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6WG1 (95Z7/115Z7) SHOP MANUAL
General Information
Troubleshooting Information

General Information
Troubleshooting Information

93215-00620

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93215-00620
July 2012

SHOP MANUAL

ISUZU DIESEL ENGINE

6WG1

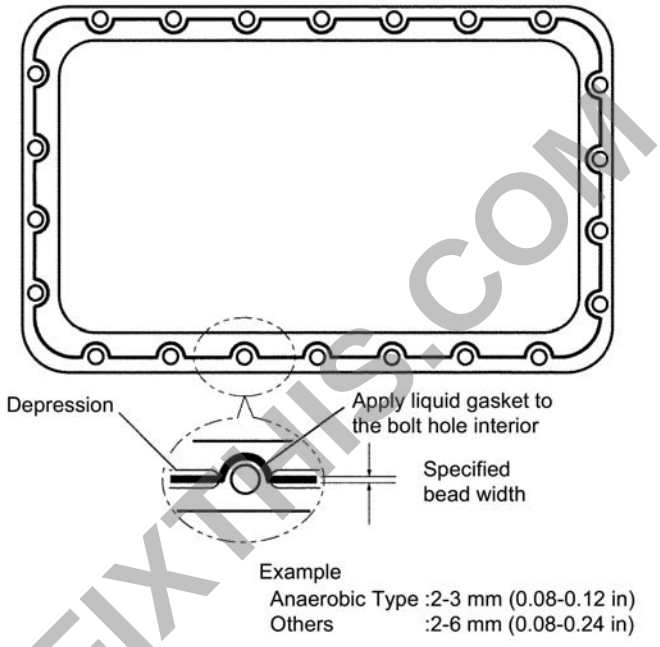
General Information
Troubleshooting Information

(For Kawasaki Wheel Loader 95Z7, 115Z7)

Serial No. 97J1-5001 and up
Serial No. 11J1-5001 and up

mm (in)

SCREW HOLE	DEPRESSION	JUDGE MENT
1-3 (0.04-0.12)		OK
1-3 (0.04-0.12)	More than 2 (0.08)	OK
		NG



PAWAZ0MF002001

Caution :

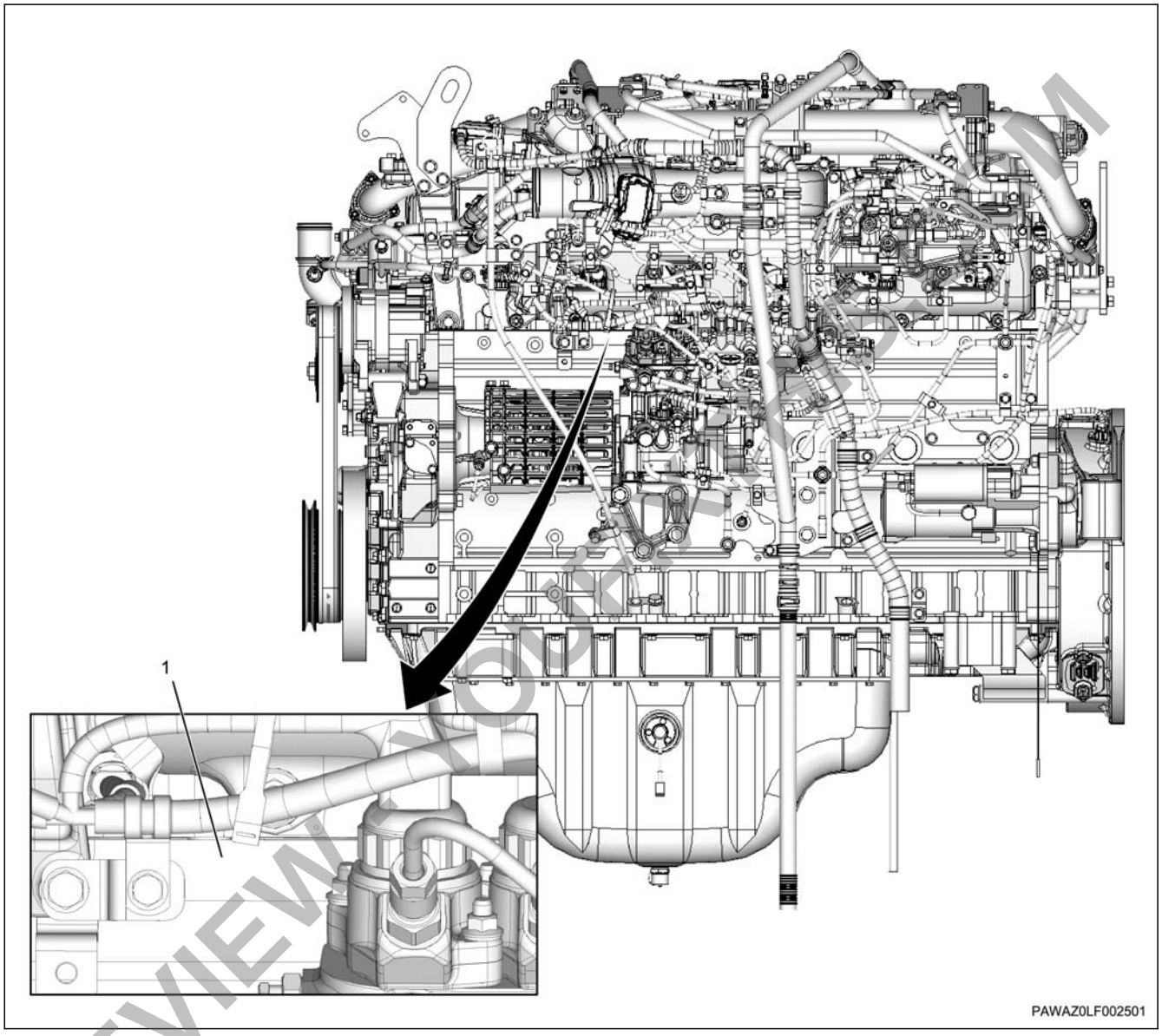
- If the workshop manual specifies an application method, follow that method.

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Function, Structure, Operation

1. Engine number



1. Engine number stamping

2. Function, Structure, Operation

1. Engine structural diagram

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Engine compression pressure inspection

1. Engine compression pressure inspection description of function

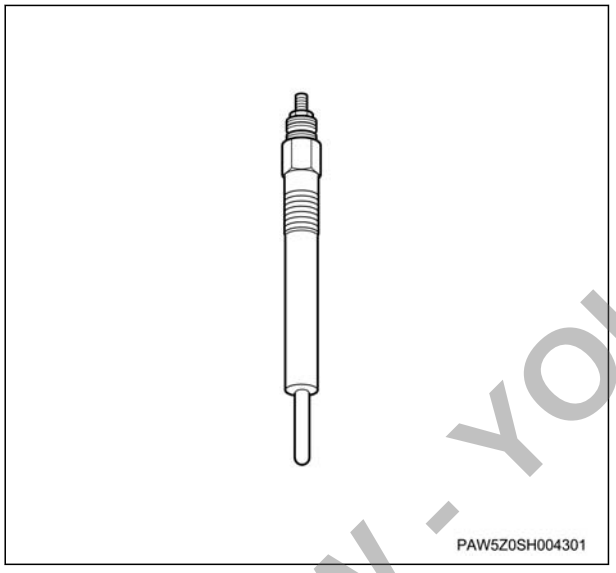
Note：

- Confirm that there is no abnormality with the battery and the starter.

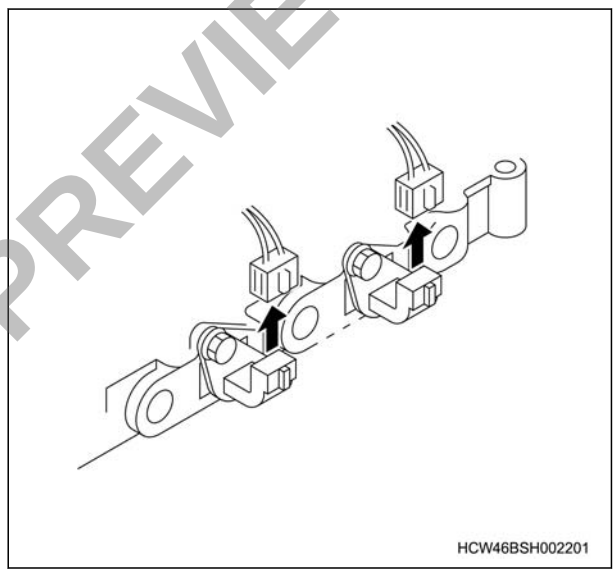
1. Disconnect the battery ground cable.
2. Remove the inlet pipe.
3. Remove the EGR cooler.
4. Remove glow plug from cylinder head.

Note：

- Remove all the cylinders.



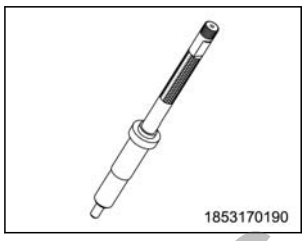
5. Remove the injector harness connector from the lower cover.



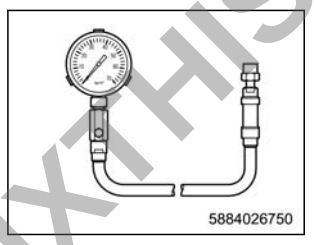
6. Install the special tool to the cylinder head assembly.

Note：

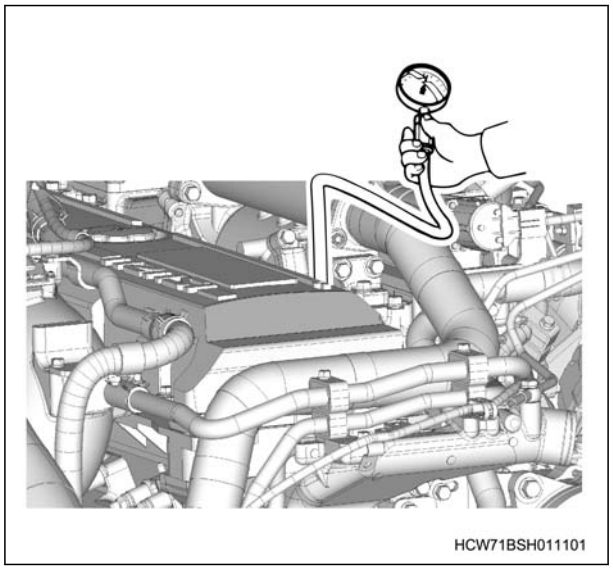
- Insert the compression gauge adapter into the installation hole of the glow plug to install the compression gauge.



SST: 1-8531-7019-0 - compression gauge adapter



SST: 5-8840-2675-0（5-8531-7002-0） - compression gauge



7. Measure the compression pressure.

Note：

- Rotate the starter and read the indication of the compression pressure when the compression gauge needle stabilizes with engine speed of approx. 200 r/min.

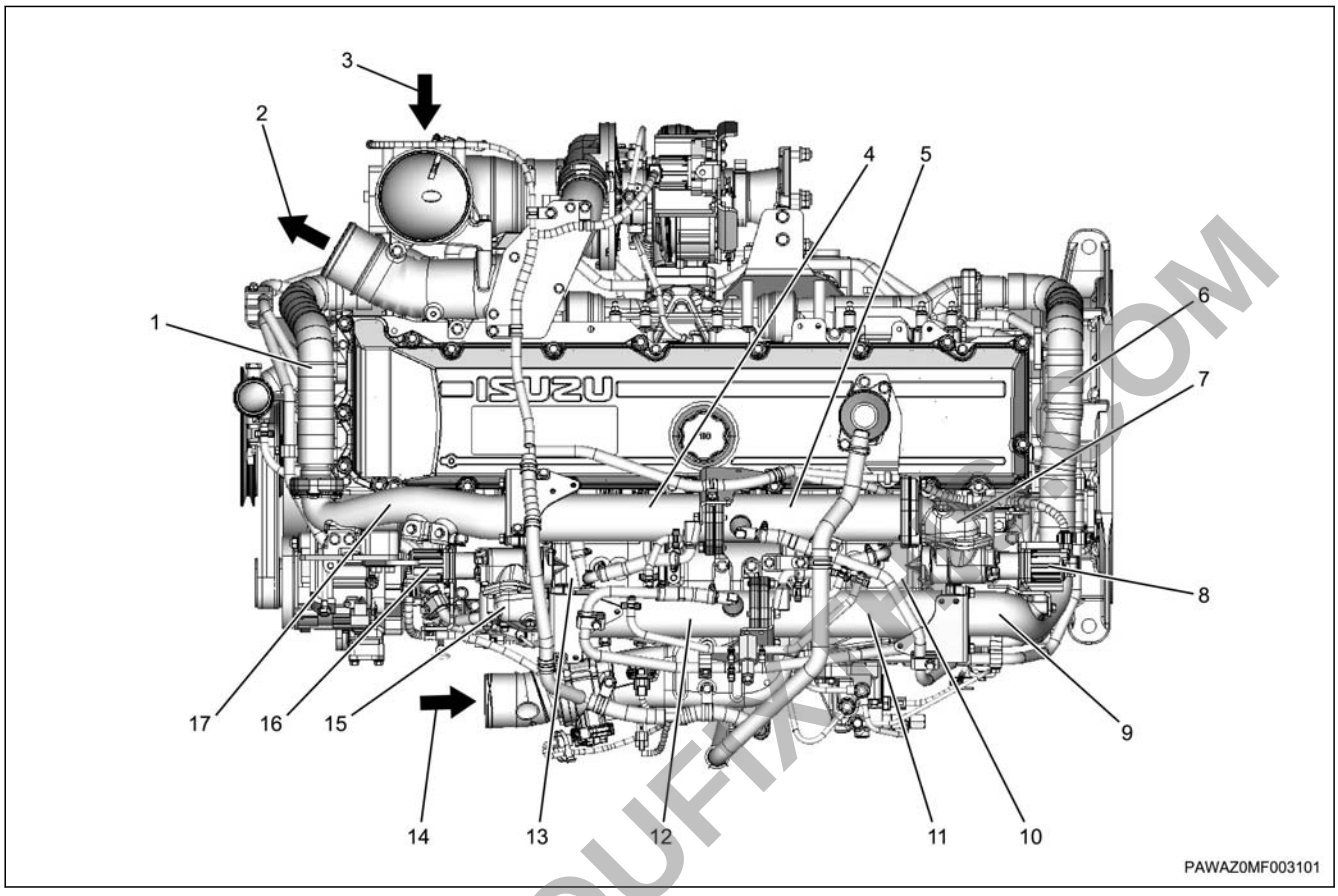
8. Measure the compression pressure of all cylinders.

Note：

- The compression pressure should be measured when the engine has cooled down.

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1. EGR pipe A
2. To intercooler
3. From air cleaner
4. EGR cooler A
5. EGR cooler B
6. EGR pipe B
7. EGR cooler duct B
8. EGR valve 1
9. EGR cooler duct C
10. EGR valve duct B
11. EGR cooler C
12. EGR cooler D
13. EGR valve duct A
14. From intercooler
15. EGR cooler duct D
16. EGR valve 2
17. EGR cooler duct A

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DTC P2455 (Flash Code 47) DPD Differential Pressure Sensor Circuit High.....15E-98
DTC P2456 (Flash Code 47) DPD Differential Pressure Sensor Learned Position.....15E-99
DTC P2458 (Flash Code 139) DPD Regeneration Duration 15E-100
DTC U0001 (Flash Code 84) CAN-Bus Malfunction (ISO-CAN).....15E-101
DTC U0073 (Flash Code 84) CAN-Bus Malfunction (J1939).....15E-102
DTC U0101 (Flash Code 85) Lost Communication with TCM.....15E-103
DTC U0110 (Flash Code 87) Lost Communication with VNT System.....15E-104
DTC U0411 (Flash code 87) Turbo Charger Control Module Signal Malfunction.....15E-105
DTC mapping table.....15E-106

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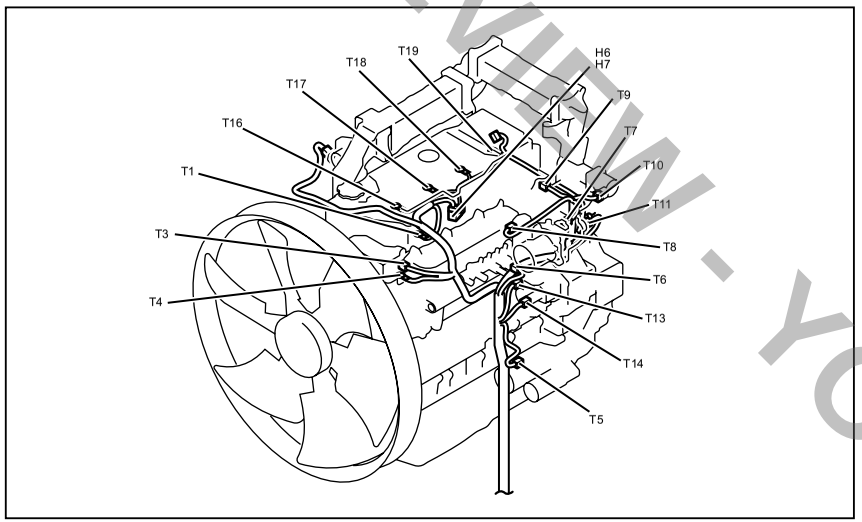
DTC P2455 (Flash Code 47) DPD Differential Pressure Sensor Circuit High.....1A-115
DTC P2456 (Flash Code 47) DPD Differential Pressure Sensor Learned Position.....1A-116
DTC P2458 (Flash Code 139) DPD Regeneration Duration 1A-117
DTC U0001 (Flash Code 84) CAN-Bus Malfunction (ISO-CAN).....1A-119
DTC U0073 (Flash Code 84) CAN-Bus Malfunction (J1939).....1A-120
DTC U0101 (Flash Code 85) Lost Communication with TCM.....1A-122
DTC U0110 (Flash Code 87) Lost Communication with VNT System.....1A-123
DTC U0411 (Flash code 87) Turbo Charger Control Module Signal Malfunction.....1A-124

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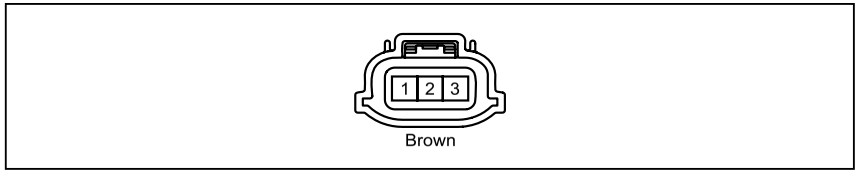
2. Location Diagram

The positional information of connectors is displayed.



3. Connector Information

The information for connector shape, terminal position
and connector color (except for milky white color) is displayed.



4. Terminal Name

Includes the circuits that correlate to each terminal of the parts.

T3

Pin No.	Pin name
1	Engine coolant temperature sensor GND
2	Engine coolant temperature sensor signal
3	Engine coolant temperature sensor OEM meter

T5

Pin No.	Pin name
1	Oil pressure sensor GND
2	Oil pressure sensor signal
3	Oil pressure sensor power source

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Cylinder head assembly

removal

1. Battery ground cable disconnect
   1. Disconnect the battery ground cable from the battery.
2. Coolant drain

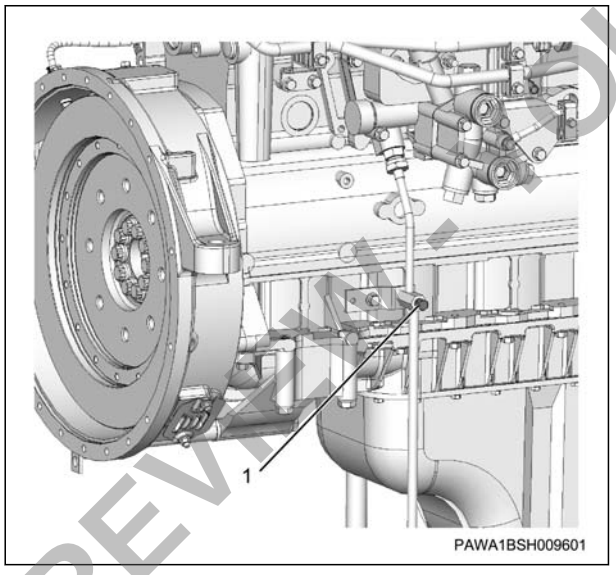
   Warning：
   - Do not loosen the radiator cap when the coolant is hot.
   - Steam and boiling water may burst out and cause burns, so make sure that the engine has cooled off.

   1. Drain the coolant from the radiator.

   Caution：
   - After draining the coolant, tighten the drain plug.

   2. Drain the coolant from the engine assembly.

   Note：
   - Loosen the drain plug on the cylinder block side.



1. Drain plug

3. Engine oil drain
   1. Remove the drain plug from the oil pan.

   Note：
   - Drain engine oil into the drain pan.

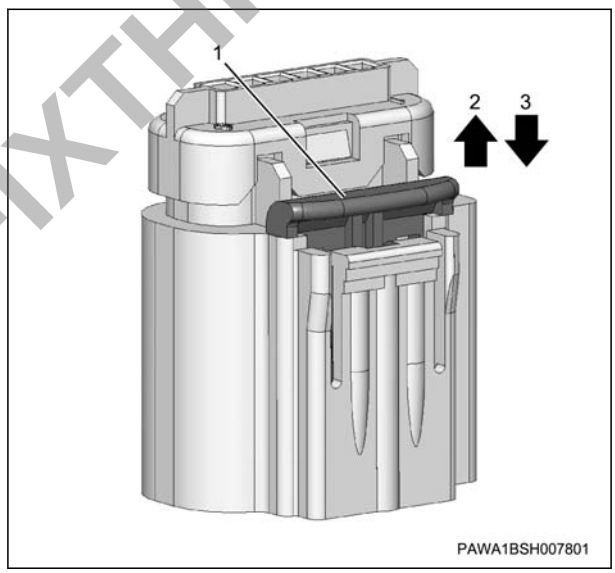
   2. Install the drain plug to the oil pan.

   tightening torque： 70 N・m { 7.1 kgf・m / 52 lb・ft }

   Caution：
   - Be careful not to forget to tighten the drain plug.

4. Ventilation hose disconnect
   1. Disconnect the ventilation hose from the cylinder head cover.
5. Intake throttle valve removal
   1. Disengage the harness connector from the intake throttle valve.

   Note：
   - Pull the lock operation portion to release the lock.



1. Lock control section
2. Lock release
3. Lock

   2. Remove the inlet pipe from the intake throttle valve.
   3. Remove the intake throttle valve from the inlet pipe.

   Caution：
   - Seal the opening of the inlet manifold to prevent foreign matter from getting inside.

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Fuel supply pump

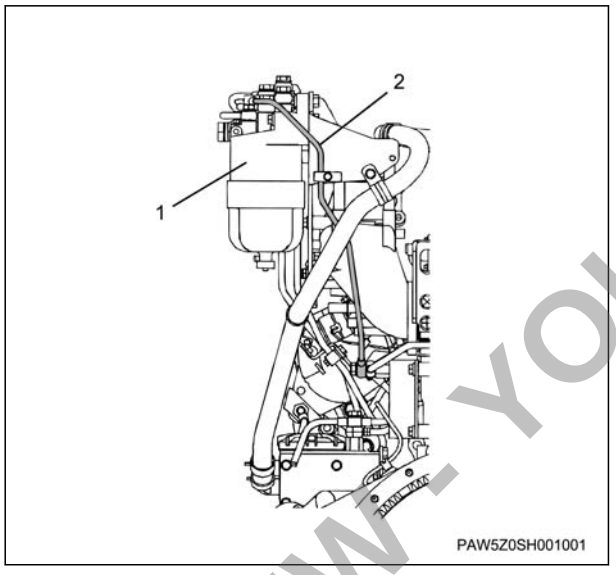
removal

1. Fuel safety information

   Caution：

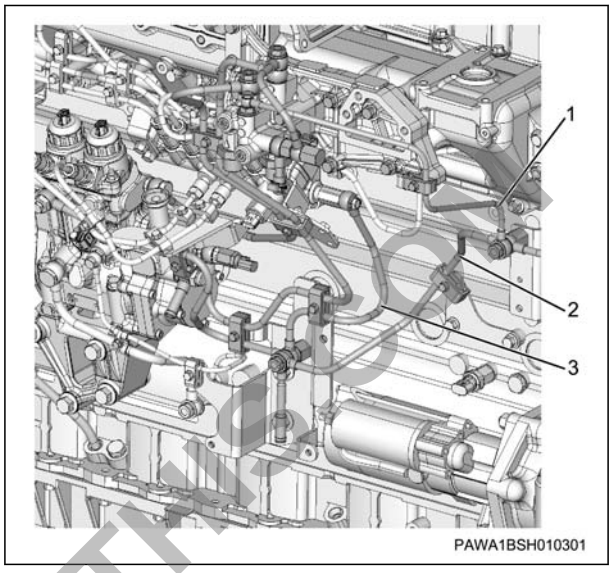
   - Fuel leakage can cause a fire, so wipe away any leaked fuel after completing the work and inspection, and make sure to confirm that no fuel leak is found after starting the engine.

2. Battery ground cable disconnect
   1. Disconnect the battery ground cable from the battery.
3. Fuel leak-off pipe removal
   1. Remove the fuel leak-off pipe from the fuel filter and the connector.



1. Fuel filter
2. Fuel leak-off pipe

   2. Remove the fuel return pipe from the fuel supply pump and the connector.
   3. Remove the fuel return pipe from the pressure limiter and the connector.



1. Fuel leak-off pipe
2. Fuel return pipe
3. Fuel return pipe

   4. Fuel pipe removal
      1. Remove the clip from the fuel pipe.
      2. Remove the fuel pipe from the fuel filter.
      3. Remove the fuel pipe from the fuel supply pump.

      Caution：

      - Seal the removed pipe installation section to prevent dust from attaching to it.

   5. Fuel feed pipe removal
      1. Remove the fuel feed pipe from the fuel filter.
      2. Remove the fuel feed pipe from the fuel supply pump.

      Note：

      - Remove the fuel temperature sensor together.

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Water pump assembly

removal

1. Battery ground cable disconnect
   1. Disconnect the battery ground cable from the battery.
2. Coolant drain

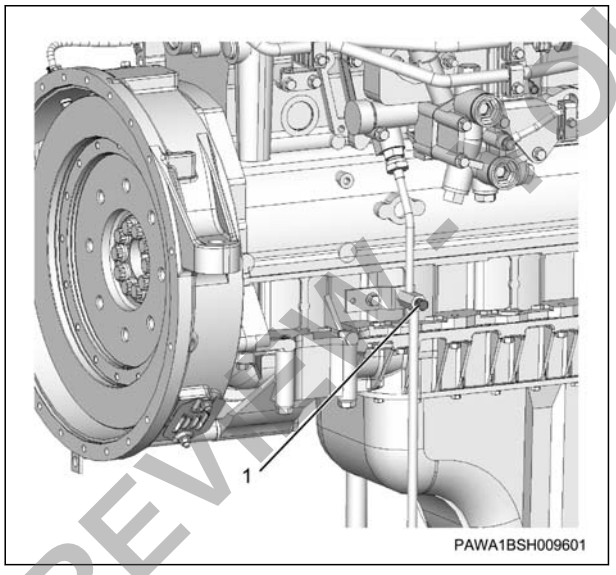
   Warning：
   - Do not loosen the radiator cap when the coolant is hot.
   - Steam and boiling water may burst out and cause burns, so make sure that the engine has cooled off.

   1. Drain the coolant from the radiator.

   Caution：
   - After draining the coolant, tighten the drain plug.

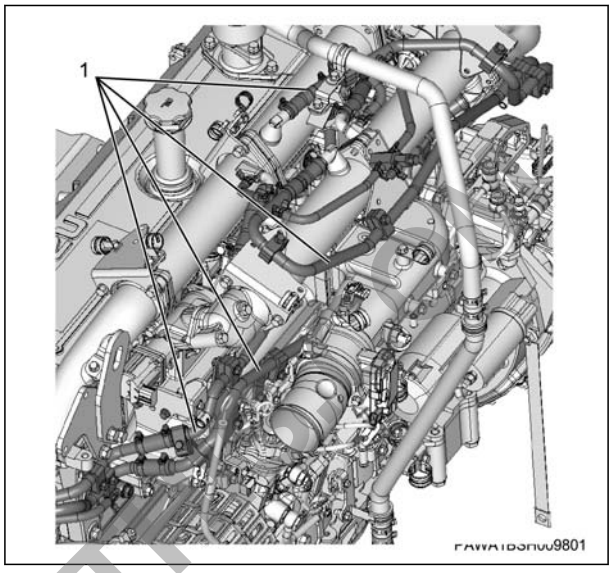
   2. Drain the coolant from the engine assembly.

   Note：
   - Loosen the drain plug on the cylinder block side.



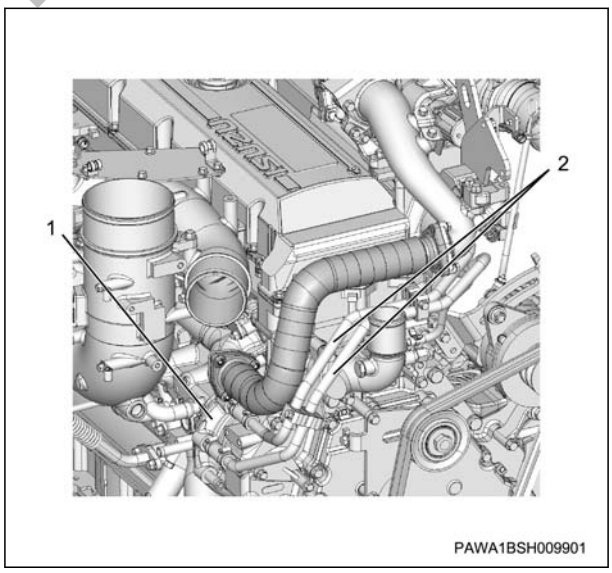
1. Drain plug

3. EGR cooler water pipe removal
   1. Remove the EGR cooler water pipe from the EGR cooler.



1. EGR cooler water pipe

   2. Remove the EGR cooler water pipe from the water pump.



1. Water pump
2. EGR cooler water pipe

3. Remove the EGR cooler water pipe from the thermostat housing.

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Oil pan

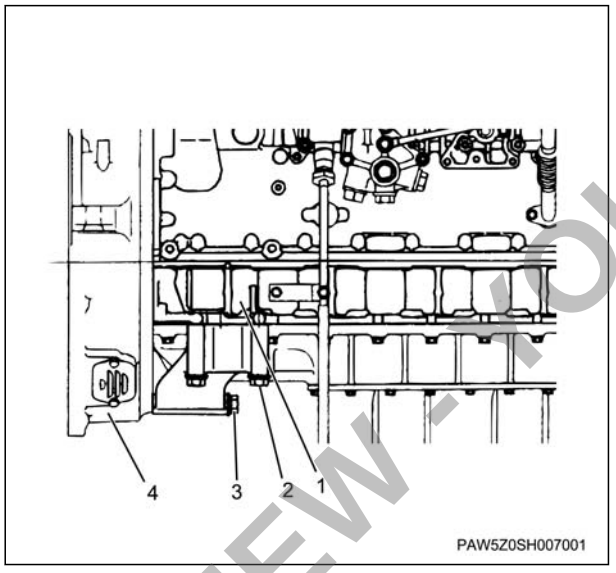
removal

1. Engine oil drain
   1. Remove the drain plug from the oil pan.

      Note：
      - Drain engine oil into the drain pan.
   2. Install the drain plug to the oil pan.

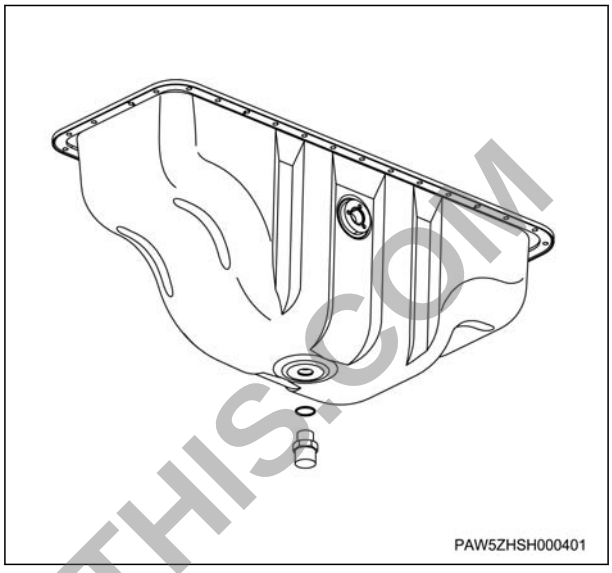
      tightening torque： 70 N・m { 7.1 kgf・m / 52 lb・ft }

      Caution：
      - Be careful not to forget to tighten the drain plug.
2. Oil pan removal
   1. Remove the flywheel housing stay from the flywheel housing.

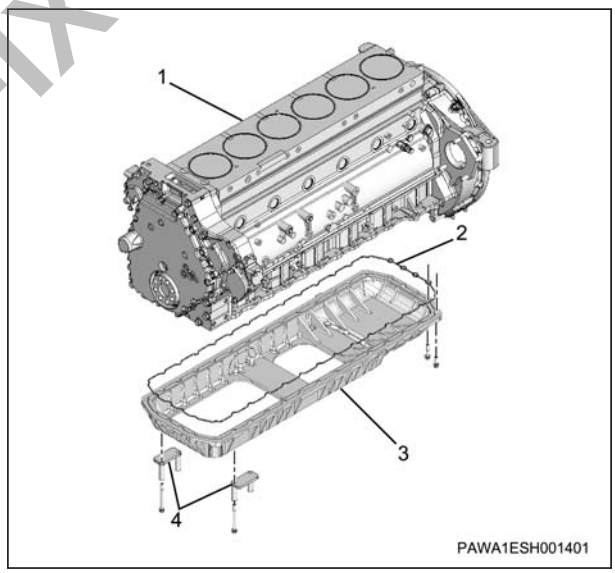


1. Cylinder block
2. Cylinder block side bolt
3. Flywheel housing side bolt
4. Flywheel housing

   2. Remove the oil pan from the spacer.



   3. Remove the spacer from the crankcase.



1. Cylinder block
2. O-ring
3. Spacer
4. Bracket

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Turbocharger assembly

removal

1. Battery ground cable disconnect
   1. Disconnect the battery ground cable from the battery.
2. Coolant drain

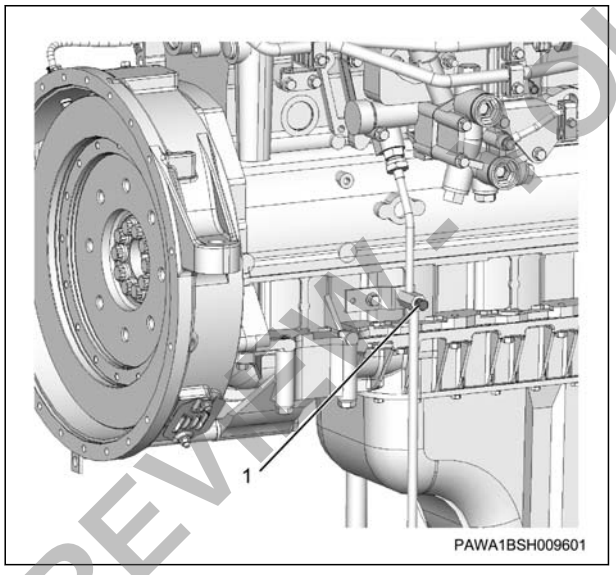
   Warning：
   - Do not loosen the radiator cap when the coolant is hot.
   - Steam and boiling water may burst out and cause burns, so make sure that the engine has cooled off.

   1. Drain the coolant from the radiator.

   Caution：
   - After draining the coolant, tighten the drain plug.

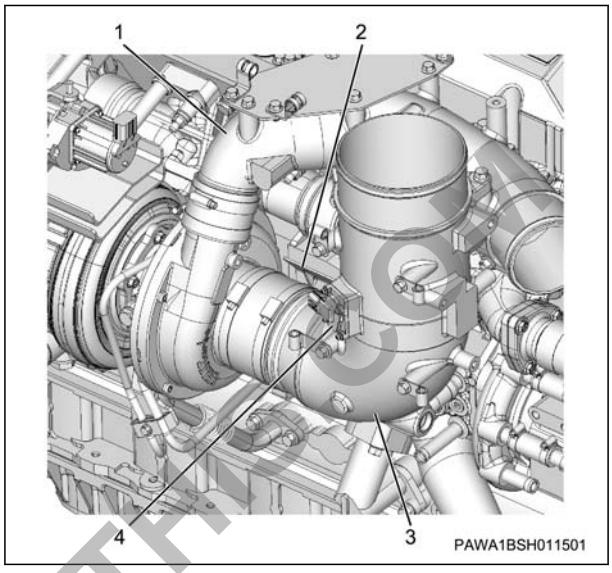
   2. Drain the coolant from the engine assembly.

   Note：
   - Loosen the drain plug on the cylinder block side.



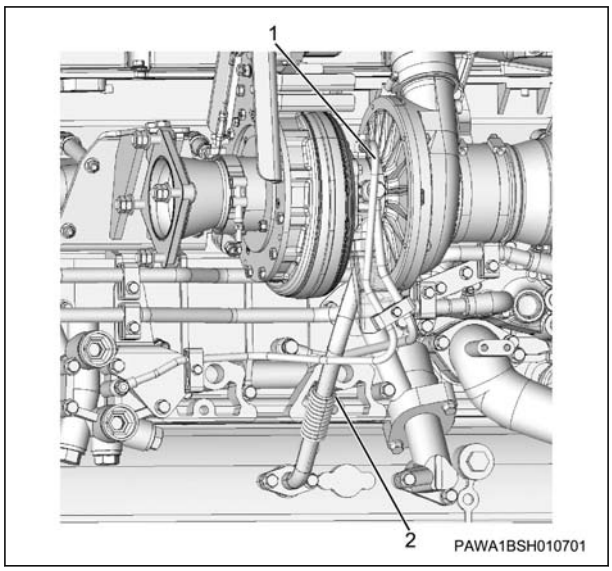
1. Drain plug

3. Air duct removal
   1. Remove the air duct from the turbocharger assembly.



1. Inlet pipe
2. Heat protector
3. Air duct
4. MAF sensor

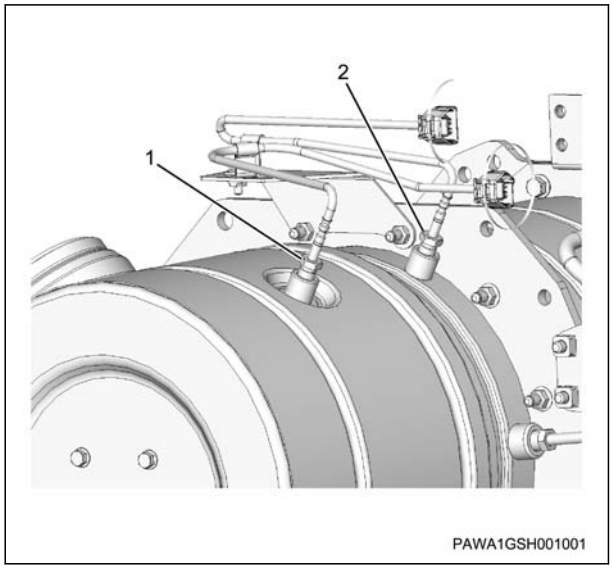
4. Turbocharger feed oil pipe removal
   1. Disconnect the turbocharger feed oil pipe from the turbocharger assembly.
   2. Remove the turbocharger feed oil pipe from the oil filter body.
5. Oil return pipe removal
   1. Disengage the oil return pipe from the turbocharger assembly.
   2. Remove the oil return pipe from the cylinder block.



1. Turbocharger feed oil pipe
2. Oil return pipe

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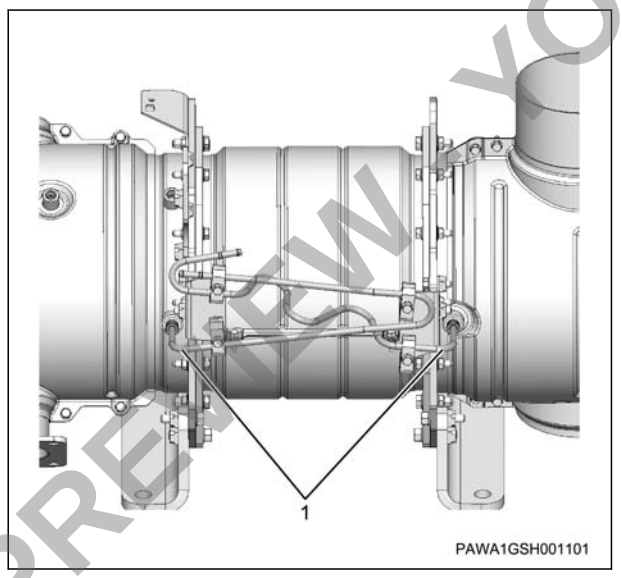
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1. Exhaust gas temperature sensor 2
2. Exhaust gas temperature sensor 1

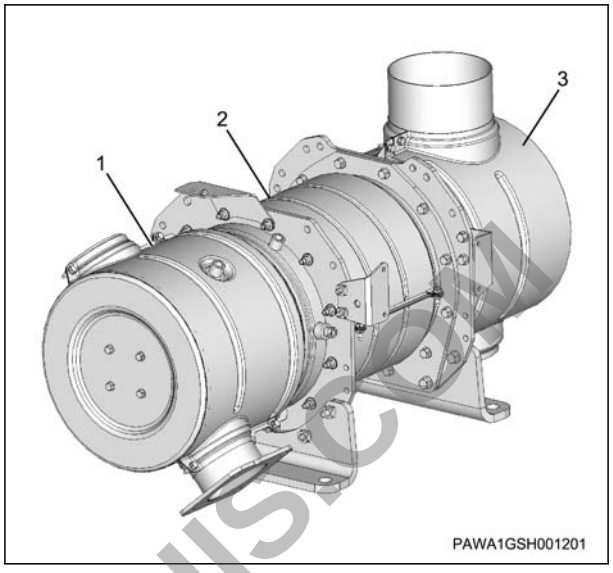
5. DPD assembly disassembly

1. Loosen the differential pressure pipe using the wrench.
2. Remove the clip from the differential pressure pipe.
3. Remove the differential pressure pipe from the DPD assembly.



1. Differential pressure pipe

4. Remove the oxidation catalyst assembly from the filter assembly.
5. Remove the filter assembly from the exhaust silencer assembly.



1. Oxidation catalyst assembly
2. Filter assembly
3. Exhaust silencer assembly

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EGR valve

removal

1. Battery ground cable disconnect
   1. Disconnect the battery ground cable from the battery.
2. Coolant drain

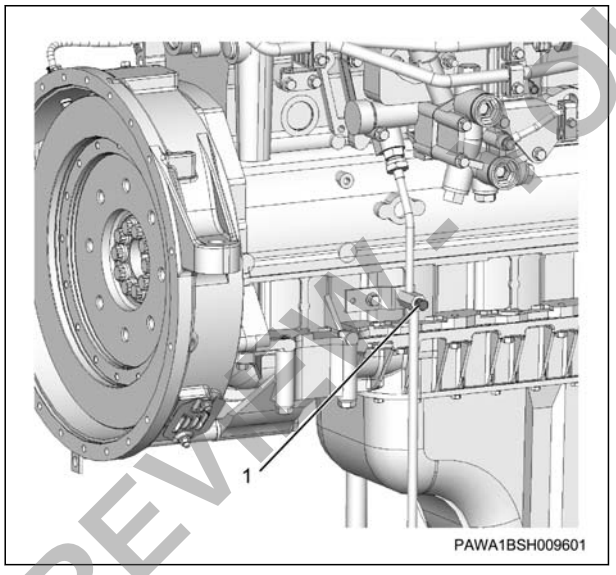
   Warning：
   - Do not loosen the radiator cap when the coolant is hot.
   - Steam and boiling water may burst out and cause burns, so make sure that the engine has cooled off.

   1. Drain the coolant from the radiator.

   Caution：
   - After draining the coolant, tighten the drain plug.

   2. Drain the coolant from the engine assembly.

   Note：
   - Loosen the drain plug on the cylinder block side.

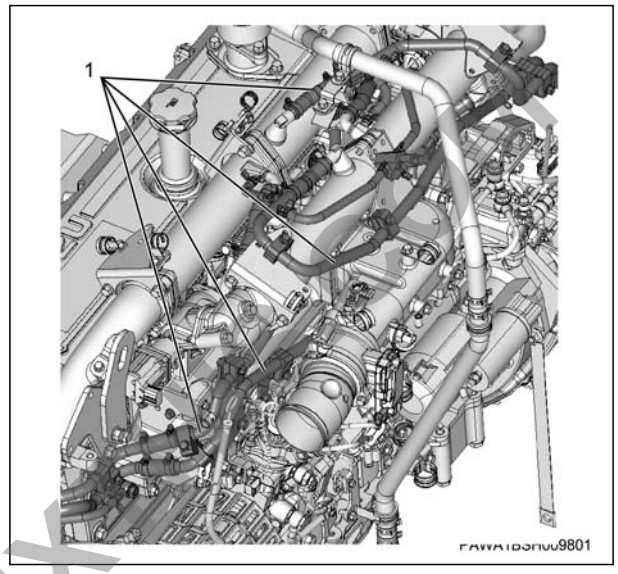


1. Drain plug

3. Engine harness disconnect
   1. Disconnect the engine harness from the engine.

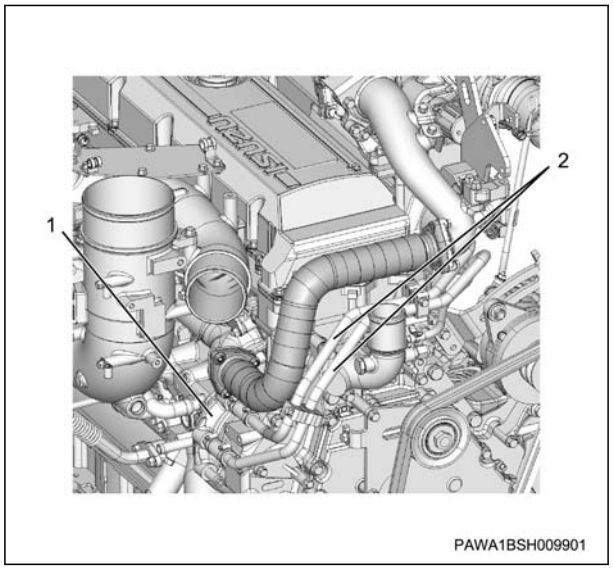
   Note：
   - Disconnect each connector.

4. Ventilation hose disconnect
   1. Disconnect the ventilation hose from the cylinder head cover.
5. EGR cooler water pipe removal
   1. Remove the EGR cooler water pipe from the EGR cooler.



1. EGR cooler water pipe

   2. Remove the EGR cooler water pipe from the water pump.



1. Water pump
2. EGR cooler water pipe

   3. Remove the EGR cooler water pipe from the thermostat housing.

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Glow plug

removal

1. Battery ground cable disconnect
   1. Disconnect the battery ground cable from the battery.
2. Coolant drain

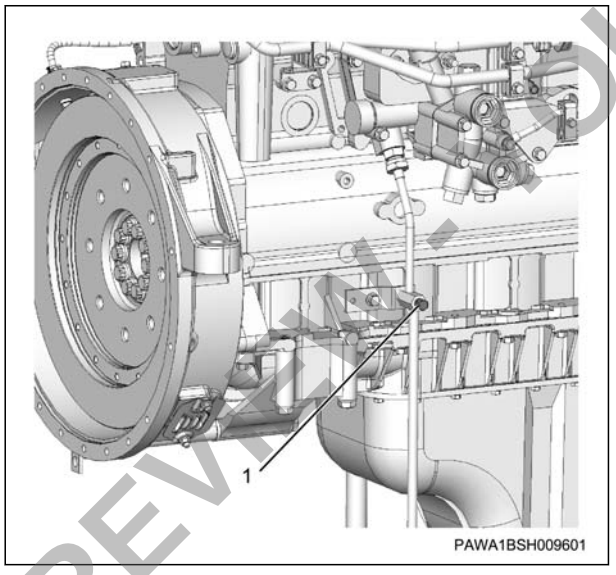
   Warning：
   - Do not loosen the radiator cap when the coolant is hot.
   - Steam and boiling water may burst out and cause burns, so make sure that the engine has cooled off.

   1. Drain the coolant from the radiator.

   Caution：
   - After draining the coolant, tighten the drain plug.

   2. Drain the coolant from the engine assembly.

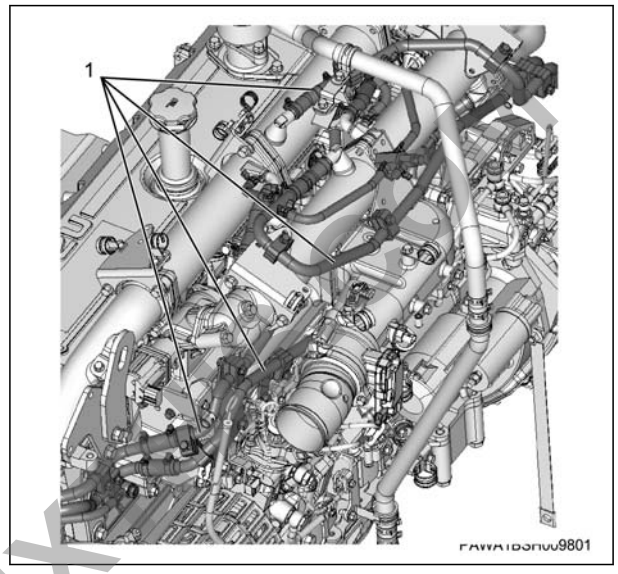
   Note：
   - Loosen the drain plug on the cylinder block side.



1. Drain plug

3. Engine harness disconnect
   1. Disconnect the engine harness from the engine.

   Note：
   - Disconnect each connector.
4. Ventilation hose disconnect
   1. Disconnect the ventilation hose from the cylinder head cover.
5. EGR cooler water pipe removal
   1. Remove the EGR cooler water pipe from the EGR cooler.



1. EGR cooler water pipe

6. EGR pipe removal
   1. Remove the EGR pipe A from the EGR cooler duct A.
   2. Remove the EGR pipe B from the EGR cooler duct C.

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FOREWORD

This manual describes the service procedures for the 6WG1 diesel engine (Interim Tier 4 compatible).
The contents of this manual are current at the date of issue, but may differ slightly from your engine due to specification changes or other modifications made thereafter.

This manual consists of the following sub-sections.

Publication No.	Publication Name	Sub-sections	
IDE-2600G	ENGINE	0	Introduction
		14A	Service Information Guide
		15B	Maintenance Information
		15C	Functional Inspection
		15D	Sympton
		15E	DTC Information
		1A	Engine Control
		1B	Mechanical
		1C	Fuel System
		1D	Cooling
		1E	Lubrication
		1F	Induction
		1G	Exhaust
		1H	Aux. Emission Control Devices
		1J	Electrical
		-	Wiring Diagram

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Engine start failure

1. Engine start failure description of symptom

Low cranking rotation.
The cranking rotation is normal, but the engine does not start.
The engine starts, but stable engine revolution cannot be maintained or the engine does not blow up.

2. Engine start failure diagnostics

・Preliminary inspection

Before using this section, perform the functional inspection and the OBD system check to check all of the following items.
Check the machine side for excessive loads.
The ECM and diagnostic light are operating properly.
DTC check.
The scan tool data is in the normal range of operation values.
Check the machine condition to locate the indicated symptom.
Check with the customer whether the customer is using the specified engine oil and fuel.

・Visual inspection

Careful visual inspection is required for certain symptom procedures. This can lead to correcting a problem without further inspections, saving valuable time.
The inspection covers the following items.
Dirt and clogging of the fuel filter.
Poor connector connections. Especially in the CKP sensor and CMP sensor.
Low battery terminal voltage.
Proper connections, tightening, and disconnection of wiring.
Branching the ECM power source for the commercial accessory power source.
Whether the ECM ground is clean and securely installed in the correct location.
Cracks, and twists in the pipes and hoses related to fuel, air, and oil, and correct connections thereof. Extensively check for any leaks or blockage.
Layout of the fuel filter, pre-filter, and electromagnetic pump constituting a structure that may cause air stagnant.

Isuzu genuine pre-filter has no air bleeding plug. Therefore, check whether it is placed so that no air stagnant occurs.
Check whether layout of the intake and discharge ports of the electromagnetic pump is appropriate. Modify any layout where the intake port is positioned on the upper part of the electromagnetic pump or the discharge port is positioned toward the direction in which the machine moves.
Fuel leaks and damage or dents on pipes in the fuel system.
Abnormalities in intake system parts
Abnormalities in exhaust system parts

・Diagnostic aids

Abnormalities in the fuel system such as fuel out, fuel freezing, air contained in the fuel piping, abnormalities in the filter, abnormalities in the piping, poor fuel quality, abnormalities in the fuel tank
Abnormalities in the intake system such as clogging in the filter and abnormalities in the intake piping
Use of low viscosity fuel such as kerosene may promote wear, etc. on the supply pump plunger portion and result in insufficient discharge, causing engine start failures. In this case, it is necessary to replace the supply pump.
If an engine start failure occurs, check the fuel that the customer uses. If low viscosity fuel such as kerosene, etc. is used, the trouble will occur again after replacing the supply pump. Advise the customer not to use any low viscosity fuel.
Mixed oil of fuel after long storage periods and biofuel containing organic substances is prone to oxidation. Oxidized oil will promote wear of the parts related to the camshaft in the supply pump, causing engine start failures due to insufficient discharge. In this case, it is necessary to replace the supply pump.
Supply pump replacement due to use of the mixed oil of fuel after long storage periods and biofuel containing organic substances will be charged on customers. Therefore, advice customers not to use such oil.
When using fuel containing large amount of water, add a large size sedimenter to the pre-fuel filter to prevent water from entering into the fuel system.
Abnormalities in the supply pump, and fuel feeding without pressure
ECM determination on DTCs for open circuit or short circuit of PCV is not detected unless the conditions of the engine revolution being 300r/min and the common rail pressure being under the target value continue. Therefore, if the engine does not start due to open circuit or short circuit of the PCV, a DTC will be detected.

Note：

- Abnormalities in the CKP sensor cannot be diagnosed without cranking of 14 revolutions or more. Therefore, crank the engine for 14 seconds or more at 60 r/min.
  In the case of the CKP sensor failure at low revolution of the engine, DTCs of the CKP sensor may not be detected. In case of an intermittent failure, etc., raise the engine revolution to No Load Max to check whether DTCs related to the CKP sensor are detected.

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DTC P2453 (Flash Code 141)
DPD Differential Pressure Sensor Circuit Range/Performance

1. DTC P2453 description of DTC

The exhaust differential pressure sensor is installed near DPD itself. The exhaust differential pressure sensor changes the signal voltage in accordance with changes in the exhaust gas pressure in front and in rear of the DPD filter.
When the ECM has detected that the exhaust differential pressure is too high, it sets DTC.

2. DTC P2453 condition for setting the DTC

DTCs P2454 and P2455 are not set.
The battery voltage is between 18 and 32 V.
The ignition switch is ON.
The exhaust differential pressure is 60 kPa {0.6 kgf/cm2, 8.7 psi} or more for 2.4 seconds or longer.

3. DTC P2453 action taken when the DTC sets

Failure is indicated in the monitor on the machine, or the diagnostic light is turned on.

Note：

- Depending on the manufacturer of the machine, the failure indication may not be shown.

Limit the fuel injection amount.
Stop the EGR control.
Stop the DPD regeneration.

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DTC P1669 (Flash Code 75)
DPD Lamp Control Circuit

1. DTC P1669 diagnostics
   1. Turn OFF the ignition switch.
   2. Inspect the fuse.
   3. If a problem is found, replace the fuse.
   4. When the fuse is wire-melted again, repair the GND short of the circuit to which power is supplied by the fuse.
   5. Turn OFF the ignition switch.
   6. Disconnect the ECM harness connectors.
   7. Turn ON the ignition switch.
   8. Confirm that DPD manual regeneration indicator light is off.
   9. When the DPD manual regeneration indicator light is OFF, repair the GND short circuit between the ECM and the monitor panel.
   10. Turn OFF the ignition switch.
   11. Remove the fuse that supplies voltage to the DPD manual regeneration indicator light.
   12. Turn ON the ignition switch.
   13. Measure the voltage between DPD indicator light control circuit of the ECM harness connector and a normal GND.

   values： 1.0 V

   14. If the reading is more than or equal to the specified value, repair any short circuit with the battery or ignition power supply circuit between the ECM and the monitor panel.
   15. Turn OFF the ignition switch.
   16. Install the fuse again.
   17. Turn ON the ignition switch.
   18. Connect a test cable with fuse between the ECM harness connector and a normal GND.
   19. Confirm that DPD manual regeneration indicator light turns on.
   20. If the DPD manual regeneration indicator light does not turn on, inspect the ECM harness connector for a poor connection.
   21. If a problem is found, repair the ECM harness connector.
   22. Turn OFF the ignition switch.
   23. Remove the monitor panel.
   24. Inspect to see if there is an open circuit or high resistance in the power source circuit between the fuse and the monitor panel.
   25. If a problem is found, repair the power supply circuit.
   26. Inspect the control circuit between the ECM and the monitor panel for an open circuit and high resistance.
   27. If a problem is found, repair the control circuit.
   28. Inspect to see if there is a poor connection with the harness connector of the monitor panel.
   29. If a problem is found, repair the harness connector.
   30. When the harness connector is normal, replace the monitor panel.
   31. Replace the ECM.

   Refer to "*1.Engine 1J.Electrical(6WG1) ECM removal*".

   Refer to "*1.Engine 1J.Electrical(6WG1) ECM installation*".

   32. Set the injector ID code on the ECM.
2. DTC P1669 confirm resolution
   1. Clear the DTC using the trouble diagnosis scan tool.
   2. Turn OFF the ignition switch for at least 30 seconds.
   3. Turn ON the ignition switch.
   4. Use the trouble diagnosis scan tool to confirm that a DTC has not been detected.

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1. Water return pipe
2. Water feed pipe

15. Oil return pipe installation

1. Install the O-ring to the oil return pipe.

Note：

- Install them on both ends of the oil return pipe.
- Tighten the oil return pipe together with the bracket.

2. Temporarily tighten the oil return pipe to the turbocharger assembly.
3. Temporarily tighten the oil return pipe to the cylinder block.
4. Securely tighten the oil return pipe to the turbocharger assembly.

tightening torque： 25 N・m { 2.5 kgf・m / 18 lb・ft }

5. Securely tighten the oil return pipe to the cylinder block.

tightening torque： 50 N・m { 5.1 kgf・m / 37 lb・ft }

16. Turbocharger feed oil pipe installation

1. Temporarily tighten the turbocharger feed oil pipe onto the turbocharger assembly.
2. Temporarily tighten the turbocharger feed oil pipe to the oil port cover.

Note：

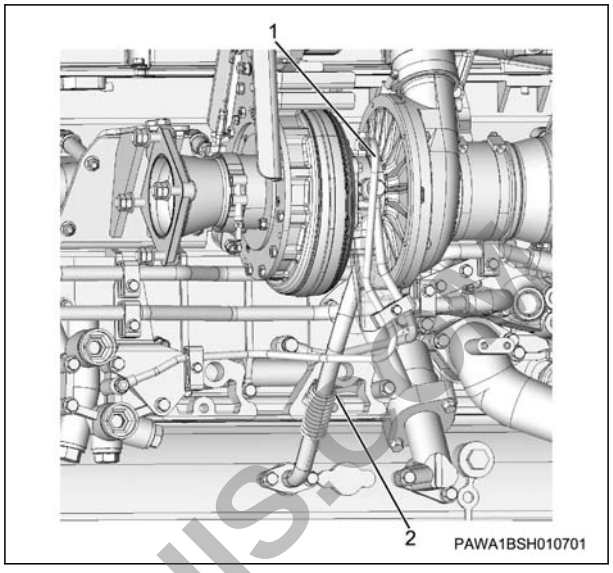
- Install 2 clips.

3. Securely tighten the turbocharger feed oil pipe onto the turbocharger assembly.

tightening torque： 35 N・m { 3.6 kgf・m / 26 lb・ft }

4. Securely tighten the turbocharger feed oil pipe to the oil port cover.

tightening torque： 28 N・m { 2.9 kgf・m / 21 lb・ft }



1. Turbocharger feed oil pipe
2. Oil return pipe

17. Air duct installation

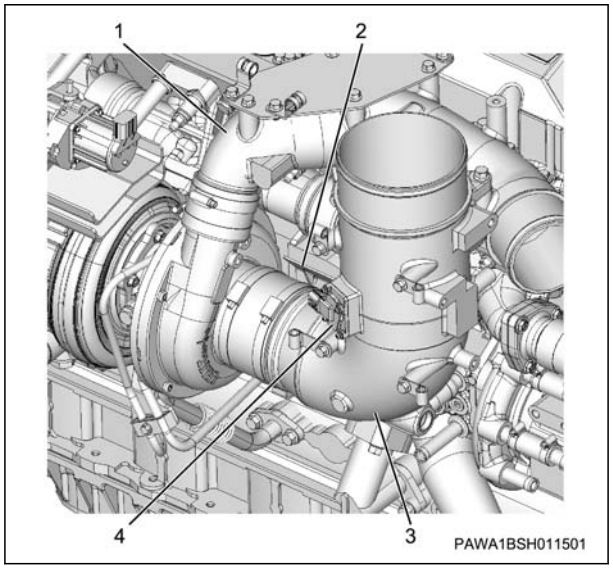
1. Install the air duct to the turbocharger assembly.

Note：

- Temporarily attach the rubber hose and clip on the turbocharger side, and then insert the air duct.

tightening torque： 39 N・m { 4.0 kgf・m / 29 lb・ft }

2. Install the heat protector to the air duct.



1. Inlet pipe
2. Heat protector
3. Air duct
4. MAF sensor

18. Fuel filter installation

1. Install the fuel filter to the cylinder head assembly.

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Crankshaft

removal

1. Battery ground cable disconnect
   1. Disconnect the battery ground cable from the battery.
2. Coolant drain

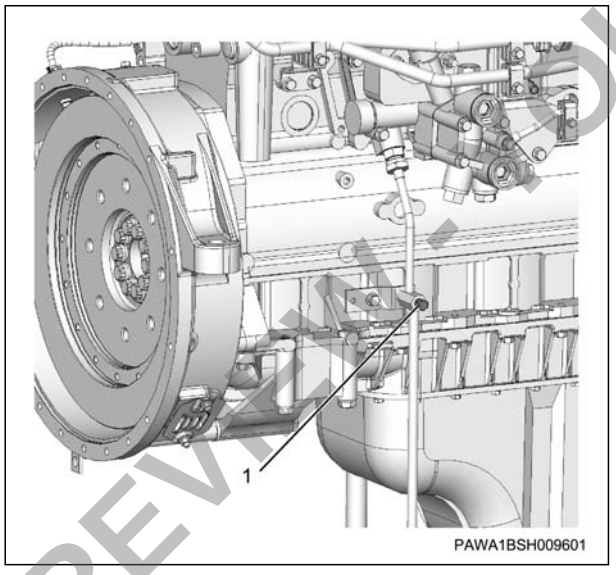
   Warning：
   - Do not loosen the radiator cap when the coolant is hot.
   - Steam and boiling water may burst out and cause burns, so make sure that the engine has cooled off.

   1. Drain the coolant from the radiator.

   Caution：
   - After draining the coolant, tighten the drain plug.

   2. Drain the coolant from the engine assembly.

   Note：
   - Loosen the drain plug on the cylinder block side.



1. Drain plug

3. Engine oil drain
   1. Remove the drain plug from the oil pan.

   Note：
   - Drain engine oil into the drain pan.

   2. Install the drain plug to the oil pan.

   tightening torque： 70 N・m { 7.1 kgf・m / 52 lb・ft }

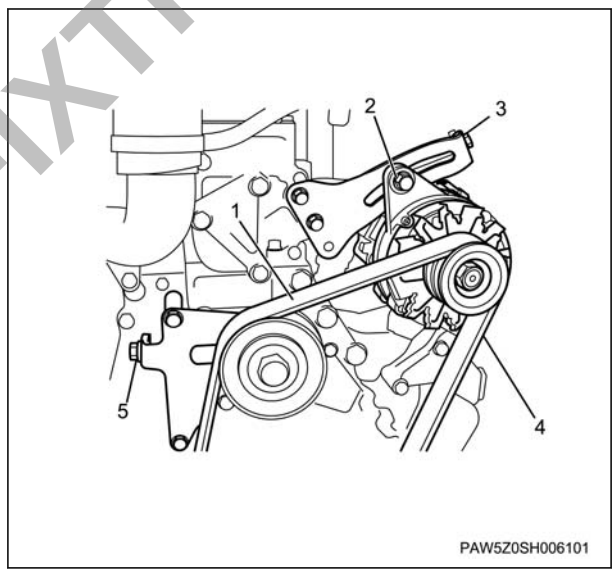
   Caution：
   - Be careful not to forget to tighten the drain plug.

4. Oil level gauge guide tube removal
   1. Remove the oil level gauge guide tube from the cylinder block.

   Caution：
   - Be careful not to damage the O-ring.

5. Generator drive belt removal
   1. Remove the generator drive belt from the generator.

   Note：
   - Loosen the lock nut and adjust bolt to remove the generator drive belt.



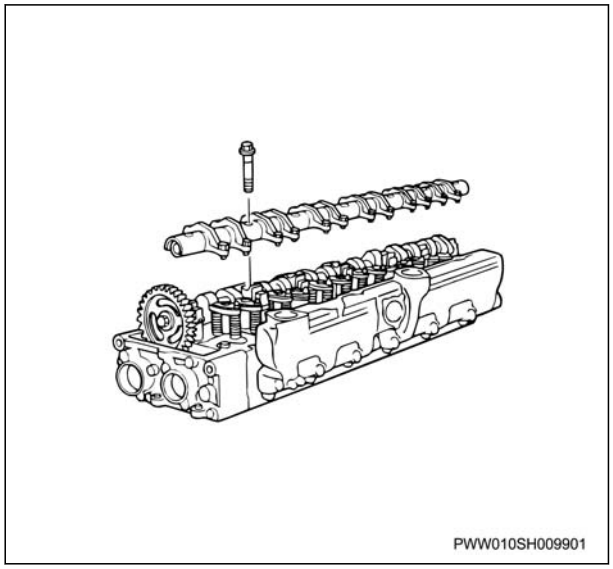
1. Generator drive belt
2. Lock nut
3. Generator adjust bolt
4. Penetration bolt
5. Pulley adjust bolt

6. Ventilation hose removal
   1. Remove the ventilation hose from the engine assembly.
7. Intake throttle valve removal
   1. Disengage the harness connector from the intake throttle valve.

   Note：
   - Pull the lock operation portion to release the lock.

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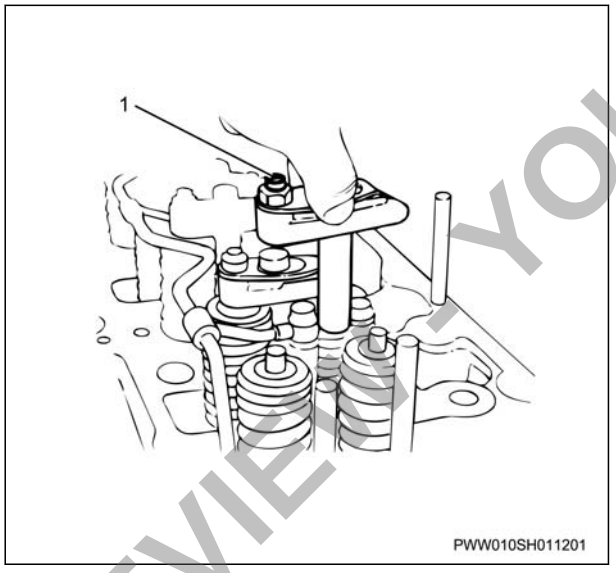


8. Bridge removal

1. Remove the bridge from the bridge guide.

Caution :

- Store the removed bridges in numerical order.



1. Bridge

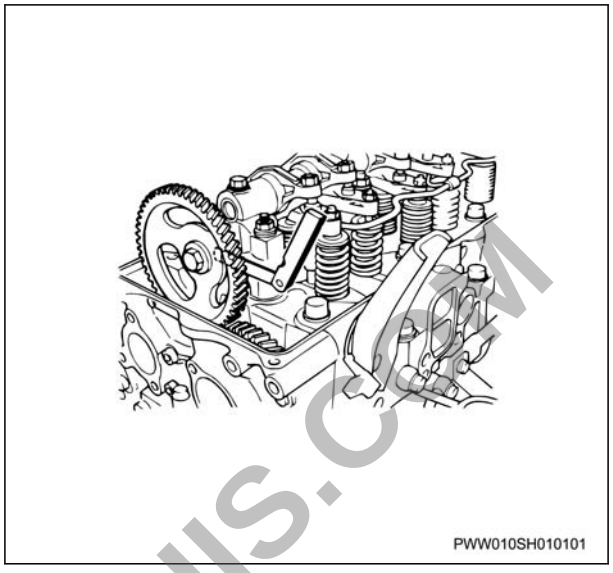
9. Camshaft measurement

1. Measure the clearance using the feeler gauge.

Note :

- Measure the camshaft clearance in the axis direction.

Camshaft clearance in the axis direction	
Assembly specification	: 0.085 to 0.170 mm { 0.0033 to 0.0067 in }
Limit for use	: 0.25 mm { 0.0098 in }



10. Camshaft removal

1. Remove the nut from the bracket.

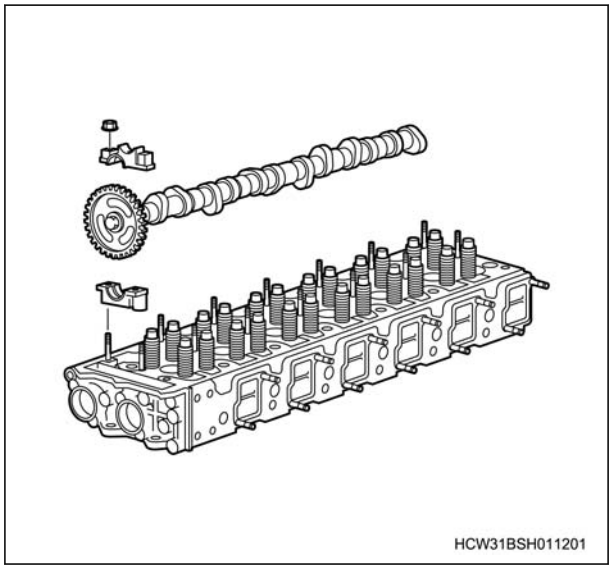
Caution :

- Evenly loosen them on both sides to remove them.

2. Remove the camshaft from the bracket.

Note :

- Remove the camshaft together with the camshaft bracket.

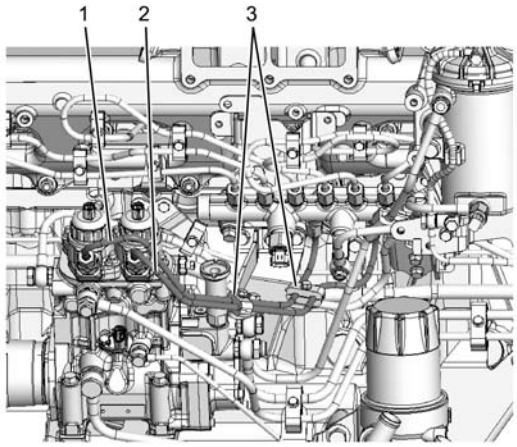


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tightening torque： 44 N・m { 4.5 kgf・m / 32 lb・ft }

7. Securely tighten the clip to the fuel pipe.



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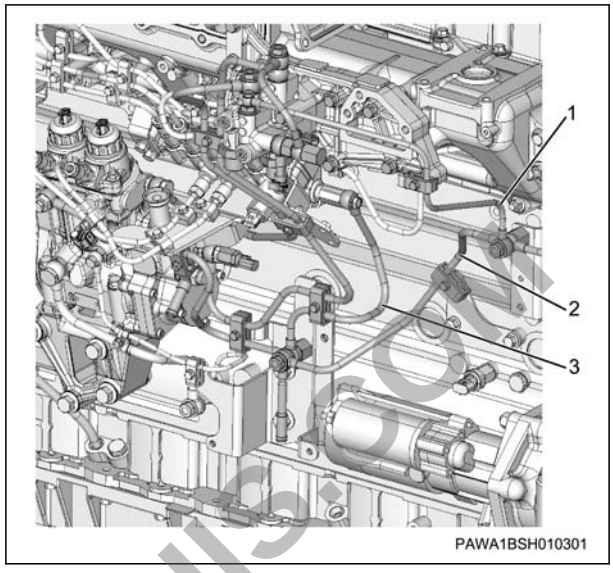
1. Fuel pipe
2. Fuel pipe
3. Clip

6. Fuel leak-off pipe installation

1. Temporarily tighten the fuel return pipe to the pressure limiter.
2. Temporarily tighten the fuel return pipe to the fuel supply pump.
3. Temporarily tighten the fuel return pipe to the connector.
4. Temporarily tighten the fuel leak-off pipe onto the fuel filter.
5. Temporarily tighten the fuel leak-off pipe to the connector.
6. Tighten the eyebolt using the torque wrench.

tightening torque： 41 N・m { 4.2 kgf・m / 30 lb・ft }

tightening torque： 15 N・m { 1.5 kgf・m / 11 lb・ft }
M8



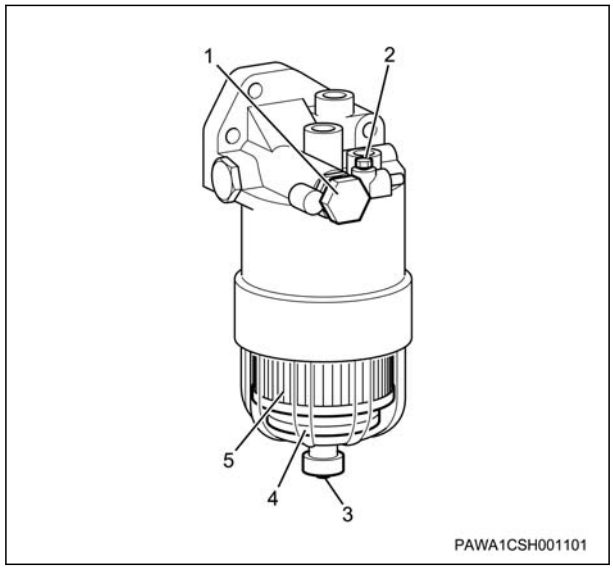
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1. Fuel leak-off pipe
2. Fuel return pipe
3. Fuel return pipe

7. Fuel air bleed

Caution：

- To prevent engine failure, be sure to perform air removal after the installation or removal of fuel system parts.



PAWA1CSH001101

1. Priming pump
2. Plug
3. Drain plug
4. Case
5. Fuel filter element

1. Loosen the plug using the wrench.

Note：

- Start with the fuel filter that is nearest to the fuel tank.

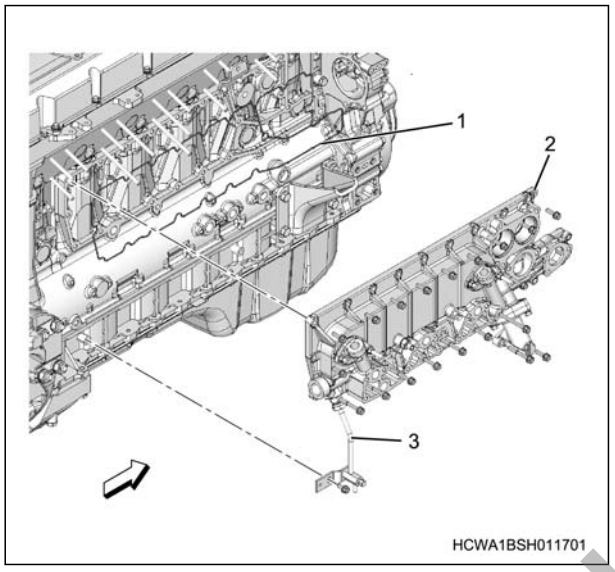
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installation

1. Oil cooler assembly installation
   1. Install the gasket to the oil cooler assembly.
   2. Install the O-ring to the oil cooler assembly.
   3. Install the oil cooler assembly to the cylinder block.

   tightening torque： 50 N・m { 5.1 kgf・m / 37 lb・ft }



1. Gasket
2. Oil cooler assembly
3. Water drain pipe

   4. Install the connector to the oil cooler assembly.

   tightening torque： 78 N・m { 8.0 kgf・m / 58 lb・ft }

   5. Install the pipe to the connector.

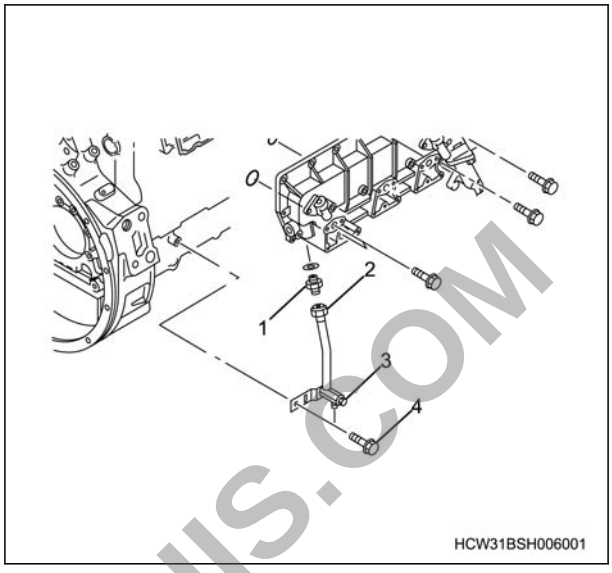
   tightening torque： 68 N・m { 6.9 kgf・m / 50 lb・ft }

   6. Install the bolt to the cylinder block.

   tightening torque： 43 N・m { 4.4 kgf・m / 32 lb・ft }

   7. Install the drain plug to the pipe.

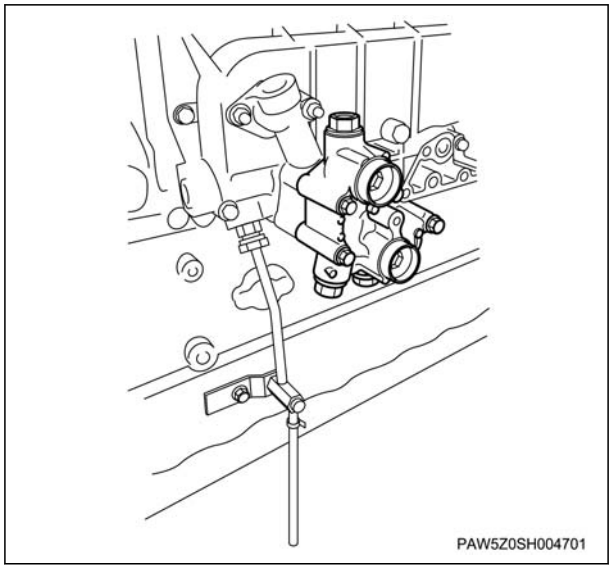
   tightening torque： 4 N・m { 0.4 kgf・m / 35 lb・in }



1. Connector
2. Pipe
3. Drain plug
4. Bolt

   8. Install the oil port cover to the oil cooler assembly.

   tightening torque： 43 N・m { 4.4 kgf・m / 32 lb・ft }



2. Thermostat housing installation
   1. Install the thermostat housing to the oil cooler assembly.

   Note：

   - Install the O-ring and the gasket, and then install the thermostat housing.

   2. Tighten the bolt using wrench.

   Note：

   - Push the thermostat housing against the oil cooler assembly, and then tighten the bolt on the water pump assembly side.

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