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Model Year Start: 2023	Model: Prius Prime	Prod Date Range: [03/2023 -]
Title: M20A-FXS (ENGINE MECHANICAL): CAMSHAFT: REMOVAL; 2023 - 2024 MY Prius Prius Prime [03/2023 -]		

REMOVAL

CAUTION / NOTICE / HINT

The necessary procedures (adjustment, calibration, initialization or registration) that must be performed after parts are removed and installed, or replaced during camshaft removal/installation are shown below.

Necessary Procedures After Parts Removed/Installed/Replaced

REPLACED PART OR PERFORMED PROCEDURE	NECESSARY PROCEDURE	EFFECT/INOPERATIVE FUNCTION WHEN NECESSARY PROCEDURE NOT PERFORMED	LINK
Replacement of ECM	Perform Vehicle Identification Number (VIN) registration	DTC is output	INFO
	ECU configuration	-	INFO
	Update ECU security key	Vehicle Control History (RoB) are stored	INFO
<ul style="list-style-type: none"> Replacement of throttle body with motor assembly Cleaning the deposits from the throttle body with motor assembly Replacement of cam timing control motor with EDU assembly* Replacement of camshaft timing gear assembly* Replacement of camshaft (for 	Inspection after repair	<ul style="list-style-type: none"> Poor idle, etc. Engine start function, etc. 	INFO

*: Even when not replacing the part, it is necessary to perform the specified necessary procedures after installation.

*1: Also necessary after performing a tire rotation.

*2: It is not necessary to perform this procedure if the tire pressure warning valve and transmitters are installed to the same location.

*3: The vehicle height changes because of tire replacement.

*4: If matchmarks were not placed when removing parts related to steering operation, perform end position initial setting.

REPLACED PART OR PERFORMED PROCEDURE	NECESSARY PROCEDURE	EFFECT/INOPERATIVE FUNCTION WHEN NECESSARY PROCEDURE NOT PERFORMED	LINK
intake or exhaust camshaft) <ul style="list-style-type: none"> • Replacement of camshaft timing exhaust gear assembly • Replacement of fuel (engine room side) pump assembly (for high pressure side) • Replacement of ignition coil assembly • Replacement of engine assembly • Gas leak from exhaust system is repaired 			
Replacement of inverter with converter assembly	ECU configuration	-	INFO
	Resolver learning	<ul style="list-style-type: none"> • DTCs are stored • Slight vibration at a vehicle speed of 5 km/h (3 mph) or less • Shock or vibration during acceleration 	for M20A-FXS HEV Model: INFO for M20A-FXS PHEV Model: INFO
for PHEV Model: Replacement of service plug grip	High voltage fuse accumulated load history reset	DTCs are stored	INFO
Replacement of hybrid vehicle transaxle assembly	<ul style="list-style-type: none"> • Resolver learning • Initialize resolver 	<ul style="list-style-type: none"> • DTCs are stored • Slight vibration at a vehicle speed of 	for M20A-FXS HEV Model: INFO
<p>*: Even when not replacing the part, it is necessary to perform the specified necessary procedures after installation.</p> <p>*1: Also necessary after performing a tire rotation.</p> <p>*2: It is not necessary to perform this procedure if the tire pressure warning valve and transmitters are installed to the same location.</p> <p>*3: The vehicle height changes because of tire replacement.</p> <p>*4: If matchmarks were not placed when removing parts related to steering operation, perform end position initial setting.</p>			

REPLACED PART OR PERFORMED PROCEDURE	NECESSARY PROCEDURE	EFFECT/INOPERATIVE FUNCTION WHEN NECESSARY PROCEDURE NOT PERFORMED	LINK
		5 km/h (3 mph) or less <ul style="list-style-type: none"> Shock or vibration during acceleration 	for M20A-FXS PHEV Model: INFO
Suspension parts	Rear television camera assembly optical axis (Back camera position setting)	Parking Assist Monitor System	INFO
	Parking assist ECU initialization	Panoramic View Monitor System	INFO
		Advanced Park	INFO
Tires	<ul style="list-style-type: none"> Initialization*1*2 Tire Position Identification*1*2 	Tire Pressure Warning System	Refer to Procedures Necessary When Replacing Parts (for Tire Pressure Warning System) table below INFO
	Rear television camera assembly optical axis (Back camera position setting)	Parking Assist Monitor System	INFO
	Parking assist ECU initialization*3	Panoramic View Monitor System	INFO
		Advanced Park	INFO
No. 2 steering intermediate shaft assembly*4	End position initial setting	-	INFO
Replacement of front bumper assembly*	Front television camera view adjustment	Panoramic View Monitor System	INFO
		Advanced Park	INFO
Front wheel alignment adjustment	Perform "Calibration"	<ul style="list-style-type: none"> DTCs are stored ABS warning light illuminates 	INFO

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*3: The vehicle height changes because of tire replacement.

*4: If matchmarks were not placed when removing parts related to steering operation, perform end position initial setting.

REPLACED PART OR PERFORMED PROCEDURE	NECESSARY PROCEDURE	EFFECT/INOPERATIVE FUNCTION WHEN NECESSARY PROCEDURE NOT PERFORMED	LINK
		<ul style="list-style-type: none"> • Brake system warning light (yellow indicator) illuminates • Slip indicator light illuminates • Electronically controlled brake system disabled or malfunctions 	

*: Even when not replacing the part, it is necessary to perform the specified necessary procedures after installation.

*1: Also necessary after performing a tire rotation.

*2: It is not necessary to perform this procedure if the tire pressure warning valve and transmitters are installed to the same location.

*3: The vehicle height changes because of tire replacement.

*4: If matchmarks were not placed when removing parts related to steering operation, perform end position initial setting.

NOTICE:

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

Click here [INFO](#)

HINT:

When the cable is disconnected / reconnected to the auxiliary battery terminal, systems temporarily stop operating. However, each system has a function that completes learning the first time the system is used.

Items for which learning is completed by driving the vehicle

EFFECT/INOPERATIVE FUNCTION WHEN NECESSARY PROCEDURE NOT PERFORMED	NECESSARY PROCEDURES	LINK
Front Camera System	Drive the vehicle straight ahead at 35 km/h (22 mph) or more for 5 seconds or more.	INFO

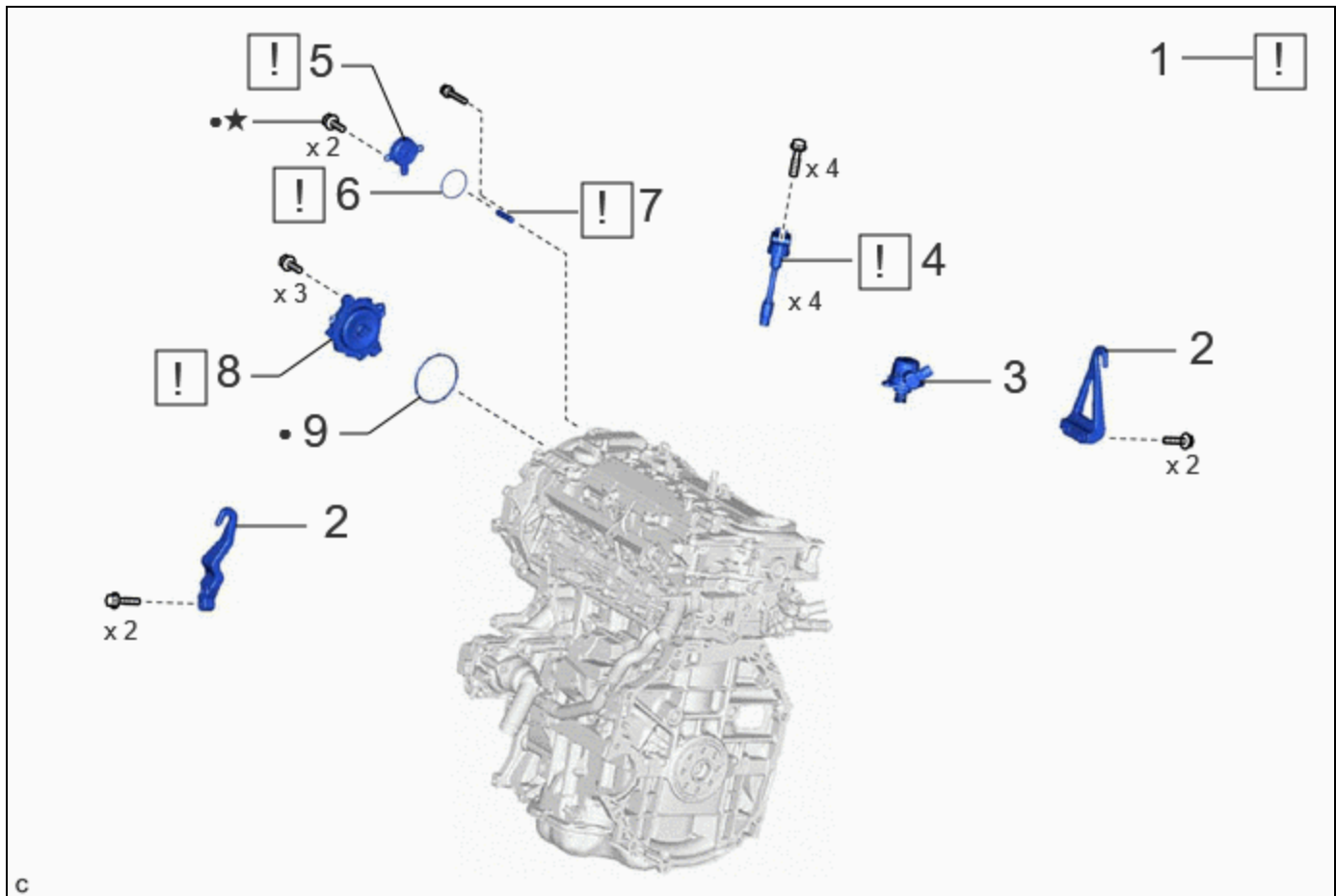
Items for which learning is completed by operating the vehicle normally




EFFECT/INOPERATIVE FUNCTION WHEN NECESSARY PROCEDURE NOT PERFORMED	NECESSARY PROCEDURES	LINK
Power Door Lock Control System*1 <ul style="list-style-type: none"> • Back door opener 	Perform door unlock operation with door control switch or electrical key transmitter sub-assembly switch.	INFO
*1: w/o Power Back Door System *2: w/ Power Back Door System		

EFFECT/INOPERATIVE FUNCTION WHEN NECESSARY PROCEDURE NOT PERFORMED	NECESSARY PROCEDURES	LINK
Power Back Door System*2	Reset back door close position	INFO
Air Conditioning System	<p>for HEV Model:</p> <p>After the ignition switch is turned to ON, the servo motor standard position is recognized.</p> <p>for PHEV Model:</p> <p>After the ignition switch is turned to ON, the servo motor and cooler expansion valve standard position is recognized.</p>	-
<p>*1: w/o Power Back Door System</p> <p>*2: w/ Power Back Door System</p>		

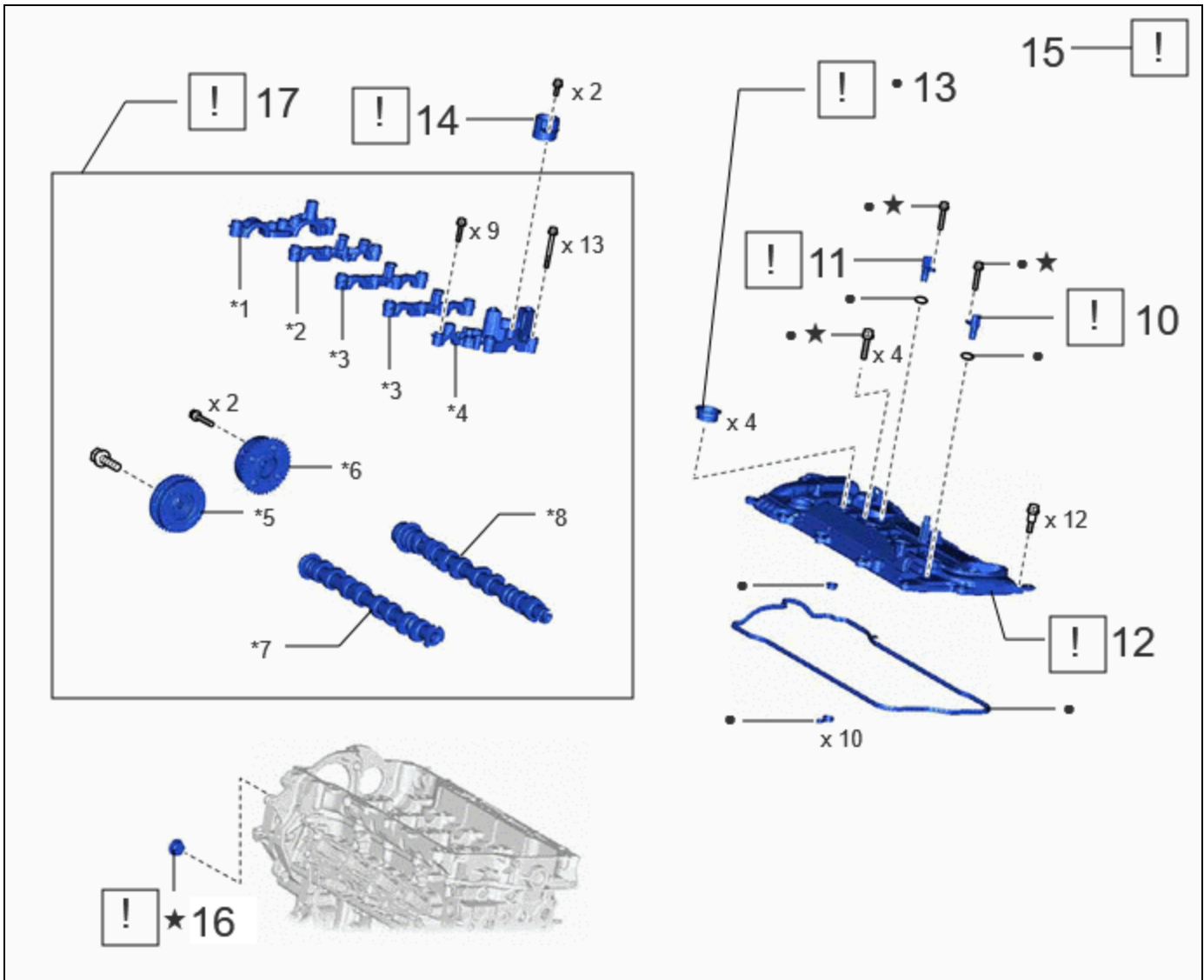
CAUTION / NOTICE / HINT

COMPONENTS (REMOVAL)



	PROCEDURE	PART NAME CODE			
1	INSTALL ENGINE ASSEMBLY TO ENGINE STAND	-	INFO	-	-
2	ENGINE HANGERS	-	-	-	-
3	FUEL (ENGINE ROOM SIDE) PUMP ASSEMBLY (for High Pressure)	23100X	-	-	-
4	IGNITION COIL ASSEMBLY	19500	INFO	-	-
5	CAM TIMING OIL CONTROL SOLENOID ASSEMBLY	15370	INFO	-	-
6	CAM TIMING OIL CONTROL SOLENOID O-RING	15370A	INFO	-	-
7	CAMSHAFT TIMING VALVE ASSEMBLY	135A0B	INFO	-	-
8	CAM TIMING CONTROL MOTOR WITH EDU ASSEMBLY	13090D	INFO	-	-
9	CAM TIMING CONTROL MOTOR O-RING	13090E	-	-	-

•	Non-reusable part	★	Precoated part
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PROCEDURE		PART NAME CODE			
10	CAMSHAFT POSITION SENSOR (for Intake Side)	11102A	INFO	-	-
11	CAMSHAFT POSITION SENSOR (for Exhaust Side)	11102A	INFO	-	-
12	CYLINDER HEAD COVER SUB-ASSEMBLY	11201	INFO	-	-
13	SPARK PLUG TUBE GASKET	11193	INFO	-	-
14	FUEL PUMP LIFTER GUIDE	23477	INFO	-	-
15	SET NO. 1 CYLINDER TO TDC (COMPRESSION)	-	INFO	-	-
16	STRAIGHT SCREW PLUG	-	INFO	-	-
17	CAMSHAFT	-	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
•	Non-reusable part	★	Precoated part

PROCEDURE

1. INSTALL ENGINE ASSEMBLY TO ENGINE STAND

- for HEV Model:

Click here [INFO](#)

- for PHEV Model:


Click here [INFO](#)

2. REMOVE ENGINE HANGERS


3. REMOVE FUEL (ENGINE ROOM SIDE) PUMP ASSEMBLY (for High Pressure)

Click here [INFO](#)


4. REMOVE IGNITION COIL ASSEMBLY

	Click here INFO
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5. REMOVE CAM TIMING OIL CONTROL SOLENOID ASSEMBLY

	Click here INFO
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6. REMOVE CAM TIMING OIL CONTROL SOLENOID O-RING

	Click here INFO
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7. REMOVE CAMSHAFT TIMING VALVE ASSEMBLY

	Click here INFO
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8. REMOVE CAM TIMING CONTROL MOTOR WITH EDU ASSEMBLY



Click here [INFO](#)

9. REMOVE CAM TIMING CONTROL MOTOR O-RING

Click here [INFO](#)

10. REMOVE CAMSHAFT POSITION SENSOR (for Intake Side)



Click here [INFO](#)

11. REMOVE CAMSHAFT POSITION SENSOR (for Exhaust Side)



Click here [INFO](#)

12. REMOVE CYLINDER HEAD COVER SUB-ASSEMBLY



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

13. REMOVE SPARK PLUG TUBE GASKET



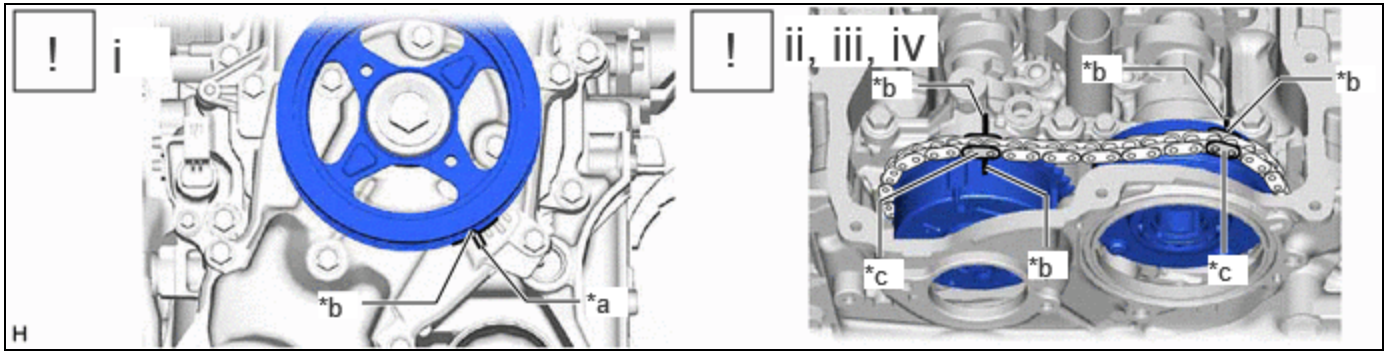
- for HEV Model:
Click here [INFO](#)
- for PHEV Model:
Click here [INFO](#)

14. REMOVE FUEL PUMP LIFTER GUIDE



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

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



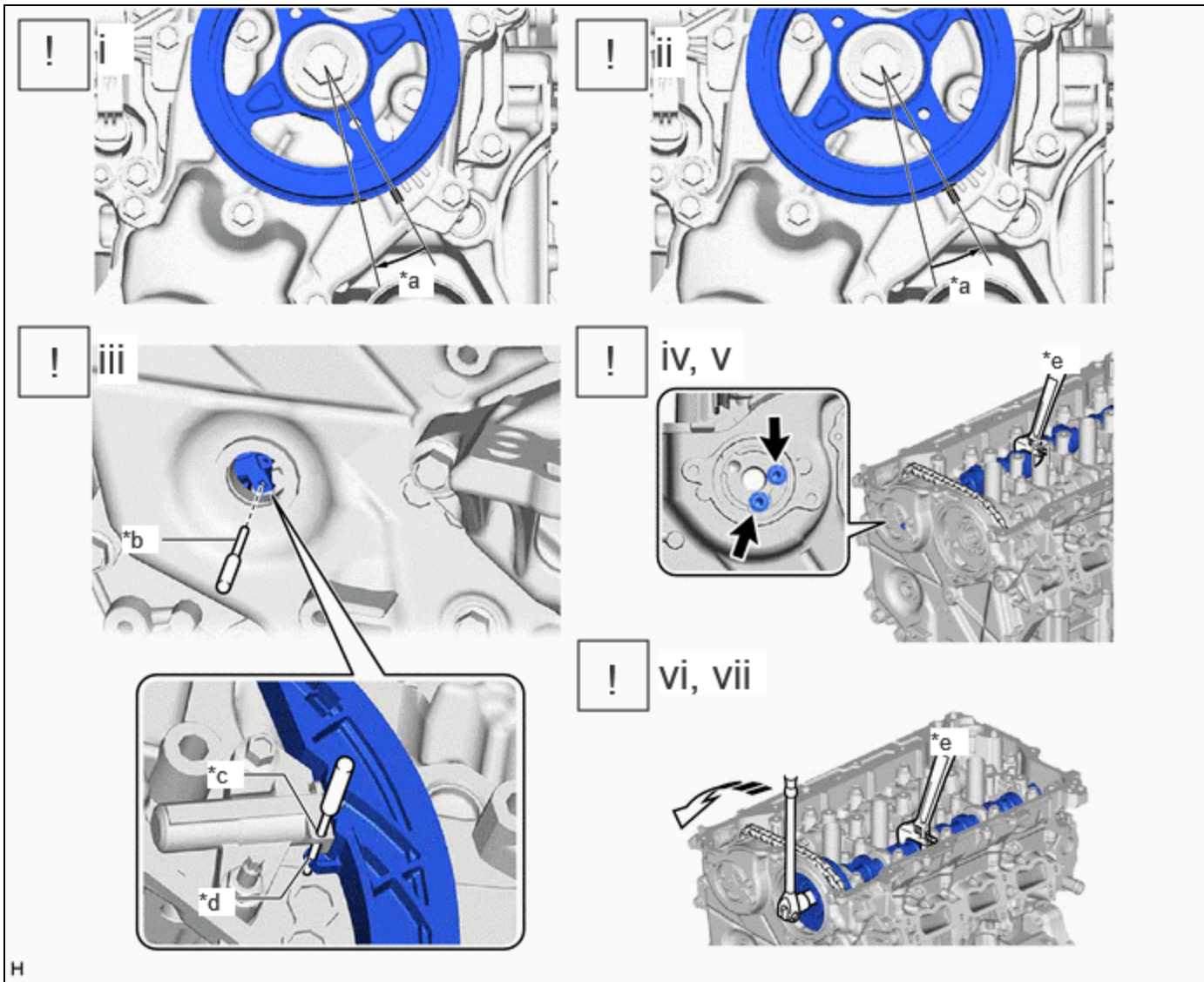
*a	"0" Timing Mark	*b	Timing Mark
*c	Paint Mark	-	-

- (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 timing marks are positioned as shown in the illustration.
- (3) If the timing marks are not positioned as shown in the illustration, turn the crankshaft clockwise and then align them again.
- (4) Place paint marks on the chain sub-assembly at points aligned with the timing marks on the camshaft timing gear assembly and camshaft timing exhaust gear assembly.

16. REMOVE STRAIGHT SCREW PLUG

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



*a	Approximately 15°	*b	Pin
*c	Pin Hole (No. 1 Chain Tensioner Assembly Side)	*d	Pin Hole (Chain Tensioner Slipper Side)
*e	Hold	-	-
	Turn	-	-

- (1) Rotate the crankshaft approximately 15° clockwise.
- (2) Rotate the crankshaft approximately 15° counterclockwise.
- (3) Align the pin hole of the No. 1 chain tensioner assembly with the pin hole of the chain tensioner slipper, and then insert the pin.
- (4) Using the hexagonal portion of the exhaust camshaft sub-assembly, secure the exhaust camshaft sub-assembly.

NOTICE:

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

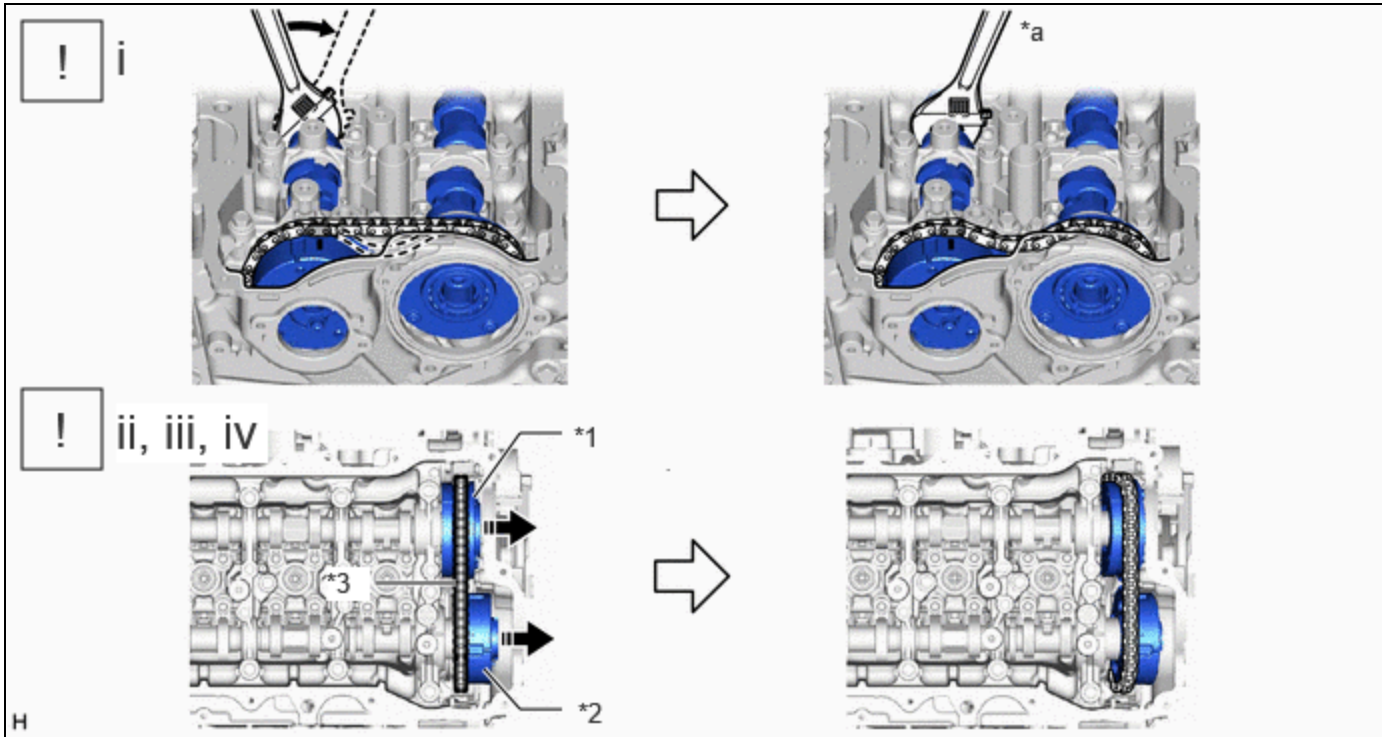
- (5) Using a 5 mm hexagon socket wrench, remove the 2 bolts from the camshaft timing exhaust gear assembly.

(6) Using the hexagonal portion of the intake camshaft sub-assembly, secure 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.

(7) Using a 10 mm bi-hexagon socket wrench, remove the bolt from the camshaft timing gear assembly.



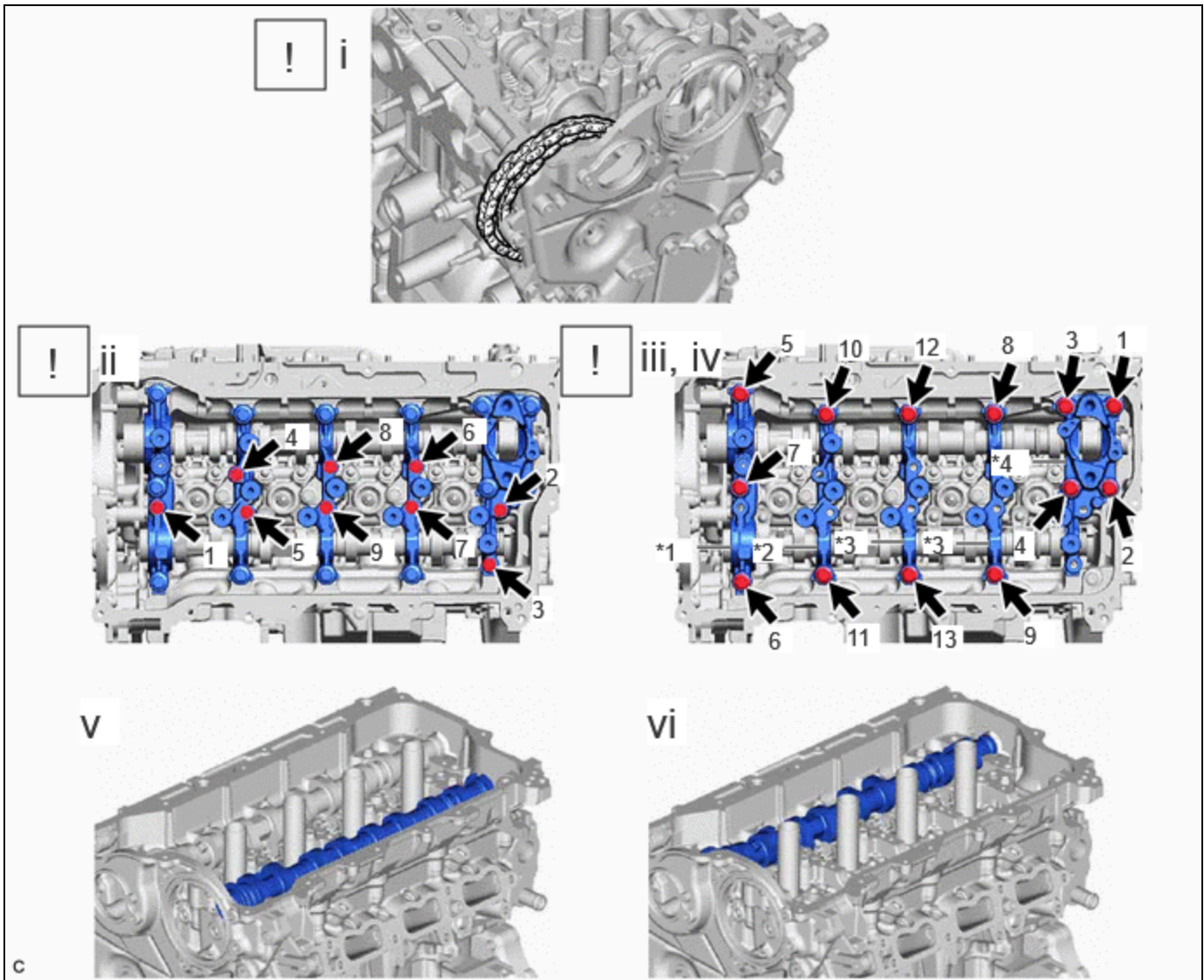
*1	Camshaft Timing Gear Assembly	*2	Camshaft Timing Exhaust Gear Assembly
*3	Chain Sub-assembly	-	-
*a	Hold	-	-
	Turn		Remove in this Direction

(1) Using the hexagonal portion of the exhaust camshaft sub-assembly, loosen and hold the chain sub-assembly while moving the exhaust camshaft sub-assembly in the direction shown in the illustration.

NOTICE:

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

- (2) Move the camshaft timing gear assembly together with the camshaft timing exhaust gear assembly and chain sub-assembly toward the No. 2 timing chain cover assembly as shown in the illustration.
- (3) Remove the camshaft timing exhaust gear assembly from the chain sub-assembly.
- (4) Remove the camshaft timing gear assembly from the chain sub-assembly.



*1	No. 1 Camshaft Bearing Cap	*2	No. 2 Camshaft Bearing Cap
*3	No. 3 Camshaft Bearing Cap	*4	No. 4 Camshaft Bearing Cap

(1) Secure the chain sub-assembly to the vehicle using rope, etc.

NOTICE:

Do not drop the chain sub-assembly into the timing chain cover assembly.

(2) Uniformly loosen and remove the 9 bolts in the order shown in the illustration.

(3) Uniformly loosen and remove the 13 bolts in the order shown in the illustration.

NOTICE:

Uniformly loosen the bolts while holding the camshaft horizontally.

(4) Remove the No. 1 camshaft bearing cap, No. 2 camshaft bearing cap, 2 No. 3 camshaft bearing caps and No. 4 camshaft bearing cap.

HINT:

Arrange the removed parts so that they can be reinstalled in their original locations.

(5) Remove the intake camshaft sub-assembly from the camshaft housing sub-assembly.

(6) Remove the exhaust camshaft sub-assembly from the camshaft housing sub-assembly.

