Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM100000002BIHB
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: M20A-FXS (ENGINE MECHANICAL): CYLINDER BLOCK: DISASSEMBLY; 2023 - 2024 MY Prius Prius Prime [03/2023 -]		

DISASSEMBLY

CAUTION / NOTICE / HINT

The necessary procedures (adjustment, calibration, initialization or registration) that must be performed after parts are removed and installed, or replaced during engine unit 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
• 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	• 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) • 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 cylinder head sub-assembly • Replacement of port fuel injector assembly • Replacement of direct fuel injector assembly • Replacement of EGR valve assembly • Replacement of air fuel ratio sensor (sensor 1) • Replacement of knock control sensor • Replacement of spark plug			

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REPLACED PART OR PERFORMED PROCEDURE	NECESSARY PROCEDURE	EFFECT/INOPERATIVE FUNCTION WHEN NECESSARY PROCEDURE NOT PERFORMED	LINK
• Replacement of piston or piston ring			
Replacement of inverter with converter assembly	ECU configuration	-	INFO
	Resolver learning	• 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	• Resolver learning • Initialize resolver	• 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
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	• Initialization*1*2	Tire Pressure Warning System	Refer to Procedures Necessary When

*: 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
	• Tire Position Identification*1*2		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"	• DTCs are stored • ABS warning light illuminates • Brake system warning light (yellow indicator) illuminates • Slip indicator light illuminates • Electronically controlled brake system disabled or malfunctions	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.

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

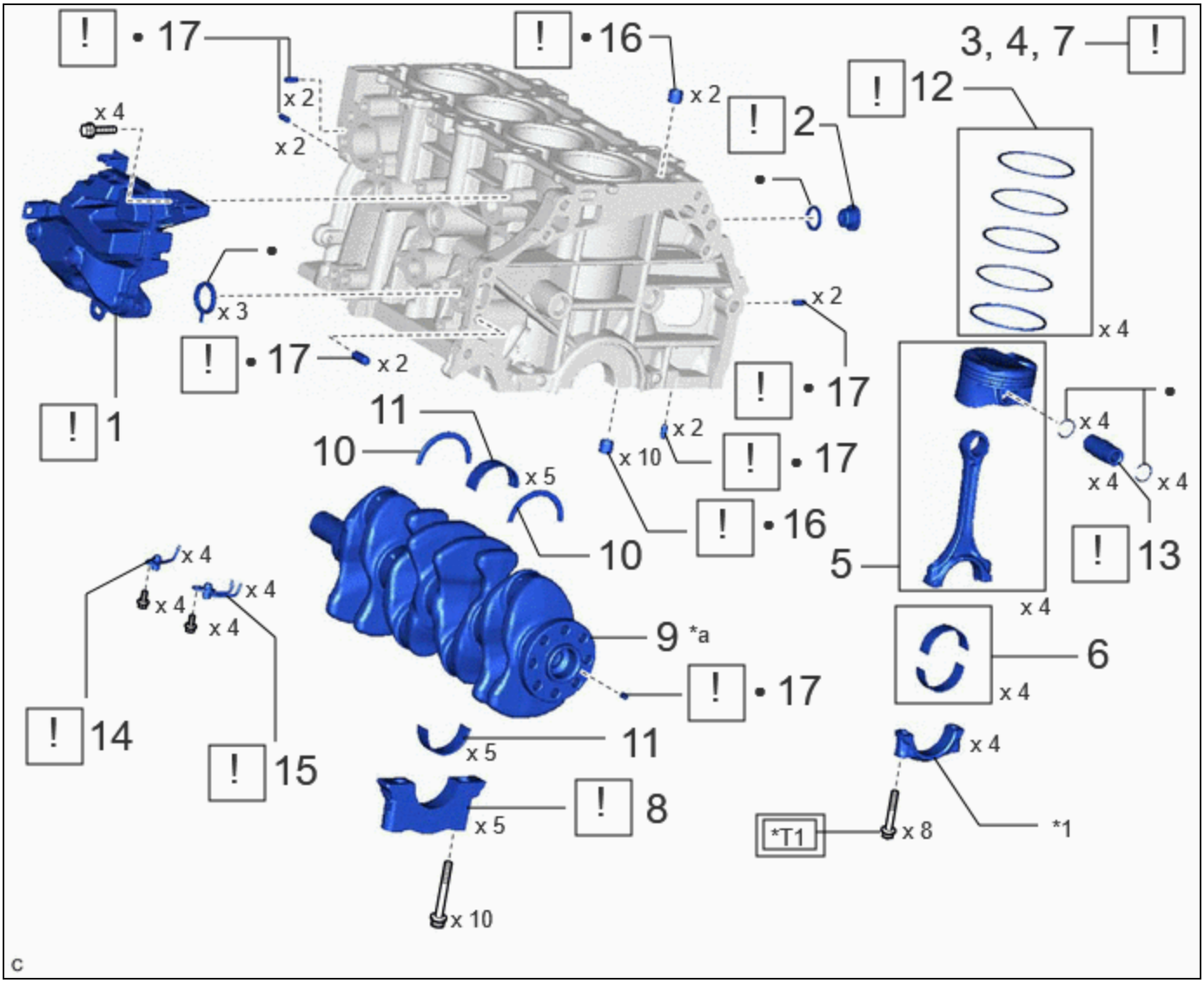
EFFECT/INOPERATIVE FUNCTION WHEN NECESSARY PROCEDURE NOT PERFORMED	NECESSARY PROCEDURES	LINK
Front Camera System	Drive the vehicle straight ahead at 35 km/h (22 mph) or more for 5 seconds or more.	INFO

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 • Back door opener	Perform door unlock operation with door control switch or electrical key transmitter sub-assembly switch.	INFO
Power Back Door System*2	Reset back door close position	INFO
Air Conditioning System	**for HEV Model:** After the ignition switch is turned to ON, the servo motor standard position is recognized. **for PHEV Model:** After the ignition switch is turned to ON, the servo motor and cooler expansion valve standard position is recognized.	-
*1: w/o Power Back Door System *2: w/ Power Back Door System		

CAUTION / NOTICE / HINT

COMPONENTS (DISASSEMBLY)



	PROCEDURE	PART NAME CODE	!		
1	NO. 1 VENTILATION CASE	12211	INFO	-	-
2	CYLINDER BLOCK WITH HEAD STRAIGHT SCREW PLUG	11432R	INFO	-	-
3	INSPECT CONNECTING ROD THRUST CLEARANCE	-	INFO	-	-
4	INSPECT CONNECTING ROD OIL CLEARANCE	-	INFO	-	-
5	PISTON WITH CONNECTING ROD	-	INFO	-	-
6	CONNECTING ROD BEARING	13041	-	-	-
7	INSPECT CRANKSHAFT THRUST CLEARANCE	-	INFO	-	-
8	CRANKSHAFT BEARING CAP	-	INFO	-	-
9	CRANKSHAFT	13411	-	-	-
10	CRANKSHAFT THRUST WASHER	11791	-	-	-
11	CRANKSHAFT BEARING	11711	-	-	-

	PROCEDURE	PART NAME CODE			
12	PISTON RING SET	13011	INFO	-	-
13	PISTON PIN	-	INFO	-	-
14	NO. 1 OIL NOZZLE SUB-ASSEMBLY	15708	INFO	-	-
15	NO. 2 OIL NOZZLE SUB-ASSEMBLY	15709	INFO	-	-
16	RING PIN	-	INFO	-	-
17	STRAIGHT PIN	-	INFO	-	-

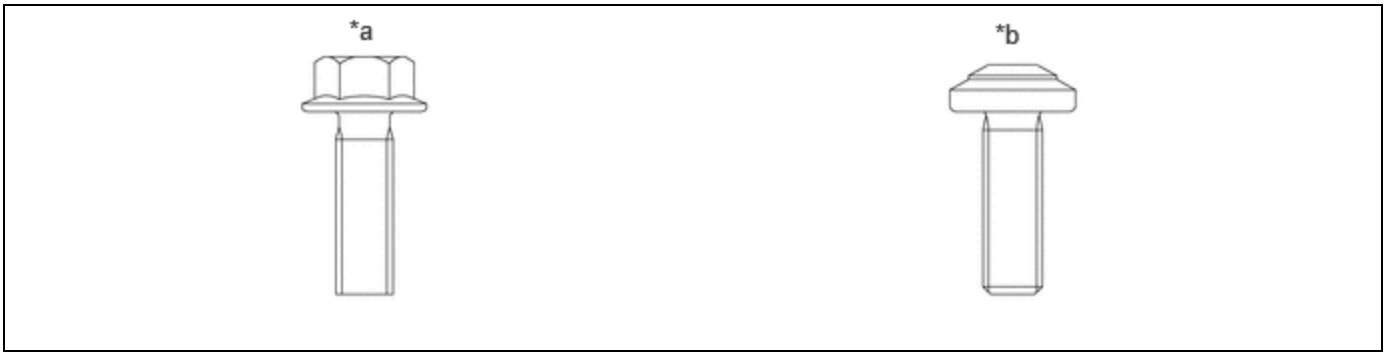
*1	CONNECTING ROD BEARING CAP	-	-
*a	**HINT:** As the illustration shown is an example, the actual details may differ.	-	-
	Tightening torque for "Major areas involving basic vehicle performance such as moving/turning/stopping": N*m (kgf*cm, ft.*lbf)	•	Non-reusable part
*T1	1st: 38 (387, 28) 2nd: Turn 90°	-	-

PROCEDURE

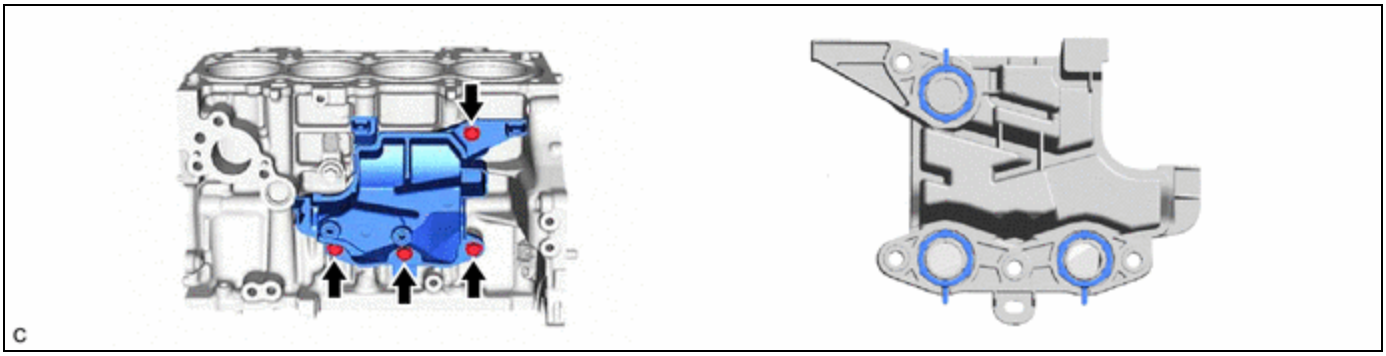
1. REMOVE NO. 1 VENTILATION CASE

CAUTION:

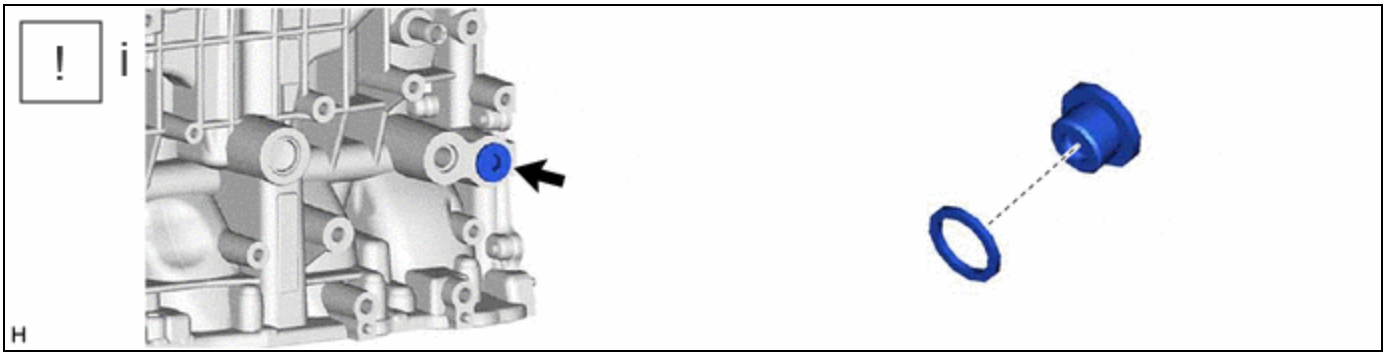
- When the No. 1 ventilation case is fastened using only bolt A:
  Perform this procedure only when replacement of the No. 1 ventilation case is necessary.
- When the No. 1 ventilation case is fastened using bolt B:
  Do not remove and install the No. 1 ventilation case.



*a	Bolt A	*b	Bolt B

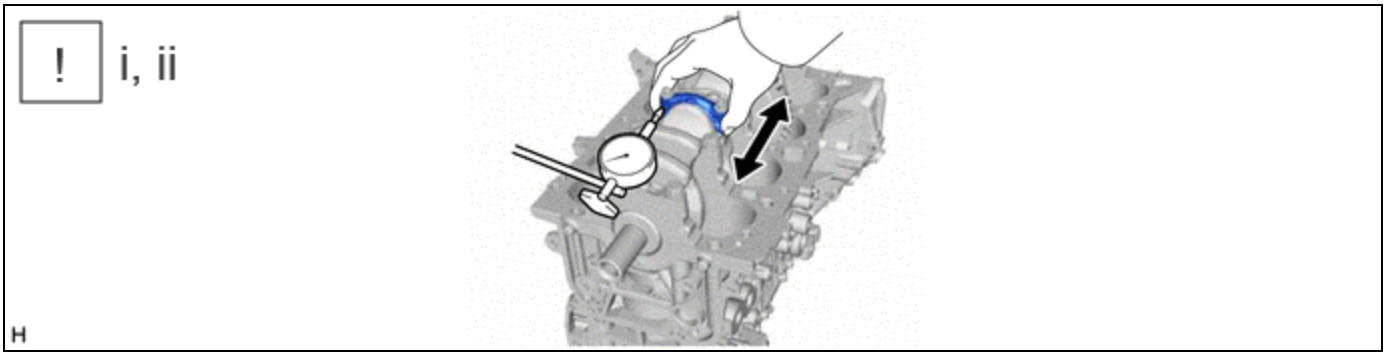


2. REMOVE CYLINDER BLOCK WITH HEAD STRAIGHT SCREW PLUG



(1) Using a 10 mm hexagon socket wrench, remove the cylinder block with head straight screw plug and gasket from the cylinder block sub-assembly.

3. INSPECT CONNECTING ROD THRUST CLEARANCE

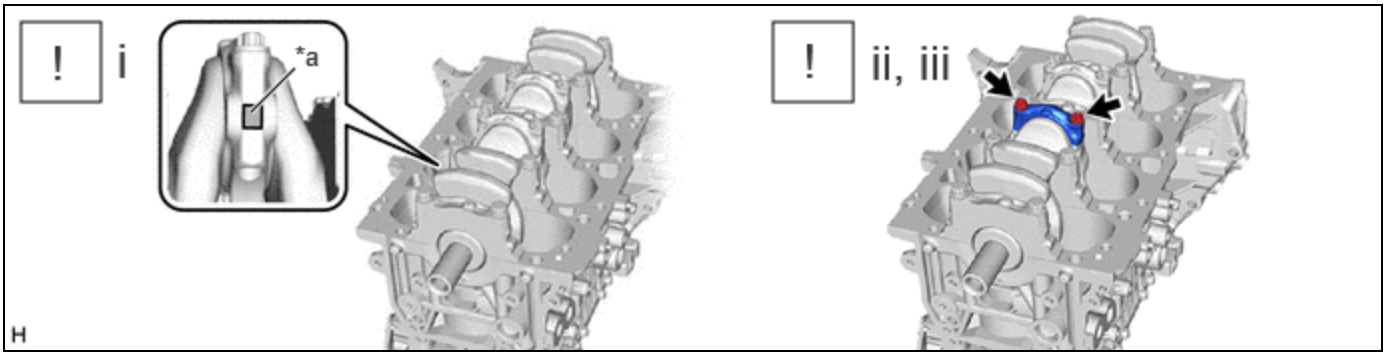


(1) Using a dial indicator, measure the thrust clearance while moving the connecting rod sub-assembly back and forth.

Standard Thrust Clearance:
0.160 to 0.512 mm (0.00630 to 0.0202 in.)
Maximum Thrust Clearance:
0.512 mm (0.0202 in.)

(2) If the thrust clearance is more than the maximum, replace the connecting rod. If necessary, replace the crankshaft.

4. INSPECT CONNECTING ROD OIL CLEARANCE



*a	Alignment Mark	-	-

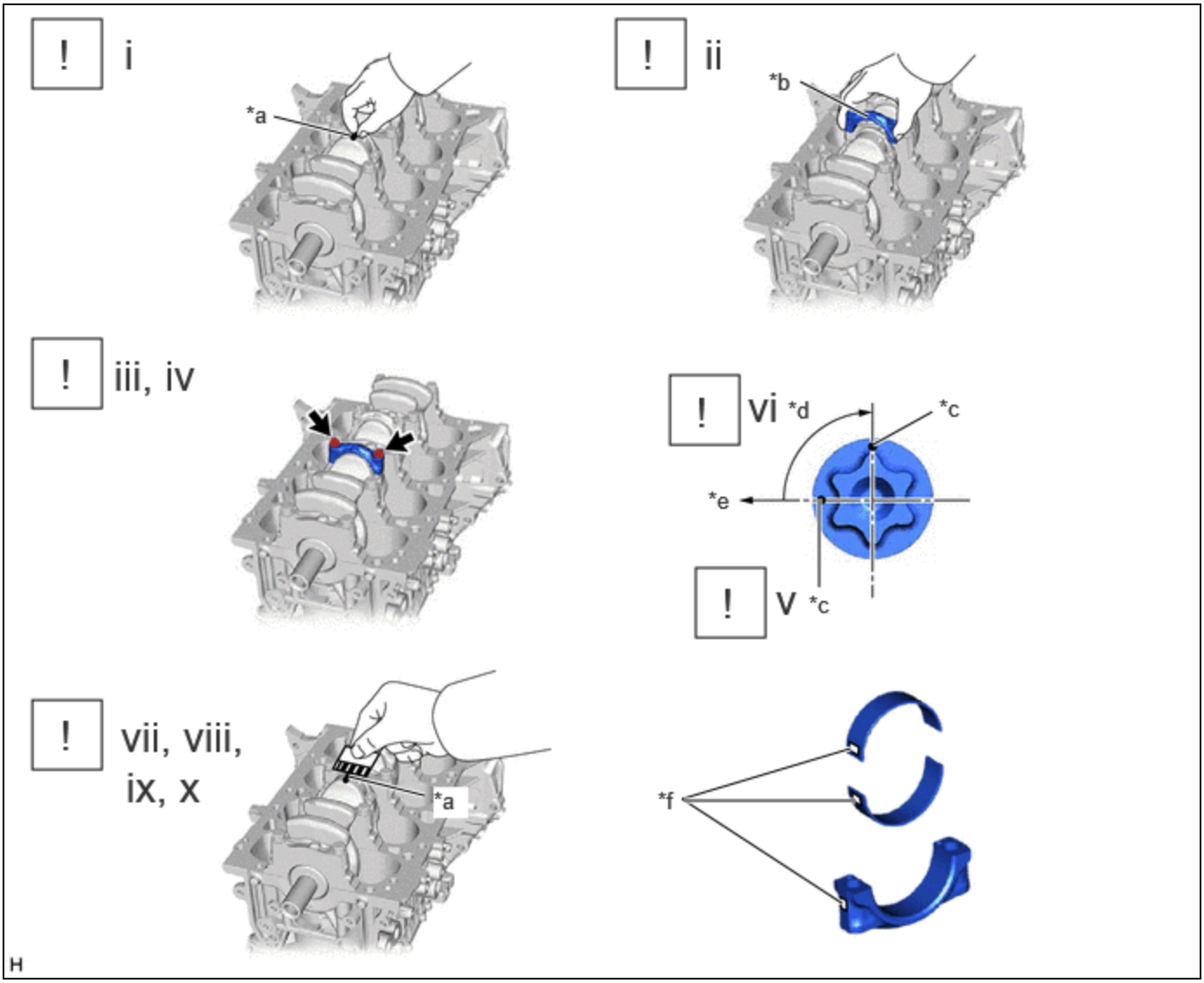
(1) Note the alignment marks on the connecting rod and connecting rod bearing cap so that they can be reinstalled to their original locations.

(2) Using an E12 "TORX" socket wrench, remove the 2 connecting rod bolts, then remove the connecting rod bearing cap and connecting rod bearing together as a set.

(3) Clean the crank pin and connecting rod bearing and check the crank pin and connecting rod bearing for pitting and scratches.

NOTICE:

Check the crank pin and connecting rod bearing for pitting and scratches.



*a	Plastigage	*b	Front Mark
*c	Paint Mark	*d	90°
*e	Front of Engine	*f	1, 2 or 3 Mark

(1) Lay a strip of Plastigage on the crank pin.

(2) Check that the front mark of the connecting rod bearing cap is facing the correct direction, and install the connecting rod bearing cap to the connecting rod.

(3) Apply a light coat of engine oil to the threads and under the heads of the 2 connecting rod bolts.

(4) Using an E12 "TORX" socket wrench, install and alternately tighten the 2 connecting rod bolts in several steps.

Torque:

38 N·m {387 kgf·cm, 28 ft·lbf}

(5) Mark the front of each connecting rod bolt with paint.

(6) Tighten the connecting rod bolts 90° as shown in the illustration.

NOTICE:

Do not turn the crankshaft during the measurement.

(7) Using an E12 "TORX" socket wrench, remove the 2 connecting rod bolts and connecting rod bearing cap.

(8) Measure the Plastigage at its widest point.

Standard Oil Clearance:
0.032 to 0.065 mm (0.00126 to 0.00256 in.)
Maximum Oil Clearance:
0.065 mm (0.00256 in.)

HINT:

If replacing a connecting rod bearing, select a new one with the same number as marked on the connecting rod bearing cap. There are 3 sizes of standard connecting rod bearings, marked "1", "2" or "3" accordingly.

Standard Connecting Rod Big End Inside Diameter:

MARK	SPECIFIED CONDITION
1	51.000 to 51.008 mm (2.00787 to 2.00818 in.)
2	51.008 to 51.016 mm (2.00818 to 2.00850 in.)
3	51.016 to 51.024 mm (2.00850 to 2.00881 in.)

Standard Connecting Rod Bearing Center Wall Thickness:

MARK	SPECIFIED CONDITION
1	1.483 to 1.487 mm (0.0584 to 0.0585 in.)
2	1.487 to 1.491 mm (0.0585 to 0.0587 in.)
3	1.491 to 1.495 mm (0.0587 to 0.0589 in.)

Standard Crank Pin Diameter:
47.992 to 48.000 mm (1.88945 to 1.88976 in.)

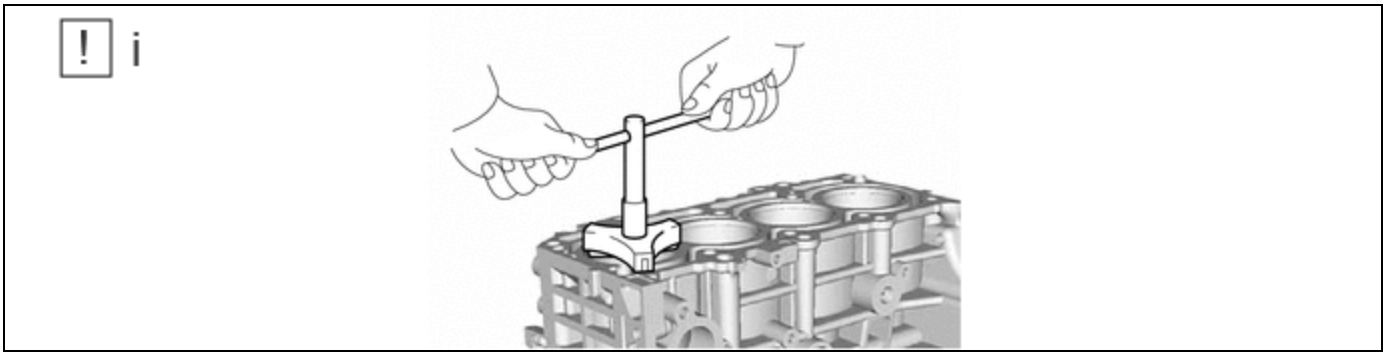
NOTICE:

Remove the Plastigage completely after the measurement.

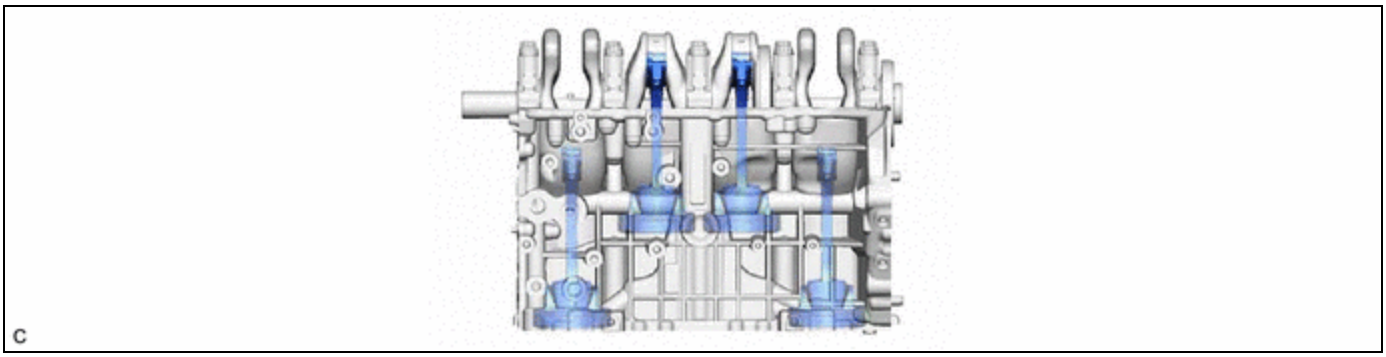
(9) If the oil clearance is more than the maximum, replace the connecting rod bearings.

(10) Perform the inspection above for each cylinder.

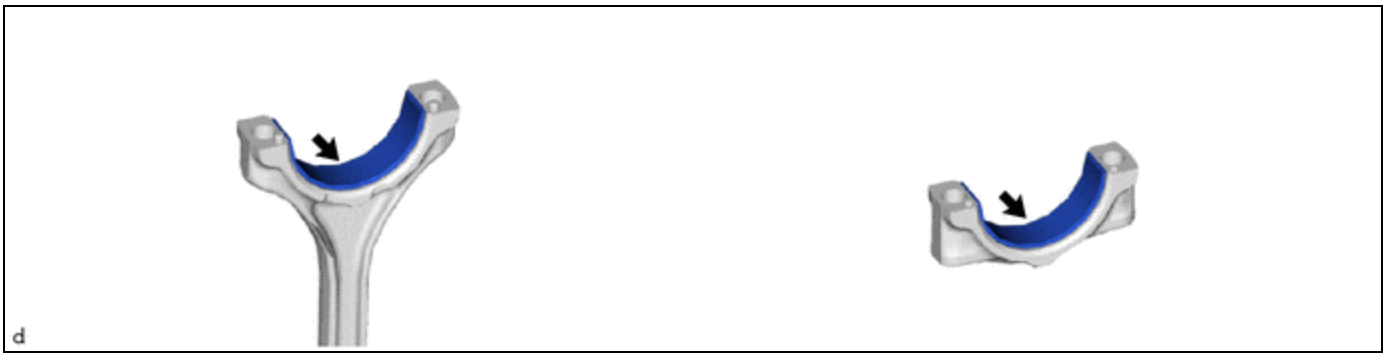
5. REMOVE PISTON WITH CONNECTING ROD



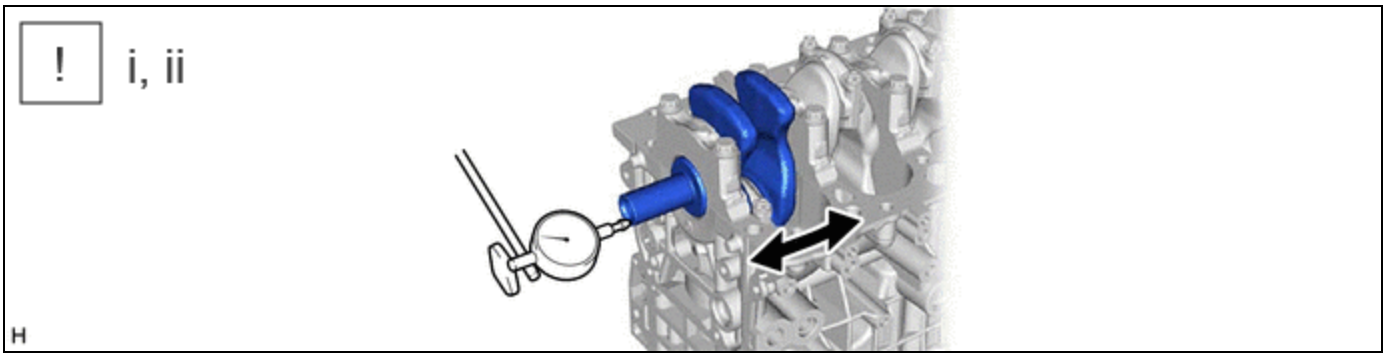
(1) Using a ridge reamer, remove all the carbon from the top of each cylinder.



6. REMOVE CONNECTING ROD BEARING



7. INSPECT CRANKSHAFT THRUST CLEARANCE



(1) Using a dial indicator, measure the crankshaft thrust clearance while prying the crankshaft back and forth with a screwdriver.

Standard Thrust Clearance:

0.02 to 0.22 mm (0.000787 to 0.00866 in.)

Maximum Thrust Clearance:

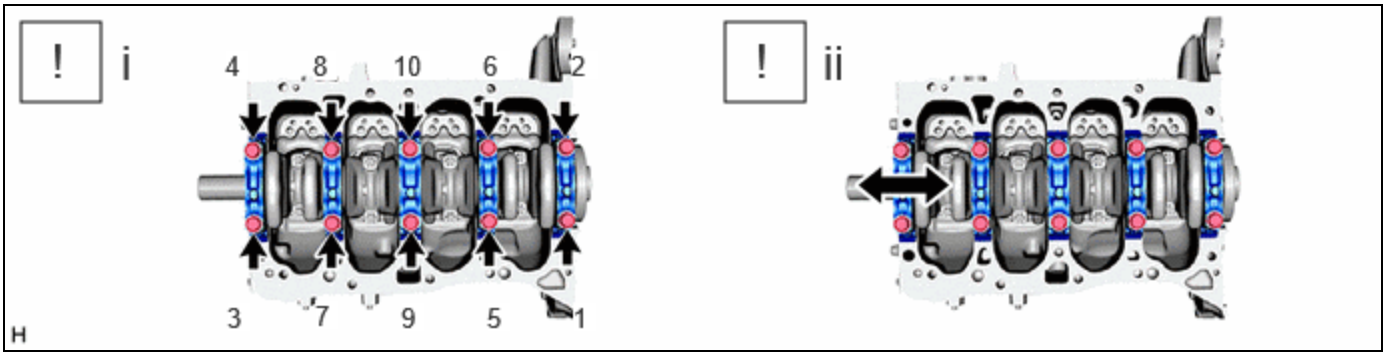
0.22 mm (0.00866 in.)

Standard Crankshaft Thrust Washer Thickness:

2.415 to 2.465 mm (0.0951 to 0.0970 in.)

(2) If the thrust clearance is more than the maximum, replace the crankshaft thrust washers as a set. If necessary, replace the crankshaft.

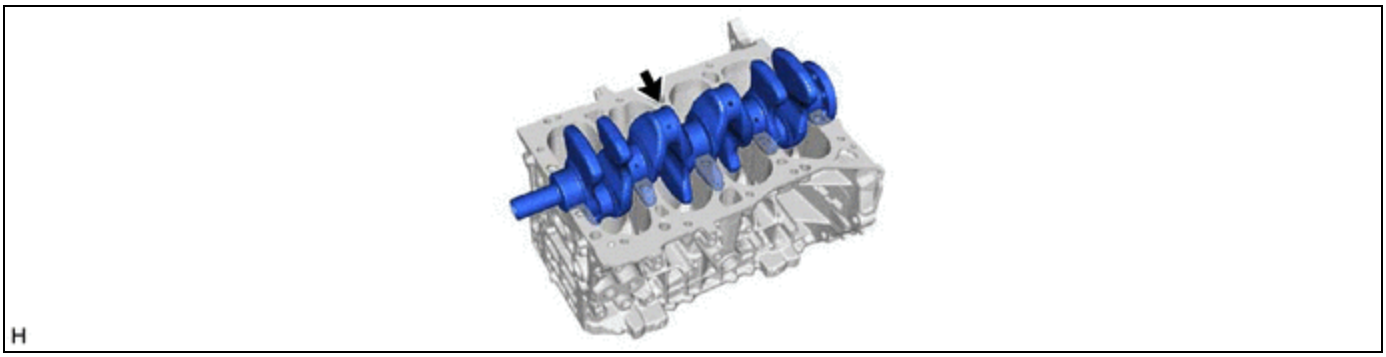
8. REMOVE CRANKSHAFT BEARING CAP



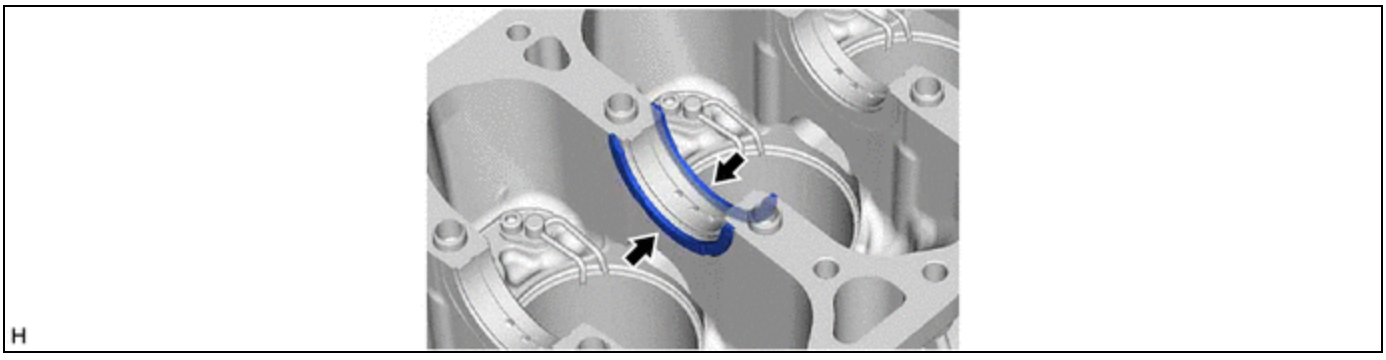
(1) Uniformly loosen and remove the 10 crankshaft bearing cap set bolts in several steps in the order shown in the illustration.

(2) While moving the crankshaft bearing cap back and forth using 2 crankshaft bearing cap set bolts, remove the crankshaft bearing cap together with the crankshaft bearing.

9. REMOVE CRANKSHAFT

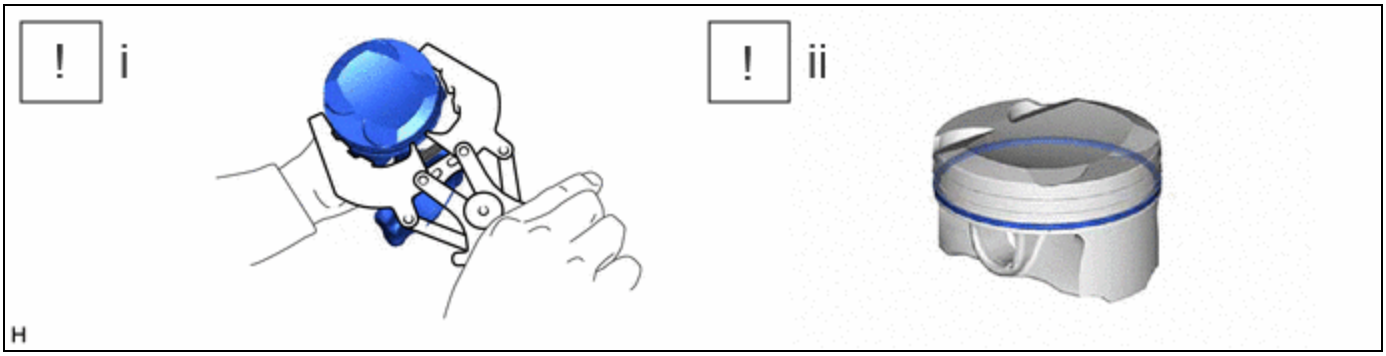


10. REMOVE CRANKSHAFT THRUST WASHER



11. REMOVE CRANKSHAFT BEARING

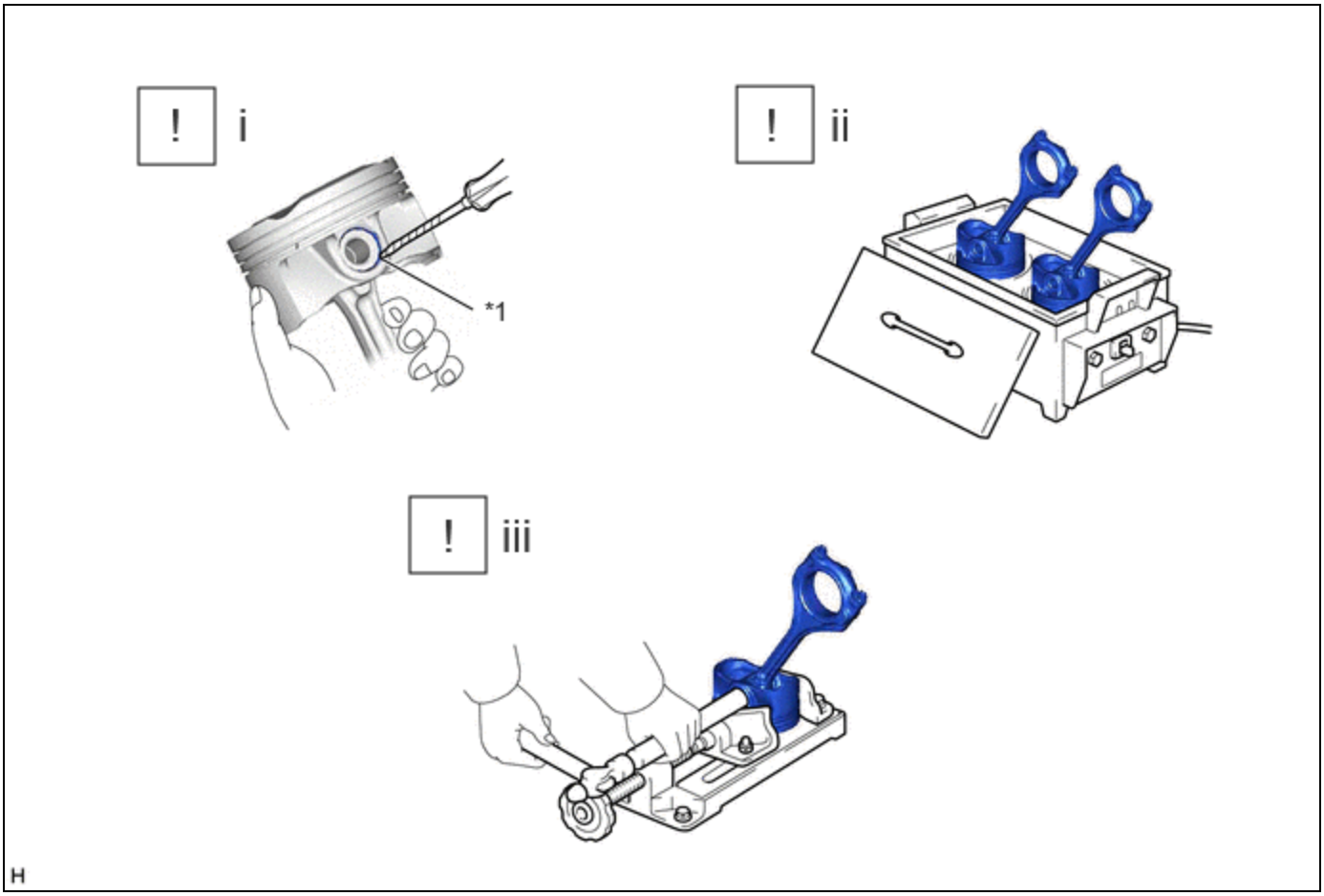
12. REMOVE PISTON RING SET



(1) Using a piston ring expander, remove the No. 1 compression ring and No. 2 compression ring from the piston.

(2) Remove the oil ring expander, upper side rail and lower side rail from the piston by hand.

13. REMOVE PISTON PIN



*1	Front Mark Cutout Portion	-	-

(1) Using a screwdriver with its tip wrapped with protective tape, pry out the piston pin hole snap ring (front side) from the piston.

NOTICE:

- Do not remove the piston pin hole snap ring (rear side) unless it has to be replaced.
- Be careful not to damage the piston when removing the piston pin hole snap ring (rear side).

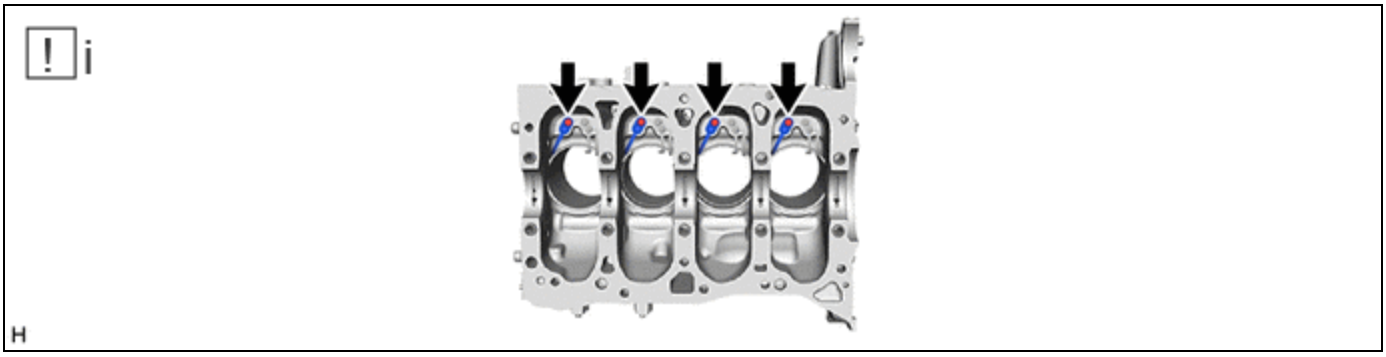
(2) Gradually heat each piston to between 80 and 90°C (176 and 194°F).

CAUTION:

Be sure to wear protective gloves.

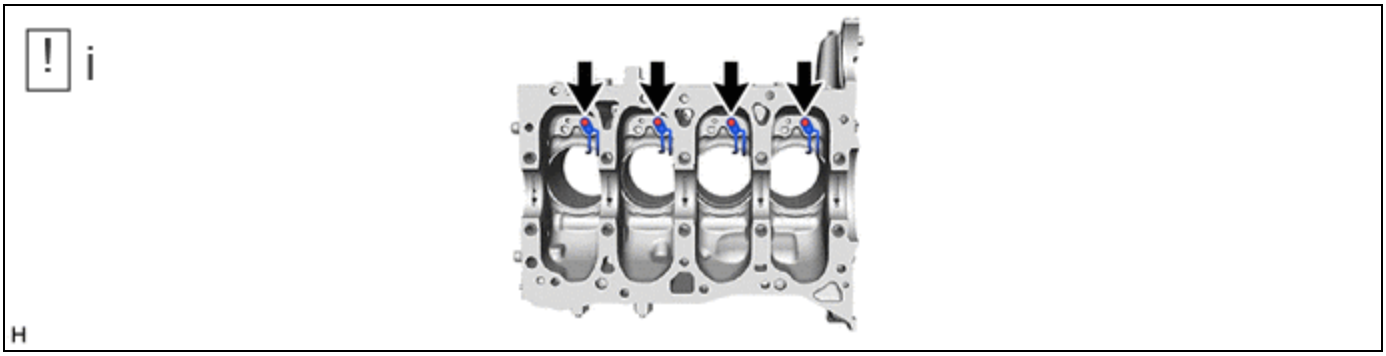
(3) Using a brass bar and a hammer, lightly tap out the piston pin and remove the connecting rod.

14. REMOVE NO. 1 OIL NOZZLE SUB-ASSEMBLY



(1) Using a 5 mm hexagon socket wrench, remove the 4 bolts and 4 No. 1 oil nozzle sub-assemblies from the cylinder block sub-assembly.

15. REMOVE NO. 2 OIL NOZZLE SUB-ASSEMBLY

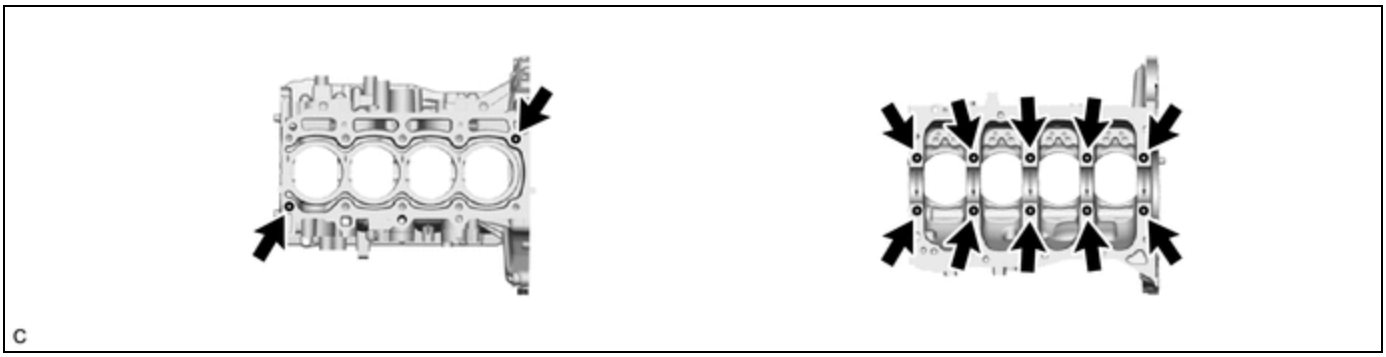


(1) Using a 5 mm hexagon socket wrench, remove the 4 bolts and 4 No. 2 oil nozzle sub-assemblies from the cylinder block sub-assembly.

16. REMOVE RING PIN

NOTICE:

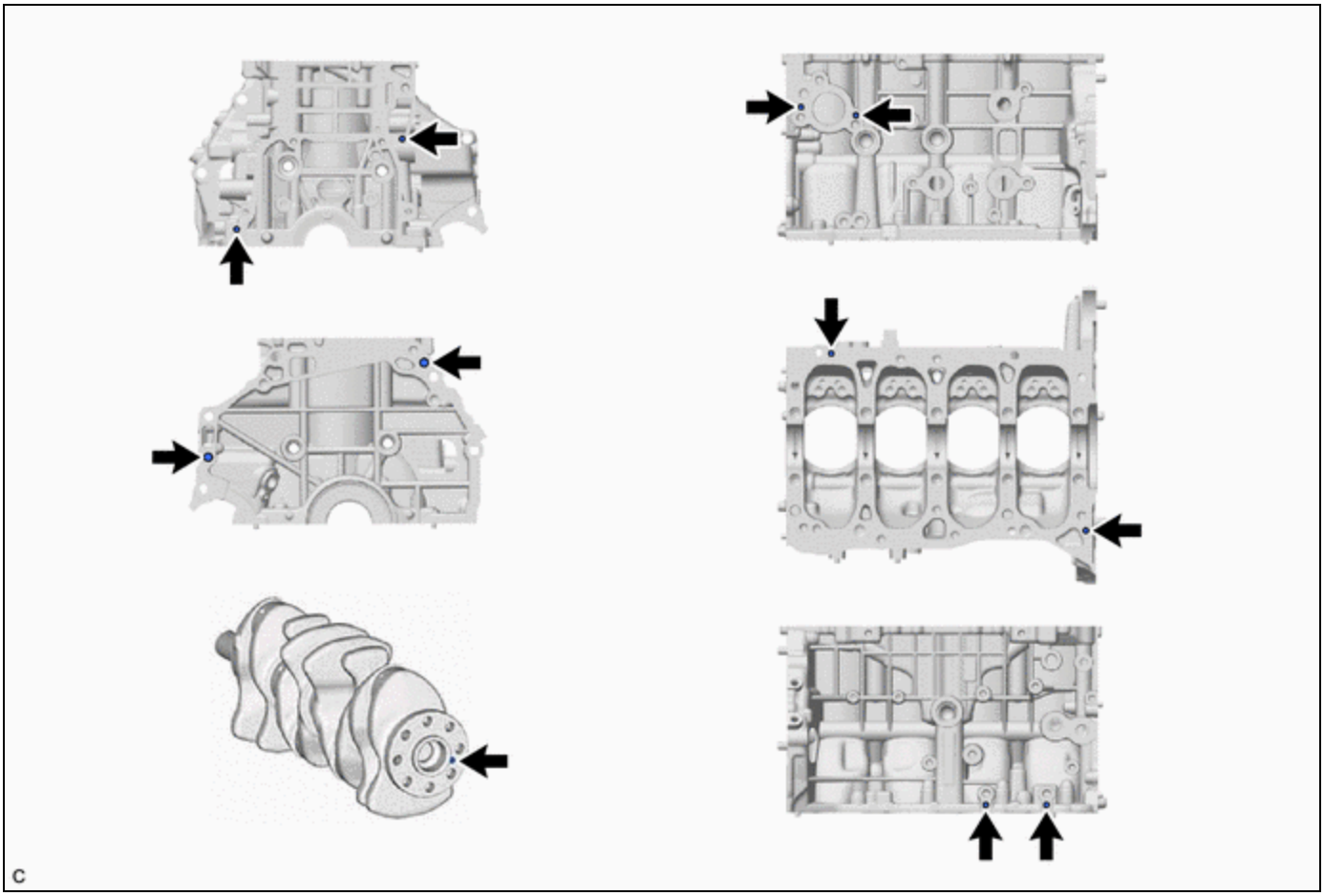
It is not necessary to remove the ring pins unless they are being replaced.



17. REMOVE STRAIGHT PIN

NOTICE:

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