

TO THE READER

This Workshop Manual tells the servicing personnel about the mechanism, servicing and maintenance of the V2607-CR-E4B, V2607-CR-TE4B and V3307-CR-TE4B. It contains 4 parts: **"Information"**, **"General"**, **"Mechanism"** and **"Servicing"**.

■ Information

This section primarily contains information below.

- Safety First
- Specification
- Performance Curve
- Dimension
- Wiring Diagram

■ General

This section primarily contains information below.

- Engine Identification
- Muffler Full Assembly Identification
- General Precautions
- Maintenance Check List
- Check and Maintenance
- Special Tools

■ Mechanism

This section contains information on the structure and the function of the unit. Before you continue with the subsequent sections, make sure that you read this section.

Refer to Workshop Manual (Code No. 9Y021-01870) for the diesel engine mechanism that this workshop manual does not include.

■ Servicing

This section primarily contains information below.

- Troubleshooting
- Servicing Specifications
- Tightening Torques
- Checking, Disassembling and Servicing

All illustrations, photographs and specifications contained in this manual are of the newest information available at the time of publication.

KUBOTA reserves the right to change all information at any time without notice.

Since this manual includes many models, information or illustrations and photographs can show more than one model.

December, 2012

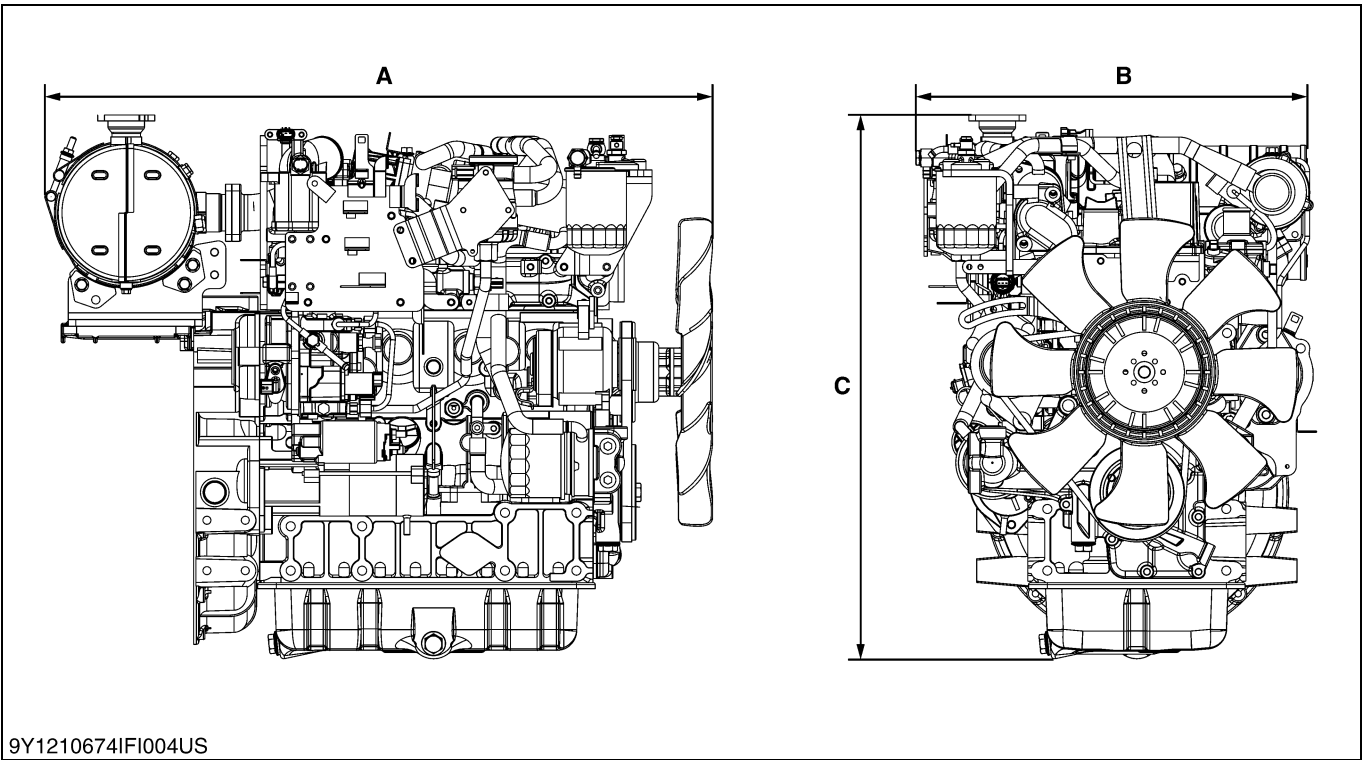
2. SPECIFICATIONS

Model	V2607-CR-E4B	V2607-CR-TE4B	V3307-CR-TE4B
Number of Cylinder	4		
Engine Type	Vertical, water-cooled, 4-cycle DI diesel engine		
Bore × Stroke	87.0 × 110 mm (3.43 × 4.33 in.)		94.0 × 120 mm (3.70 × 4.72 in.)
Total Displacement	2615 cm ³ (159.6 cu.in.)		3331 cm ³ (203.3 cu.in.)
SAE Net Continuous	34.3 kW / 2700 min ⁻¹ (rpm) (46.0 HP / 2700 min ⁻¹ (rpm))	43.5 kW / 2700 min ⁻¹ (rpm) (58.3 HP / 2700 min ⁻¹ (rpm))	45.6 kW / 2600 min ⁻¹ (rpm) (61.2 HP / 2600 min ⁻¹ (rpm))
SAE Gross Intermittent	42.0 kW / 2700 min ⁻¹ (rpm) (56.3 HP / 2700 min ⁻¹ (rpm))	53.0 kW / 2700 min ⁻¹ (rpm) (71.1 HP / 2700 min ⁻¹ (rpm))	55.4 kW / 2600 min ⁻¹ (rpm) (74.3 HP / 2600 min ⁻¹ (rpm))
Maximum Bare Speed	2900 min ⁻¹ (rpm)		2800 min ⁻¹ (rpm)
Minimum Bare Idling Speed	800 min ⁻¹ (rpm)		
Combustion Chamber	Reentrant Type, Center Direct Injection Type (E-CDIS)		
Fuel Injection Pump	DENSO Common Rail System		
Governor			
Injector			
Fuel Injection Timing			
Fuel Injection Pressure			
Direction of Rotation	Counter-clockwise (Viewed from flywheel side)		
Firing Order	1-3-4-2		
Compression Ratio	18.0	16.8	17.5
Lubricating System	Forced lubrication by trochoid pump		
Oil Pressure Indicating	Electrical Type Switch		
Lubricating Filter	Full Flow Paper Filter (Cartridge Type)		
Cooling System	Pressurized radiator, forced circulation with water pump		
Starting System	Electric Starting with Starter		
Starter Motor	12 V, 2.5 kW		12 V, 3.0 kW
Starting Support Device	By Glow Plug in Combustion Chamber		
EGR	External EGR (EGR Cooler + Electric EGR Valve + Reed Valve)		
Battery	12 V, 92 AH equivalent		12 V, 108 AH equivalent
Charging Alternator	12 V, 720 W		
Fuel	Diesel Fuel No. 2-D S15, see page G-8.		
Lubricating Oil	Class CJ-4 lubricating oil as per API classification is recommended. For details on recommended lubricating oils, see page G-8.		
Lubricating Oil Capacity	10.2 L (2.69 U.S.gals)		11.2 L (2.96 U.S.gals)
Weight (Dry)	267 kg (589 lbs)	272 kg (600 lbs)	305 kg (672 lbs)

- The specification described above is of the standard engine of each model.
- Conversion Formula: HP = 0.746 kW, PS = 0.7355 kW

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V2607-CR-TIE4B



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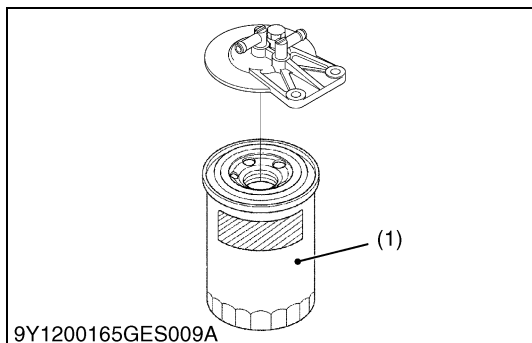
	V2607-CR-TIE4B
A	888 mm (35.0 in.)
B	524 mm (20.6 in.)
C	723 mm (28.5 in.)

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4. MAINTENANCE CHECK LIST

To make sure that the engine operates safely for a long time, refer to the table below to do regular inspections.

Inspection Item		Service Interval									
		Daily	Initial 50 hrs	Every 50 hrs	Every 250 hrs	Every 500 hrs	Every 1000 hrs	Every 1500 hrs	Every 3000 hrs	Every 1 year	Every 2 years
	Check of engine oil level	○									
	Check of fuel level	○									
	Check of coolant level	○									
	Check of fan belt	○									
	Check of fuel hoses and clamp bands			○							
	Check of draining of water separator			○							
	Check of radiator hoses and clamp bands				○						
	Cleaning of air cleaner element (Replace the element after 6-times cleaning)				○						
	Adjustment of fan belt tension				○						
	Check of intake air line				○						
	Change of engine oil		○			○					
	Replacement of oil filter cartridge		○			○					
★1	Replacement of fuel filter cartridge					○					
	Cleaning of water separator					○					
★2	Cleaning of fuel tank interior					○					
★2	Cleaning of water jacket and radiator interior					○					
★2	Replacement of fan belt					○					○
★2	Check of valve clearance						○				
★2,★3	Check of injector							○			
★2,★3	Check of EGR cooler							○			
★3	Replacement of oil separator element							○			
★2,★3	Check of PCV (Positive Crankcase Ventilation) Valve							○			
★2,★3	Check of turbocharger								○		
★2,★3	Cleaning of DPF								○		
★2,★3	Check of EGR system								○		
★2	Replacement of air cleaner element									○	
★2	Check of DPF differential pressure pipes and hoses									○	
★2	Check of EGR piping									○	
	Check of intake air line									○	
	Check of exhaust manifold (Crack, gas leakage and mounting screw)									○	
★2	Replacement of oil separator rubber hose										○
★2	Replacement of rubber hose of DPF differential pressure sensor										○
★2	Replacement of intake hose (After air flow sensor)										○
★2	Replacement of pressure detection hose of boost sensor										○
★2	Replacement of EGR cooler hose										○
★2	Replacement of water hose										○
★2	Replacement of lubricant hose										○
	Change of radiator coolant (L.L.C.)										○
★2	Replacement of radiator hoses and clamp bands										○
★1,★2	Replacement of fuel hoses and clamps										○

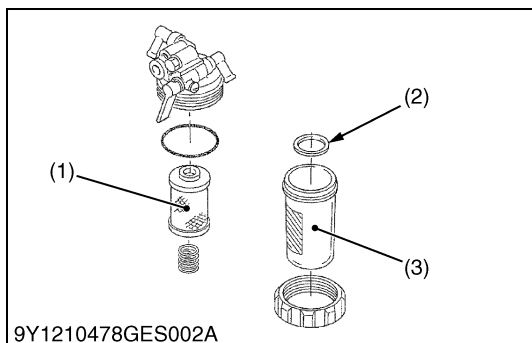


Replacement of Fuel Filter Cartridge

1. Remove the fuel filter cartridge (1) with filter wrench.
2. Apply a thin layer of fuel to the surface of the new filter cartridge gasket before you put it on.
3. Tighten the new cartridge by hand.
4. Open the fuel valve and bleed the fuel system.
5. Operate the engine for a while and check if there is not the fuel leakage from the filter.

(1) Fuel Filter Cartridge

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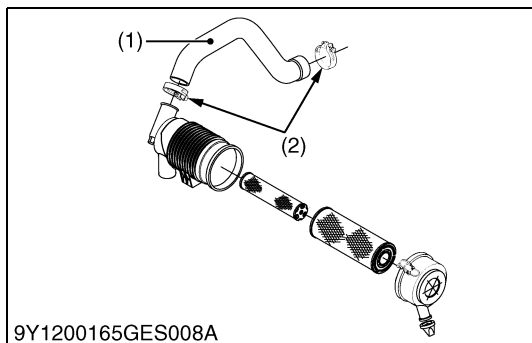
Cleaning of Water Separator

1. Remove and flush the filter cup (3) if the float (2) goes up with water, or the filter cup (3) has the dust.
2. Flush the element (1) with kerosene to prevent dust to go into the inner element (1).
3. After you replace, bleed the fuel system.

(1) Element
(2) Float

(3) Filter Cup

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Check of Intake Air Line

1. Make sure that the intake air hose(s) (1) connections are correct for every year of operation.
2. If the clamp (2) is loose, apply oil to the threads and tighten it again correctly.
3. You must replace the intake air hose(s) every 2 years. Also replace the clamp every 2 years and tighten it correctly.

■ IMPORTANT

- To prevent serious damage to the engine, keep out dust in the intake air line.

(1) Intake Air Hose

(2) Clamp

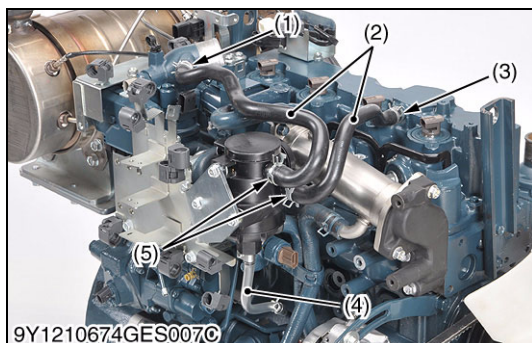
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Check of Exhaust Manifold

1. Check the exhaust manifold for crack, exhaust gas leakage and loose mounting screw.
2. If you find a crack, change the exhaust manifold.
3. If you find a gas leakage, tighten the mounting screw again or replace the gasket with a new one.
4. If you find a loose mounting screw, tighten the mounting screw again.

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[10] EVERY 2 YEARS



Replacement of Oil Separator Rubber Hose

1. Loosen the clamp (1), (3), (5) and remove the rubber hose (2), (4).
2. Replace the rubber hose (2), (4) and clamp (1), (3), (5) with new ones.
3. Tighten the clamp correctly.

(1) Clamp

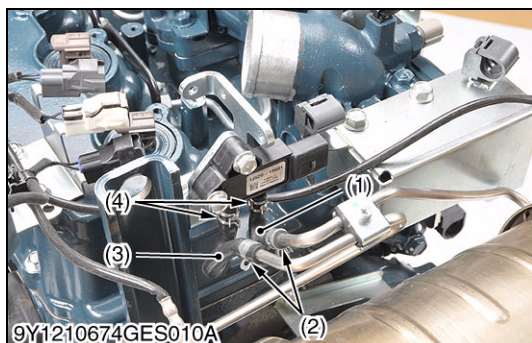
(4) Rubber Hose

(2) Rubber Hose

(5) Clamp

(3) Clamp

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Replacement of Rubber Hose of DPF Differential Pressure Sensor [V2607-CR-E4B / V2607-CR-TE4B / V3307-CR-TE4B]

1. Loosen the clamp (2), (4) and remove the rubber hose (1), (3).
2. Replace the rubber hose (1), (3) and clamp (2), (4) with new ones.
3. Tighten the clamp correctly.

(1) Rubber Hose

(3) Rubber Hose

(2) Clamp

(4) Clamp

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Replacement of Intake Hose (After Air Flow Sensor)

1. Loosen the clamp and remove the hose.
2. Replace the hose and clamp with new ones.
3. Tighten the clamp correctly.

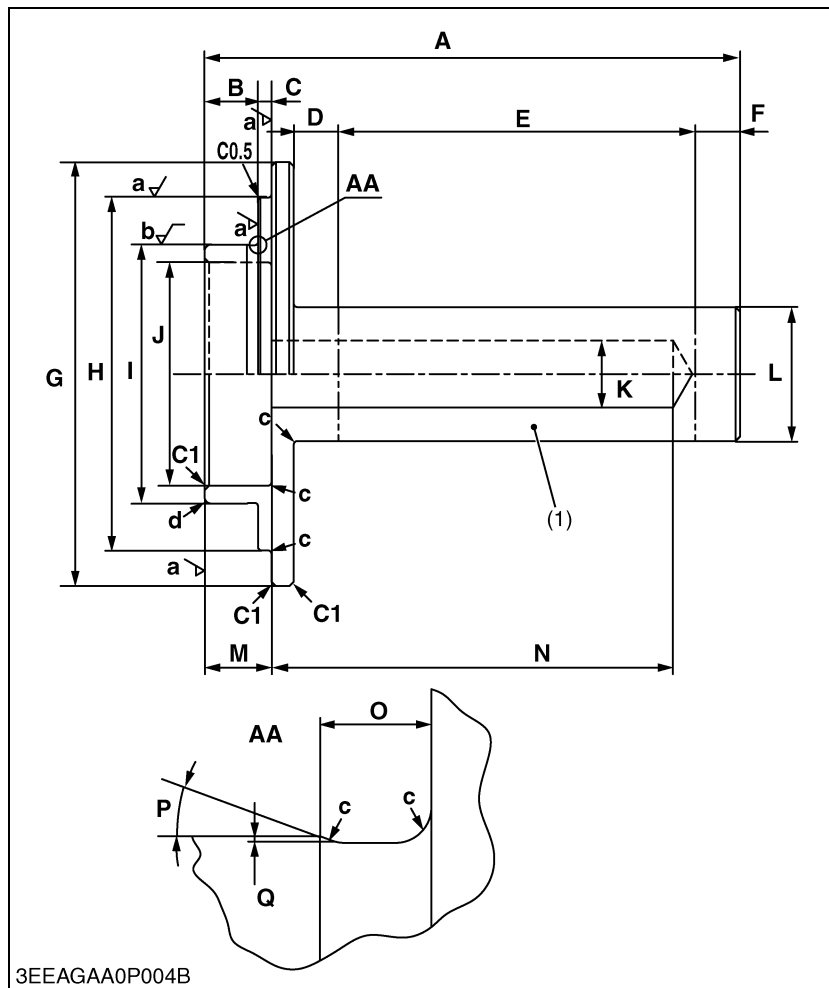
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Front Cover Oil Seal Replacing Tool**Application**

- Use to press fit the front cover oil seal.

NOTE

- This special tool is not provided, so make it referring to the figure.



A	120 mm (4.72 in.)
B	12.0 mm (0.472 in.)
C	2.90 to 3.00 mm (0.115 to 0.118 in.)
D	10.0 mm (0.394 in.)
E	80.0 mm (3.15 in.)
F	10.0 mm (0.394 in.)
G	95.0 mm dia. (3.74 in. dia.)
H	78.900 to 79.100 mm dia. (3.1063 to 3.1141 in. dia.)
I	57.971 to 57.990 mm dia. (2.2824 to 2.2830 in. dia.)
J	50.0 mm dia. (1.97 in. dia.)
K	15.0 mm dia. (0.591 in. dia.)
L	30.0 mm dia. (1.18 in. dia.)
M	15.0 mm (0.591 in.)
N	90.0 mm (3.54 in.)
O	2.50 mm (0.0984 in.)
P	0.35 rad (20 °)
Q	0.15 to 0.25 mm (0.0059 to 0.0098 in.)
a	Ra = 3.2 a
b	Ra = 1.6 a
c	0.80 mm radius (0.031 in. radius)
d	1.5 mm radius (0.059 in. radius)
C0.5	Chamfer 0.50 mm (0.020 in.)
C1	Chamfer 1.0 mm (0.039 in.)

(1) Material: S43C-D

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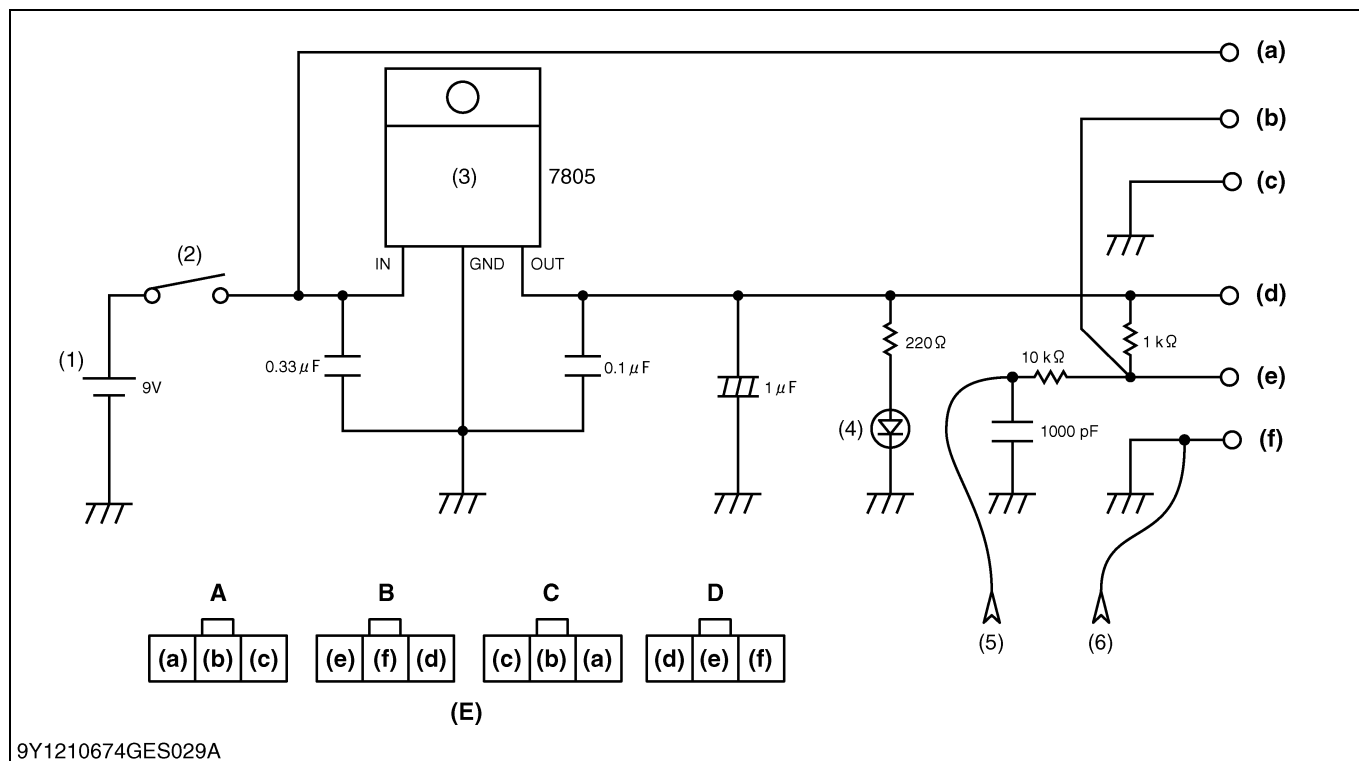
Rotation Sensor Signal Interface Unit

Application

- Use for reading rotation sensor signal.

■ **NOTE**

- This special tool is not provided, so make it referring to the figure.



- (1) 9V Battery
- (2) Switch
- (3) 3-Terminal Regulator

- (4) LED
- (5) Clip (Red)
- (6) Clip (Black)

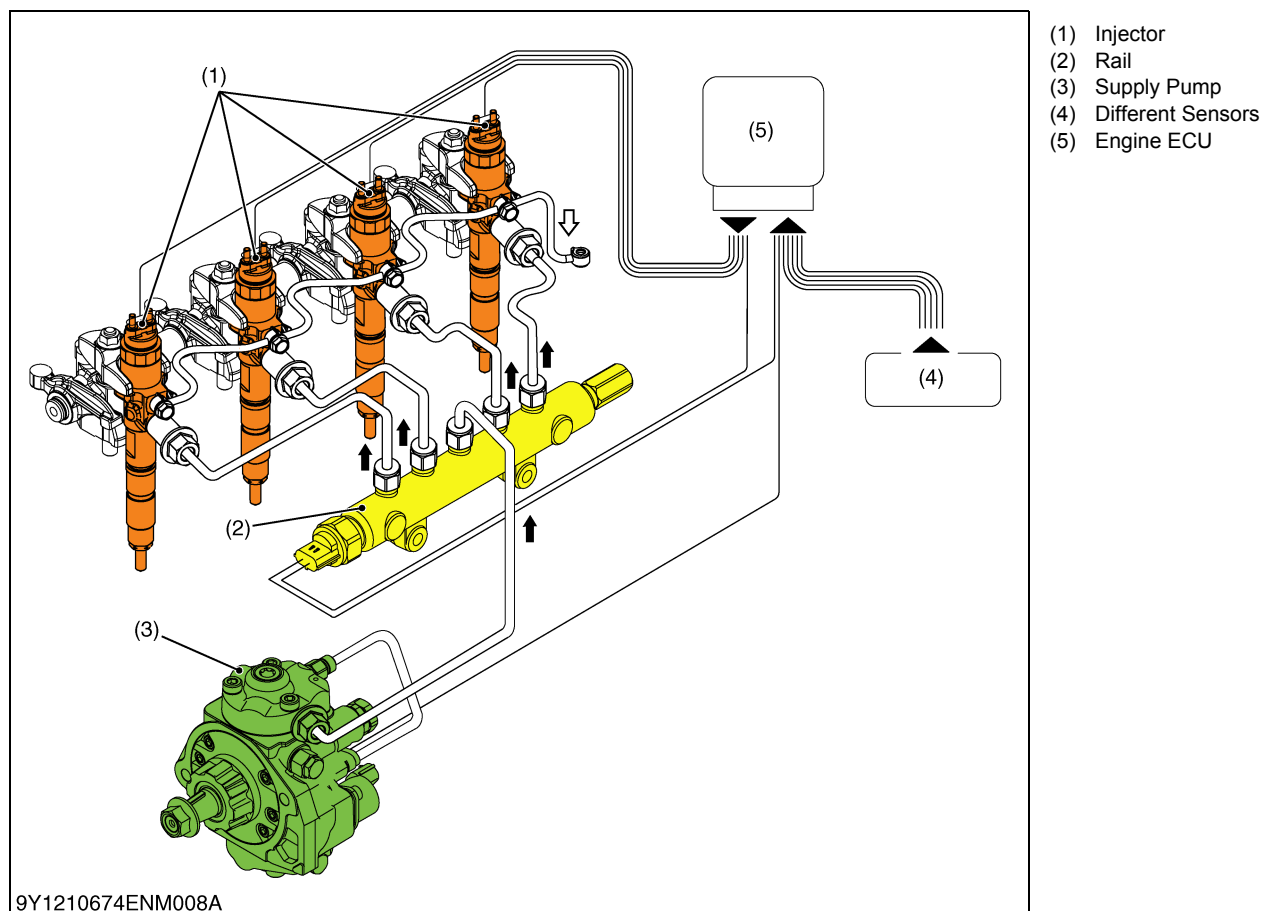
- A:** for Panasonic
B: for DENSO
C: for BOSCH cam angle
D: for BOSCH crank angle
(E) Connector Side

- (a) +9 V
(b) Signal
(c) GND
(d) +5 V
(e) Signal
(f) GND

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4. FUEL SYSTEM

[1] OVERVIEW



The fuel system of this engine is completely different from previous jerk fuel injection pumps. Our common rail system not only complies with strict emission regulations, it enables multiple, precise high-pressure injections that do not vary with engine RPM.

The system is an electronically controlled fuel injection device, with a supply pump (3) that pressurizes the fuel, a rail (2) that stores the high-pressure fuel, injectors (1) that inject the fuel under high-pressure via solenoids into each cylinder and an engine ECU that controls them all.

Various parameters are controlled by the engine ECU, such as the amount of fuel from the injectors and their timing, the pressure of fuel in the rail, etc., as sensed via signals from each sensor and CAN communications from the engine's ECU.

This results in fuel always being injected under ideal conditions, which suppresses the hallmark of a diesel engine, the black smoke during takeoff and acceleration, so there is less smoke, it is cleaner and with a higher output of power.

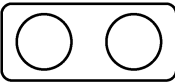
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■ NOTE

- Lighting patterns when the lamp is lighted by ECU directly.

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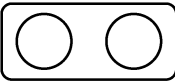
Permit

Auto Regeneration Permit	RGN and Inhibit Lamp	Manual RGN Demand Lamp	Warning Lamp	State of Regeneration
				
Level 0 (No need Regeneration)				Regeneration is not required
Level 1 (Auto Regeneration)	●			Regeneration starts automatically when the PM level reaches to this level. Parked regeneration is impossible in this level.
Level 2 (Request parked Regeneration)	●	★		ECU requests parked regeneration if the PM level does not decrease to automatic regeneration level in 1800 seconds after automatic regeneration starts. (Automatic regeneration does not stop in this level.)
Level 3 (Parked Regeneration)	●	★	●	Automatic regeneration stops. Operator had better park the machine and start manual regeneration as soon as possible. During parked regeneration, machine operation is restricted.
Level 4 (Regeneration with service tools)			●	Parked regeneration is impossible. Regeneration is possible with service tools only. (Service tools are available among all levels without level 5)
Level 5 (DPF Cleaning)			●	Regeneration is impossible even with service tools. DPF cleaning is necessary.

●: Lighting, ★: Blinking

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Inhibit

Auto Regeneration Inhibit	RGN and Inhibit Lamp	Manual RGN Demand Lamp	Warning Lamp	State of Regeneration
				
Level 0 (No need Regeneration)	★			Regeneration is not required
Level 1 (Auto Regeneration)	★			Automatic regeneration inhibit
Level 2 (Request parked Regeneration)	★	★		ECU requests parked regeneration if the PM level does not decrease to automatic regeneration level in 1800 seconds after automatic regeneration starts. (Automatic regeneration does not stop in this level.)
Level 3 (Parked Regeneration)	★	★	●	Automatic regeneration stops. Operator had better park the machine and start manual regeneration as soon as possible. During parked regeneration, machine operation is restricted.
Level 4 (Regeneration with service tools)	★		●	Parked regeneration is impossible. Regeneration is possible with service tools only. (Service tools are available among all levels without level 5)
Level 5 (DPF Cleaning)	★		●	Regeneration is impossible even with service tools. DPF cleaning is necessary.

●: Lighting, ★: Blinking

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2. SERVICING SPECIFICATIONS

ENGINE BODY

Item		Factory Specification	Allowable Limit
Cylinder Head Surface	Flatness	—	0.05 mm 0.002 in.
Top Clearance		0.60 to 0.80 mm 0.024 to 0.031 in.	—
Compression Pressure [V2607-CR-TE4B] [V2607-CR-E4B / V3307-CR-TE4B] [V2607-CR-TIE4 / V3307-CR-TIE4]		3.20 MPa / 250 min ⁻¹ (rpm) 32.6 kgf/cm ² / 250 min ⁻¹ (rpm) 464 psi / 250 min ⁻¹ (rpm)	2.20 MPa / 250 min ⁻¹ (rpm) 22.4 kgf/cm ² / 250 min ⁻¹ (rpm) 319 psi / 250 min ⁻¹ (rpm)
Variance Among Cylinders		—	10 % or less
Valve Seat	Angle	0.79 rad 45 °	—
	Width	3.3 to 3.6 mm 0.13 to 0.14 in.	—
Valve Face	Angle	0.79 rad 45 °	—
Valve Recessing		0.65 to 0.85 mm 0.026 to 0.033 in.	1.20 mm 0.0472 in.
Valve Stem to Valve Guide [V2607-CR-E4B / V2607-CR-TE4B / V2607-CR-TIE4B] • Valve Stem • Valve Guide	Clearance (Intake)	0.030 to 0.057 mm 0.0012 to 0.0022 in.	0.10 mm 0.0039 in.
	O.D. (Intake)	5.968 to 5.980 mm 0.2350 to 0.2354 in.	—
	I.D. (Intake)	6.010 to 6.025 mm 0.2367 to 0.2372 in.	—

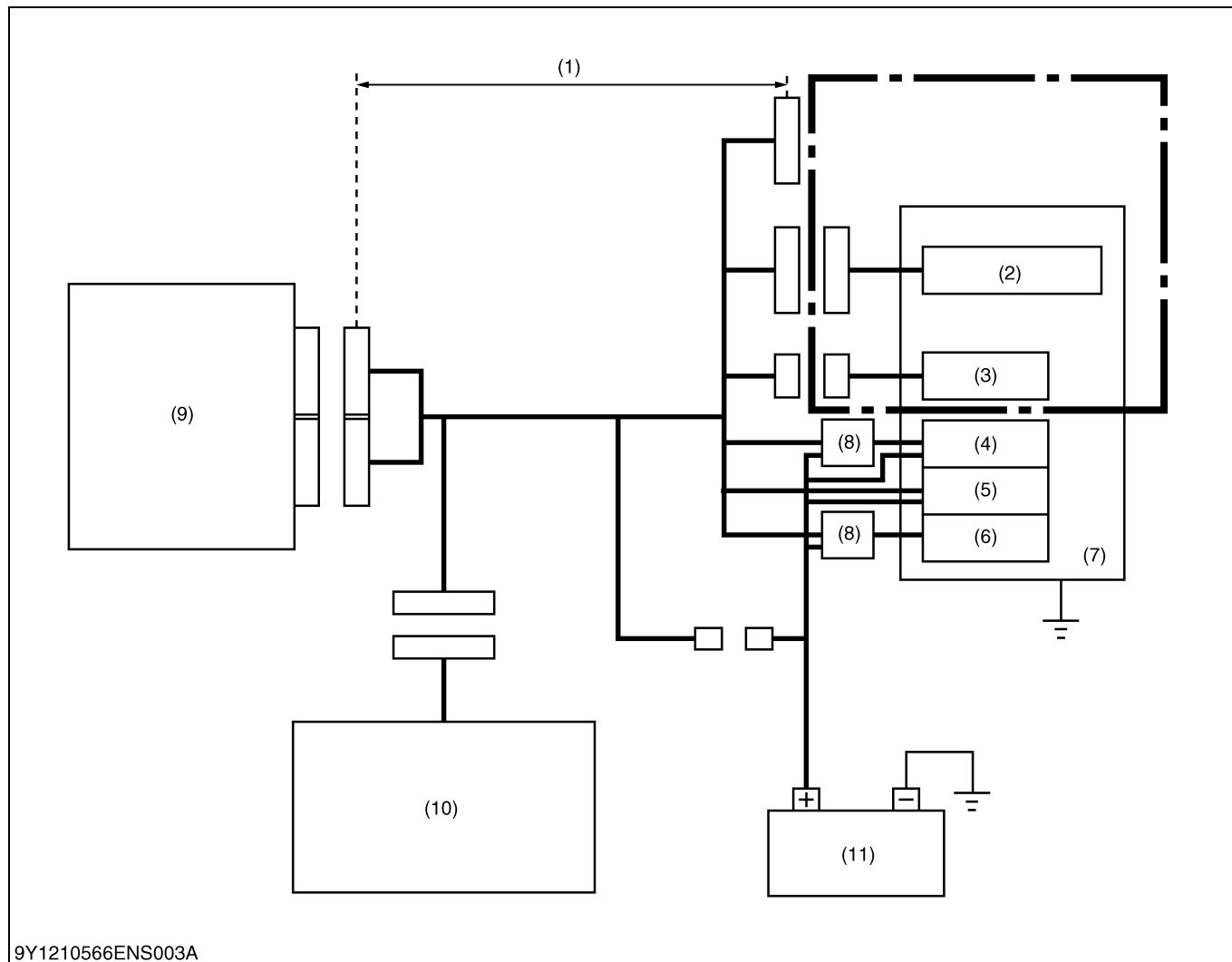
(2) External Components

CRS Intermediate Harness

1. Disconnect the ECU intermediate harness.
2. Remove the injector intermediate harness from the bracket.
3. Remove the engine intermediate harness from the bracket.

(When reassembling)

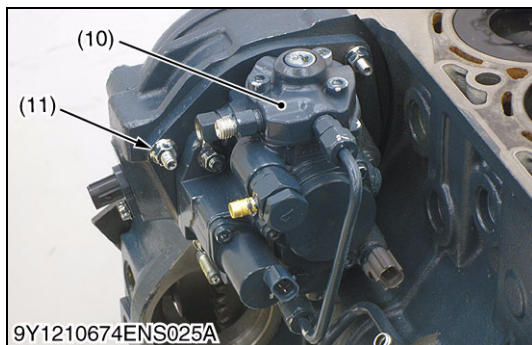
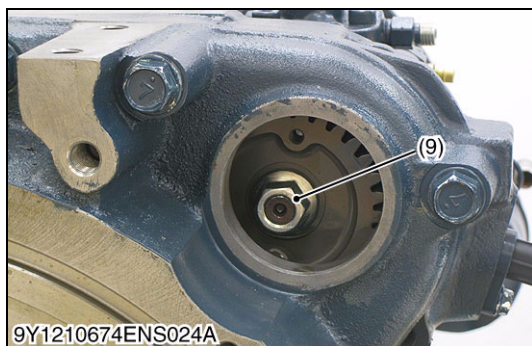
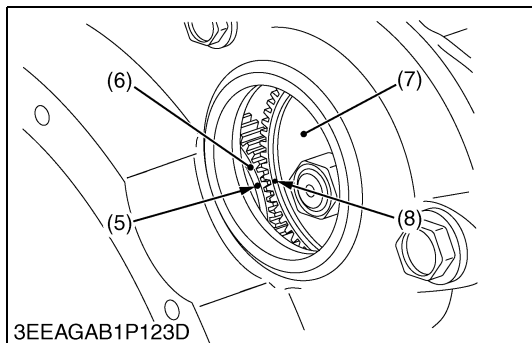
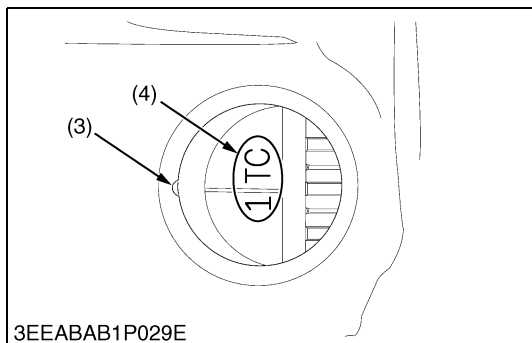
- Make sure that bracket is installed correct position.
- Make sure to install wire and clamp to specified position.



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- | | | | |
|--|--|---------------|-----------------------------|
| (1) ECU Intermediate Harness
(OEM Side Harness) | (3) Injector Intermediate Harness
(Engine Side Harness) | (6) Glow Plug | (9) Engine ECU |
| (2) Engine Intermediate Harness
(Engine Side Harness) | (4) Starter | (7) Engine | (10) OEM Designed Interface |
| | (5) Alternator | (8) Relay | (11) Battery |

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(Continued)**(When reassembling)**

- Align the alignment marks of the supply pump gear (7) and idle gear (6).
- Replace the O-ring of the supply pump (10) with a new one.
- Install the supply pump (10).
- Tighten the supply pump mounting nut (11).
- Tighten the supply pump gear mounting nut (9) to its specified torque.
- Mount the window cover (1).

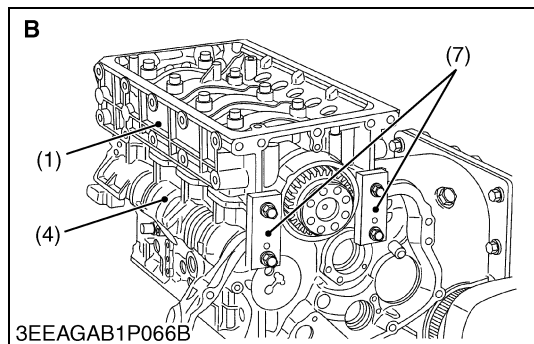
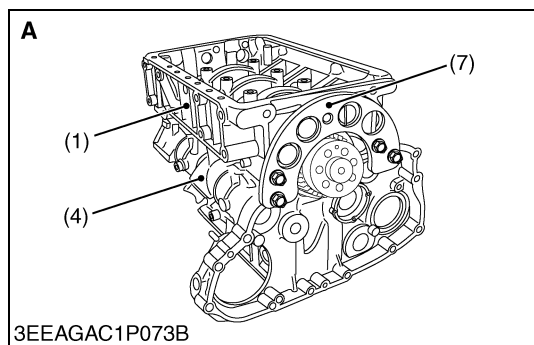
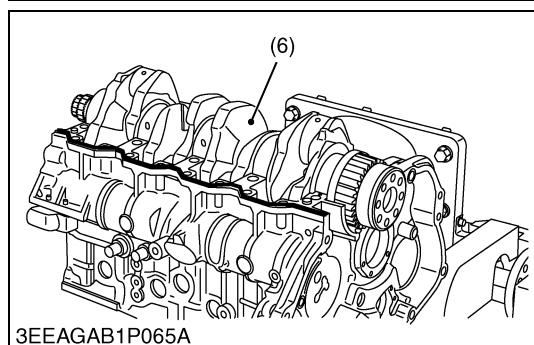
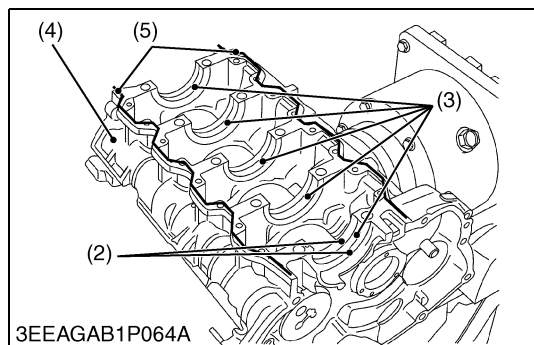
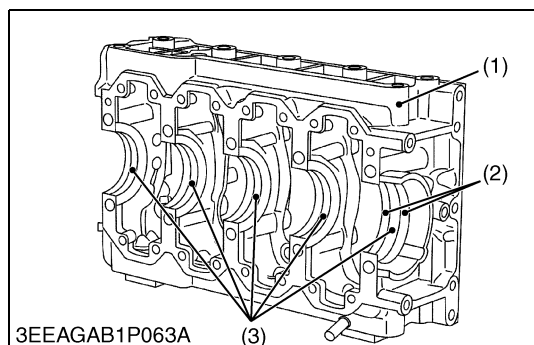
NOTE

- **When replacing the supply pump with a new one, use the diagnosis tool to conduct learning of discrepancies in the new supply pump.**

Tightening torque	Supply pump mounting nut	24 to 27 N·m 2.4 to 2.8 kgf·m 18 to 20 lbf·ft
	Supply pump gear mounting nut	59 to 68 N·m 6.0 to 7.0 kgf·m 44 to 50 lbf·ft

- | | |
|----------------------|-----------------------------------|
| (1) Window Cover | (7) Supply Pump Gear |
| (2) Flywheel Housing | (8) Timing Mark |
| (3) Mark | (9) Supply Pump Gear Mounting Nut |
| (4) TC Mark | (10) Supply Pump |
| (5) Mark | (11) Supply Pump Mounting Nut |
| (6) Idle Gear | |

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(Continued)**(When reassembling)**

- Make sure the crankcase 1 (4) and 2 (1) are clean.
- Reassemble the crankshaft bearing (3) into crankcase 1 (4) and 2 (1).
- Reassemble the thrust bearing (2), with the oil groove facing outside, into both flywheel housing edge journal side of the crankcase 1 (4) and 2 (1).
- Apply oil to the thrust bearing and set the crankshaft (6).
- Apply liquid gasket (Three Bond 1217H or equivalent) (5) to the crankcase 1 as shown in the figure.
- Make sure that the liquid gasket coating surface is free of water, dust and oil in order to keep sealing effect.
- Carefully apply the adhesive evenly.
- Match the crankcase 1 (4) and 2 (1), referring to the flywheel housing's contoured face.
- Tighten the crankcase 2 mounting screws (**A** to **J**) and the crankcase 2 flange screws (**K** to **Z**) loosely after applying engine oil.
- Tighten up the jig (7) to the specified torque same as the flywheel housing screw. (Refer to "5. SPECIAL TOOLS" at "GENERAL" section.) This helps to minimize the level difference between the crankcase 1 (4) and the crankcase 2 (1) (at the flywheel side). Possible gap must be 0.05 mm (0.002 in.) or smaller.
- Tighten the crankcase 2 mounting screw and the crankcase 2 flange screw in the order of **A** to **Z**. (Refer to previous page.)

NOTE

- When mounting the adhesive-applied parts, be careful to fit them to the mating parts.
- Assemble the adhesive-applied parts within ten minutes.

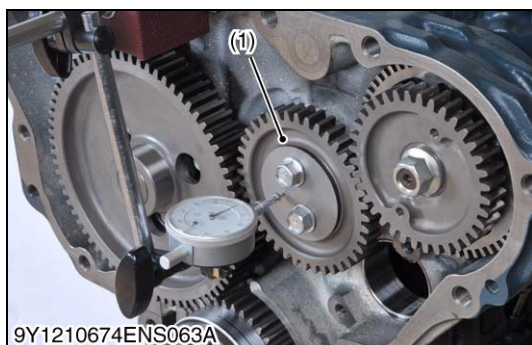
Tightening torque	Crankcase 2 mounting screw (A to J)	V2607-CR-E4B V2607-CR-TE4B V2607-CR-TIE4B	128 to 137 N·m 13.0 to 14.0 kgf·m 94.1 to 101 lbf·ft
		V3307-CR-TE4B V3307-CR-TIE4B	138 to 147 N·m 14.0 to 15.0 kgf·m 102 to 108 lbf·ft
	Crankcase 2 flange screw (K to Z)	V2607-CR-E4B V2607-CR-TE4B V2607-CR-TIE4B	49 to 55 N·m 5.0 to 5.7 kgf·m 37 to 41 lbf·ft
		V3307-CR-TE4B V3307-CR-TIE4B	59 to 63 N·m 6.0 to 6.5 kgf·m 44 to 47 lbf·ft

- (1) Crankcase 2
(2) Thrust Bearing
(3) Crankshaft Bearing
(4) Crankcase 1
(5) Liquid Gasket

- (6) Crankshaft
(7) Jig

- A:** V2607-CR-E4B / V2607-CR-TE4B / V2607-CR-TIE4B
B: V3307-CR-TE4B / V3307-CR-TIE4B

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Side Clearance of Idle Gear

1. Set a dial indicator with its point on the idle gear (1).
2. Move the idle gear (1) to the front and rear to measure the side clearance.
3. If the measurement is more than the allowable limit, replace the idle gear collar.

Side clearance of idle gear	V2607-CR-E4B V2607-CR-TE4B V2607-CR-TIE4B	Factory specification	0.050 to 0.20 mm 0.0020 to 0.0078 in.
		Allowable limit	0.90 mm 0.035 in.
	V3307-CR-TE4B V3307-CR-TIE4B	Factory specification	0.15 to 0.25 mm 0.0059 to 0.0098 in.
		Allowable limit	0.90 mm 0.035 in.

(1) Idle Gear

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Oil Clearance between Idle Gear Shaft and Idle Gear Bushing

1. Measure the idle gear shaft O.D. with an external micrometer.
2. Measure the idle gear bushing I.D. with an internal micrometer.
3. Calculate the oil clearance.
4. If the oil clearance is more than the allowable limit, replace the bushing.

Oil clearance between idle gear shaft and idle gear bushing	V2607-CR-E4B V2607-CR-TE4B V2607-CR-TIE4B	Factory specification	0.025 to 0.096 mm 0.00099 to 0.0037 in.
		Allowable limit	0.10 mm 0.0039 in.
	V3307-CR-TE4B V3307-CR-TIE4B	Factory specification	0.0250 to 0.106 mm 0.0020 to 0.0035 in.
		Allowable limit	0.11 mm 0.0043 in.

Idle gear shaft O.D.	V2607-CR-E4B V2607-CR-TE4B V2607-CR-TIE4B	Factory specification	34.959 to 34.975 mm 1.3764 to 1.3769 in.
	V3307-CR-TE4B V3307-CR-TIE4B	Factory specification	46.959 to 46.975 mm 1.8488 to 1.8494 in.

Idle gear bushing I.D.	V2607-CR-E4B V2607-CR-TE4B V2607-CR-TIE4B	Factory specification	35.000 to 35.055 mm 1.3780 to 1.3801 in.
	V3307-CR-TE4B V3307-CR-TIE4B	Factory specification	47.000 to 47.065 mm 1.8504 to 1.8529 in.

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