

Last Modified: 12-04-2024	6.11:8.1.0	Doc ID: RM100000029YCK
Model Year Start: 2023	Model: Prius	Prod Date Range: [12/2022 -]
Title: M20A-FXS (ENGINE MECHANICAL): ENGINE UNIT (for HEV Model): DISASSEMBLY; 2023 - 2024 MY Prius [12/2022 -]		

DISASSEMBLY

CAUTION / NOTICE / HINT

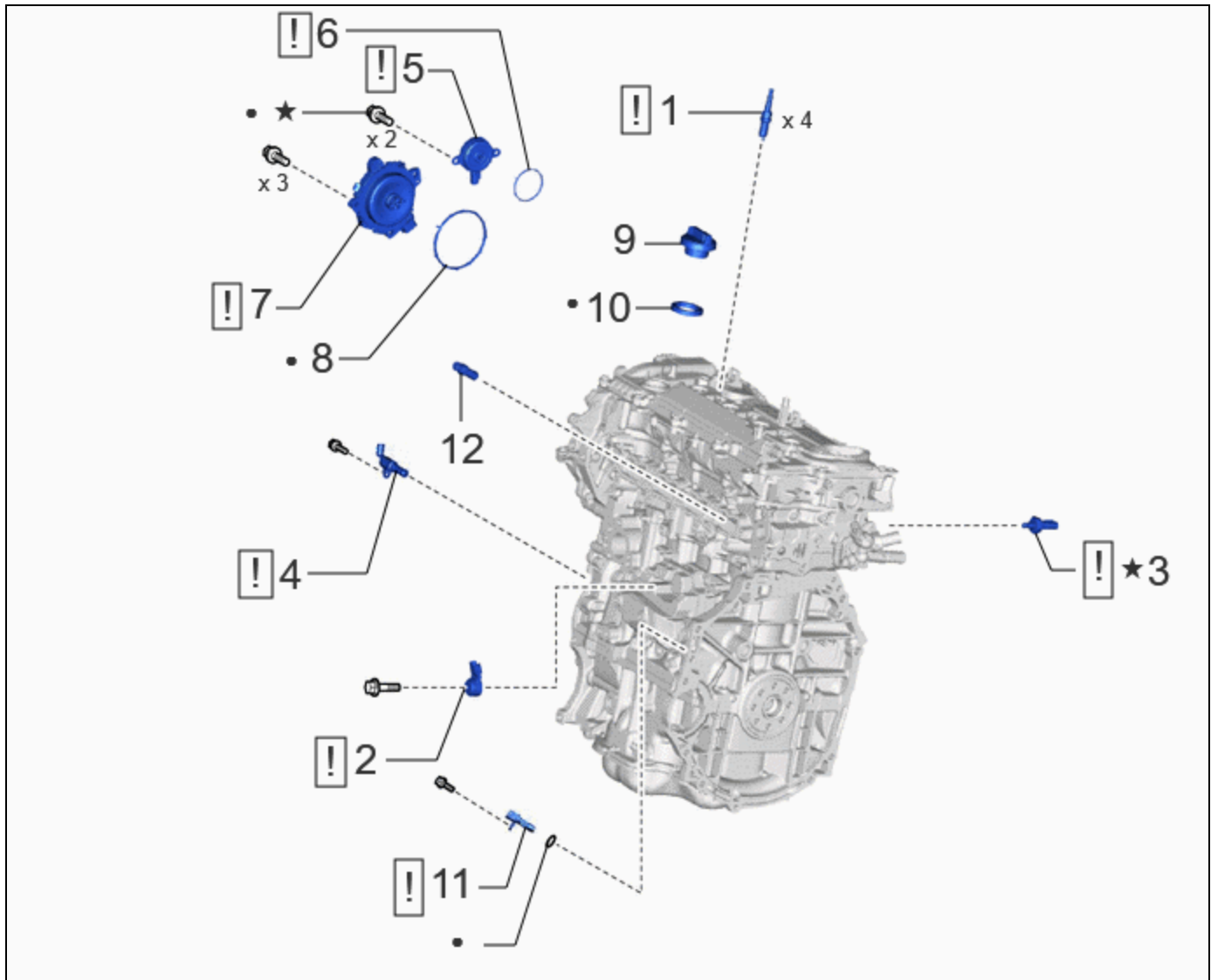
NOTICE:




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](#)

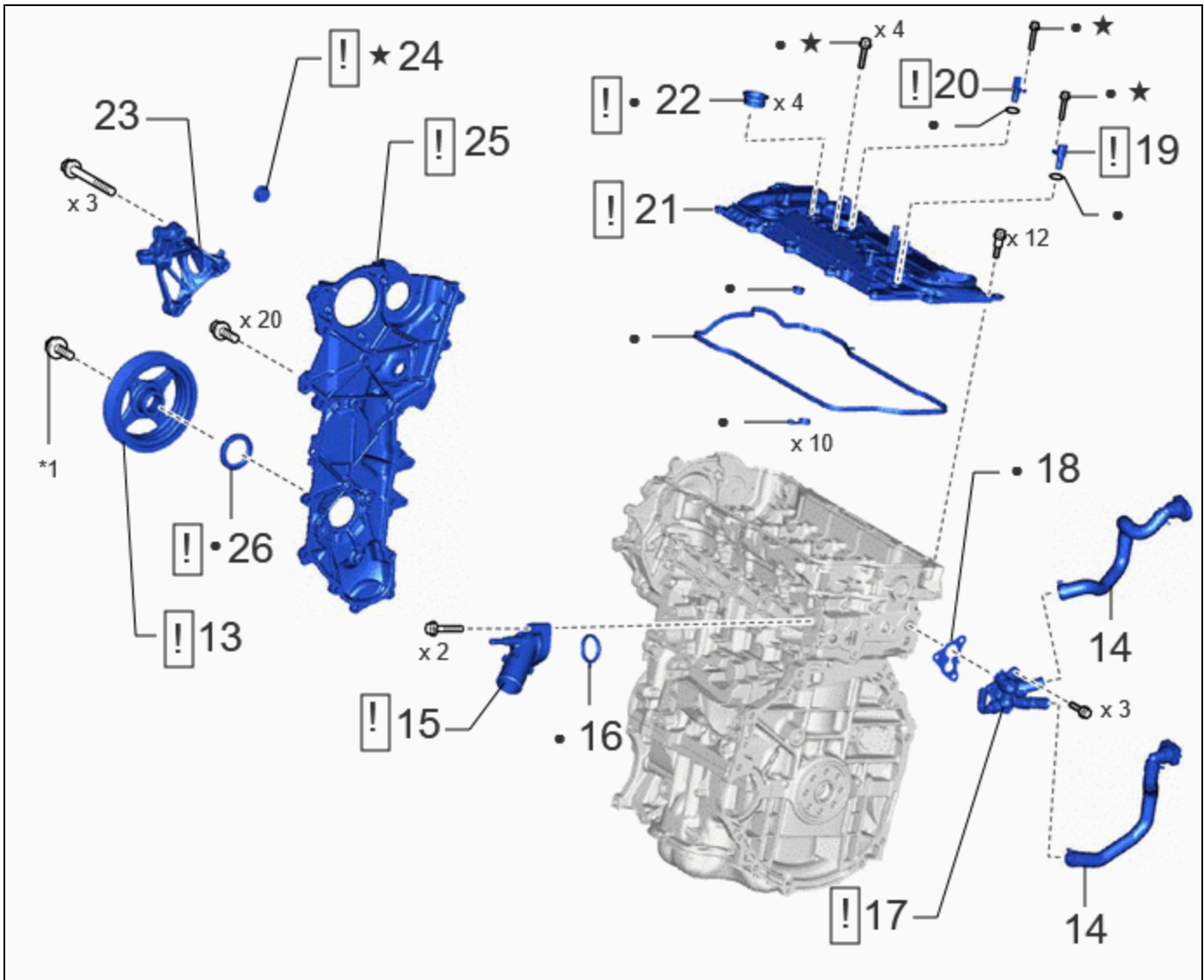
CAUTION / NOTICE / HINT

COMPONENTS (DISASSEMBLY)






PROCEDURE		PART NAME CODE			
1	SPARK PLUG	19100P	INFO	-	-
2	KNOCK CONTROL SENSOR	89615	INFO	-	-
3	OIL PRESSURE AND TEMPERATURE SENSOR	89448D	INFO	-	-
4	OIL PRESSURE CONTROL VALVE ASSEMBLY	15250	INFO	-	-
5	CAM TIMING OIL CONTROL SOLENOID ASSEMBLY	15370	INFO	-	-
6	CAM TIMING OIL CONTROL SOLENOID O-RING	15370A	INFO	-	-
7	CAM TIMING CONTROL MOTOR WITH EDU ASSEMBLY	13090D	INFO	-	-
8	CAM TIMING CONTROL MOTOR O-RING	13090E	-	-	-
9	OIL FILLER CAP ASSEMBLY	12180E	-	-	-
10	OIL FILLER CAP GASKET	12108A	-	-	-
11	CRANKSHAFT POSITION SENSOR	11401G	INFO	-	-
12	PCV VALVE (VENTILATION VALVE SUB-ASSEMBLY)	12204C	-	-	-

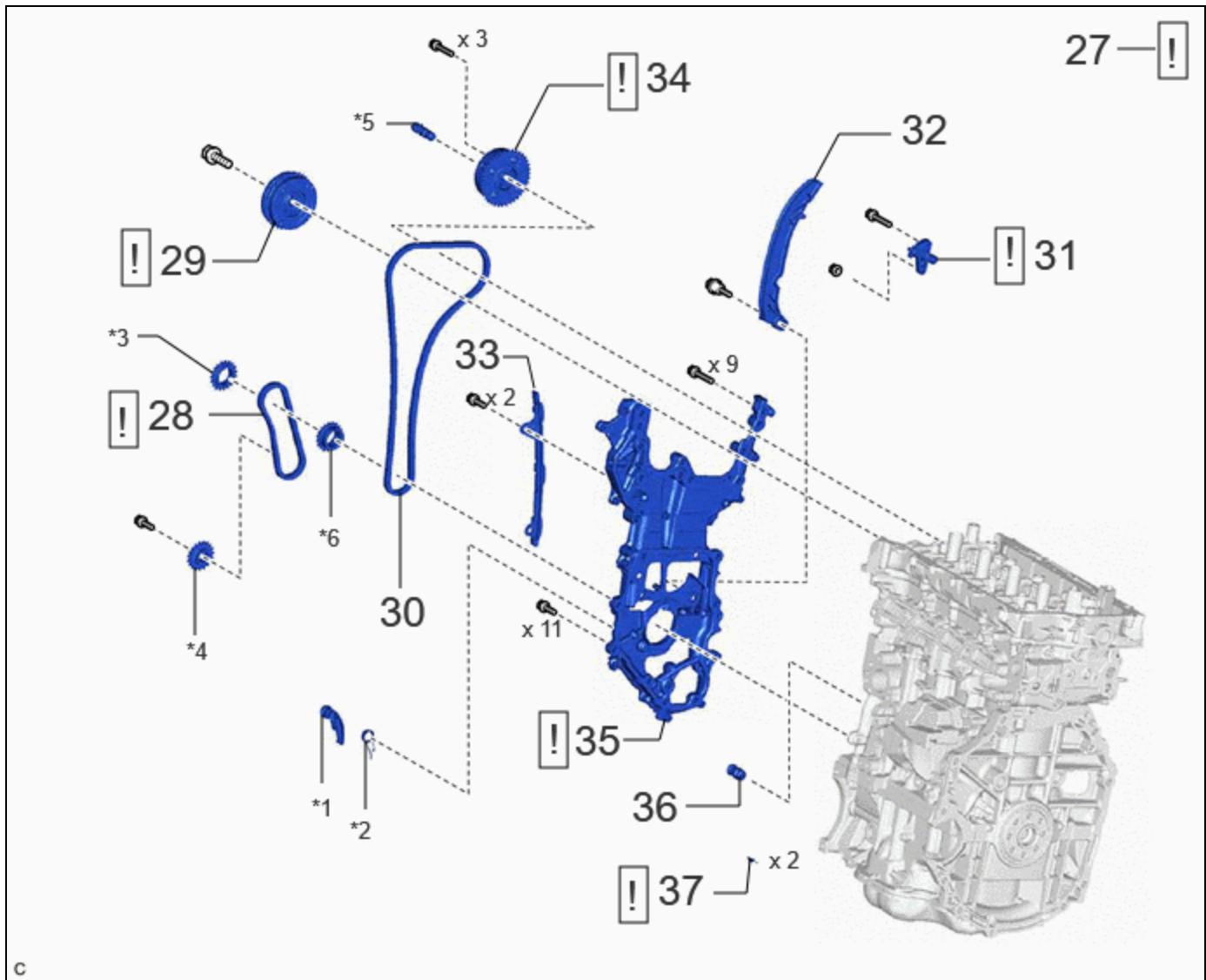
•	Non-reusable part	★	Precoated part
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	PROCEDURE	PART NAME CODE			
13	CRANKSHAFT PULLEY ASSEMBLY	13470	INFO	-	-
14	WATER HOSE SUB-ASSEMBLY	87209J	-	-	-
15	WATER OUTLET SUB-ASSEMBLY	16304	INFO	-	-
16	WATER OUTLET GASKET	16341	-	-	-
17	WATER BY-PASS OUTLET	16351	INFO	-	-
18	WATER OUTLET PIPE GASKET	16345	-	-	-
19	CAMSHAFT POSITION SENSOR (for Intake Side)	11102A	INFO	-	-
20	CAMSHAFT POSITION SENSOR (for Exhaust Side)	11102A	INFO	-	-
21	CYLINDER HEAD COVER SUB-ASSEMBLY	11201	INFO	-	-
22	SPARK PLUG TUBE GASKET	11193	INFO	-	-
23	ENGINE MOUNTING BRACKET RH	12315A	-	-	-

PROCEDURE		PART NAME CODE			
24	STRAIGHT SCREW PLUG	-	INFO	-	-
25	NO. 2 TIMING CHAIN COVER ASSEMBLY	11320B	INFO	-	-
26	TIMING CHAIN COVER OIL SEAL	11301C	INFO	-	-

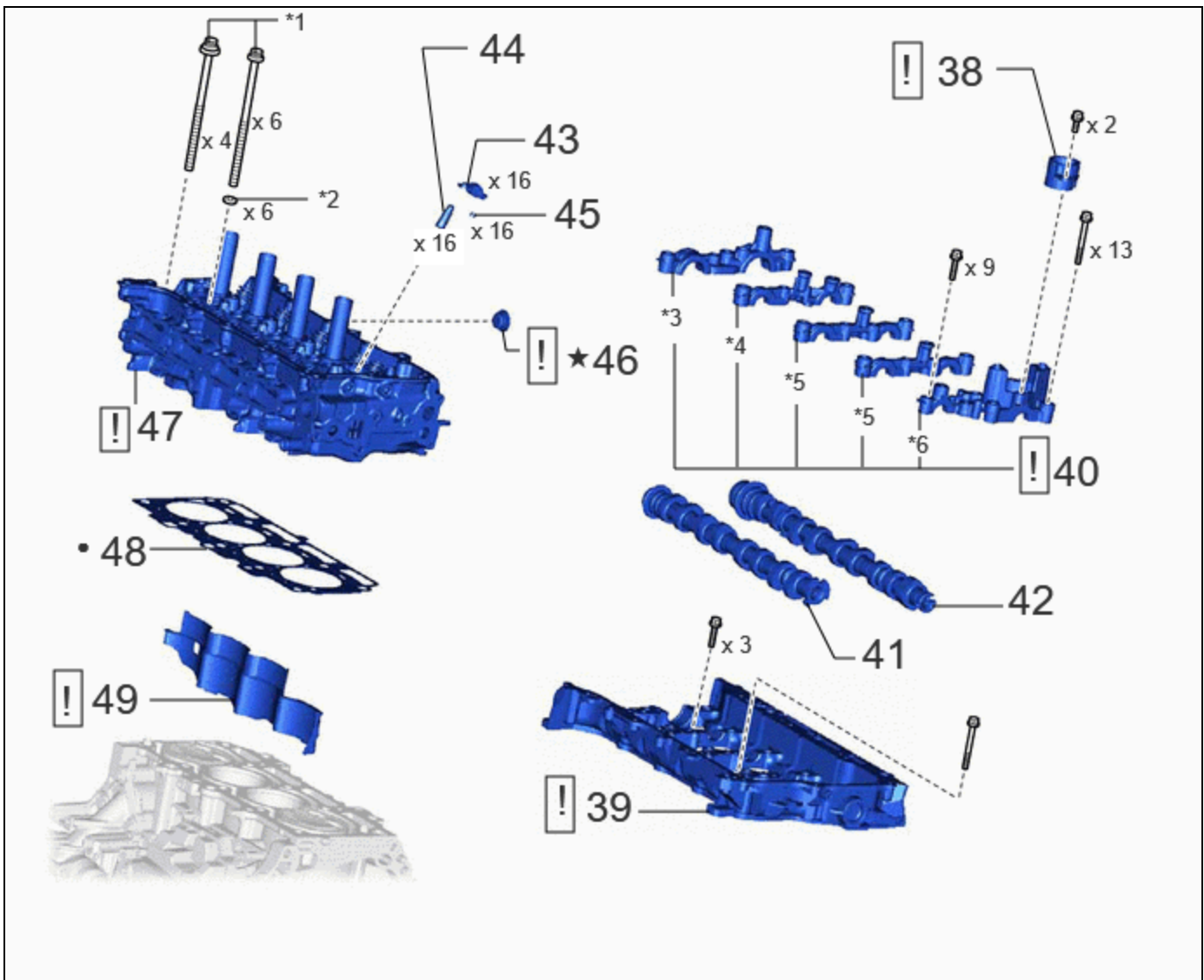
*1	CRANKSHAFT PULLEY BOLT	-	-
•	Non-reusable part	★	Precoated part









PROCEDURE		PART NAME CODE			
27	SET NO. 1 CYLINDER TO TDC (COMPRESSION)	-	INFO	-	-
28	OIL PUMP DRIVE CHAIN SUB-ASSEMBLY	13507A	INFO	-	-

	PROCEDURE	PART NAME CODE			
29	CAMSHAFT TIMING GEAR ASSEMBLY	13050	INFO	-	-
30	CHAIN SUB-ASSEMBLY	13506	-	-	-
31	NO. 1 CHAIN TENSIONER ASSEMBLY	13540	INFO	-	-
32	CHAIN TENSIONER SLIPPER	13559	-	-	-
33	NO. 1 CHAIN VIBRATION DAMPER	13561	-	-	-
34	CAMSHAFT TIMING EXHAUST GEAR ASSEMBLY	13070A	INFO	-	-
35	TIMING CHAIN COVER ASSEMBLY	11310	INFO	-	-
36	OIL NOZZLE VALVE SUB-ASSEMBLY	15703A	-	-	-
37	CRANKSHAFT TIMING GEAR KEY	13471A	INFO	-	-

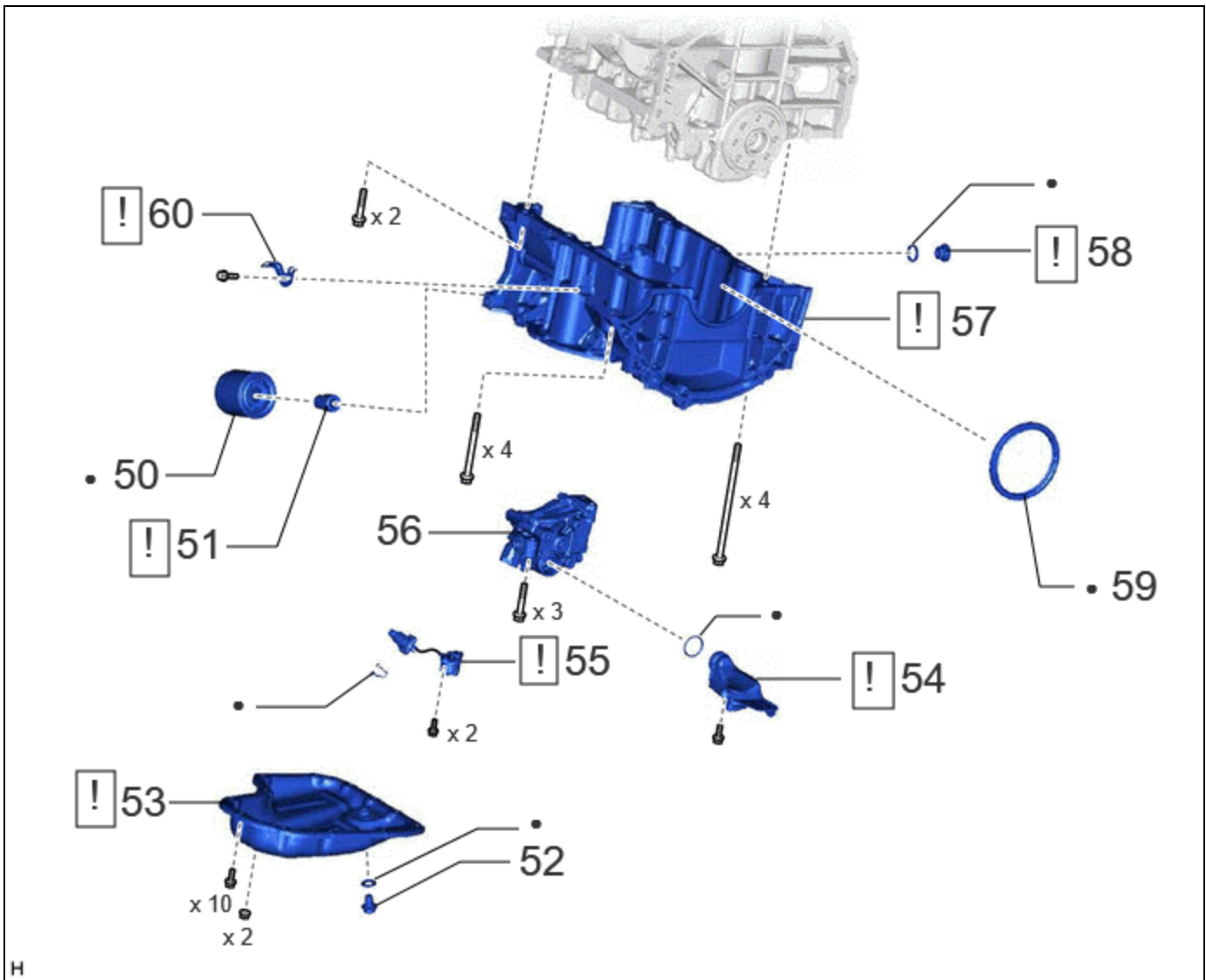
*1	CHAIN TENSIONER PLATE	*2	CHAIN DAMPER SPRING
*3	OIL PUMP DRIVE SPROCKET	*4	OIL PUMP DRIVE SHAFT SPROCKET
*5	CAMSHAFT TIMING VALVE ASSEMBLY	*6	CRANKSHAFT TIMING SPROCKET









PROCEDURE		PART NAME CODE			
38	FUEL PUMP LIFTER GUIDE	23477	INFO	-	-
39	CAMSHAFT HOUSING SUB-ASSEMBLY	11103	INFO	-	-
40	CAMSHAFT BEARING CAP	-	INFO	-	-
41	INTAKE CAMSHAFT SUB-ASSEMBLY	13501A	-	-	-
42	EXHAUST CAMSHAFT SUB-ASSEMBLY	13502B	-	-	-
43	NO. 1 VALVE ROCKER ARM SUB-ASSEMBLY	13801	-	-	-
44	VALVE LASH ADJUSTER ASSEMBLY	13750	-	-	-
45	VALVE STEM CAP	13716	-	-	-
46	NO. 3 STRAIGHT SCREW WITH HEAD PLUG	11117G	INFO	-	-
47	CYLINDER HEAD SUB-ASSEMBLY	11101	INFO	-	-
48	CYLINDER HEAD GASKET	11115	-	-	-

PROCEDURE		PART NAME CODE			
49	CYLINDER BLOCK WATER JACKET SPACER	11445	INFO	-	-

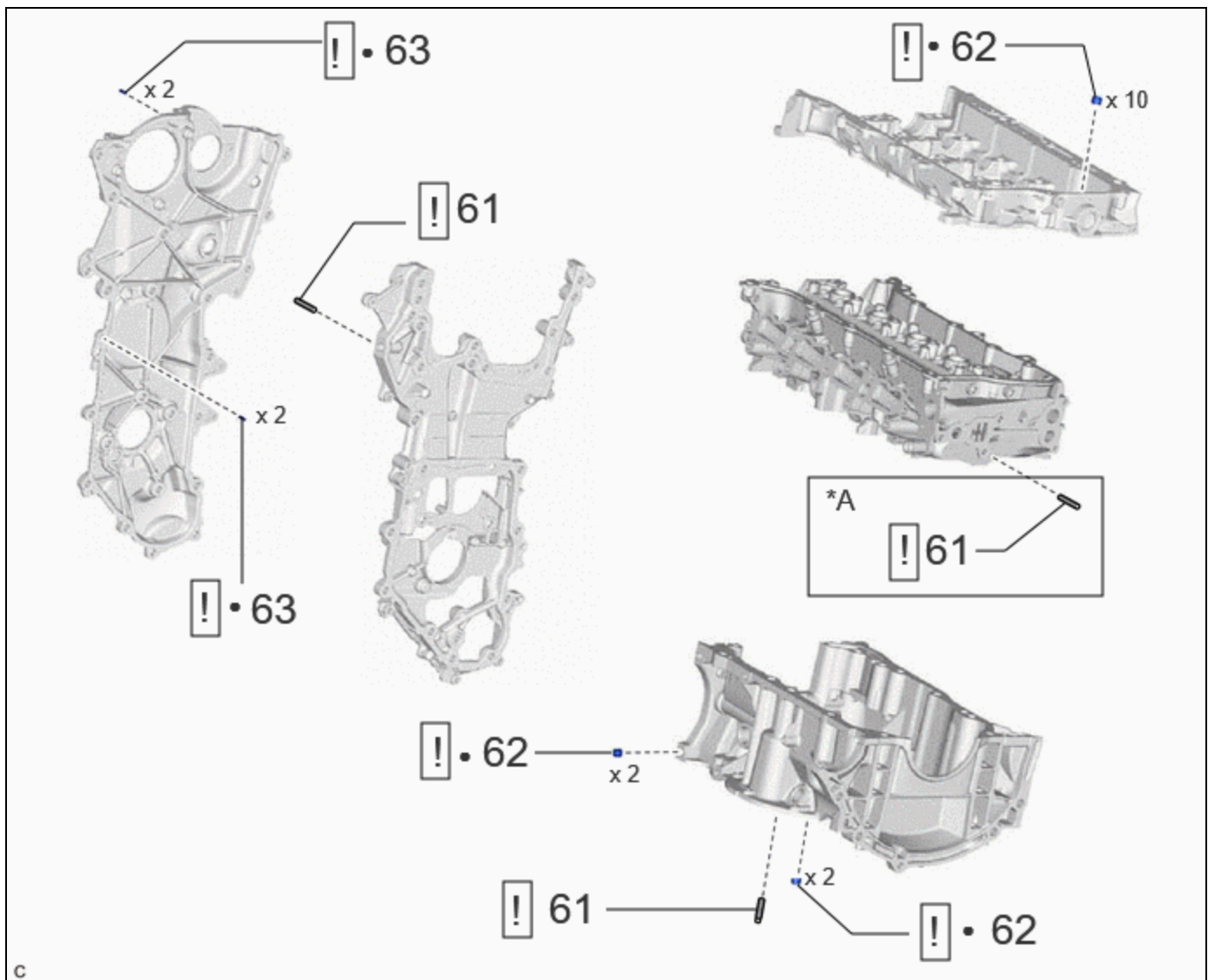
*1	CYLINDER HEAD SET BOLT	*2	PLATE WASHER
*3	NO. 1 CAMSHAFT BEARING CAP	*4	NO. 2 CAMSHAFT BEARING CAP
*5	NO. 3 CAMSHAFT BEARING CAP	*6	NO. 4 CAMSHAFT BEARING CAP
•	Non-reusable part	★	Precoated part






PROCEDURE		PART NAME CODE			
50	OIL FILTER SUB-ASSEMBLY	15601	-	-	-
51	OIL FILTER UNION	15600A	INFO	-	-

PROCEDURE		PART NAME CODE			
52	OIL PAN DRAIN PLUG	12101A	-	-	-
53	OIL PAN SUB-ASSEMBLY	12101	INFO	-	-
54	OIL STRAINER SUB-ASSEMBLY	15104	INFO	-	-
55	ENGINE OIL LEVEL SENSOR	89491	INFO	-	-
56	OIL PUMP ASSEMBLY	15100	-	-	-
57	STIFFENING CRANKCASE ASSEMBLY	11420	INFO	-	-
58	STRAIGHT SCREW PLUG	-	INFO	-	-
59	REAR ENGINE OIL SEAL	11401L	-	-	-
60	WIRE HARNESS CLAMP BRACKET	-	INFO	-	-

•	Non-reusable part	-	-
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	PROCEDURE	PART NAME CODE			
61	STUD BOLT	-	INFO	-	-
62	RING PIN	-	INFO	-	-
63	STRAIGHT PIN	-	INFO	-	-


*A	w/ Stud Bolt	-	-
•	Non-reusable part	-	-

PROCEDURE


1. REMOVE SPARK PLUG

	Click here INFO
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2. REMOVE KNOCK CONTROL SENSOR

	Click here INFO
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3. REMOVE OIL PRESSURE AND TEMPERATURE SENSOR

	Click here INFO
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4. REMOVE OIL PRESSURE CONTROL VALVE 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](#)

7. REMOVE CAM TIMING CONTROL MOTOR WITH EDU ASSEMBLY

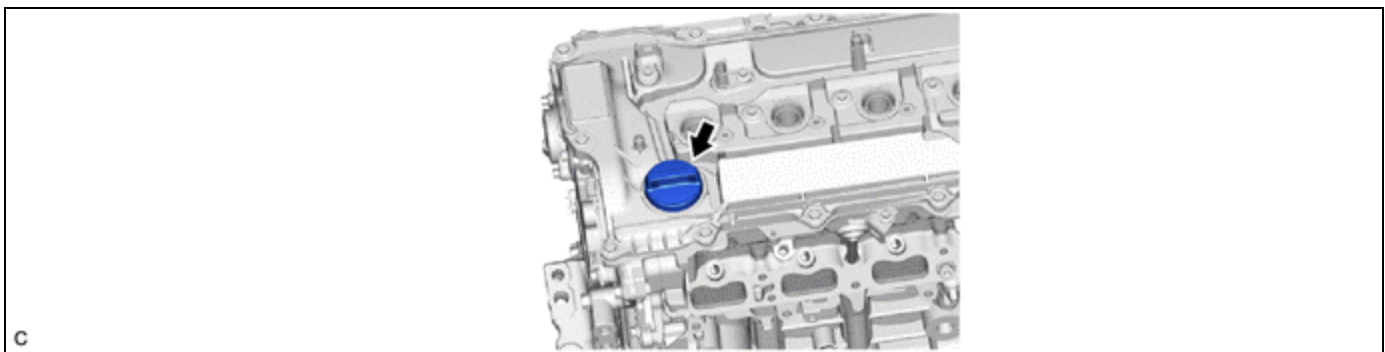


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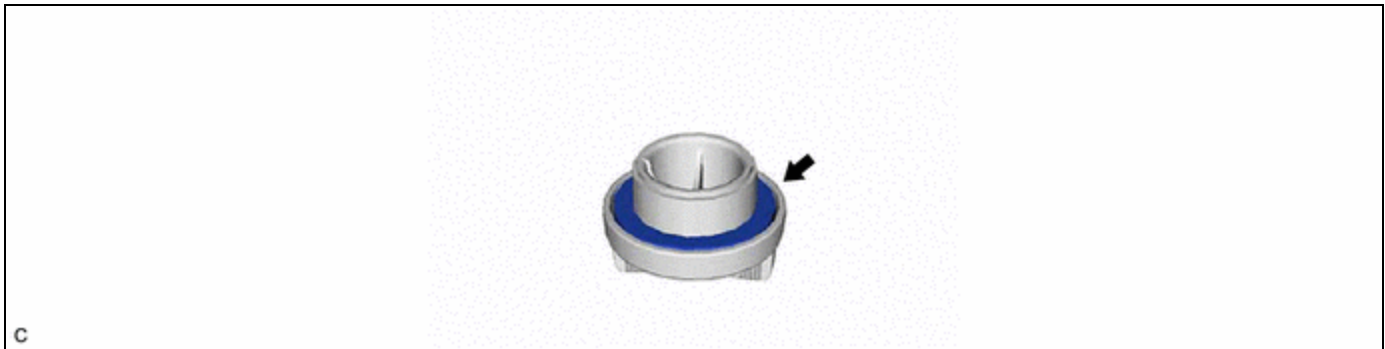
8. REMOVE CAM TIMING CONTROL MOTOR O-RING

Click here [INFO](#)

9. REMOVE OIL FILLER CAP ASSEMBLY



10. REMOVE OIL FILLER CAP GASKET



11. REMOVE CRANKSHAFT POSITION SENSOR

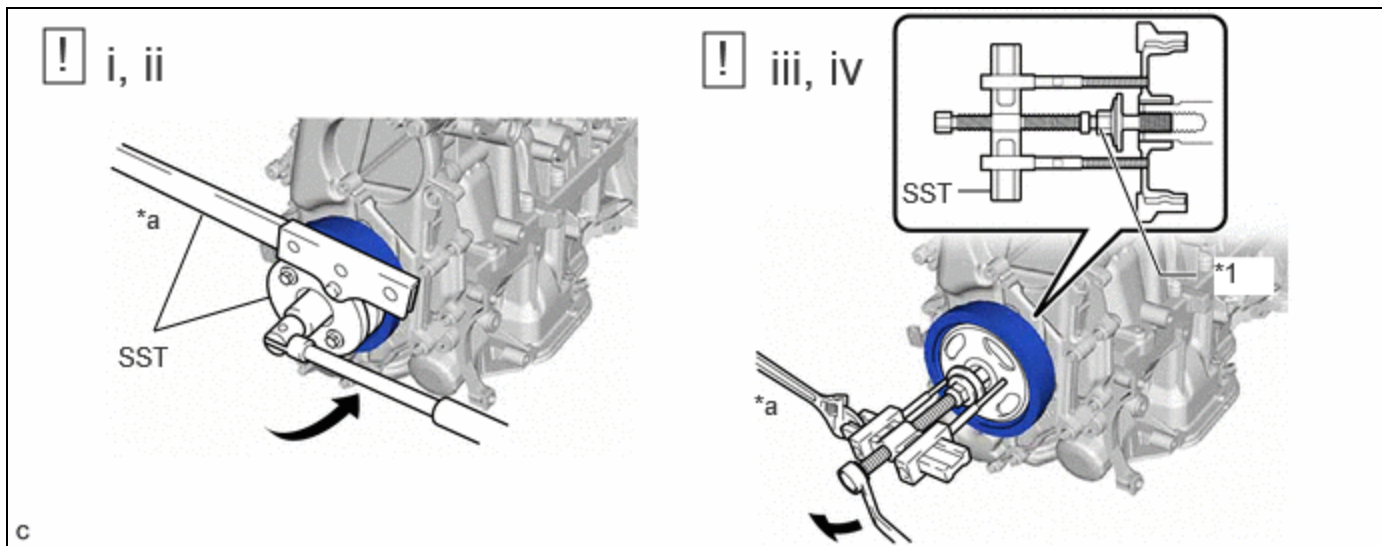


Click here [INFO](#)

12. REMOVE PCV VALVE (VENTILATION VALVE SUB-ASSEMBLY)

Click here [INFO](#)

13. REMOVE CRANKSHAFT PULLEY ASSEMBLY



*1	Crankshaft Pulley Bolt	-	-
*a	Hold	-	-
	Turn	-	-

(1) Using SST, hold the crankshaft pulley assembly and loosen the crankshaft pulley bolt.

SST: 09213-54015

SST: 09330-00021

(2) Further loosen the crankshaft pulley bolt until 2 or 3 threads remain screwed into the crankshaft.

(3) Apply lubricant to the threads and end of SST.

SST: 09950-50013

09951-05010

09952-05010

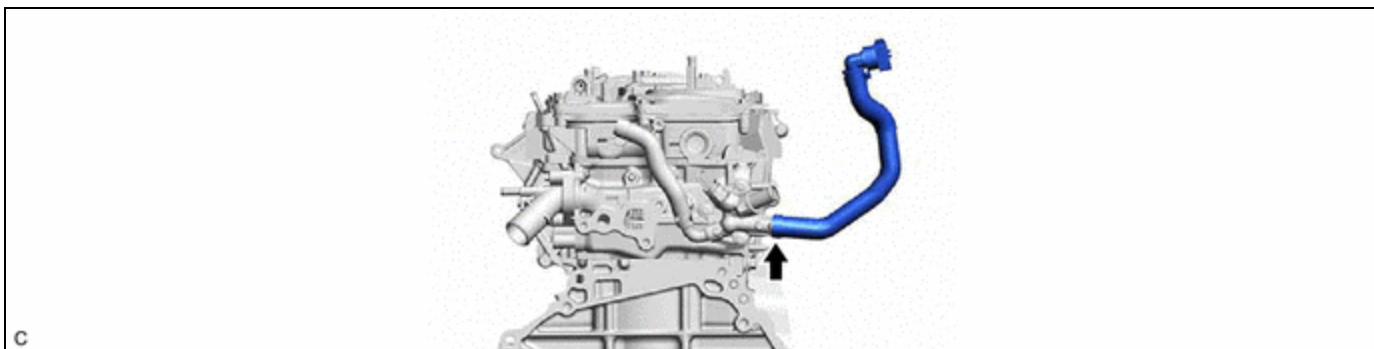
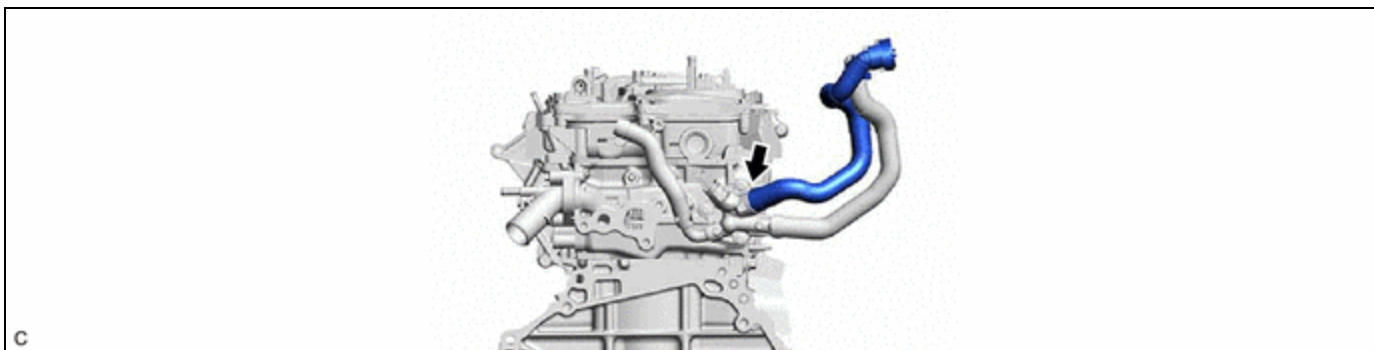
09953-05020

09954-05070

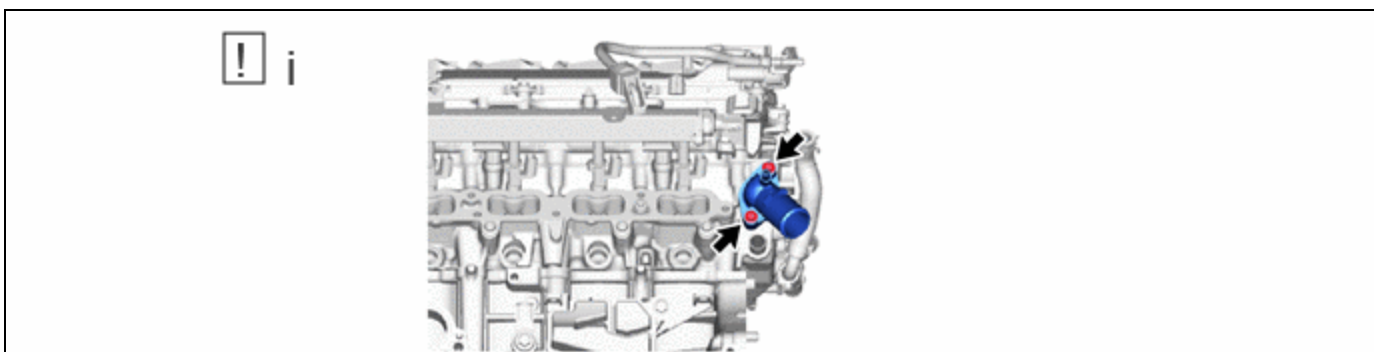
09957-04010

(4) Using SST and the crankshaft pulley bolt, remove the crankshaft pulley assembly and crankshaft pulley bolt.

14. REMOVE WATER HOSE SUB-ASSEMBLY

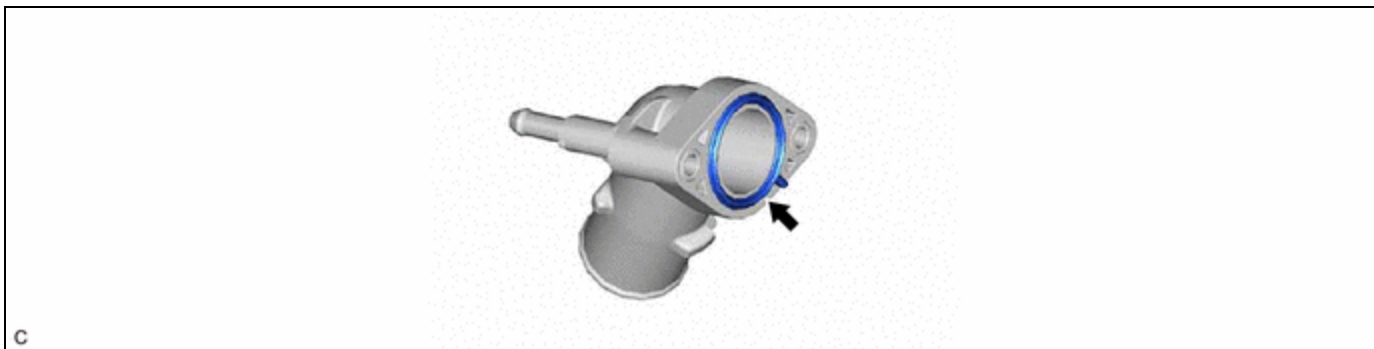


15. REMOVE WATER OUTLET SUB-ASSEMBLY

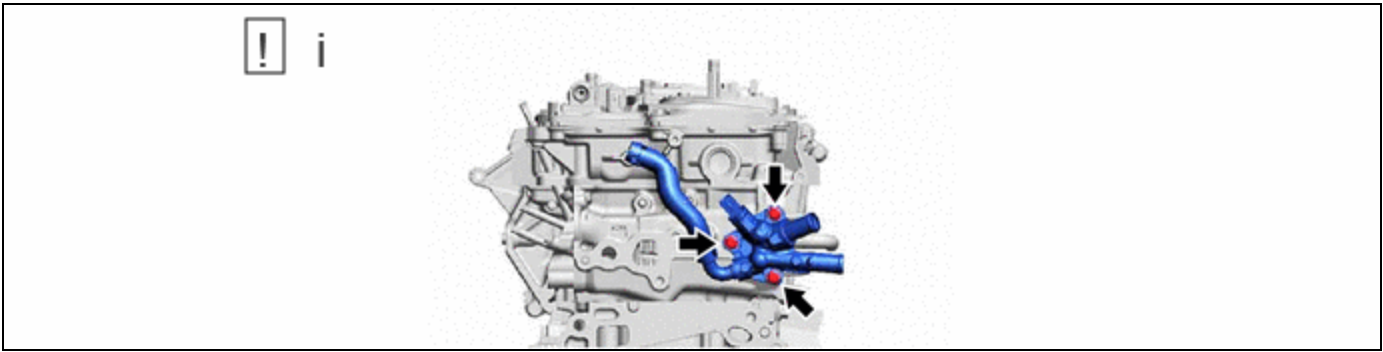


(1) Using an 8 mm socket wrench, remove the 2 bolts and water outlet sub-assembly from the cylinder head sub-assembly.

16. REMOVE WATER OUTLET GASKET

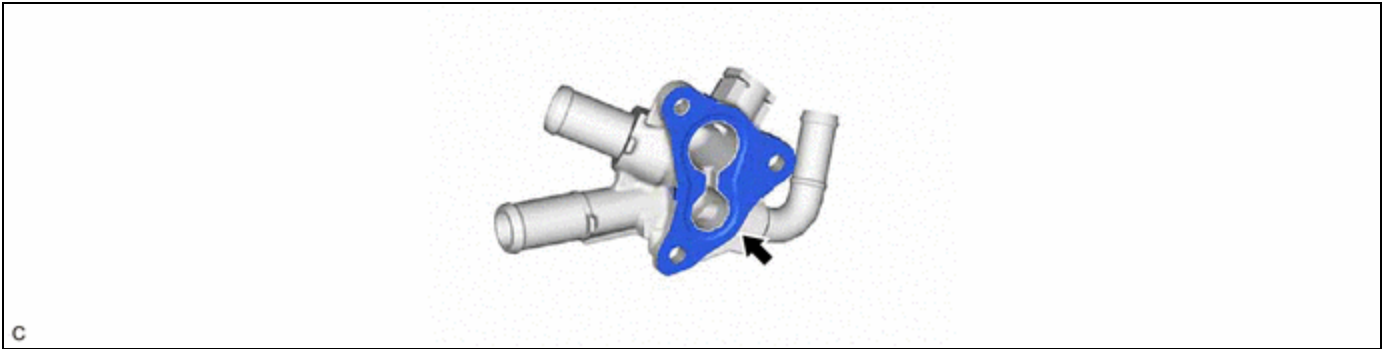


17. REMOVE WATER BY-PASS OUTLET



(1) Using an 8 mm socket wrench, remove the 3 bolts and water by-pass outlet from the cylinder head sub-assembly.

18. REMOVE WATER OUTLET PIPE GASKET



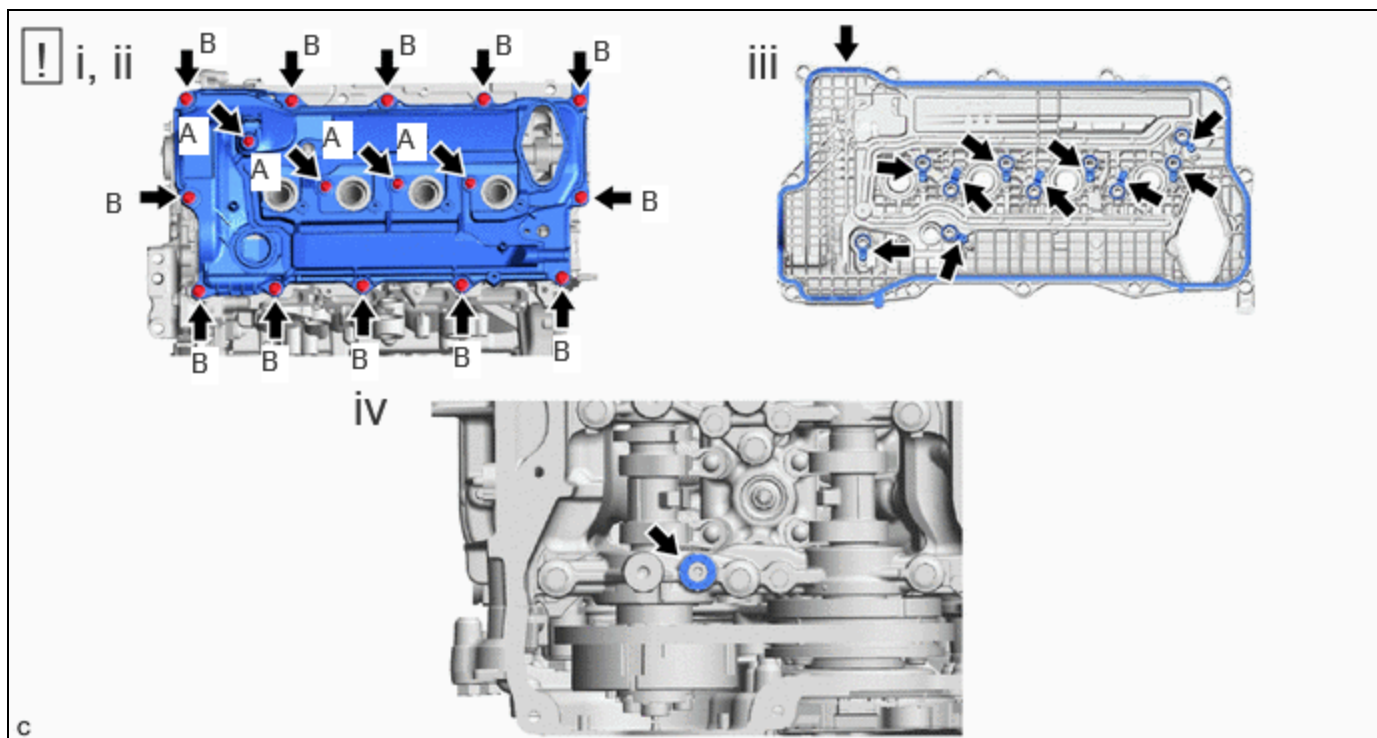
19. REMOVE CAMSHAFT POSITION SENSOR (for Intake Side)

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20. REMOVE CAMSHAFT POSITION SENSOR (for Exhaust Side)

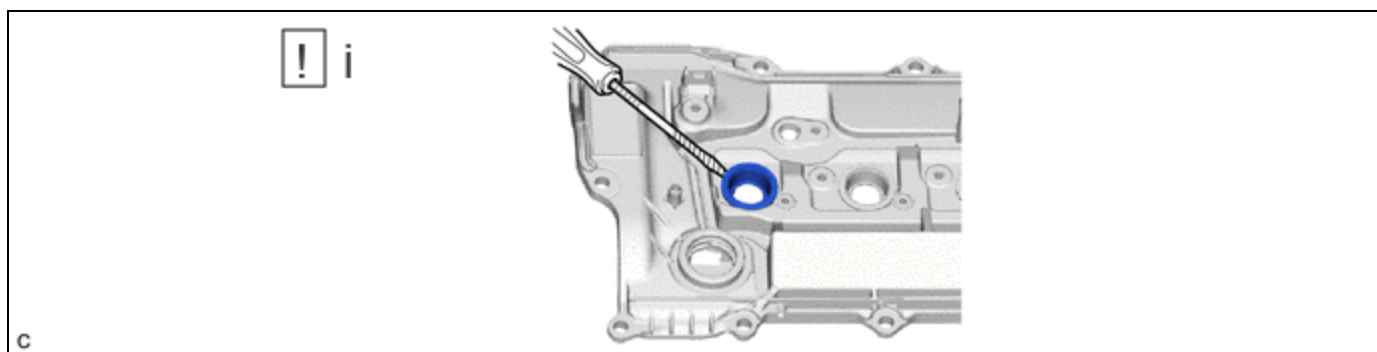
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21. REMOVE CYLINDER HEAD COVER SUB-ASSEMBLY



- (1) Using an 8 mm socket wrench, remove the 4 bolts (A).
- (2) Remove the 12 bolts (B) and cylinder head cover sub-assembly from the camshaft housing sub-assembly.
- (3) Remove the 11 gaskets from the cylinder head cover sub-assembly.
- (4) Remove the gasket from the No. 1 camshaft bearing cap.

22. REMOVE SPARK PLUG TUBE GASKET

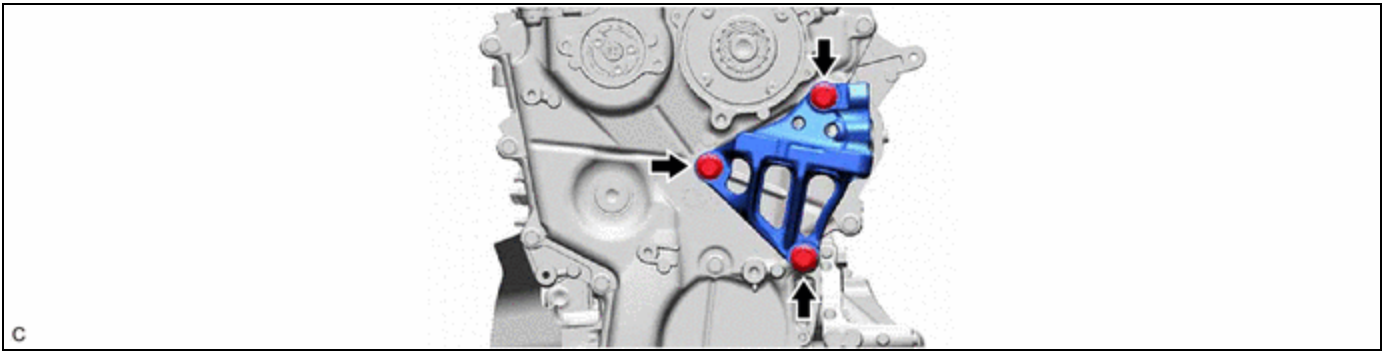


- (1) Using a screwdriver with its tip wrapped with protective tape, pry out the 4 spark plug tube gaskets from the cylinder head cover sub-assembly.

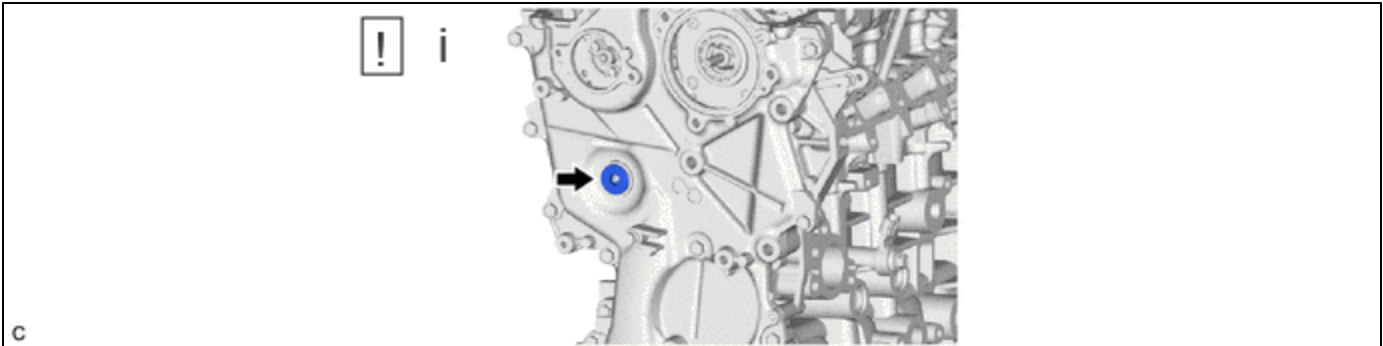
NOTICE:

Be careful not to damage the cylinder head cover sub-assembly.

23. REMOVE ENGINE MOUNTING BRACKET RH

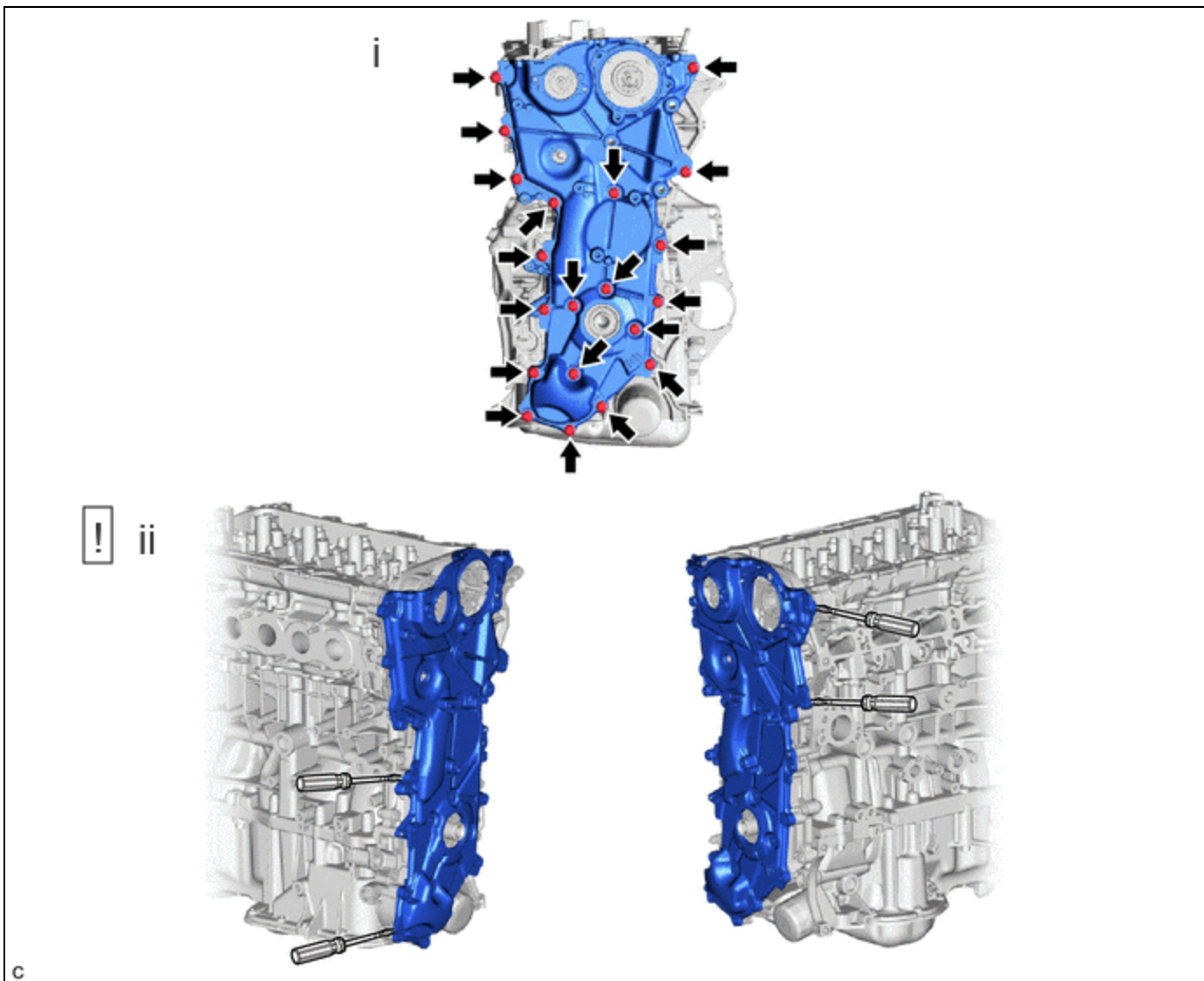


24. REMOVE STRAIGHT SCREW PLUG



- (1) Using a 10 mm hexagon socket wrench, remove the straight screw plug from the No. 2 timing chain cover assembly.

25. REMOVE NO. 2 TIMING CHAIN COVER ASSEMBLY



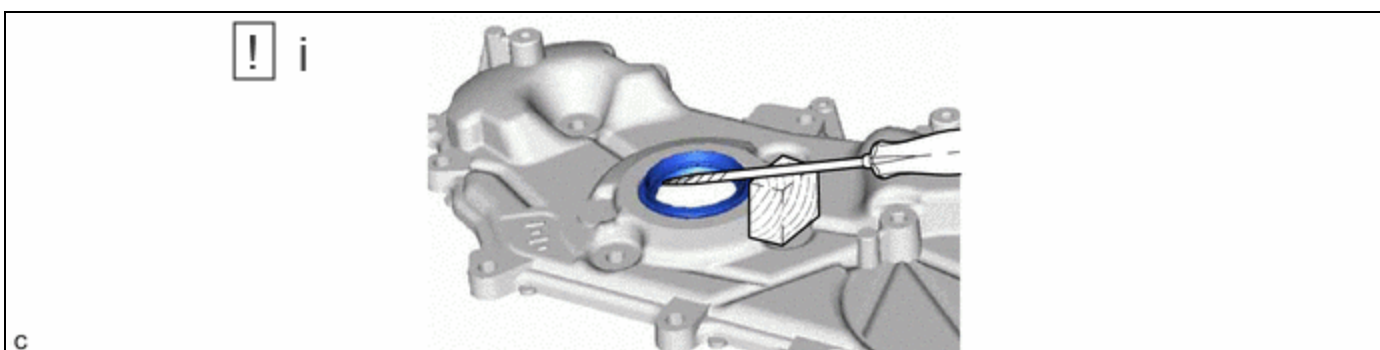
(1) Remove the 20 bolts.

(2) Remove the No. 2 timing chain cover assembly from the timing chain cover assembly by prying the No. 2 timing chain cover assembly with a screwdriver with its tip wrapped with protective tape.

NOTICE:

Be careful not to damage the contact surfaces of the No. 2 timing chain cover assembly and timing chain cover assembly.

26. REMOVE TIMING CHAIN COVER OIL SEAL

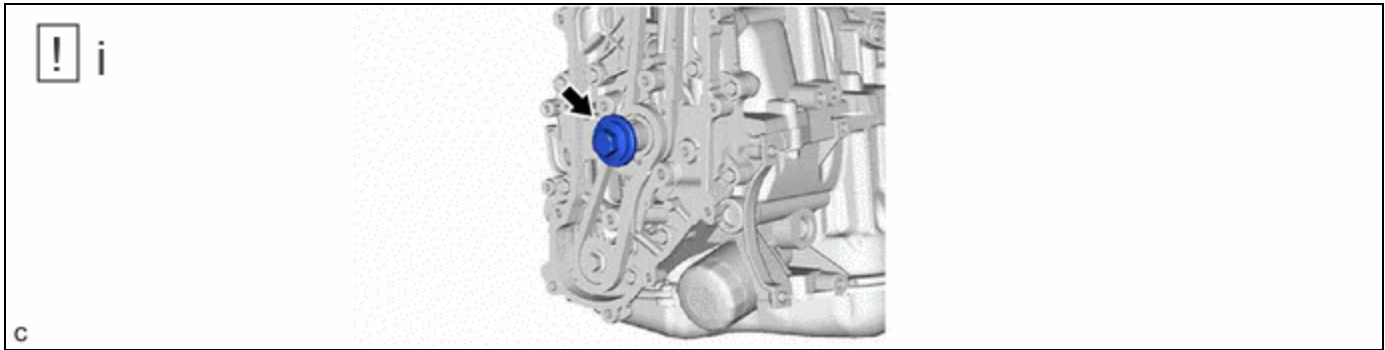


(1) Using a screwdriver with its tip wrapped with protective tape and wooden block, pry out the timing chain cover oil seal.

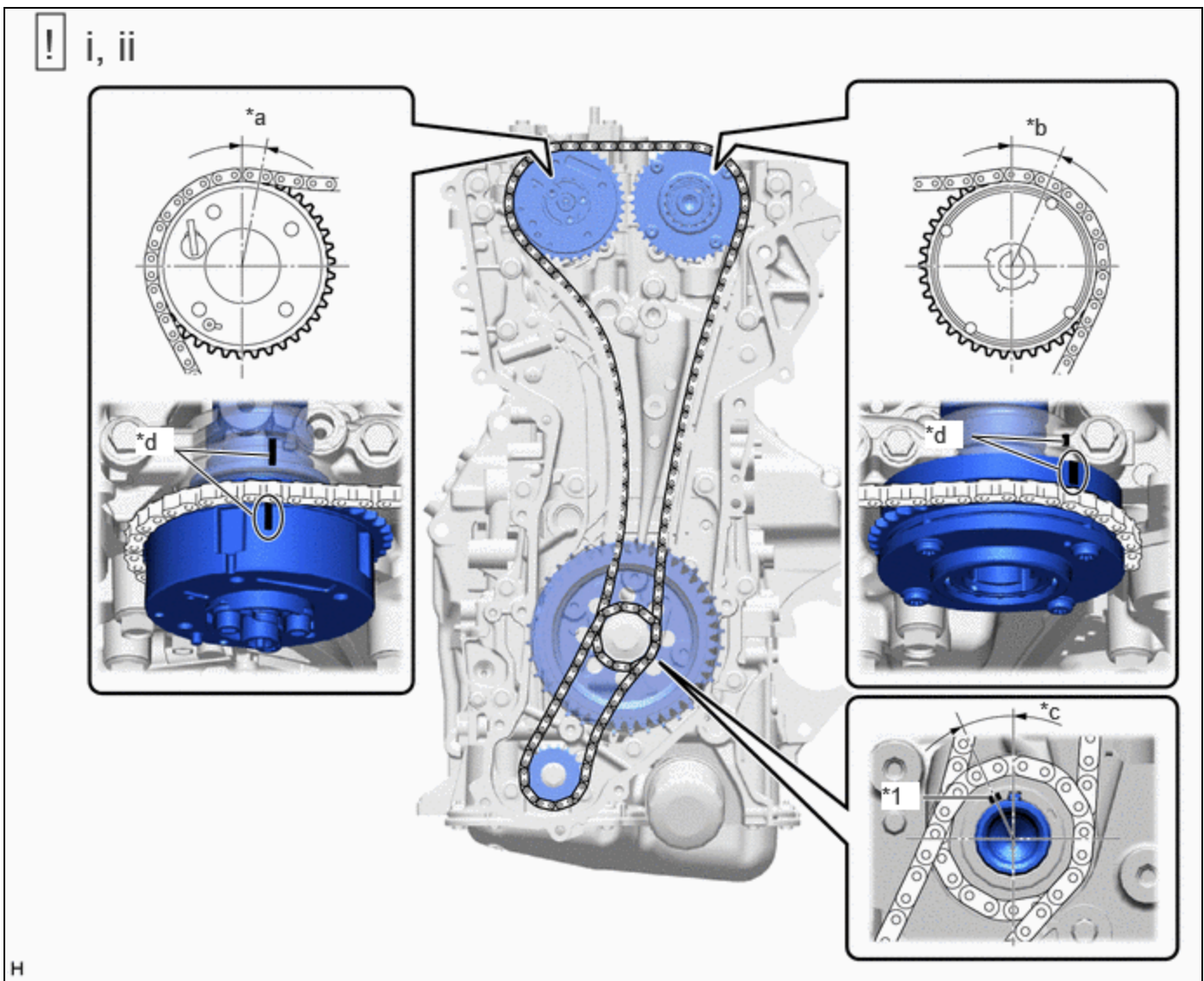
NOTICE:

Do not damage the surface of the timing chain cover oil seal press fit hole.

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



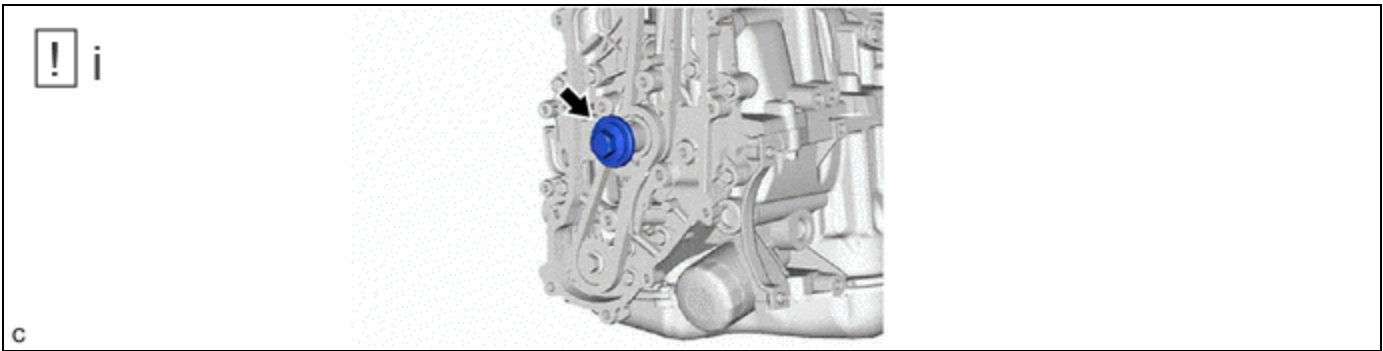
(1) Temporarily install the crankshaft pulley bolt.



*1	Crankshaft Timing Gear Key	-	-
*a	Approximately 4.63°	*b	Approximately 33.07°
*c	Approximately 2.73°	*d	Timing Mark

(1) Rotate the crankshaft clockwise and align the crankshaft timing gear key as shown in the illustration.

(2) If the timing marks are not aligned, rotate the crankshaft clockwise and realign the timing marks.

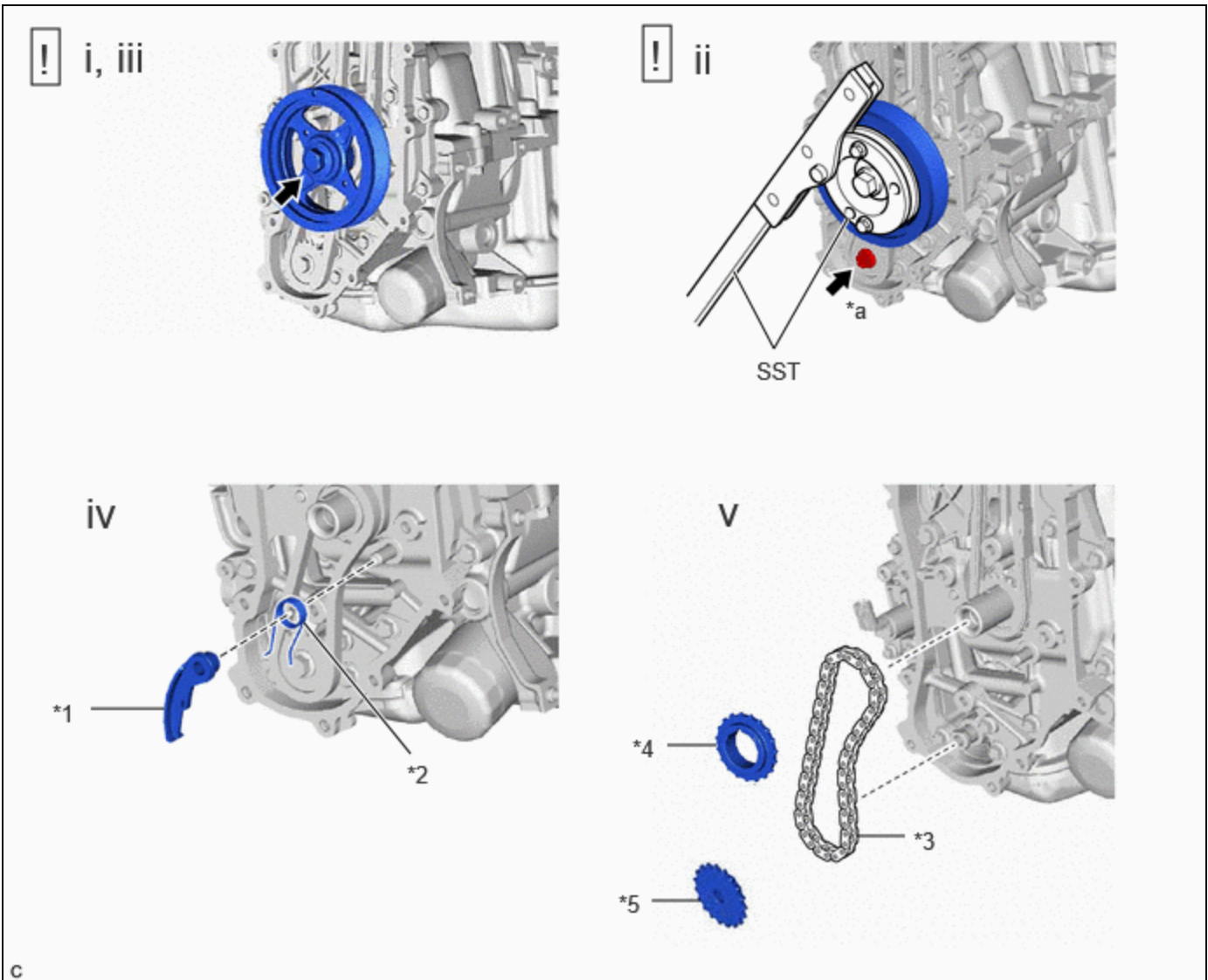


(1) While holding the hexagonal portion of the exhaust camshaft sub-assembly, remove the crankshaft pulley bolt.

NOTICE:

Be careful not to damage the camshaft housing sub-assembly, cylinder head sub-assembly and spark plug tube with the wrench.

28. REMOVE OIL PUMP DRIVE CHAIN SUB-ASSEMBLY



*1	Chain Tensioner Plate	*2	Chain Damper Spring
*3	Oil Pump Drive Chain Sub-assembly	*4	Oil Pump Drive Sprocket

*5	Oil Pump Drive Shaft Sprocket	-	-
*a	Bolt	-	-

(1) Temporarily install the crankshaft pulley assembly with the crankshaft pulley bolt.

(2) Using SST, hold the crankshaft pulley assembly and remove the bolt.

SST: 09213-54015

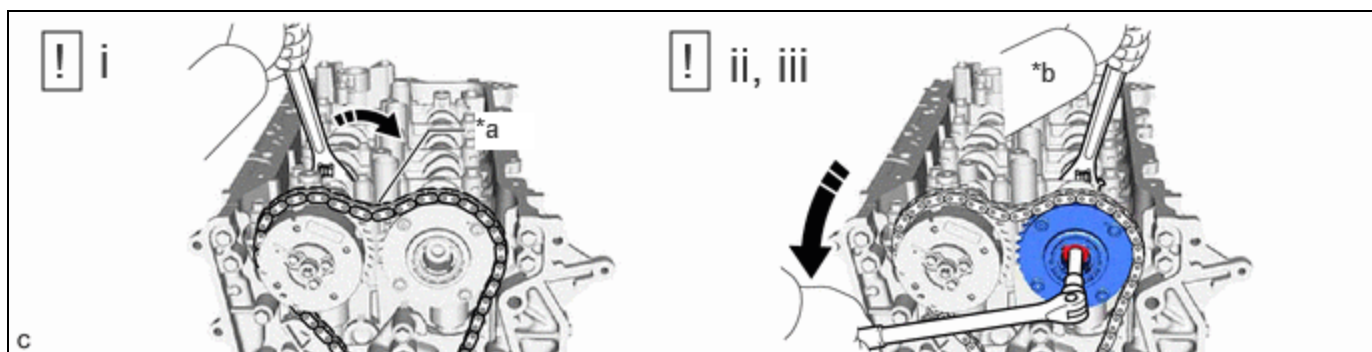
SST: 09330-00021

(3) Remove SST, the crankshaft pulley bolt and crankshaft pulley assembly.

(4) Remove the chain tensioner plate and chain damper spring.

(5) Remove the oil pump drive sprocket, oil pump drive shaft sprocket and oil pump drive chain sub-assembly.

29. REMOVE CAMSHAFT TIMING GEAR ASSEMBLY



*a	Loosen	*b	Hold
	Turn	-	-

(1) Hold the hexagonal portion of the exhaust camshaft sub-assembly with a wrench and turn the camshaft timing exhaust gear assembly clockwise to loosen the chain sub-assembly between the camshaft timing exhaust gear assembly and camshaft timing gear assembly.

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

NOTICE:

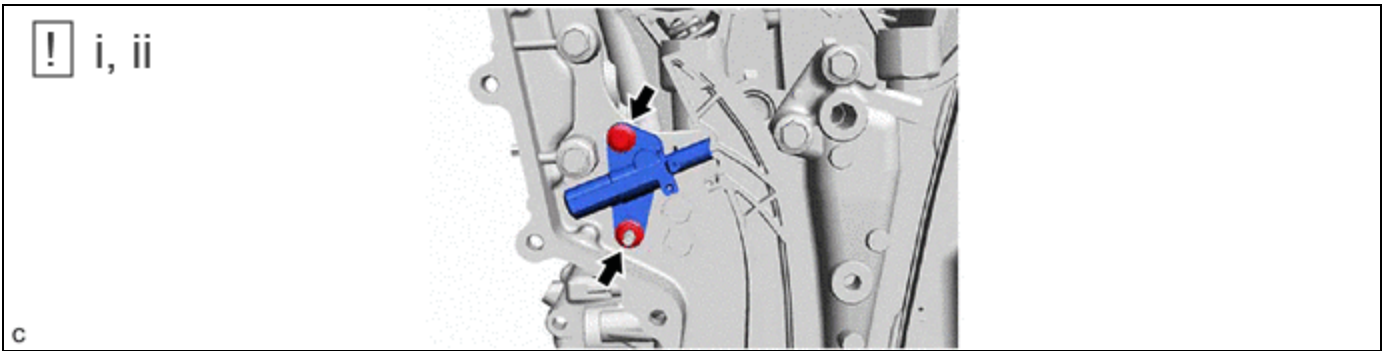
- Be careful not to damage the camshaft housing sub-assembly, cylinder head sub-assembly and spark plug tube with the wrench.
- Do not disassemble the camshaft timing gear assembly.

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

30. REMOVE CHAIN SUB-ASSEMBLY



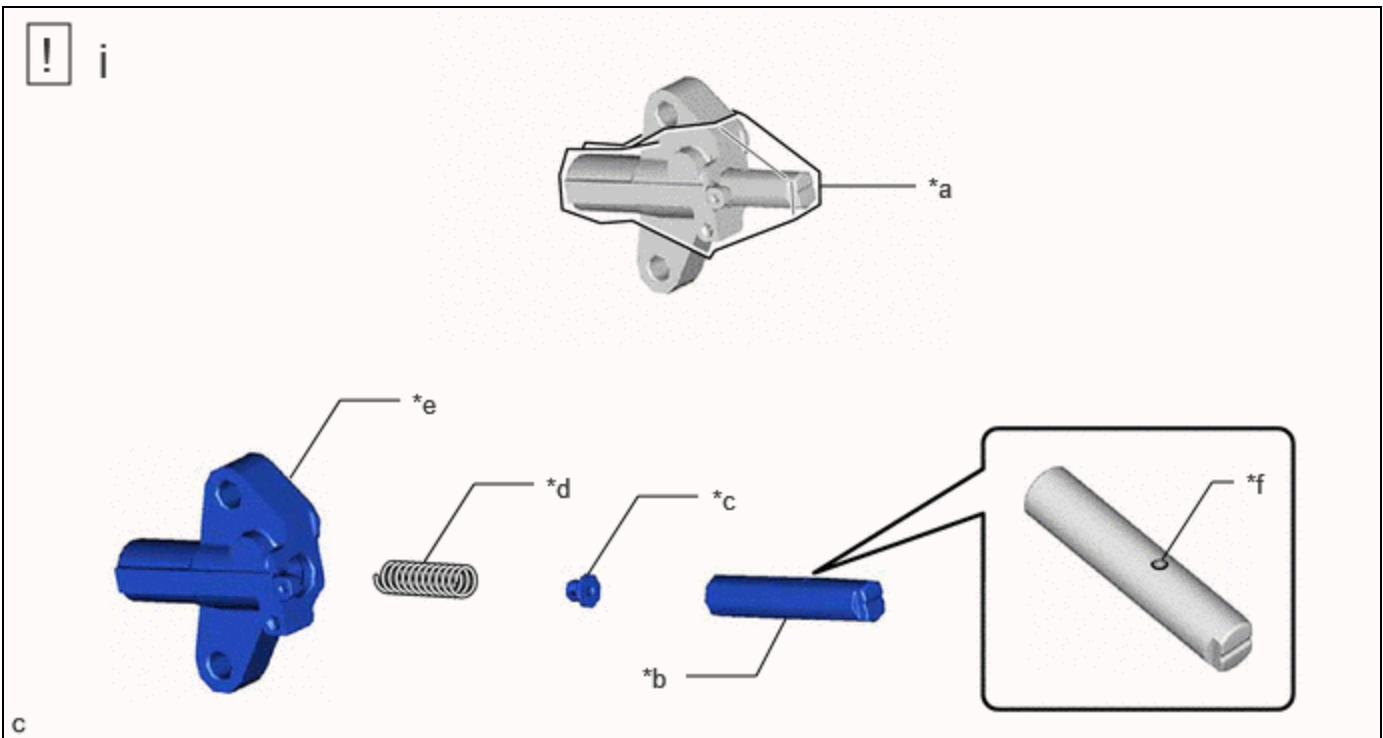
31. REMOVE NO. 1 CHAIN TENSIONER ASSEMBLY



- (1) Using an 8 mm socket wrench, remove the bolt.
- (2) Remove the nut and No. 1 chain tensioner assembly.

NOTICE:

Make sure that the plunger, check ball assembly and spring do not come out.



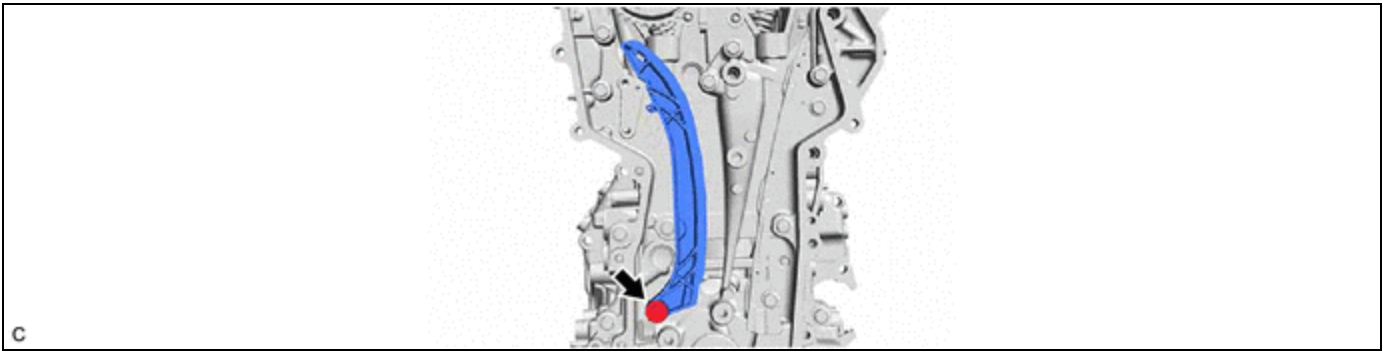
*a	Tape	*b	Plunger
*c	Check Ball Assembly	*d	Spring
*e	No. 1 Chain Tensioner Assembly Body	*f	Oil Hole

- (1) Use tape to hold the plunger inside the No. 1 chain tensioner assembly.

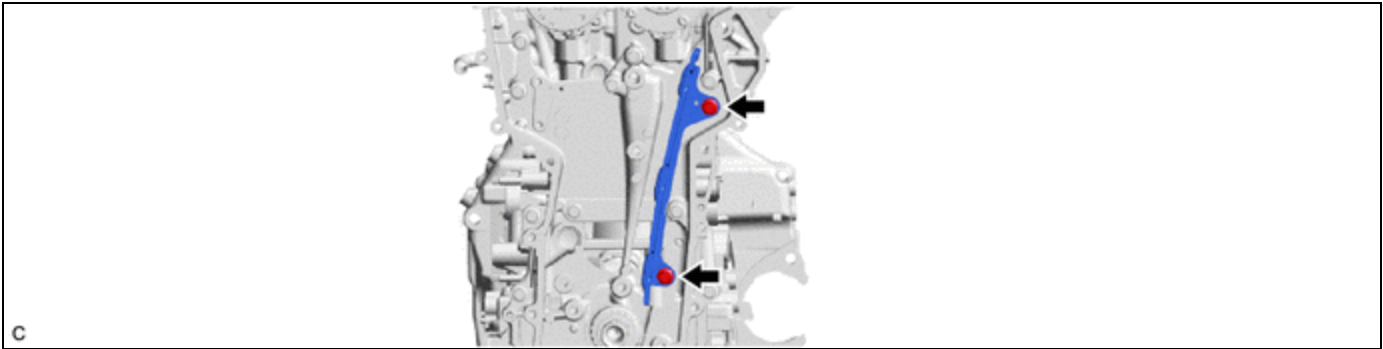
NOTICE:

- Make sure that the plunger, check ball assembly and spring do not come out.
- If the No. 1 chain tensioner assembly comes apart, reinstall the parts as shown in the illustration.

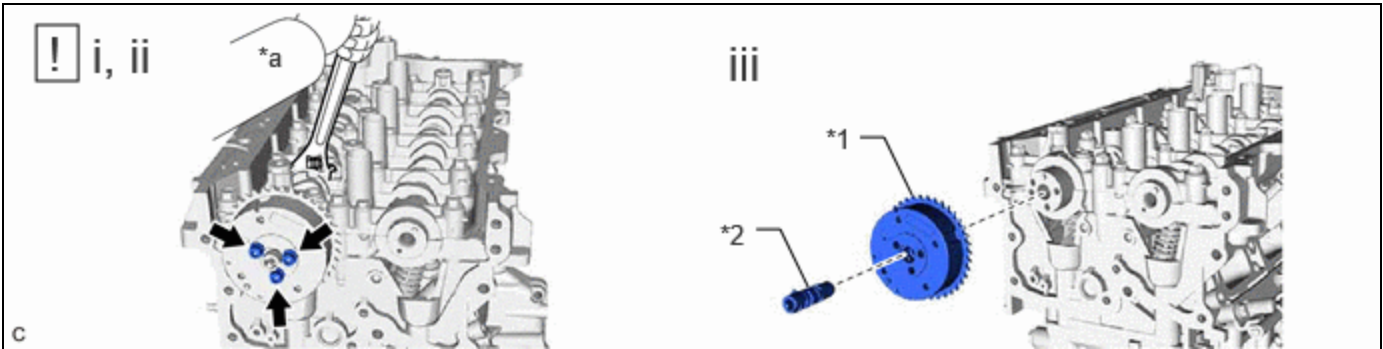
32. REMOVE CHAIN TENSIONER SLIPPER



33. REMOVE NO. 1 CHAIN VIBRATION DAMPER



34. REMOVE CAMSHAFT TIMING EXHAUST GEAR ASSEMBLY



*1	Camshaft Timing Exhaust Gear Assembly	*2	Camshaft Timing Valve Assembly
*a	Hold	-	-

(1) Using a wrench, hold the hexagonal portion of the exhaust camshaft sub-assembly.

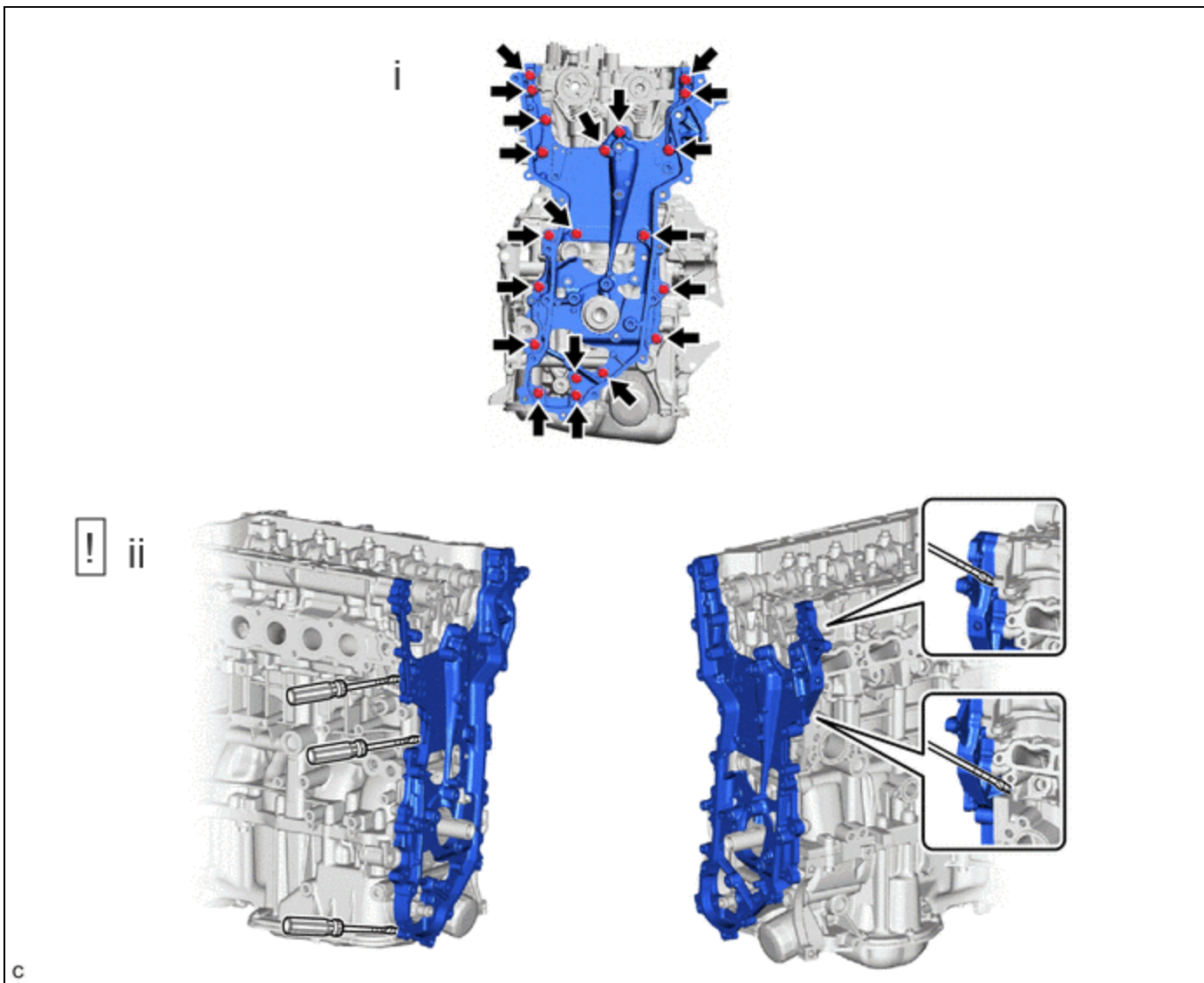
NOTICE:

Be careful not to damage the camshaft housing sub-assembly, cylinder head sub-assembly and spark plug tube with the wrench.

(2) Using a 5 mm hexagon socket wrench, remove the 3 bolts.

(3) Remove the camshaft timing exhaust gear assembly and camshaft timing valve assembly.

35. REMOVE TIMING CHAIN COVER ASSEMBLY



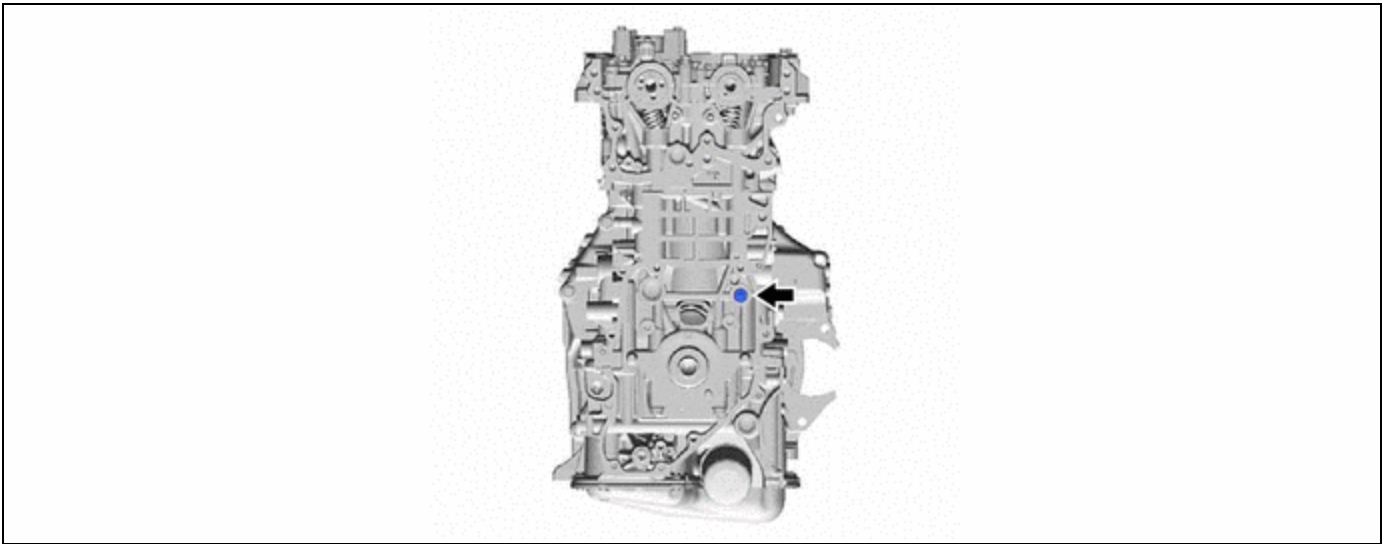
(1) Remove the 20 bolts.

(2) Remove the timing chain cover assembly by prying between the cylinder head sub-assembly, camshaft housing sub-assembly, cylinder block sub-assembly, oil pump assembly and stiffening crankcase assembly with a screwdriver with its tip wrapped with protective tape.

NOTICE:

Be careful not to damage the contact surfaces of the cylinder head sub-assembly, camshaft housing sub-assembly, cylinder block sub-assembly, oil pump assembly, stiffening crankcase assembly and timing chain cover assembly.

36. REMOVE OIL NOZZLE VALVE SUB-ASSEMBLY

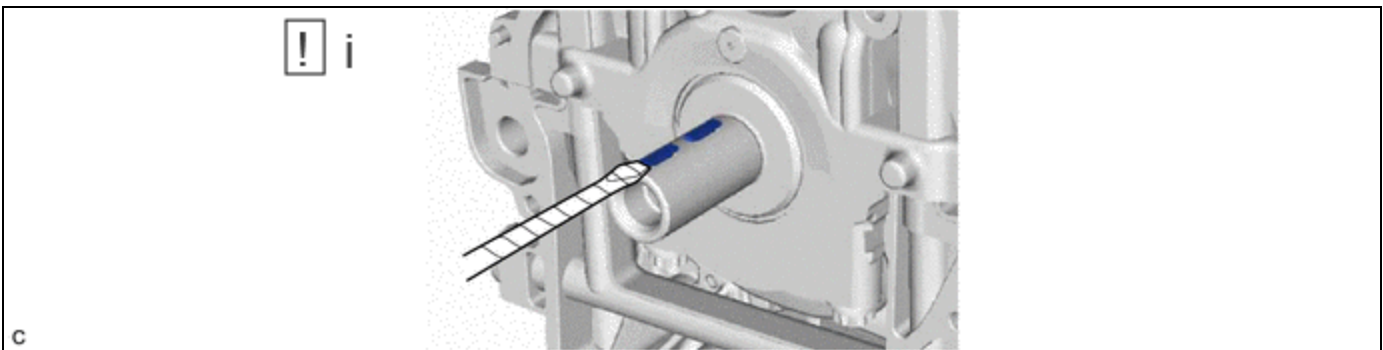


37. REMOVE CRANKSHAFT TIMING GEAR KEY



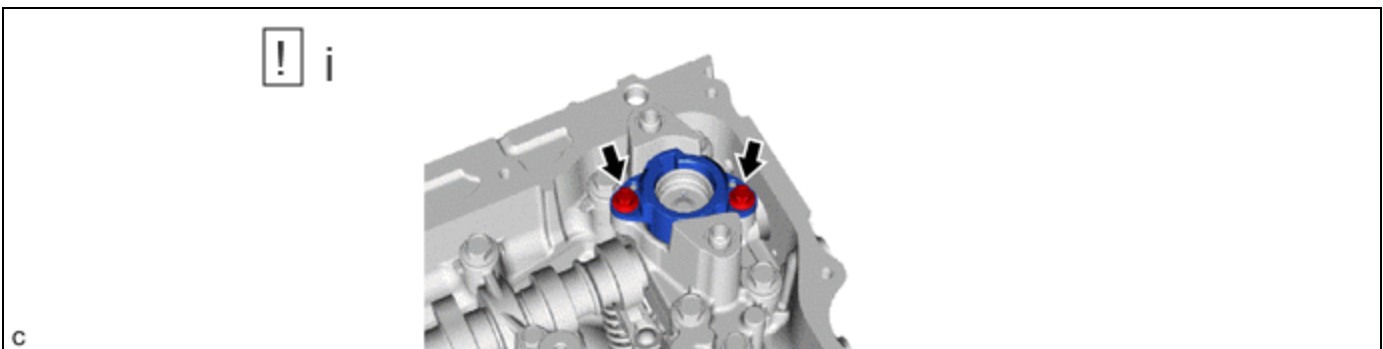
NOTICE:

Be careful not to damage the crankshaft.



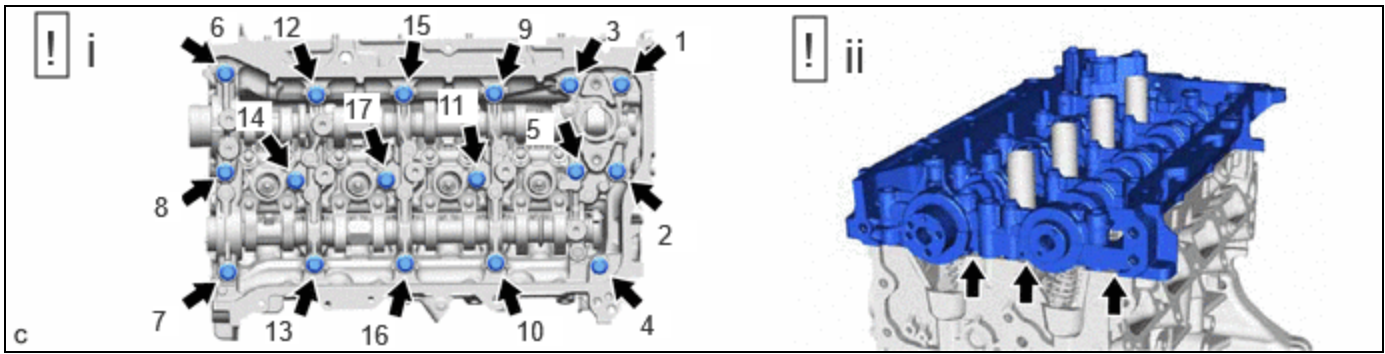
(1) Using a screwdriver with its tip wrapped with protective tape, remove the 2 crankshaft timing gear keys.

38. REMOVE FUEL PUMP LIFTER GUIDE



(1) Using an 8 mm socket wrench, remove the 2 bolts and fuel pump lifter guide from the No. 4 camshaft bearing cap.

39. REMOVE CAMSHAFT HOUSING SUB-ASSEMBLY

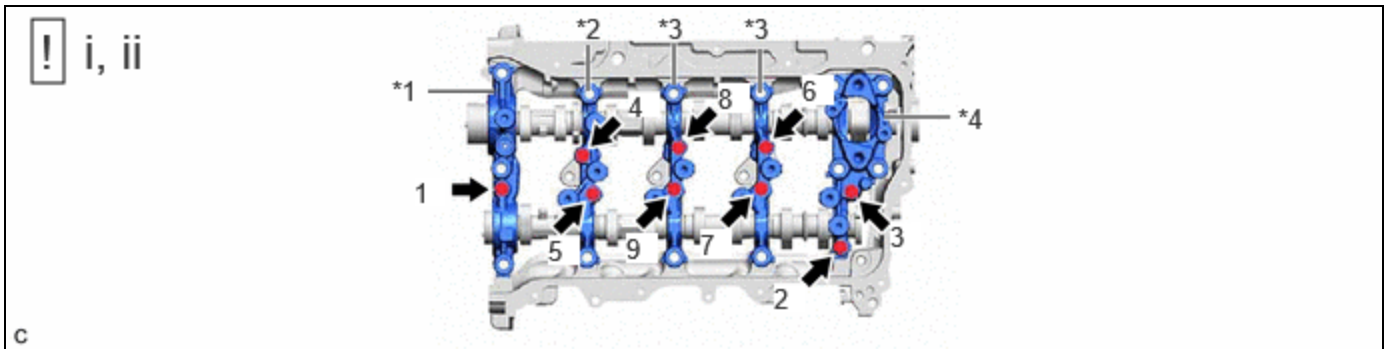


- (1) Uniformly loosen and remove the 17 bolts in the order shown in the illustration.
- (2) Remove the camshaft housing sub-assembly by prying between the cylinder head sub-assembly and camshaft housing sub-assembly with a screwdriver with its tip wrapped with protective tape.

NOTICE:

Be careful not to damage the contact surfaces of the cylinder head sub-assembly and camshaft housing sub-assembly.

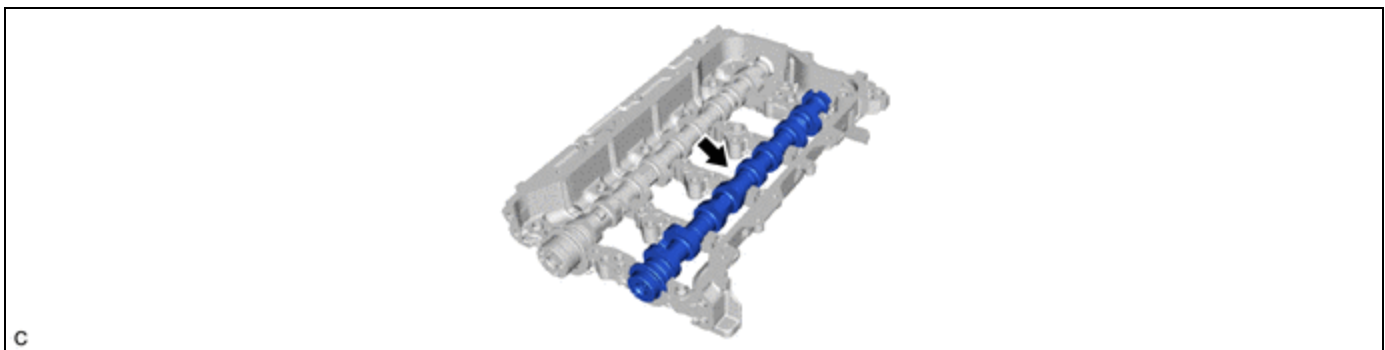
40. REMOVE CAMSHAFT BEARING CAP



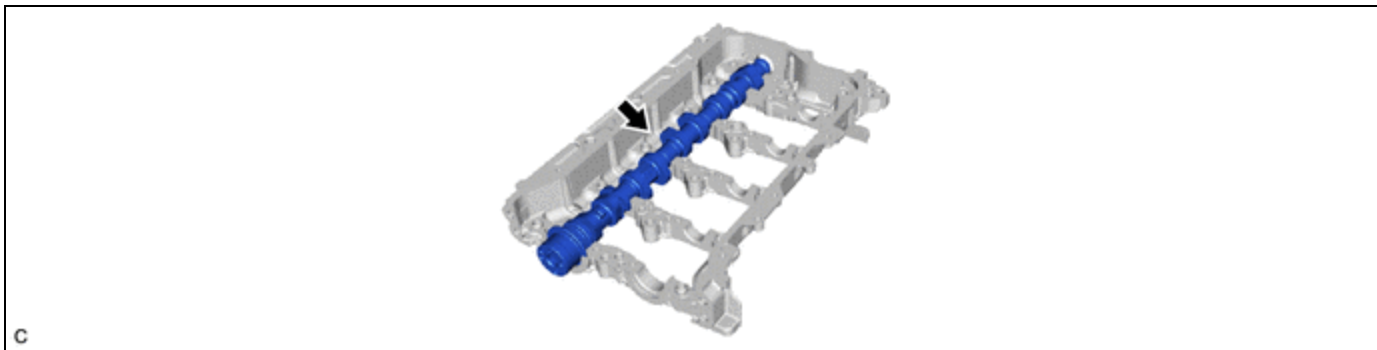
*1	No. 1 Camshaft Bearing Cap	*2	No. 2 Camshaft Bearing Cap
*3	No. 3 Camshaft Bearing Cap	*4	No. 4 Camshaft Bearing Cap

- (1) Uniformly loosen and remove the 9 bolts in the order shown in the illustration.
- (2) Remove the No. 1 camshaft bearing cap, No. 2 camshaft bearing cap, 2 No. 3 camshaft bearing caps and No. 4 camshaft bearing cap from the camshaft housing sub-assembly.

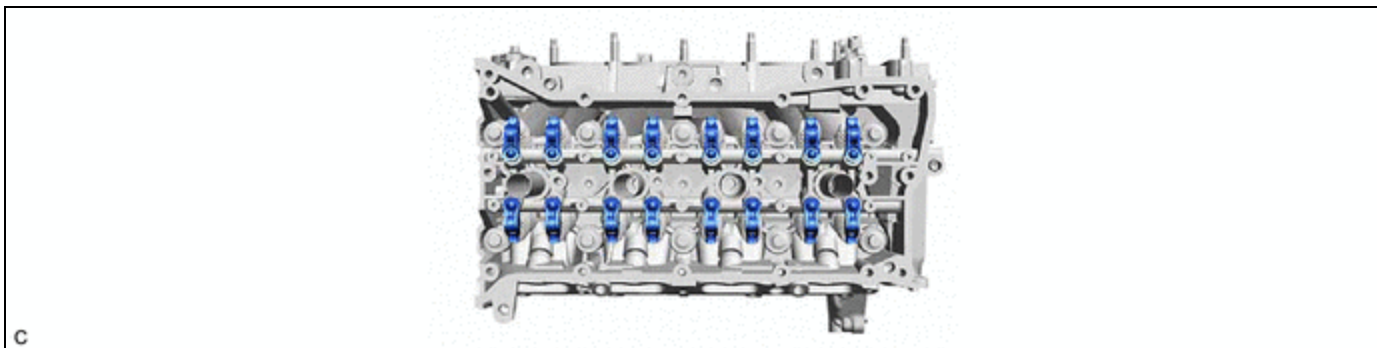
41. REMOVE INTAKE CAMSHAFT SUB-ASSEMBLY



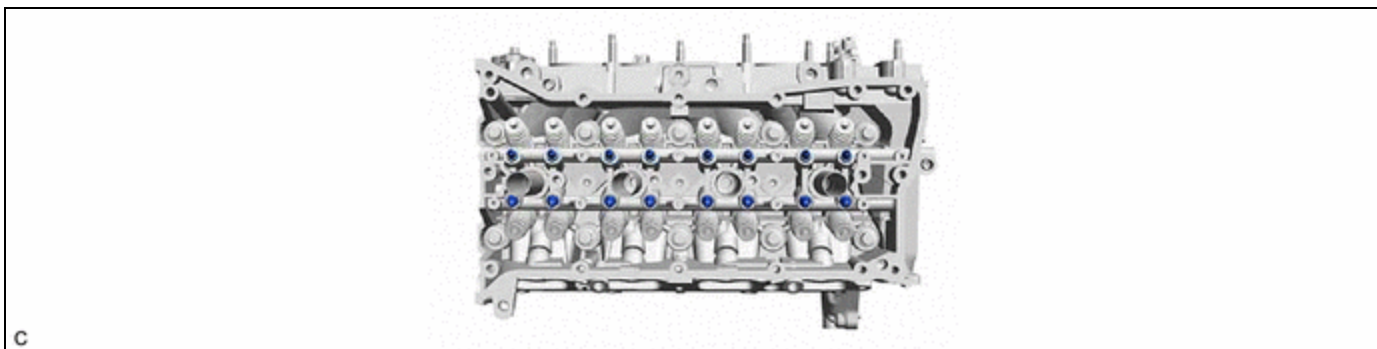
42. REMOVE EXHAUST CAMSHAFT SUB-ASSEMBLY



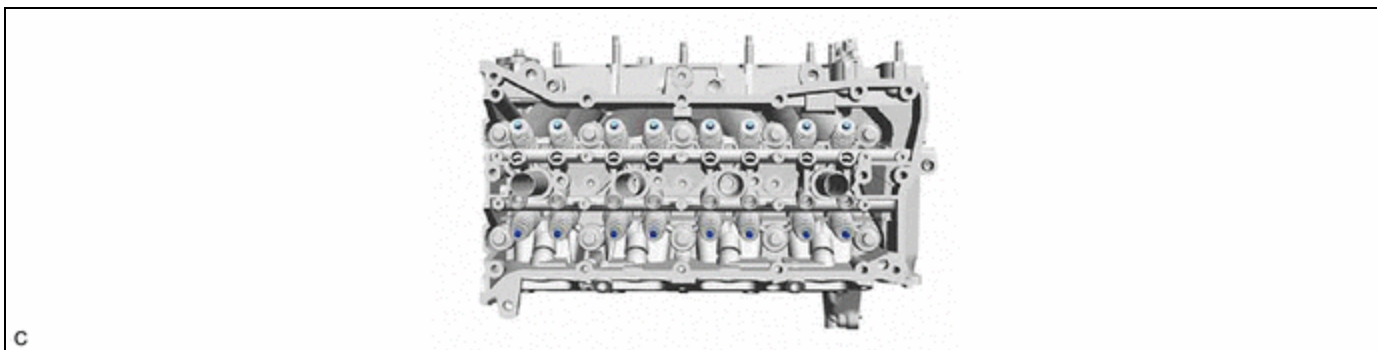
43. REMOVE NO. 1 VALVE ROCKER ARM SUB-ASSEMBLY



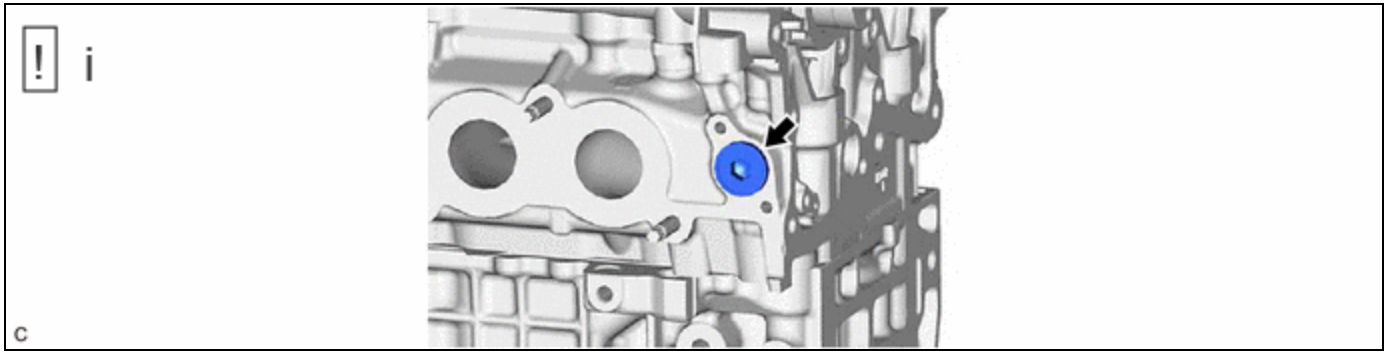
44. REMOVE VALVE LASH ADJUSTER ASSEMBLY



45. REMOVE VALVE STEM CAP



46. REMOVE NO. 3 STRAIGHT SCREW WITH HEAD PLUG

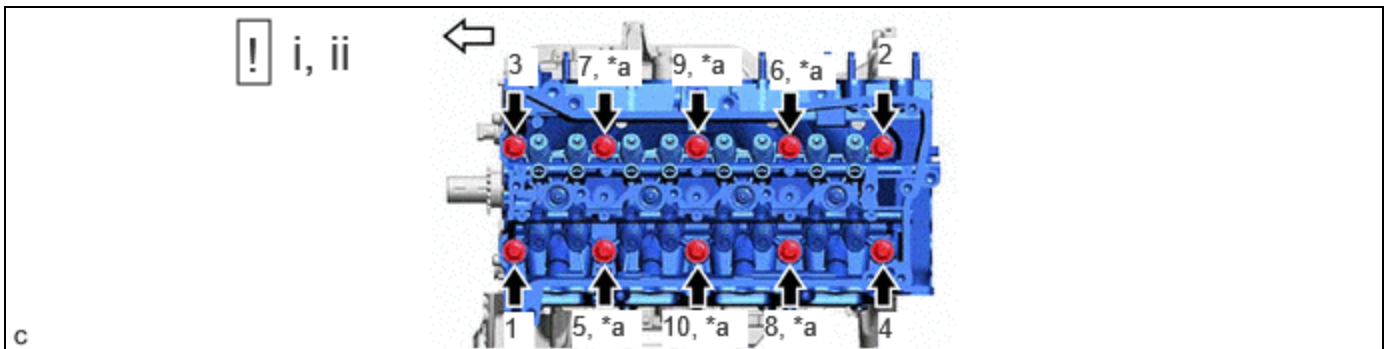


(1) Using a 10 mm hexagon socket wrench, remove the No. 3 straight screw with head plug from the cylinder head sub-assembly.

47. REMOVE CYLINDER HEAD SUB-ASSEMBLY

NOTICE:

- Be careful not to drop the plate washers into the cylinder head sub-assembly.
- Warpage or cracking of the cylinder head sub-assembly may result from removing the cylinder head set bolts in the incorrect order.



*a	Plate Washer	-	-	-
➔	Front of Engine	-	-	-

(1) Using a 12 mm socket wrench, uniformly loosen the 10 cylinder head set bolts in the order shown in the illustration. Remove the 10 cylinder head set bolts and 6 plate washers.

(2) Remove the cylinder head sub-assembly from the cylinder block sub-assembly.

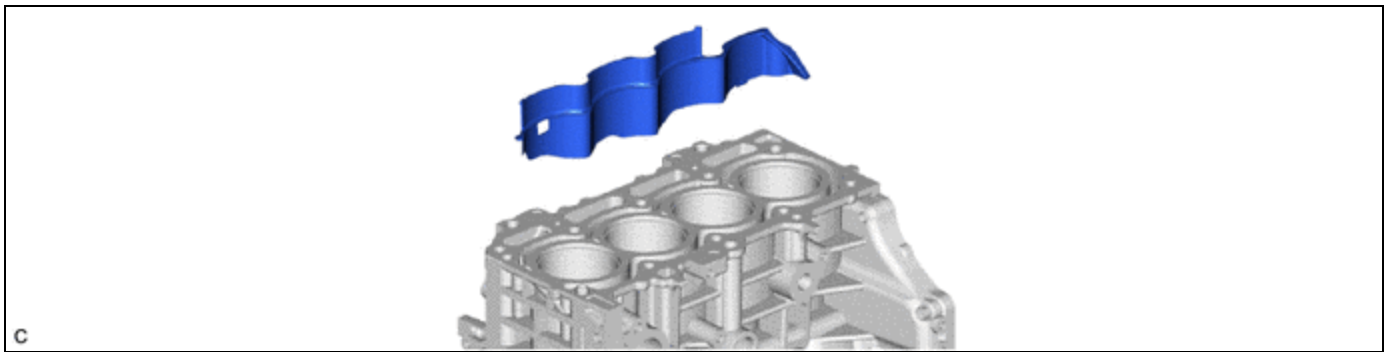
48. REMOVE CYLINDER HEAD GASKET

Click here [INFO](#)

49. REMOVE CYLINDER BLOCK WATER JACKET SPACER

NOTICE:

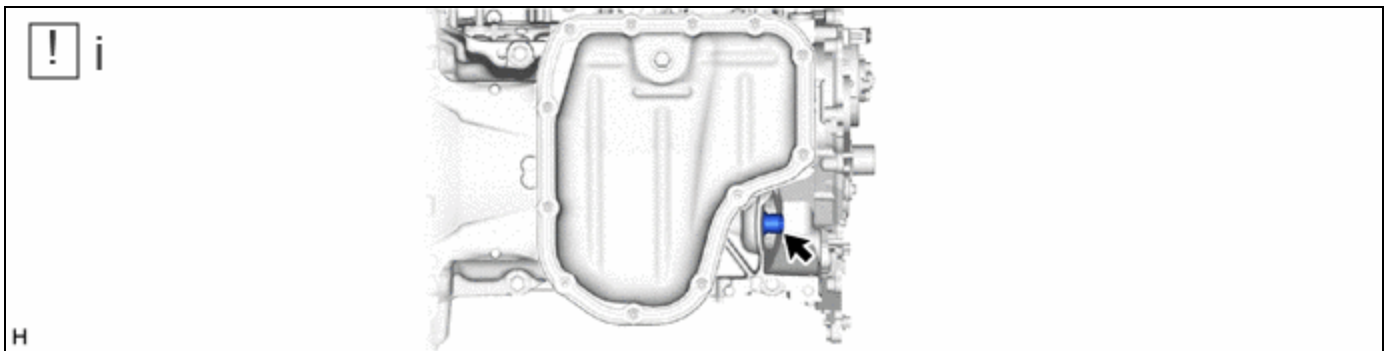
Be sure to remove the cylinder block water jacket spacer. If it is not removed, it may fall and become damaged when the cylinder block sub-assembly is inverted.



50. REMOVE OIL FILTER SUB-ASSEMBLY

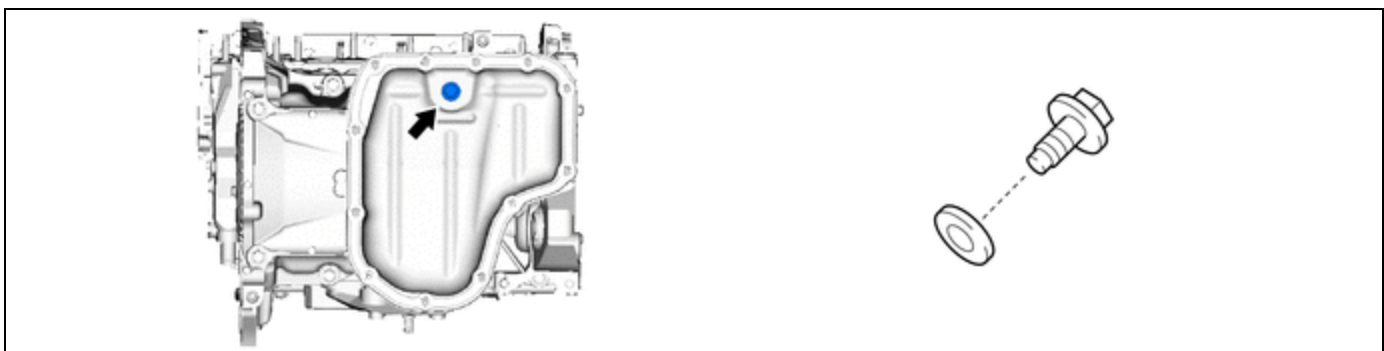
Click here [INFO](#)

51. REMOVE OIL FILTER UNION

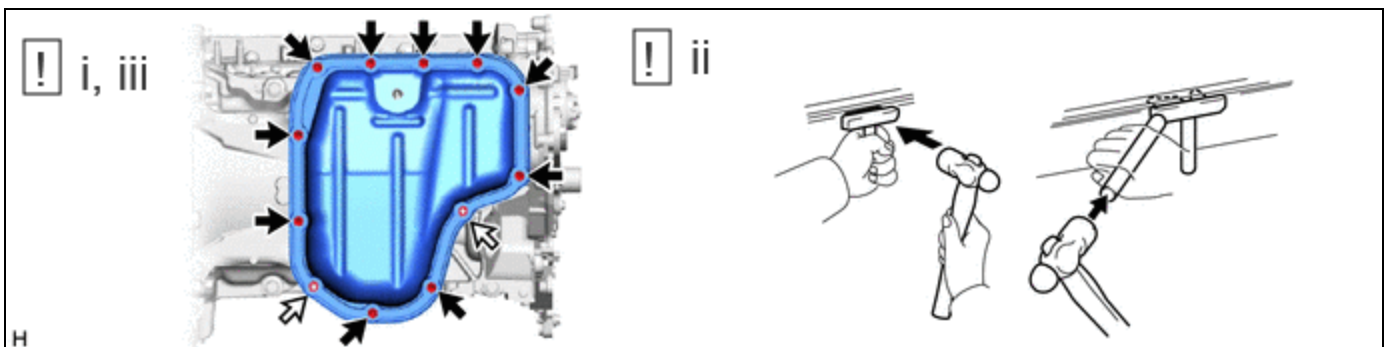




(1) Using a 12 mm straight hexagon wrench, remove the oil filter union from the stiffening crankcase assembly.

52. REMOVE OIL PAN DRAIN PLUG



53. REMOVE OIL PAN SUB-ASSEMBLY



	Bolt		Nut
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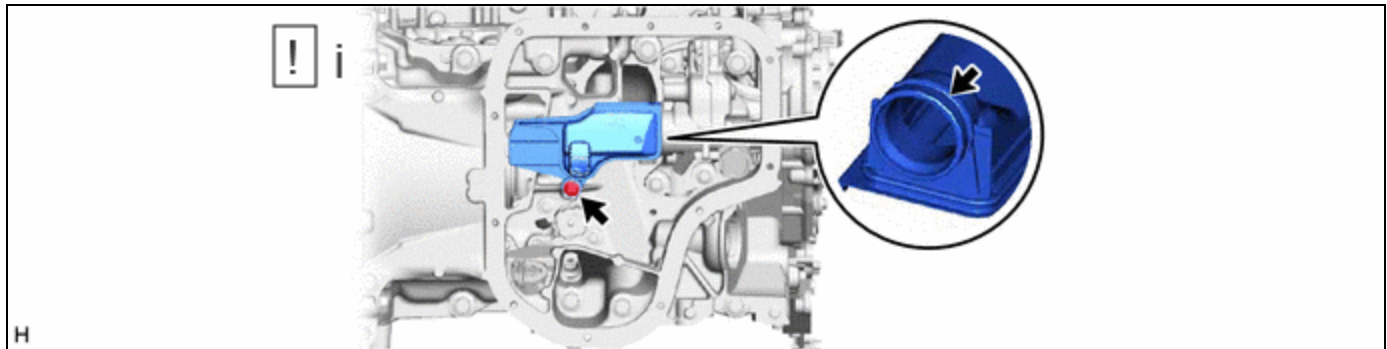
- (1) Remove the 10 bolts and 2 nuts.
- (2) Insert the blade of an oil pan seal cutter between the oil pan sub-assembly and stiffening crankcase assembly, cut through the applied sealer and remove the oil pan sub-assembly.

NOTICE:

- Be careful not to damage the contact surfaces of the stiffening crankcase assembly and oil pan sub-assembly.
- Be careful not to damage the oil pan sub-assembly flange.


- (3) Clean and inspect the bolts, nuts and stud bolts.

54. REMOVE OIL STRAINER SUB-ASSEMBLY



- (1) Using an 8 mm socket wrench, remove the bolt, oil strainer sub-assembly and oil strainer gasket.

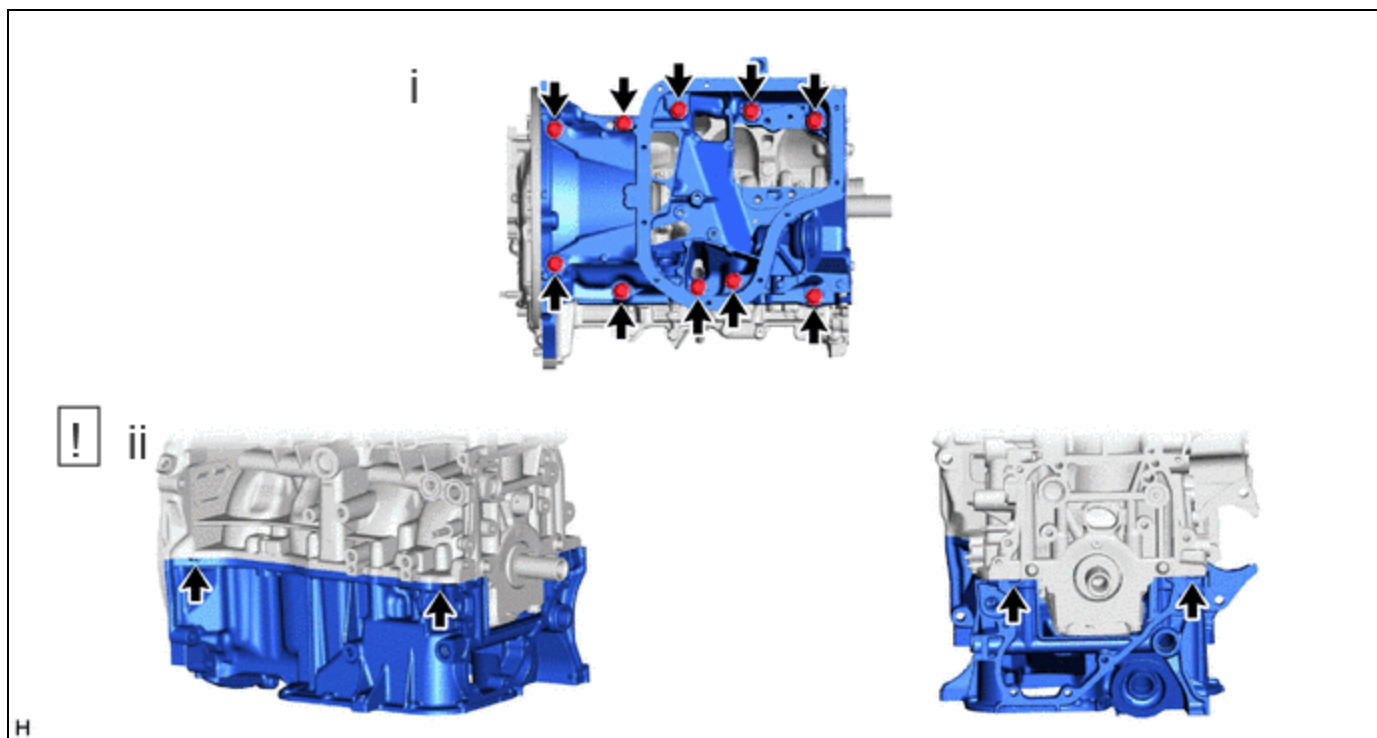
55. REMOVE ENGINE OIL LEVEL SENSOR

	Click here INFO
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56. REMOVE OIL PUMP ASSEMBLY

Click here [INFO](#)

57. REMOVE STIFFENING CRANKCASE ASSEMBLY



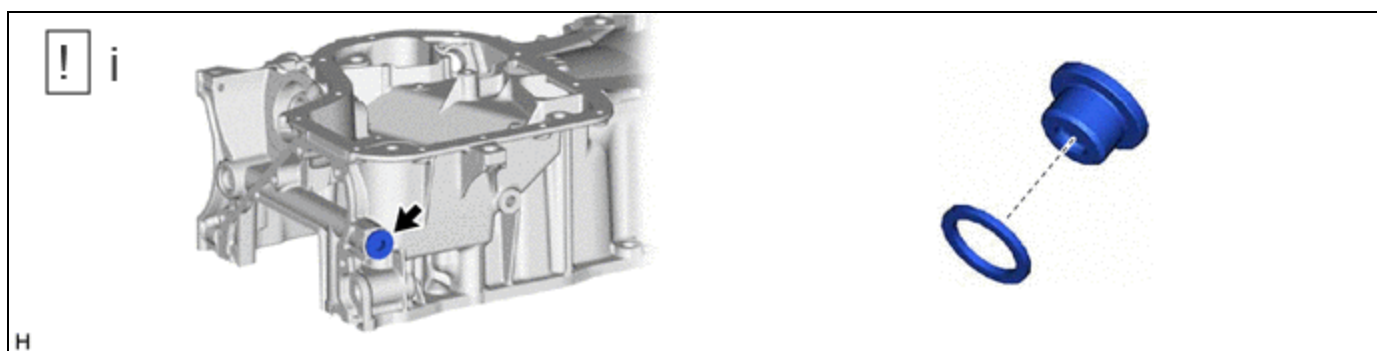
(1) Remove the 10 bolts.

(2) Using a screwdriver with its tip wrapped with protective tape, remove the stiffening crankcase assembly by prying between the stiffening crankcase assembly and cylinder block sub-assembly at the places shown in the illustration.

NOTICE:

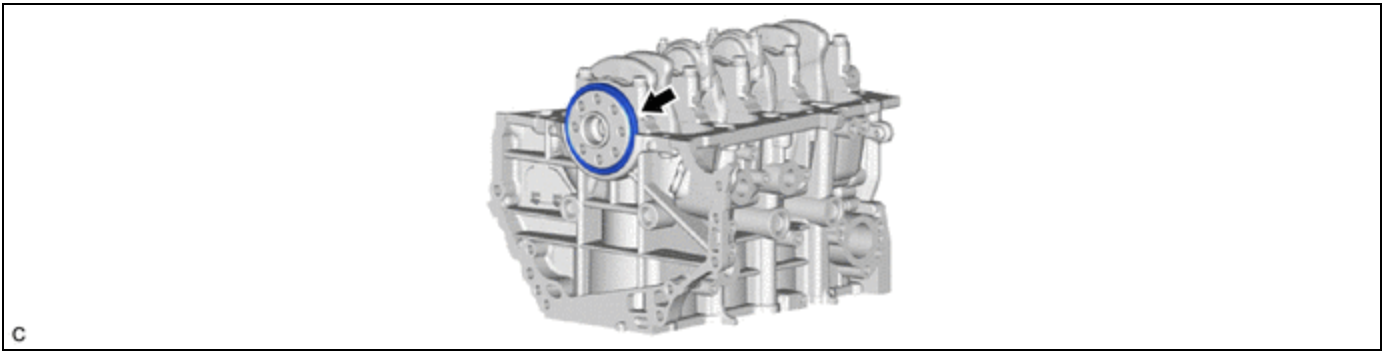
Be careful not to damage the contact surfaces of the cylinder block sub-assembly and stiffening crankcase assembly.

58. REMOVE STRAIGHT SCREW PLUG

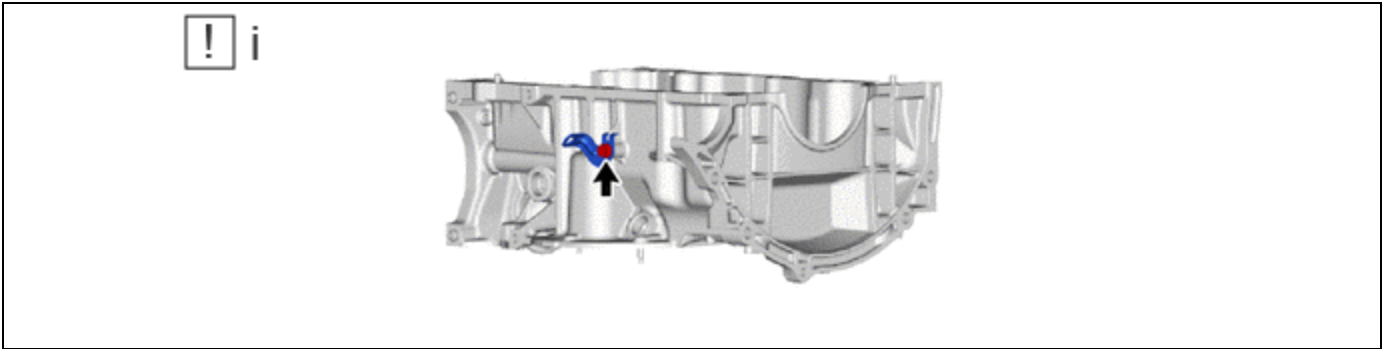


(1) Using a 10 mm hexagon socket wrench, remove the straight screw plug and gasket from the stiffening crankcase assembly.

59. REMOVE REAR ENGINE OIL SEAL



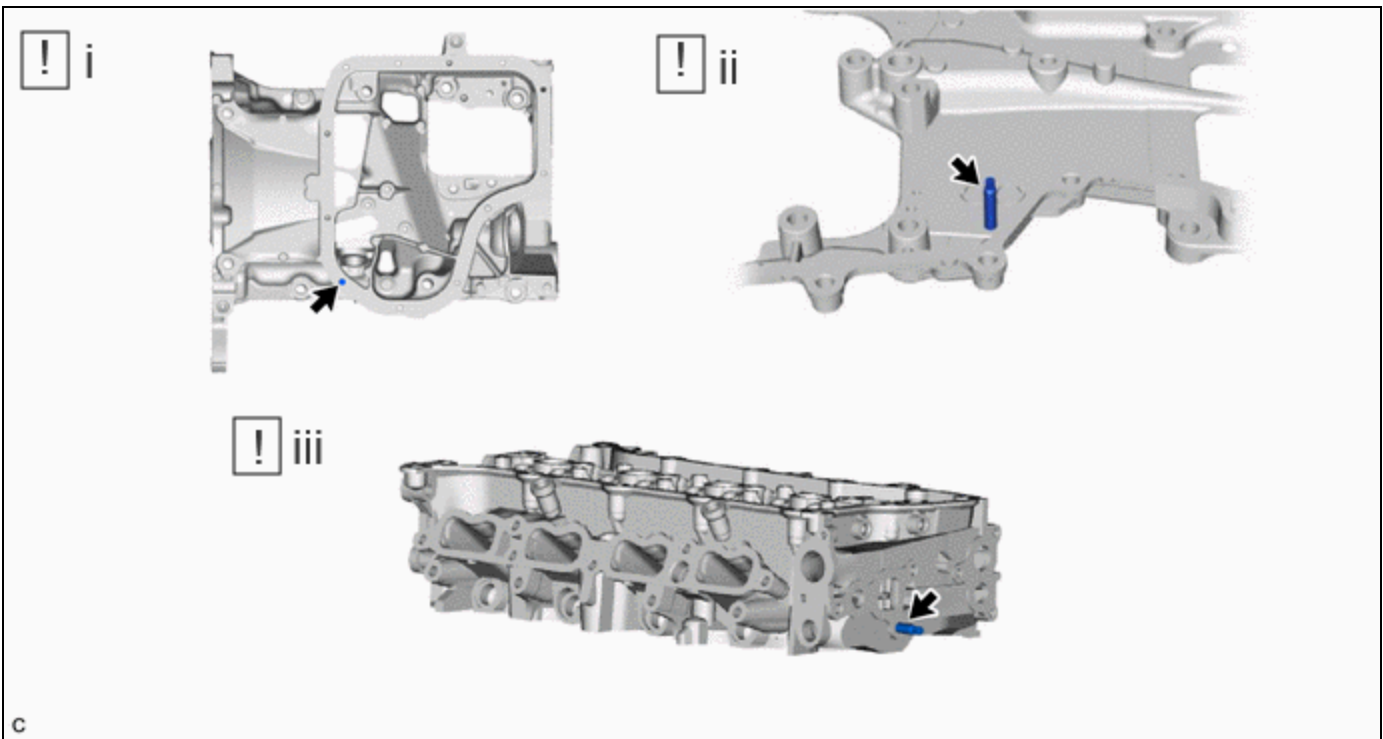
60. REMOVE WIRE HARNESS CLAMP BRACKET



(1) Using an 8 mm socket wrench, remove the bolt and wire harness clamp bracket.

61. REMOVE STUD BOLT

	<p>NOTICE: If a stud bolt is deformed or its threads are damaged, replace it.</p>
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(1) Using an E6 "TORX" socket wrench, remove the stud bolt from the stiffening crankcase assembly.

(2) Using an E6 "TORX" socket wrench, remove the stud bolt from the timing chain cover assembly.

(3) w/ Stud Bolt:

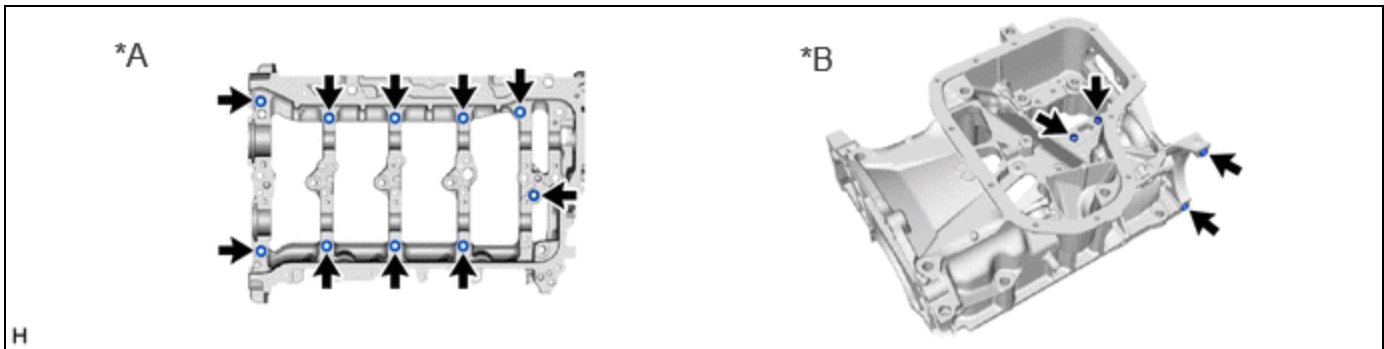
1. Using an E8 "TORX" socket wrench, remove the stud bolt from the cylinder head sub-assembly.

62. REMOVE RING PIN



NOTICE:

It is not necessary to remove the ring pins unless they are being replaced.



*A	Camshaft Housing Sub-assembly Upper Side	*B	Stiffening Crankcase Assembly Side
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63. REMOVE STRAIGHT PIN



NOTICE:

It is not necessary to remove the straight pins unless they are being replaced.

