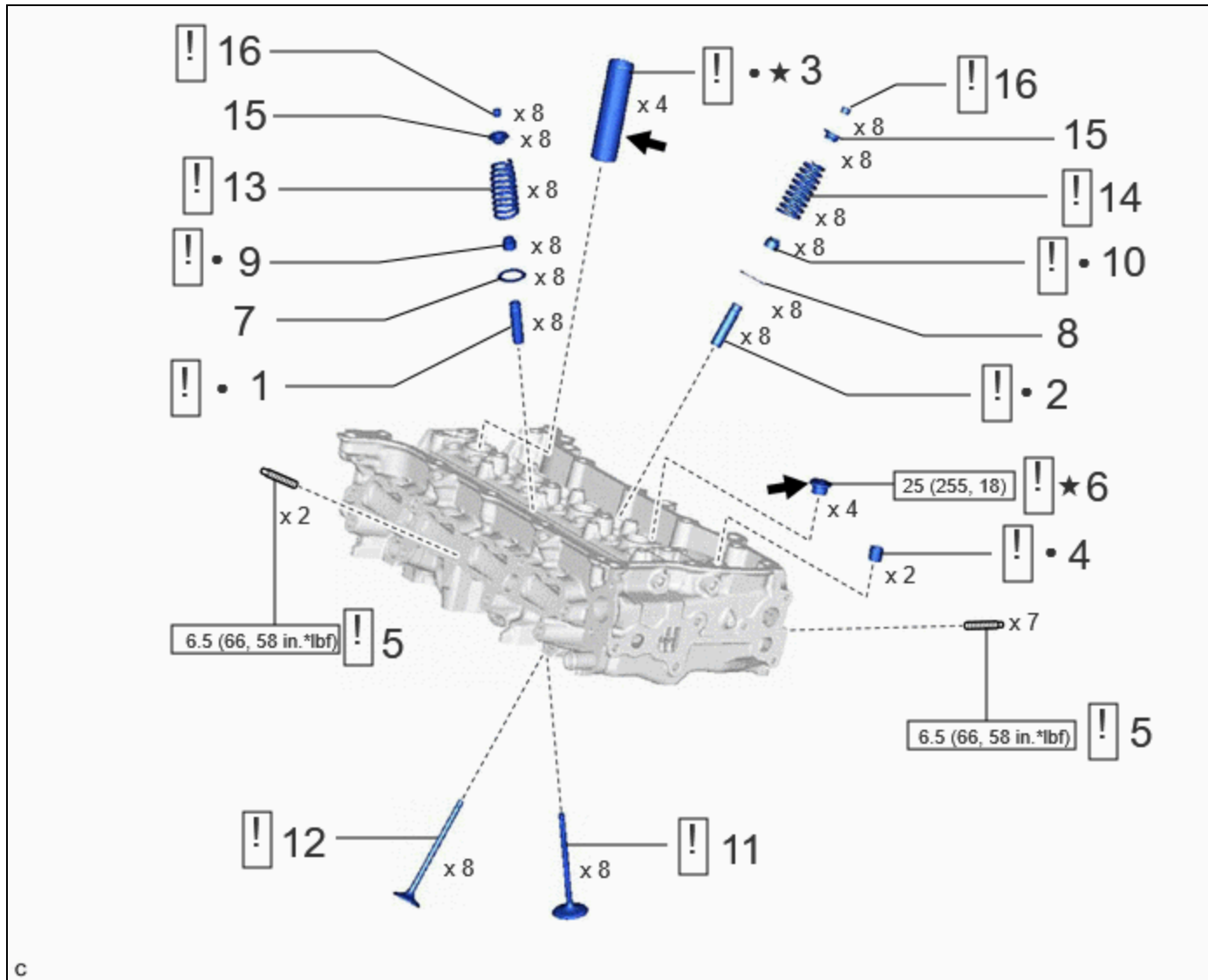


Last Modified: 12-04-2024	6.11:8.1.0	Doc ID: RM1000000029YCR
Model Year Start: 2023	Model: Prius Prime	Prod Date Range: [12/2022 -]
Title: M20A-FXS (ENGINE MECHANICAL): CYLINDER HEAD: REASSEMBLY; 2023 - 2024 MY Prius Prius Prime [12/2022 -]		




REASSEMBLY



CAUTION / NOTICE / HINT

COMPONENTS (REASSEMBLY)



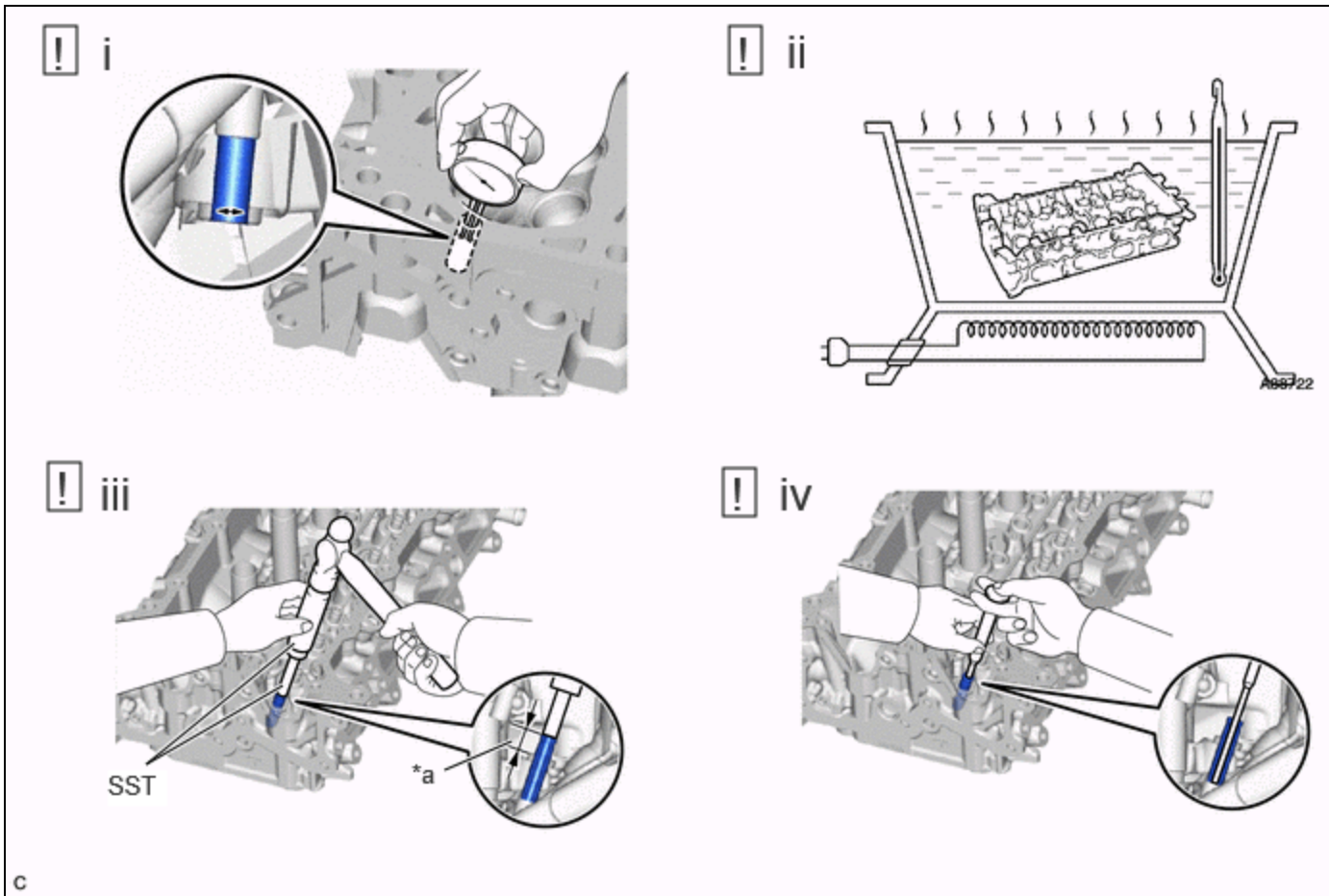
PROCEDURE		PART NAME CODE	!	✍	⚙
1	INTAKE VALVE GUIDE BUSH	11122	INFO	-	-
2	EXHAUST VALVE GUIDE BUSH	11126	INFO	-	-

PROCEDURE		PART NAME CODE			
3	SPARK PLUG TUBE	-	INFO	-	-
4	RING PIN	11115A	INFO	-	-
5	STUD BOLT	-	INFO	-	-
6	NO. 1 STRAIGHT SCREW PLUG	11117E	INFO	-	-
7	INTAKE VALVE SPRING SEAT	13734A	-	-	-
8	EXHAUST VALVE SPRING SEAT	13734B	-	-	-
9	INTAKE VALVE STEM OIL SEAL	13711E	INFO	-	-
10	EXHAUST VALVE STEM OIL SEAL	13715A	INFO	-	-
11	INTAKE VALVE	13711	INFO	-	-
12	EXHAUST VALVE	13715	INFO	-	-
13	INTAKE VALVE COMPRESSION SPRING	13711M	INFO	-	-
14	EXHAUST VALVE COMPRESSION SPRING	13715H	INFO	-	-
15	VALVE SPRING RETAINER	-	-	-	-
16	VALVE SPRING RETAINER LOCK	13741A	INFO	-	-

	N*m (kgf*cm, ft.*lbf): Specified torque	•	Non-reusable part
	Adhesive 1324	★	Precoated part

PROCEDURE

1. INSTALL INTAKE VALVE GUIDE BUSH



*a	Protrusion Height	-	-
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(1) Using a caliper gauge, measure the intake valve guide bush bore diameter of the cylinder head sub-assembly.

Standard Intake Valve Guide Bush Bore Diameter:

10.285 to 10.306 mm (0.405 to 0.406 in.)

New Guide Bush Selection Chart:

BUSH SIZE	SPECIFIED CONDITION
STD	10.333 to 10.344 mm (0.40681 to 0.40724 in.)
O/S 0.05	10.383 to 10.394 mm (0.40878 to 0.40921 in.)

Standard Bush Length:

41.3 to 41.7 mm (1.63 to 1.64 in.)

HINT:

- If the intake valve guide bush bore diameter of the cylinder head sub-assembly is more than 10.306 mm (0.406 in.), machine the intake valve guide bush bore of the cylinder head sub-assembly to a dimension of 10.335 to 10.356 mm (0.407 to 0.408 in.) to install an O/S 0.05 intake valve guide bush.
- If the intake valve guide bush bore diameter of the cylinder head sub-assembly is more than 10.356 mm (0.408 in.), replace the cylinder head sub-assembly.

(2) Heat the cylinder head sub-assembly to between 80 and 100°C (176 and 212°F).

CAUTION:

Be sure to wear protective gloves.

(3) Using SST and a hammer, tap in a new intake valve guide bush.

SST: 09201-10000

09201-01050

SST: 09950-70010

09951-07100

Standard Protrusion Height:

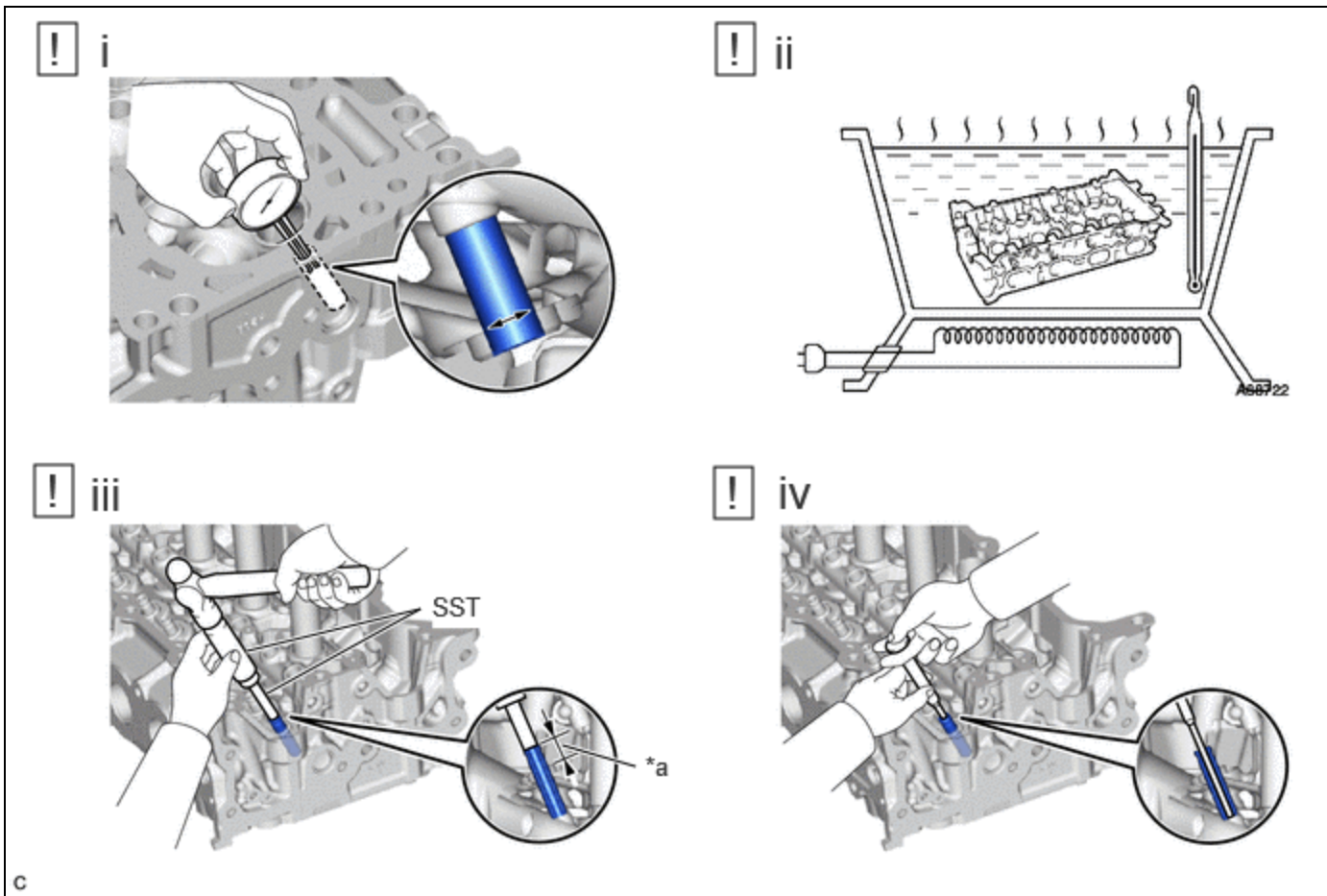
13.35 to 13.60 mm (0.526 to 0.535 in.)

(4) Using a sharp 5.5 mm reamer, ream the intake valve guide bush to obtain the standard oil clearance.

Standard Oil Clearance:

0.025 to 0.060 mm (0.000984 to 0.00236 in.)

2. INSTALL EXHAUST VALVE GUIDE BUSH



*a	Protrusion Height	-	-
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(1) Using a caliper gauge, measure the exhaust valve guide bush bore diameter of the cylinder head sub-assembly.

Standard Exhaust Valve Guide Bush Bore Diameter:

10.285 to 10.306 mm (0.405 to 0.406 in.)

New Guide Bush Selection Chart:

BUSH SIZE	SPECIFIED CONDITION
STD	10.333 to 10.344 mm (0.40681 to 0.40724 in.)
O/S 0.05	10.383 to 10.394 mm (0.40878 to 0.40921 in.)

Standard Bush Length:

43.3 to 43.7 mm (1.70 to 1.72 in.)

HINT:

- If the exhaust valve guide bush bore diameter of the cylinder head sub-assembly is more than 10.306 mm (0.406 in.), machine the exhaust valve guide bush bore of the cylinder head sub-assembly to a dimension of 10.335 to 10.356 mm (0.407 to 0.408 in.) to install an O/S 0.05 exhaust valve guide bush.
- If the exhaust valve guide bush bore diameter of the cylinder head sub-assembly is more than 10.356 mm (0.408 in.), replace the cylinder head sub-assembly.

(2) Heat the cylinder head sub-assembly to between 80 and 100°C (176 and 212°F).

CAUTION:

Be sure to wear protective gloves.

(3) Using SST and a hammer, tap in a new exhaust valve guide bush.

SST: 09201-10000

09201-01050

SST: 09950-70010

09951-07100

Standard Protrusion Height:

13.75 to 14.00 mm (0.541 to 0.551 in.)

(4) Using a sharp 5.5 mm reamer, ream the exhaust valve guide bush to obtain the standard oil clearance.

Standard Oil Clearance:

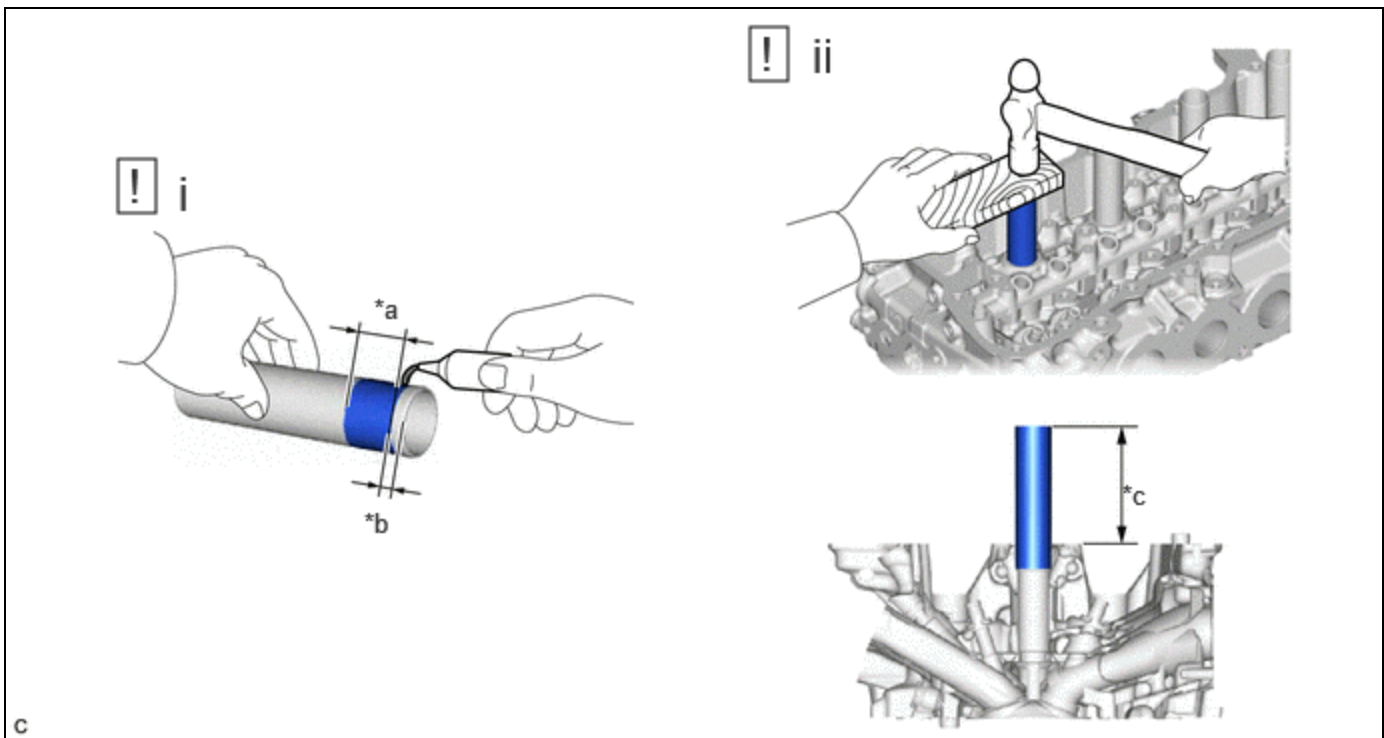
0.030 to 0.065 mm (0.00118 to 0.00256 in.)

3. INSTALL SPARK PLUG TUBE

!

NOTICE:

When using a new cylinder head sub-assembly, the spark plug tubes must be replaced.



*a	1.0 to 7.0 mm	*b	1.0 mm
*c	Protrusion Height	-	-

(1) Apply adhesive to 4 new spark plug tubes as shown in the illustration.

Adhesive:

Toyota Genuine Adhesive 1324, Three Bond 1324 or equivalent

Standard Application Width:

1.0 to 7.0 mm (0.0394 to 0.276 in.)

Distance:

1.0 mm (0.0394 in.)

(2) Using a wooden block and hammer, tap in the 4 spark plug tubes to the specified protrusion height.

Standard Protrusion Height:

77.3 to 78.3 mm (3.04 to 3.08 in.)

NOTICE:

- Do not expose the spark plug tube to engine oil for at least 1 hour after installing it.
- Be careful not to deform the spark plug tube.

4. INSTALL RING PIN

	<p>NOTICE:</p> <p>It is not necessary to remove the ring pins unless they are being replaced.</p>
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*a	Protrusion Height	-	-
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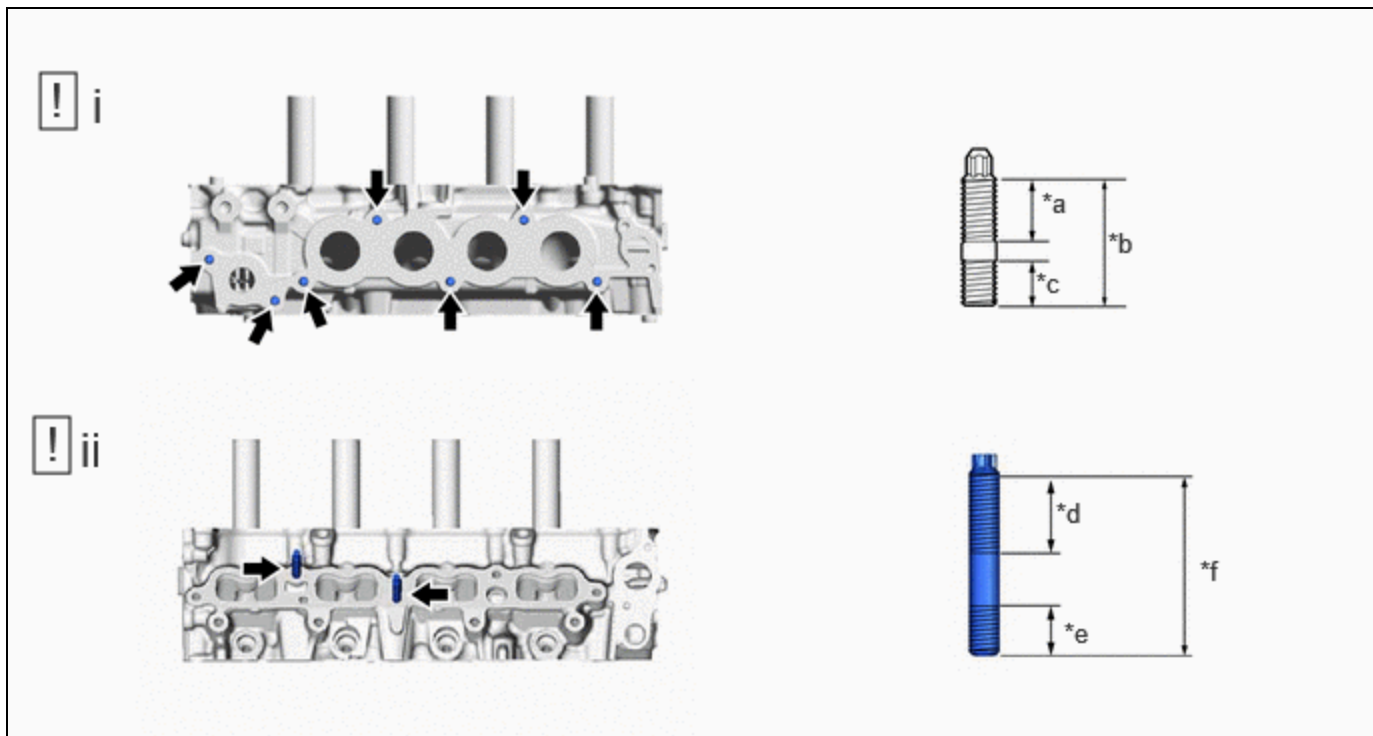
(1) Using a plastic hammer, tap in 2 new ring pins to the cylinder head sub-assembly.

Standard Protrusion Height:

6.5 to 7.5 mm (0.256 to 0.295 in.)

5. INSTALL STUD BOLT

	<p>NOTICE:</p> <p>If a stud bolt is deformed or its threads are damaged, replace it.</p>
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*a	20 mm (0.787 in.)	*b	35 mm (1.38 in.)
*c	13 mm (0.512 in.)	*d	24 mm (0.945 in.)
*e	12 mm (0.472 in.)	*f	52 mm (2.05 in.)

(1) Using an E8 "TORX" socket wrench, install the 7 stud bolts.

Torque:

6.5 N·m {66 kgf·cm, 58 in·lbf}

(2) Using an E8 "TORX" socket wrench, install the 2 stud bolts.

Torque:

6.5 N·m {66 kgf·cm, 58 in·lbf}

6. INSTALL NO. 1 STRAIGHT SCREW PLUG



(1) Apply adhesive to the 4 No. 1 straight screw plugs.

Adhesive:

Toyota Genuine Adhesive 1324, Three Bond 1324 or equivalent

(2) Using a 6 mm hexagon socket wrench, install the 4 No. 1 straight screw plugs to the cylinder head sub-assembly.

Torque:

25 N·m {255 kgf·cm, 18 ft·lbf}

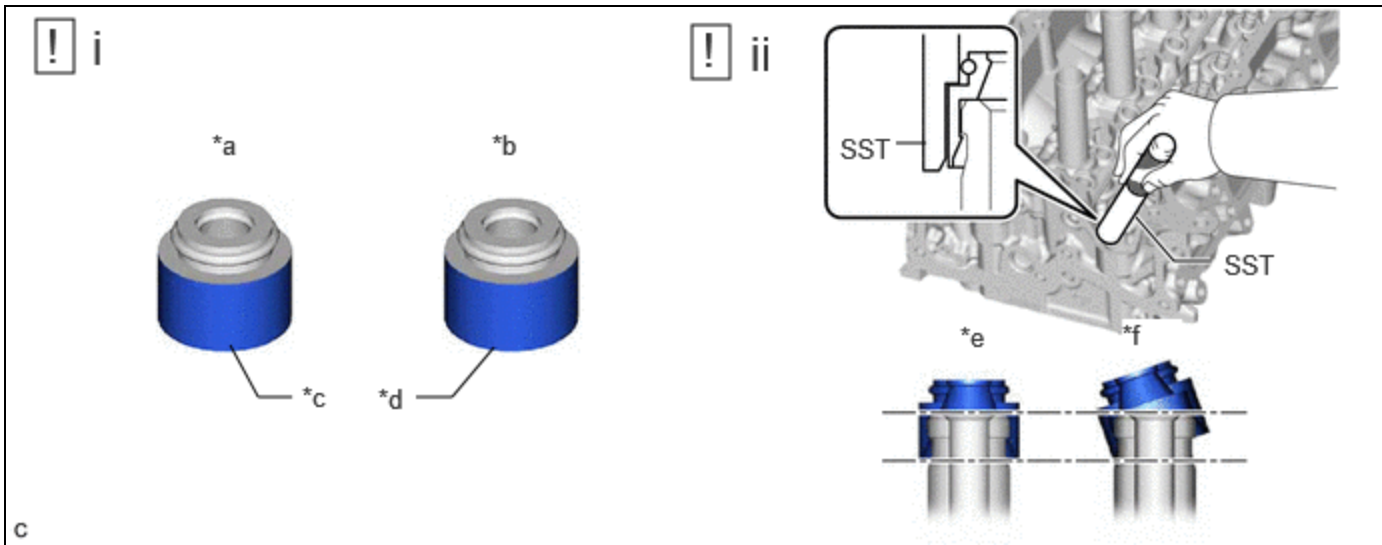
NOTICE:

Do not expose the No. 1 straight screw plug to engine oil for at least 1 hour after installing it.

7. INSTALL INTAKE VALVE SPRING SEAT

8. INSTALL EXHAUST VALVE SPRING SEAT

9. INSTALL INTAKE VALVE STEM OIL SEAL



*a	Intake Valve Stem Oil Seal	*b	Exhaust Valve Stem Oil Seal
*c	Gold	*d	Gray
*e	Correct	*f	Incorrect

(1) Apply a light coat of engine oil to 8 new intake valve stem oil seals.

NOTICE:

Make sure to install each valve stem oil seal to the correct side. Installing an intake valve stem oil seal to the exhaust side or installing an exhaust valve stem oil seal to the intake side can cause installation problems later.

HINT:

The intake valve stem oil seals are gold and the exhaust valve stem oil seals are gray.

(2) Using SST, push in the 8 intake valve stem oil seals.

SST: 09201-41020

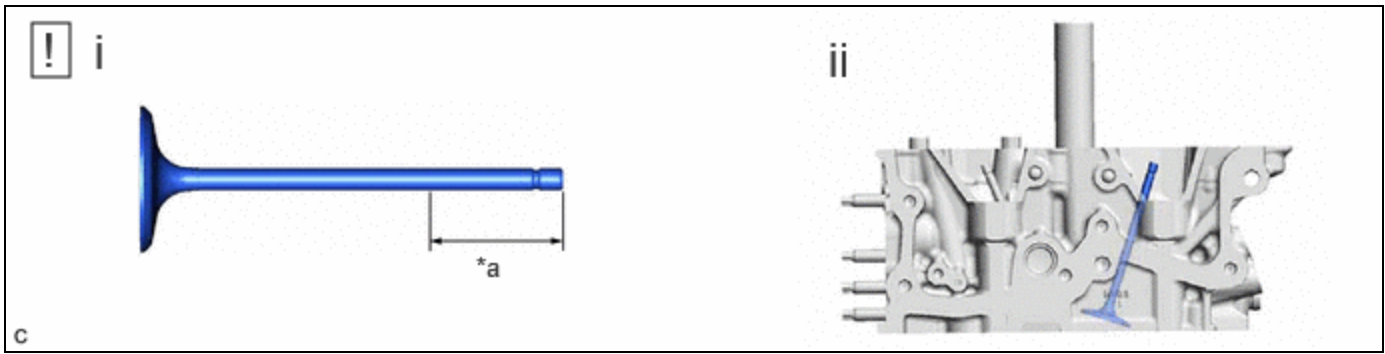
NOTICE:

Do not push in the intake valve stem oil seals at an angle.

10. INSTALL EXHAUST VALVE STEM OIL SEAL

(a) Perform the same procedure as for the intake valve stem oil seal.

11. INSTALL INTAKE VALVE



*a	30 mm (1.18 in.) or more	-	-
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- (1) Sufficiently apply engine oil to the tip area of the intake valve shown in the illustration.
- (2) Install the 8 intake valves.

12. INSTALL EXHAUST VALVE

- (a) Perform the same procedure as for the intake valve.

13. INSTALL INTAKE VALVE COMPRESSION SPRING

!

NOTICE:

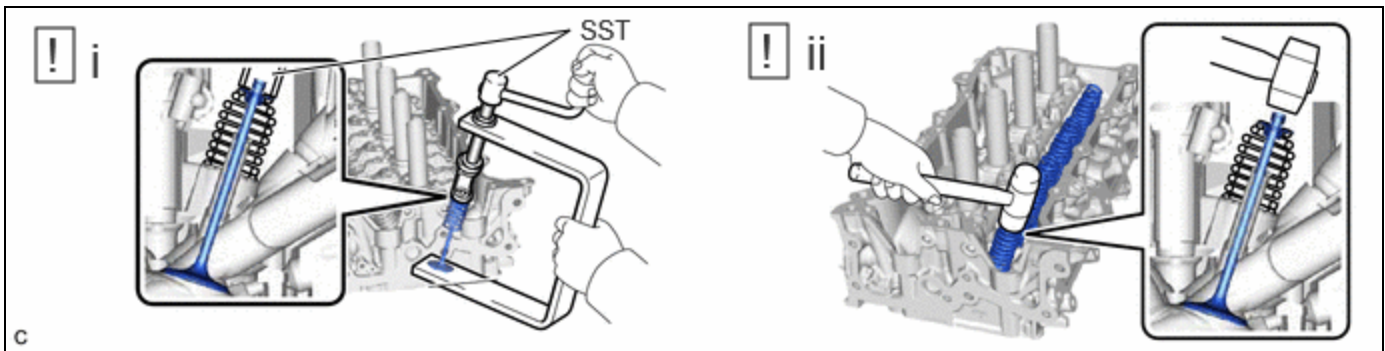
Make sure to install the compression springs with the taper side (valve spring retainer side) facing up.

14. INSTALL EXHAUST VALVE COMPRESSION SPRING

- (a) Perform the same procedure as for the intake valve compression spring.

15. INSTALL VALVE SPRING RETAINER

16. INSTALL VALVE SPRING RETAINER LOCK



- (1) Using SST, install the 16 valve spring retainer locks.

SST: 09202-70020

09202-01010

09202-01020

SST: 09202-00021

- (2) Using a plastic hammer, lightly tap the valve stem tip to ensure a proper fit.

NOTICE:

- Be careful not to damage the valve stem tip.
- Be careful not to damage the valve spring retainer.

