration.
- (3) Clean the camshaft housing sub-assembly and the cams and journals of the intake camshaft sub-assembly and exhaust camshaft sub-assembly, and then apply engine oil to them.
- (4) Apply a light coat of engine oil to the journals of the intake camshaft sub-assembly and install the intake camshaft sub-assembly to the camshaft housing sub-assembly.

- (5) Apply a light coat of engine oil to the journals of the exhaust camshaft sub-assembly and install the exhaust camshaft sub-assembly to the camshaft housing sub-assembly.
- (6) Set the No. 1 camshaft bearing cap, No. 2 camshaft bearing cap, 2 No. 3 camshaft bearing caps and No. 4 camshaft bearing cap as shown in the illustration.
- (7) Uniformly tighten the 13 bolts in the order shown in the illustration.

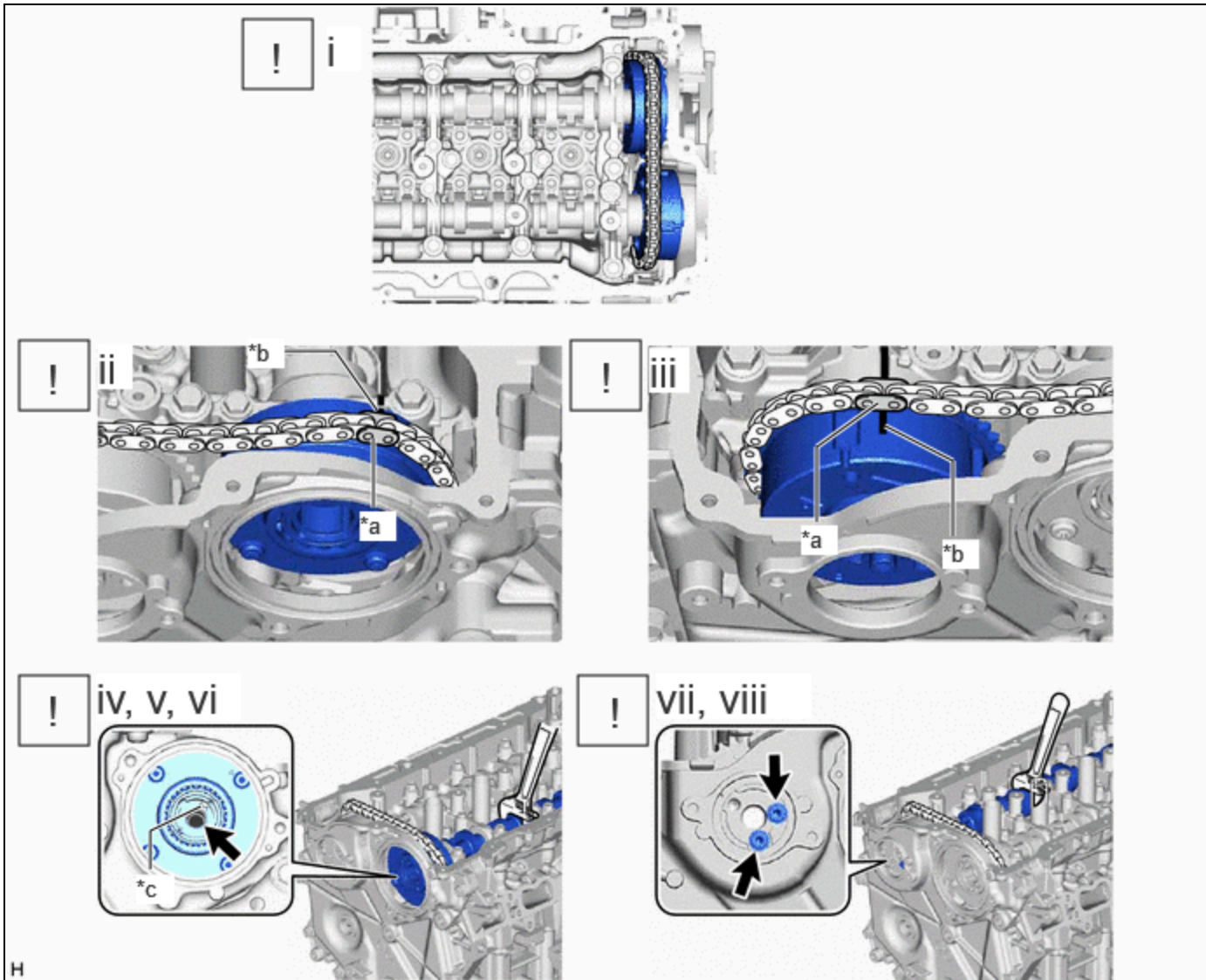
Torque:

28.5 N·m {291 kgf·cm, 21 ft·lbf}

- (8) Uniformly tighten the 9 bolts in the order shown in the illustration.

Torque:

16 N·m {163 kgf·cm, 12 ft·lbf}



*a	Paint Mark	*b	Timing Mark
*c	Knock Pin	-	-

- (1) Set the camshaft timing gear assembly and camshaft timing exhaust gear assembly to the chain sub-assembly as shown in the illustration.
- (2) Align the timing mark on the camshaft timing gear assembly with the paint mark on the chain sub-assembly.
- (3) Align the timing mark on the camshaft timing exhaust gear assembly with the paint mark on the chain sub-assembly.

- (4) Using the hexagonal portion of the intake camshaft sub-assembly, install the camshaft timing gear assembly to the intake camshaft sub-assembly.
- (5) Check that the knock pin matches the pin hole from the No. 2 timing chain cover assembly side.
- (6) Using a 10 mm bi-hexagon socket wrench, temporarily install the bolt to the camshaft timing gear assembly.

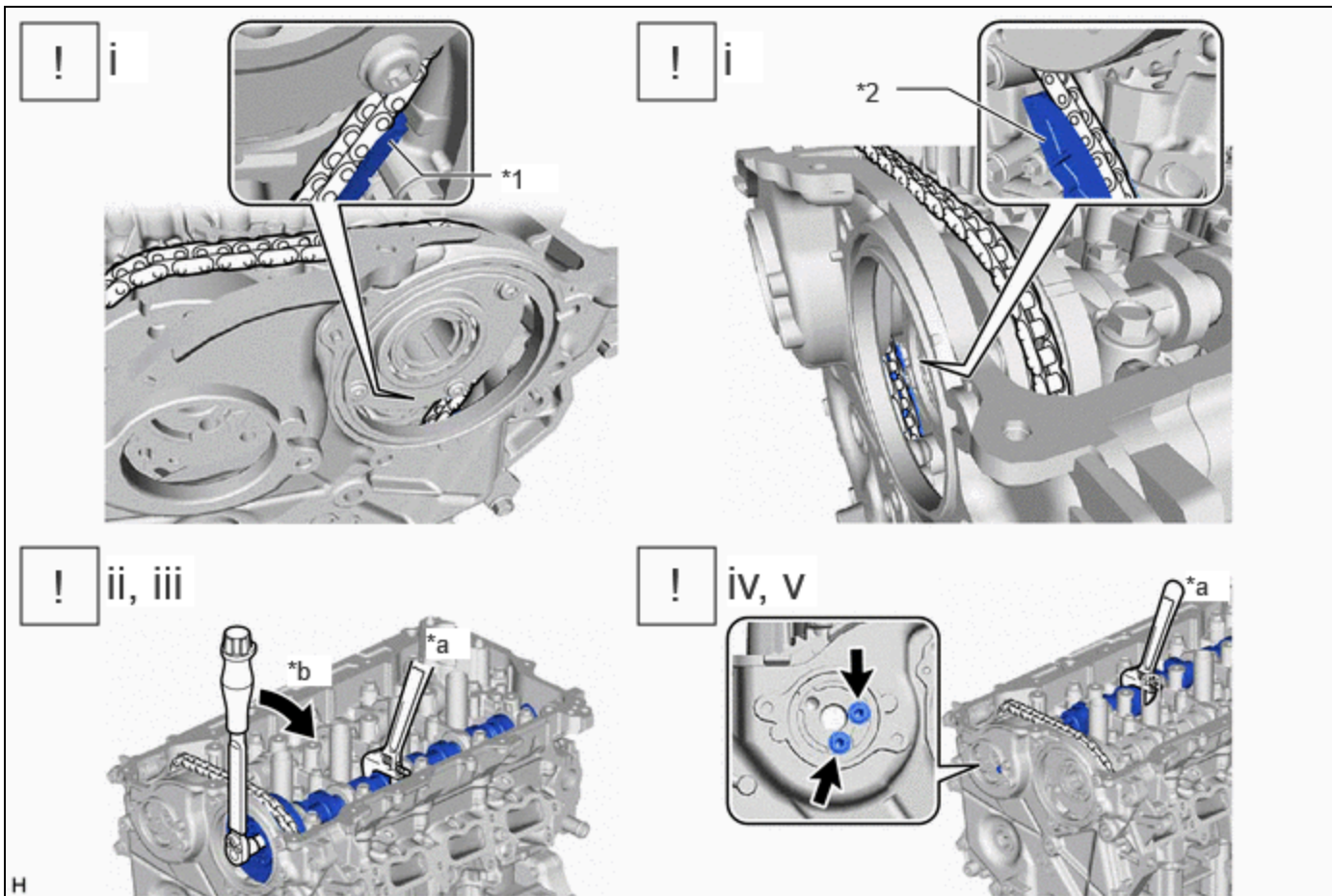
HINT:

Temporarily install the bolt enough that the camshaft timing gear assembly does not detach from the knock pin of the intake camshaft sub-assembly.

- (7) Using the hexagonal portion of the exhaust camshaft sub-assembly, install the camshaft timing exhaust gear assembly to the exhaust camshaft sub-assembly.
- (8) Using a 5 mm hexagon wrench, temporarily install with the 2 bolts.

HINT:

The 2 bolts can only be installed as shown in the illustration if the knock pin on the exhaust camshaft sub-assembly and the pin hole on the camshaft timing exhaust gear assembly match. If the 2 bolts cannot be installed, the knock pin and pin hole do not match.



*1	No. 1 Chain Vibration Damper	*2	Chain Tensioner Slipper
*a	Hold	*b	Turn

- (1) Check the status of the camshaft timing gear assembly and camshaft timing exhaust gear assembly temporarily installed to each camshaft.

1. Camshaft timing gear assembly side:

Check that the chain sub-assembly does not overlap the No. 1 chain vibration damper as shown in the illustration.

NOTICE:

If the chain sub-assembly overlaps the No. 1 chain vibration damper, install it again.

2. Camshaft timing exhaust gear assembly side:

Check that the chain sub-assembly does not overlap the chain tensioner slipper as shown in the illustration.

NOTICE:

If the chain sub-assembly overlaps the chain tensioner slipper, install it again.

(2) Using the hexagonal portion of the intake camshaft sub-assembly, hold the intake camshaft sub-assembly.

NOTICE:

- Do not damage the camshaft housing sub-assembly, cylinder head sub-assembly and spark plug tube.
- Do not disassemble the camshaft timing gear assembly.

(3) Using a 10 mm bi-hexagon socket wrench, tighten the bolt on the camshaft timing gear assembly.

Torque:

86 N·m {877 kgf·cm, 63 ft·lbf}

(4) Using the hexagonal portion of the exhaust camshaft sub-assembly, hold the exhaust camshaft sub-assembly.

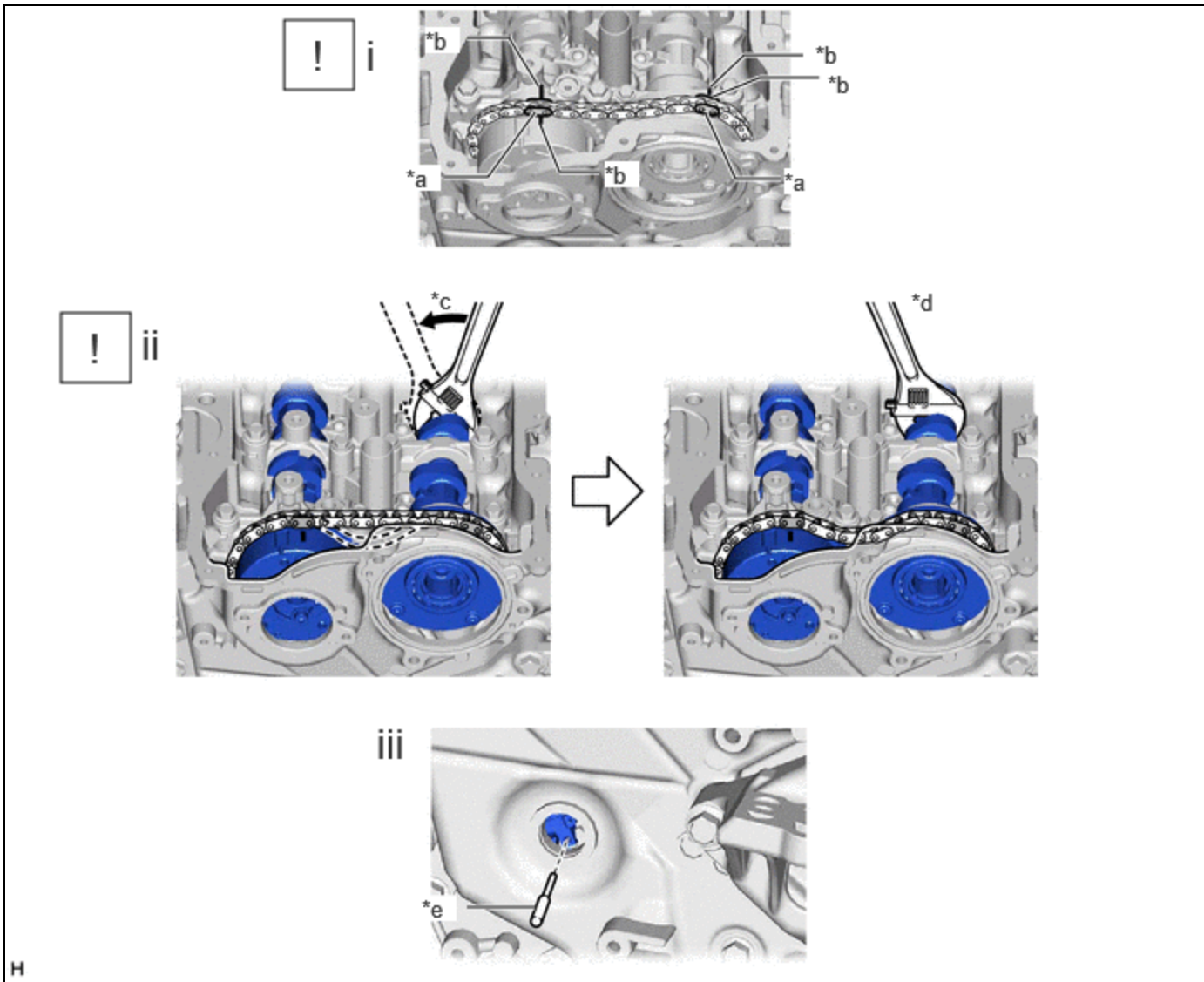
NOTICE:

Do not damage the camshaft housing sub-assembly, cylinder head sub-assembly and spark plug tube.

(5) Using a 5 mm hexagon wrench, tighten the 2 bolts.

Torque:

19 N·m {194 kgf·cm, 14 ft·lbf}



*a	Paint Mark	*b	Timing Mark
*c	Turn	*d	Hold
*e	Pin	-	-

- (1) Check that the paint marks and timing marks are positioned as shown in the illustration.
- (2) Using the hexagonal portion of the intake camshaft sub-assembly, check that the chain sub-assembly slackens when the intake camshaft sub-assembly is moved in the direction shown in the illustration.

NOTICE:

If the chain sub-assembly remains tight and does not slacken, the chain tensioner slipper and No. 1 chain vibration damper may overlap the chain sub-assembly, so install them again.

- (3) Remove the pin from the No. 1 chain tensioner assembly.
- (e) Perform "Inspection After Repair" after replacing the intake camshaft sub-assembly, exhaust camshaft sub-assembly, camshaft timing gear assembly and camshaft timing exhaust gear assembly.

Click here [INFO](#)

2. INSTALL STRAIGHT SCREW PLUG



- for HEV Model:
Click here [INFO](#)
- for PHEV Model:
Click here [INFO](#)

3. SET NO. 1 CYLINDER TO TDC (COMPRESSION)



Click here [INFO](#)

4. INSTALL FUEL PUMP LIFTER GUIDE



- for HEV Model:
Click here [INFO](#)
- for PHEV Model:
Click here [INFO](#)

5. INSTALL SPARK PLUG TUBE GASKET



- for HEV Model:
Click here [INFO](#)
- for PHEV Model:
Click here [INFO](#)

6. INSTALL CYLINDER HEAD COVER SUB-ASSEMBLY



- for HEV Model:
Click here [INFO](#)
- for PHEV Model:
Click here [INFO](#)

7. INSTALL CAM TIMING CONTROL MOTOR O-RING



Click here [INFO](#)

8. INSTALL CAM TIMING CONTROL MOTOR WITH EDU ASSEMBLY




Click here [INFO](#)

9. INSTALL CAMSHAFT TIMING VALVE ASSEMBLY

	Click here INFO
---	---------------------------------


10. INSTALL CAM TIMING OIL CONTROL SOLENOID O-RING

	Click here INFO
---	---------------------------------

11. INSTALL CAM TIMING OIL CONTROL SOLENOID ASSEMBLY

	Click here INFO
---	---------------------------------


12. INSTALL IGNITION COIL ASSEMBLY

	Click here INFO
--	---------------------------------

13. INSTALL FUEL (ENGINE ROOM SIDE) PUMP ASSEMBLY (for High Pressure)

Click here [INFO](#)

14. INSTALL ENGINE HANGERS

	<ul style="list-style-type: none">• for HEV Model: Click here INFO• for PHEV Model: Click here INFO
---	--

15. REMOVE ENGINE ASSEMBLY FROM ENGINE STAND

- for HEV Model:

Click here [INFO](#)

- for PHEV Model:

Click here [INFO](#)

