

**CX350C**  
**CX370C**  
Crawler Excavator

**SERVICE MANUAL**

Part number 48063132

English

October 2016

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**CASE**  
CONSTRUCTION



## **SERVICE MANUAL**

**CX350C Crawler excavators LC version - ISUZU engine GH-6HK1X (TIER 3)**  
**CX370C Crawler excavators LC version - ISUZU engine GH-6HK1X (TIER 3)**

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## **INTRODUCTION**

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## **Foreword - Important notice regarding equipment servicing**

All repair and maintenance work listed in this manual must be carried out only by qualified dealership personnel, strictly complying with the instructions given, and using, whenever possible, the special tools.

Anyone who performs repair and maintenance operations without complying with the procedures provided herein shall be responsible for any subsequent damages.

The manufacturer and all the organizations of its distribution chain, including - without limitation - national, regional, or local dealers, reject any responsibility for damages caused by parts and/or components not approved by the manufacturer, including those used for the servicing or repair of the product manufactured or marketed by the manufacturer. In any case, no warranty is given or attributed on the product manufactured or marketed by the manufacturer in case of damages caused by parts and/or components not approved by the manufacturer.

The manufacturer reserves the right to make improvements in design and changes in specifications at any time without notice and without incurring any obligation to install them on units previously sold. Specifications, descriptions, and illustrative material herein are as accurate as known at time of publication but are subject to change without notice.

In case of questions, refer to your CASE CONSTRUCTION Sales and Service Networks.

## Safety rules

### Personal safety



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible death or injury.

Throughout this manual you will find the signal words DANGER, WARNING, and CAUTION followed by special instructions. These precautions are intended for the personal safety of you and those working with you.

Read and understand all the safety messages in this manual before you operate or service the machine.

 DANGER indicates a hazardous situation that, if not avoided, will result in death or serious injury.

 WARNING indicates a hazardous situation that, if not avoided, could result in death or serious injury.

 CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

**FAILURE TO FOLLOW DANGER, WARNING, AND CAUTION MESSAGES COULD RESULT IN DEATH OR SERIOUS INJURY.**

### Machine safety

**NOTICE:** Notice indicates a situation that, if not avoided, could result in machine or property damage.

Throughout this manual you will find the signal word Notice followed by special instructions to prevent machine or property damage. The word Notice is used to address practices not related to personal safety.

### Information

**NOTE:** Note indicates additional information that clarifies steps, procedures, or other information in this manual.

Throughout this manual you will find the word Note followed by additional information about a step, procedure, or other information in the manual. The word Note is not intended to address personal safety or property damage.

## **Safety rules - General information**

### **Cleaning**

Clean the metal parts with cleaning solution that meets the standard and steam cleaning. (except for bearings)

After cleaning, dry well, and inject oil in all parts.

Also inject oil into the bearings after drying.

### **Inspection**

When disassembling parts, check all the parts.

If there are any worn or damaged parts, replace them.

Inspect carefully to prevent initial breakdowns.

### **Bearing**

Replace any loose bearings.

Air dry bearings before installing them.

### **Needle bearing**

When inserting needle bearings, be very careful not to damage them.

Apply grease to the section where the needle bearing will be inserted.

### **Gear**

Check that there is no wear and no damage.

### **Oil seal, O-ring, gasket**

Always install new oil seals, O-rings, and gaskets.

Apply grease to sections where oil seals and O-rings will be inserted.

### **Shaft**

Check that there is no wear and no damage.

Check the bearings and check for damaged oil seals on the shaft.

### **Service parts**

Install CASE CONSTRUCTION genuine service parts.

When placing an order, check the parts catalog. It contains the CASE CONSTRUCTION genuine part numbers.

Any breakdowns arising from the installation of non-genuine parts are not covered by the warranty.

### **Lubricants (fuel, hydraulic oil)**

Use the oil from the specified company or specified in the operator's manual or service Manual.

Any breakdowns arising from any fuel or hydraulic oil other than those specified are not covered by the warranty.

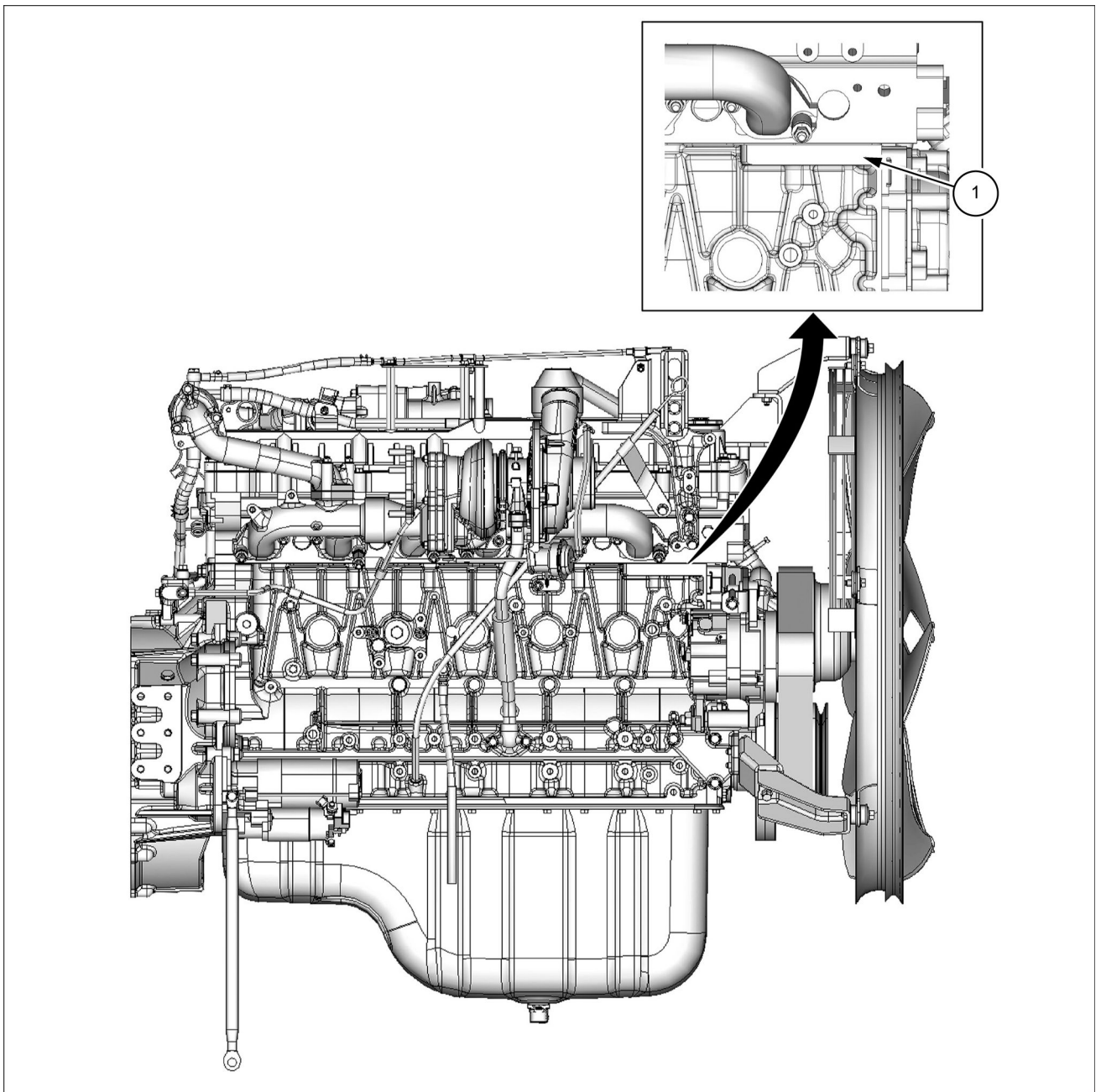


## **SERVICE MANUAL**

### **Engine**

**CX350C Crawler excavators LC version - ISUZU engine GH-6HK1X (TIER 3)**  
**CX370C Crawler excavators LC version - ISUZU engine GH-6HK1X (TIER 3)**

## Engine - Identification

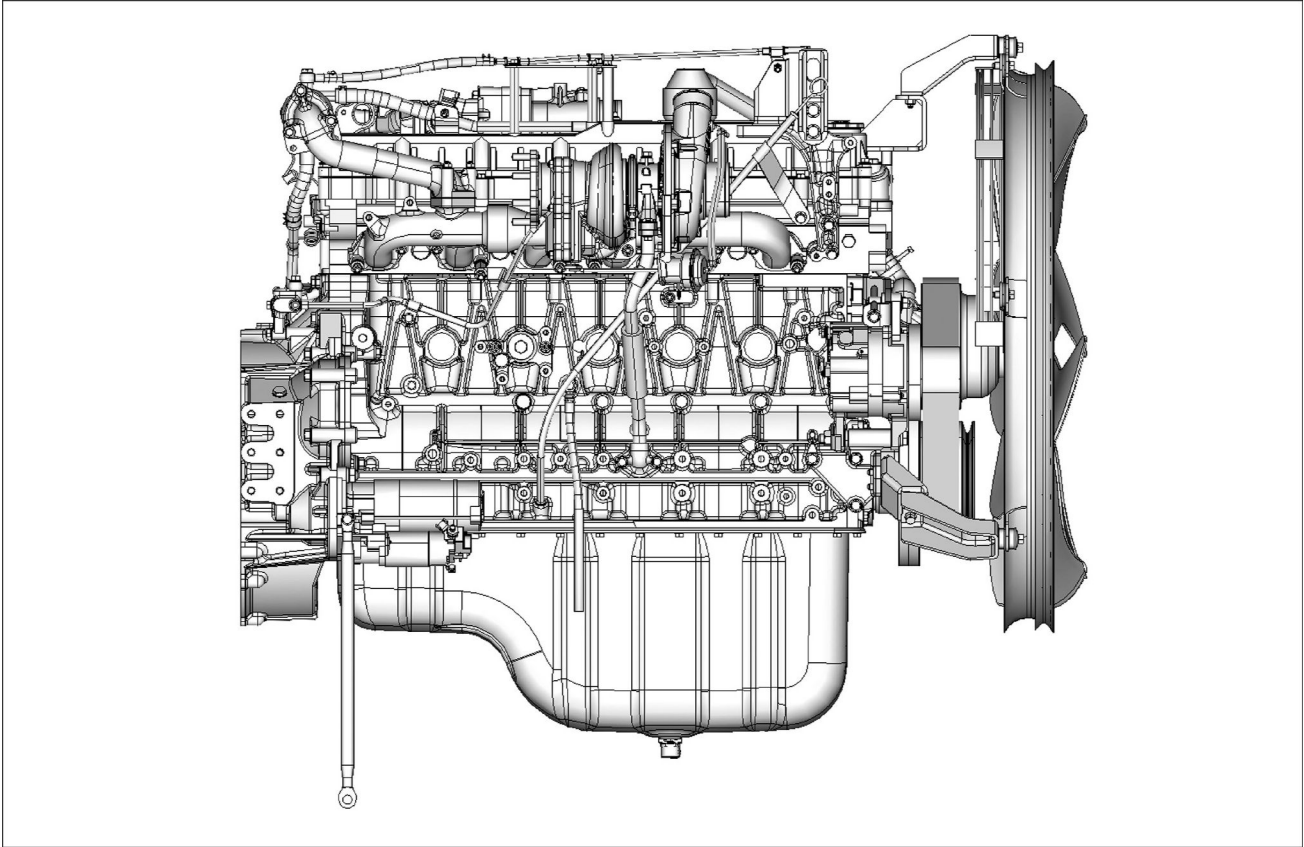


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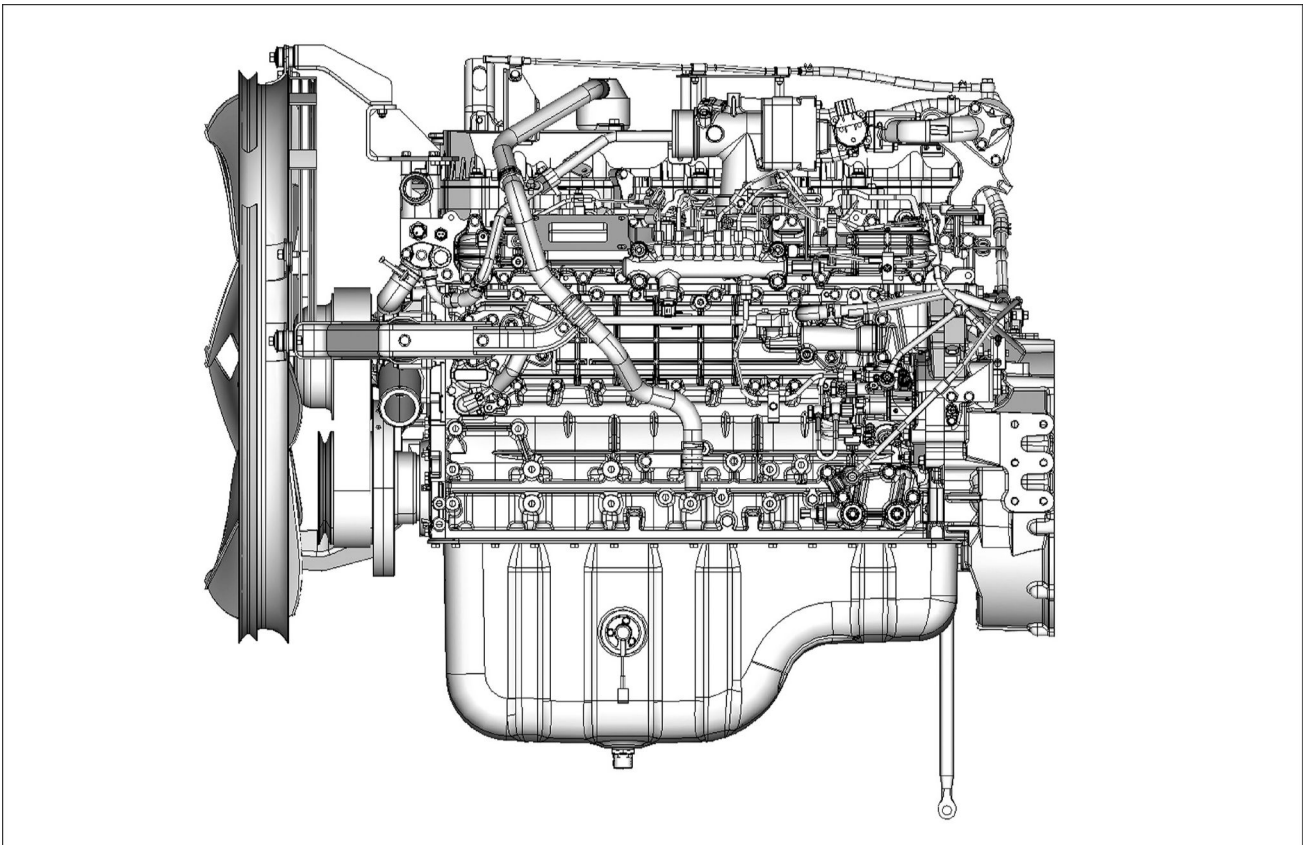
1. Engine number stamping

## Engine - External view

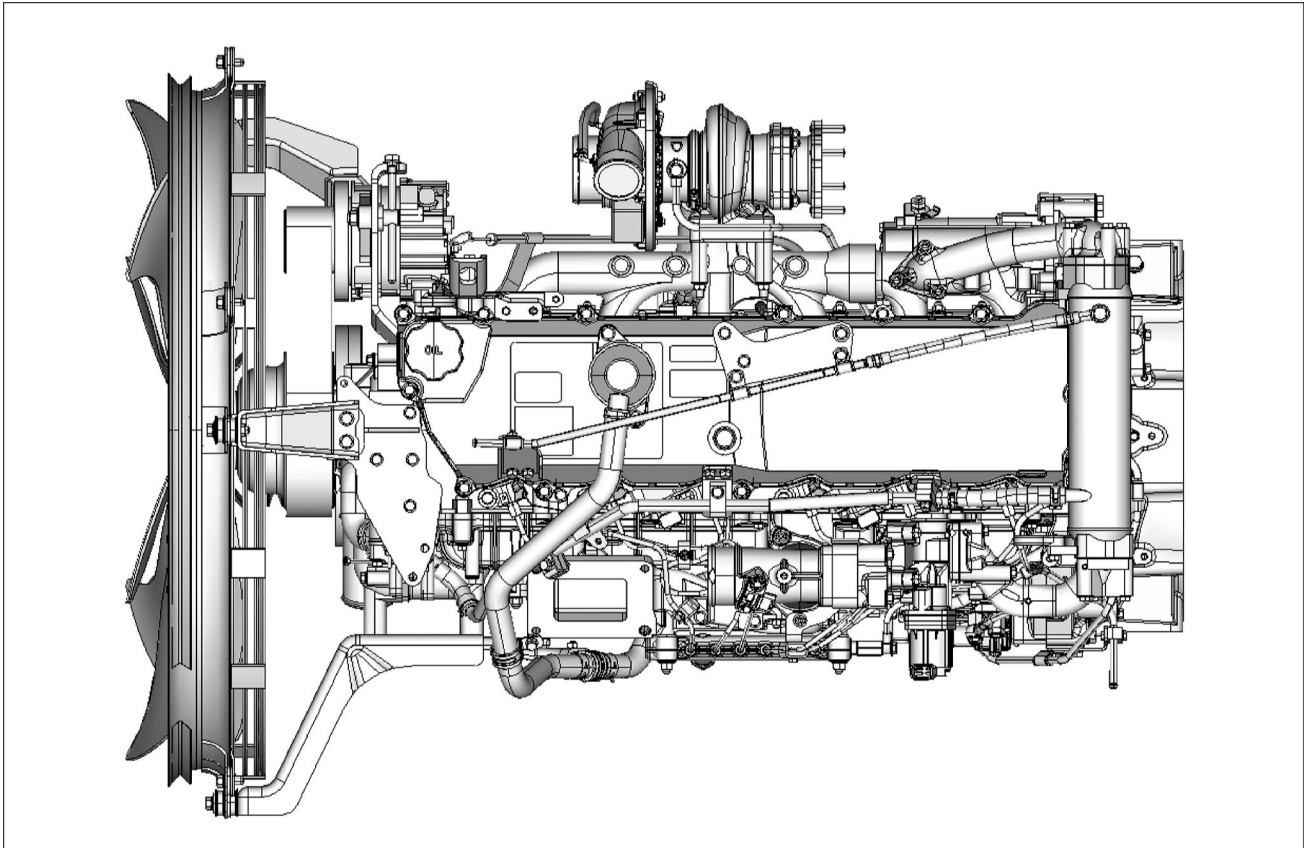
### Engine structural diagram



SML15CEX6844F 1



SML15CEX6845F 2



SMIL15CEX6846F 3

## **Engine - Static description**

### **Engine electronic control**

The ECM controls the range from injection to intake and exhaust, including the fuel injection quantity, injection timing, suction air restriction, EGR and idle speed.

### **Cylinder block**

The cylinder block is made of cast iron, with equal center distance for each bore and has high rigidity and the center of the crankshaft matches the center of the block.

The bearing caps have a ladder frame structure and are tightened to its plastic region by the turn-of-nut method.

### **Cylinder liner**

The cylinder liner is selected to match the bore inner diameter of the cylinder block. The ID number is stamped on the left side of the cylinder.

### **Piston**

The pistons are made of an aluminum alloy and use autothermatic pistons with cast struts. The combustion chamber is the round re-entrant type.

### **Cylinder head**

The cylinder heads are made of cast iron and each cylinder has 4 valves.

The cylinder head bolts use the angle tightening method to further improve reliability and durability.

### **Crankshaft**

Tuffride steel is used and the grade of each journal diameter is stamped on the No. 1 balance weight.

### **EGR system**

The EGR system is controlled by the engine control module (ECM) based on the coolant temperature, engine speed or engine load, and other data. It purifies the emission gas by recirculating it.

The main components are the EGR valve, EGR cooler, and sensors.

### **Connecting rod cap bolt**

The connecting rod cap bolts use the angle tightening method to further improve reliability and durability.

### **Common rail type electronic control injection system**

The common rail type electronic control injection system is consist of the fuel supply pump, which supplies fuel at the target pressure value set for highpressure fuel, the common rail, which measures the high-pressure fuel, and the fuel injector, which turns the fuel into a fine mist and inject it.

Each is controlled by the ECM based on signals. The injection timing and injection amount are controlled according to the operating conditions.

### **Fuel injector**

The fuel injector use 7-hole nozzle. The solenoid valve on the injector head section opens/closes to adjust the injection quantity and injection timing.

The ECM corrects for variance in fuel injection quantity between the fuel injectors according to the ID code data in memory.

When fuel injectors are adjusted, the ID code data must be recorded in the ECM.

### **Fuel filter with sedimenter**

The fuel filter with sedimenter uses the difference in specific gravity between diesel and water to remove any water from the fuel. When the filter fills up with water, an indicator is used to notify the operator.

### **Preheat system**

The preheat system consists of the ECM, glow relay, glow plug, and glow indicator lamp. The preheat system operates when the engine coolant temperature is low and assists engine starting.

### **Lubricating system**

A full-flow bypass integrated oil filter is used and the pistons are cooled with the water-cooled oil cooler and oil jets.

## Engine - Prepare

### **⚠ WARNING**

#### **Escaping fluid!**

Hydraulic fluid or diesel fuel leaking under pressure can penetrate the skin and cause infection or other injury. To prevent personal injury: Relieve all pressure before disconnecting fluid lines or performing work on the hydraulic system. Before applying pressure, make sure all connections are tight and all components are in good condition. Never use your hand to check for suspected leaks under pressure. Use a piece of cardboard or wood for this purpose. If injured by leaking fluid, see your doctor immediately.

Failure to comply could result in death or serious injury.

W0178A

### **⚠ WARNING**

#### **Avoid injury!**

Shut off the engine, remove the key, and make sure all motion is stopped before servicing the machine.

Failure to comply could result in death or serious injury.

W1128A

### **⚠ WARNING**

#### **Crushing hazard!**

The lifting systems must be operated by qualified personnel who are aware of the correct procedures to follow. Make sure all lifting equipment is in good condition, and all hooks are equipped with safety latches.

Failure to comply could result in death or serious injury.

W0256A

### **⚠ WARNING**

#### **Heavy objects!**

Lift and handle all heavy components using lifting equipment with adequate capacity. Always support units or parts with suitable slings or hooks. Make sure the work area is clear of all bystanders.

Failure to comply could result in death or serious injury.

W0398A

### **⚠ WARNING**

#### **Explosion hazard!**

Batteries emit explosive gases. Always ventilate when using in an enclosed area or when charging. Keep the battery away from sparks, open flames, and other ignition sources.

Failure to comply could result in death or serious injury.

W0369A

**NOTICE:** *Keep away from flames.*

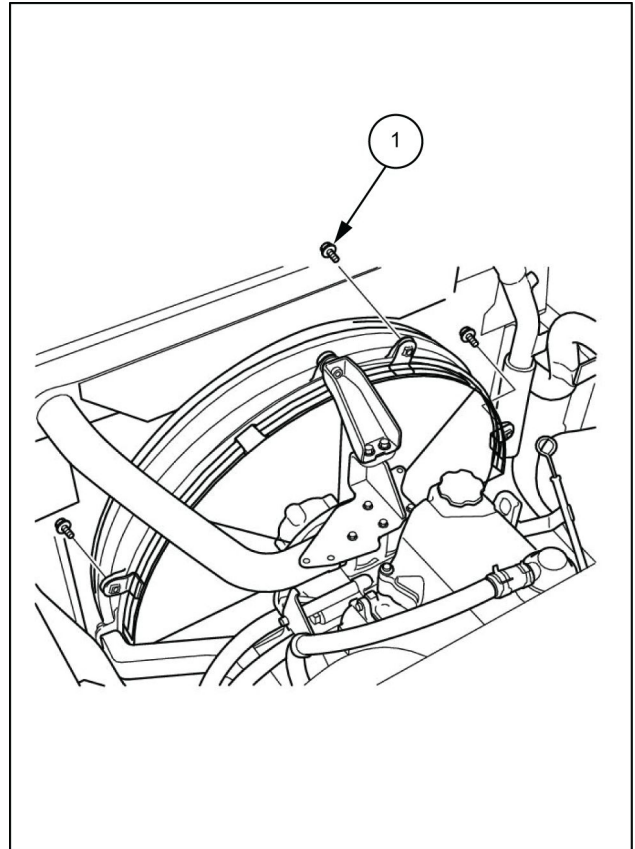
**NOTICE:** *The air conditioner circuit is filled with high pressure gas, gas may spray out dangerously when loosening lines.*

Items to prepare:

- Wrenches [ **7 mm, 8 mm, 10 mm, 13 mm, 17 mm, 19 mm, 36 mm** ]
- Box wrench [ **30 mm**]
- Shackle (with the required lifting capacity) x 2
- Wire rope (with the required breaking load)
- Lifting equipment (with the required lifting capacity)
- Marking pen
- Cap
- Plug
- Waste oil can
- Rag
- Cleaning fluid
- Wood plank, etc.

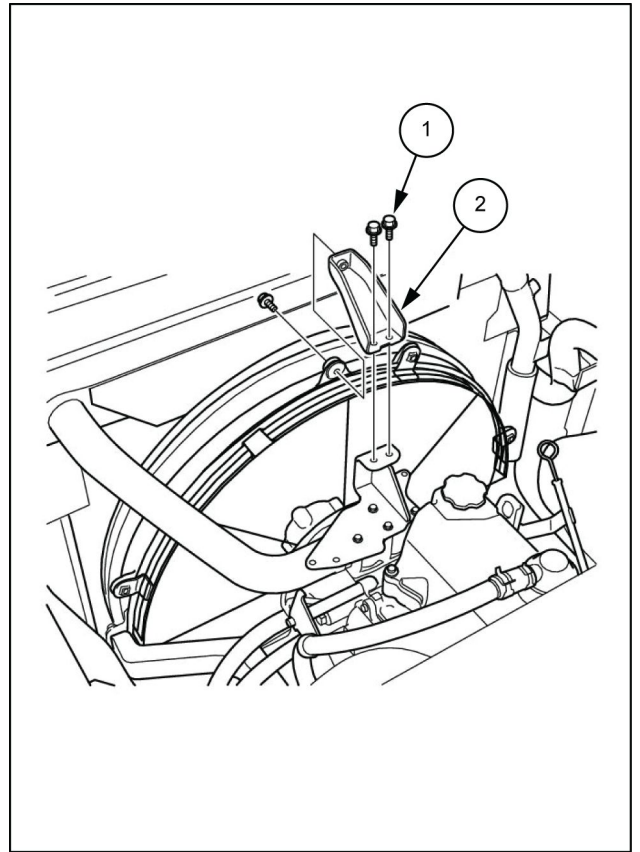
## Engine - Remove

1. Turn OFF the battery disconnect switch or disconnect the negative terminal of the battery.
  - After disconnecting terminals or harnesses, fasten them so that they do not interfere with the frame. Also, cover with a rubber cap to protect against sparks.
2. Drain the engine oil. (For details, See "Engine Oil Replacing".)
3. Drain the coolant from the radiator. (For details, see **Radiator - Remove (10.400)**)
4. Remove the engine hood. (For details, see **Hood - Remove (90.100)**)
5. Remove the hydraulic pump. (For details, see **Pump - Remove (35.106)**)
6. Use a wrench [ **13 mm**] to remove the 3 bolts (1).



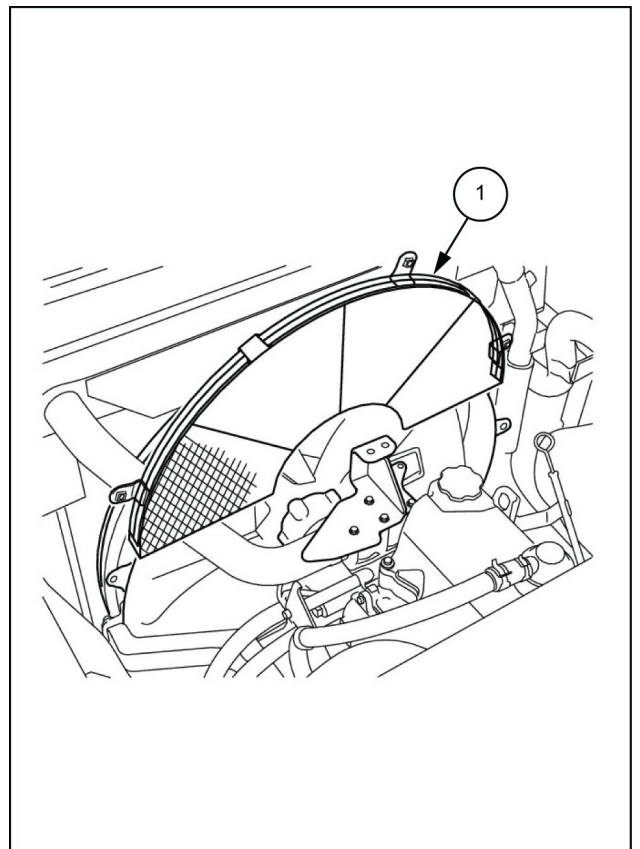
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7. Use a wrench [ **13 mm**] to remove the 3 bolts **(1)**, and then remove the bracket **(2)**.



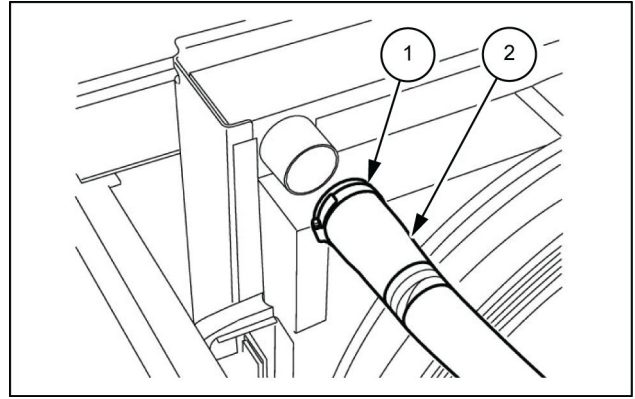
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8. Remove the fan guard **(1)**.



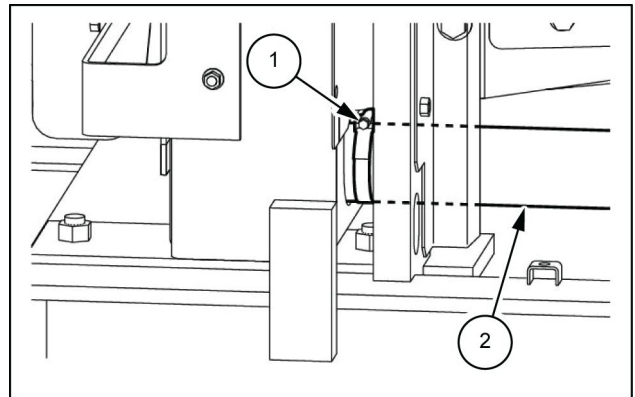
LPIL12CX03543BB 3

9. Use a wrench [ **7 mm** ] to loosen the hose band (1) on the radiator, and then disconnect the upper hose (2).



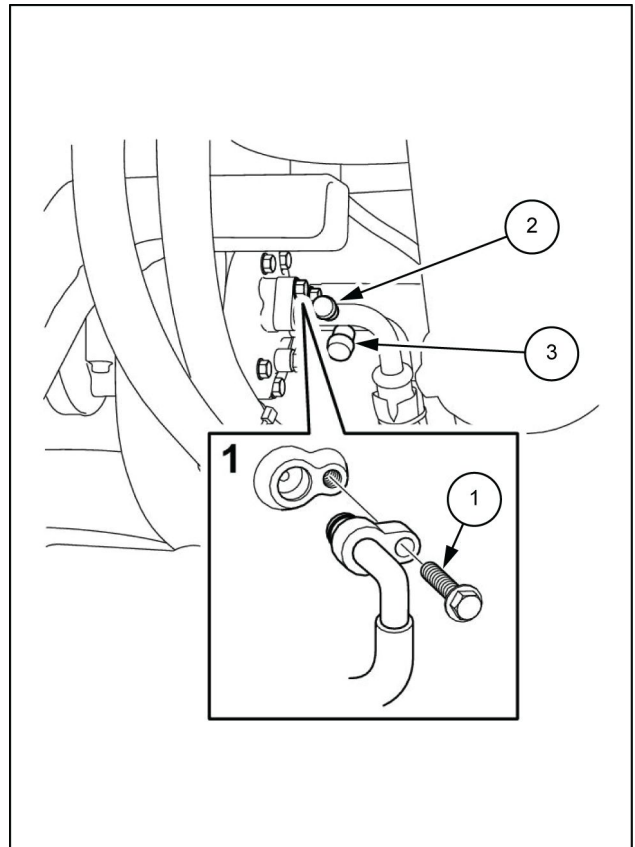
SMIL13CEX3130AB 4

10. Use a wrench [ **7 mm** ] to loosen the hose band (1) on the radiator, and then disconnect the lower hose (2).
- Use caps to cover the radiator and hoses to prevent any entry of water, dust or dirt.
  - Before removing the radiator hose, completely drain the coolant.



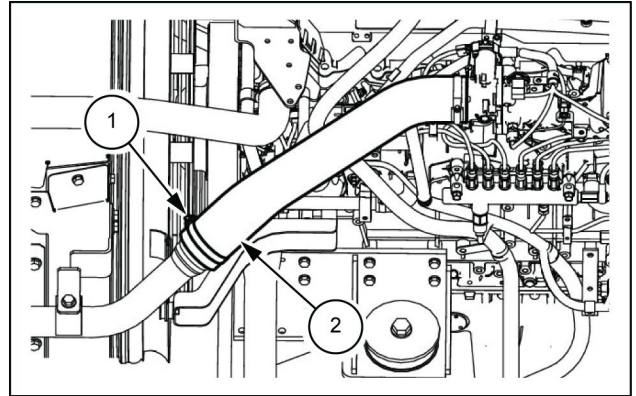
SMIL13CEX3131AB 5

11. Use a wrench [ **13 mm** ] to loosen the 2 line bolts (1), and then remove the 2 lines (2) and (3) from the compressor.
- Always remove the low-pressure (suction side) line (2) first.
  - Install caps or plugs to the compressor and lines to prevent any entry of water, dust or dirt.
- Tightening torque for bolt installation: **19.6 - 24.5 N·m (14.5 - 18.1 lb ft)**



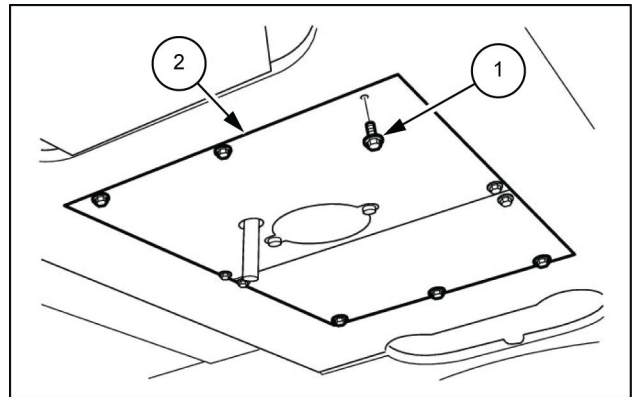
SMIL13CEX3132BB 6

12. Use a wrench [ **8 mm** ] to loosen the hose band (1) on the inter cooler, and then disconnect the hose (2).
- Use caps to cover the lines and hoses to prevent any entry of water, dust or dirt.



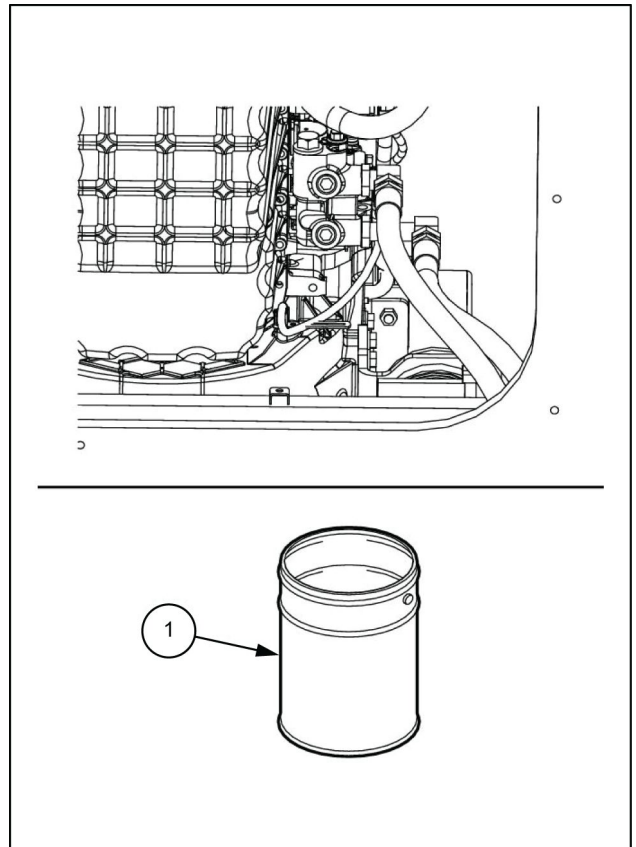
SMIL13CEX3133AB 7

13. Use a wrench [ **19 mm** ] to remove the 5 bolts (1), and then remove the under cover (2).
- Use caution when removing as the parts are heavy.  
Tightening torque for bolt installation: **63.7 - 73.5 N·m (46.9 - 54.2 lb ft)**



SMIL13CEX3134AB 8

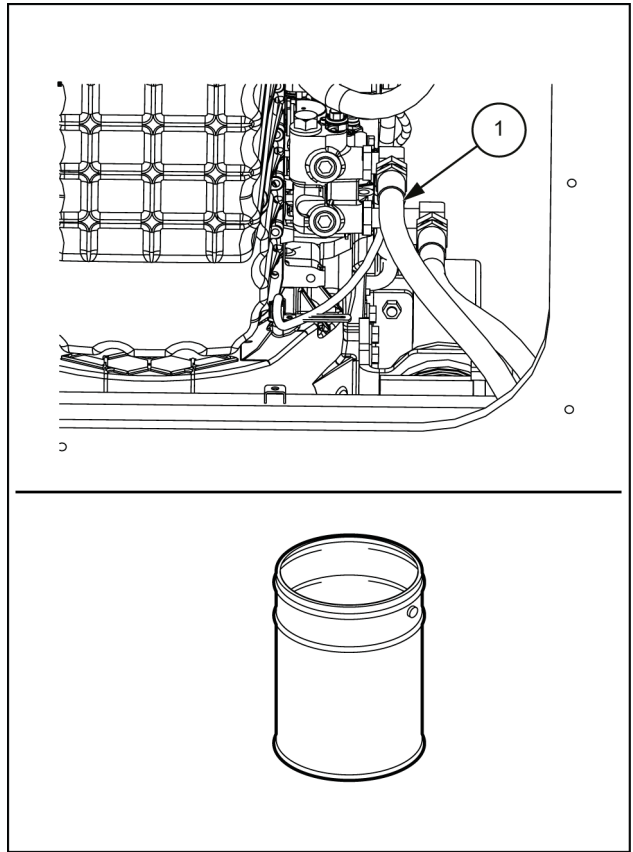
14. Prepare the waste oil can (1).
- Drain the engine oil before disconnecting the engine oil hose.



SMIL13CEX3135BB 9

15. Use a wrench [ **36 mm** ] to disconnect the 2 engine oil remote hoses ( **1** ).

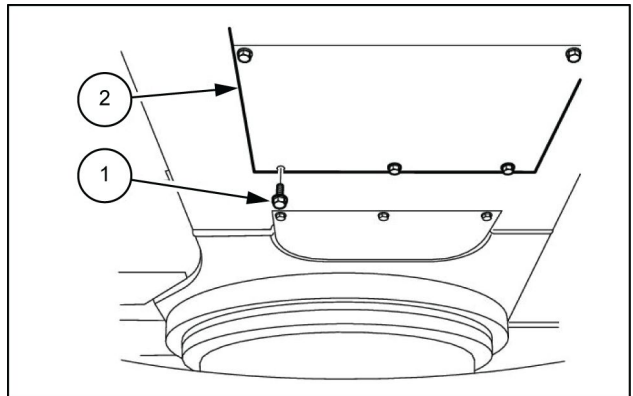
- Mark the engine and hoses so that the connectors match at the time of installation.
- Install caps or plugs to the engine and hoses to prevent any entry of water, dust or dirt.
- Clean the engine and hoses by spraying them with a parts cleaner to prevent scratches and prevent dirt from accumulating on the connectors.



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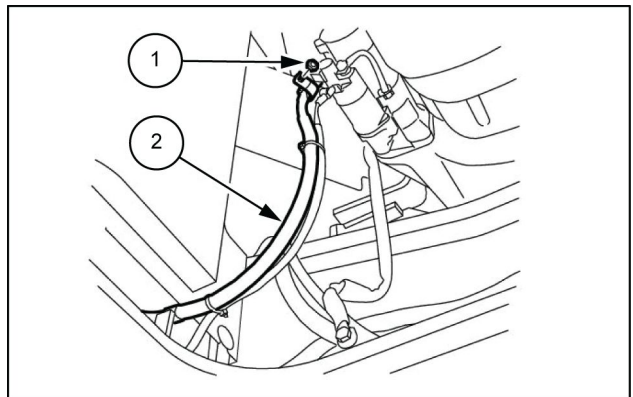
16. Use a wrench [ **19 mm** ] to remove the 5 bolts ( **1** ), and then remove the under cover ( **2** ).

Tightening torque for bolt installation: **63.7 - 73.5 N·m (47.0 - 54.2 lb ft)**



SMIL13CEX3137AB 11

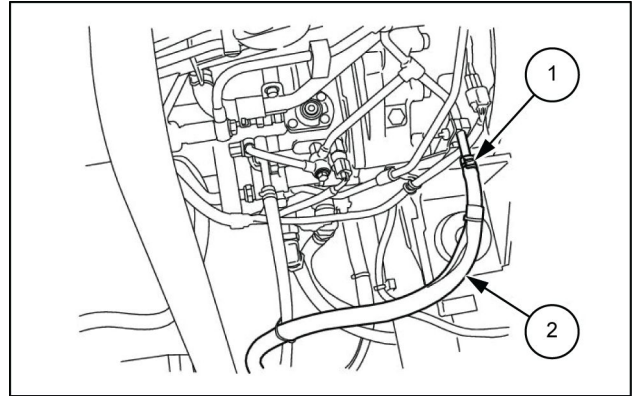
17. Use a wrench [ **8 mm** ] to remove the 2 nuts ( **1** ), and then remove the wiring ( **2** ) from the starter motor.



SMIL13CEX3138AB 12

18. Remove the hose band (1), and then disconnect the fuel hose (2).

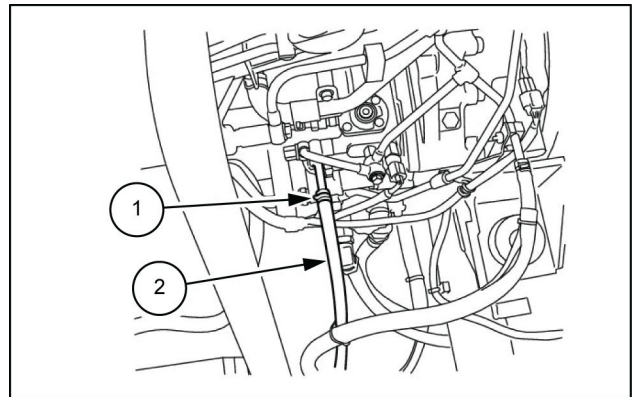
- Install caps or plugs to the engine and hoses to prevent any entry of water, dust or dirt.



SMIL13CEX3139AB 13

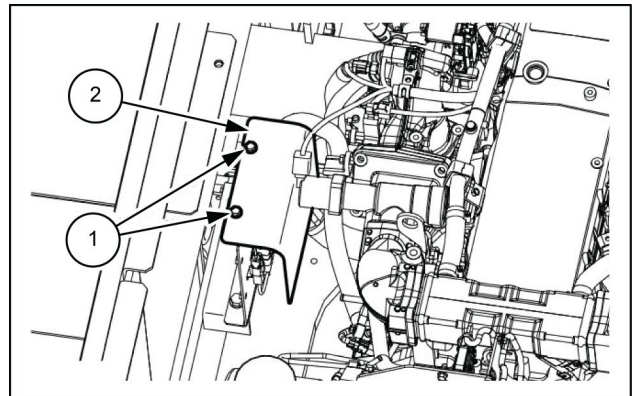
19. Remove the hose bands (1), and then disconnect the fuel hose (2).

- Install caps or plugs to the engine and hoses to prevent any entry of water, dust or dirt.



SMIL13CEX3140AB 14

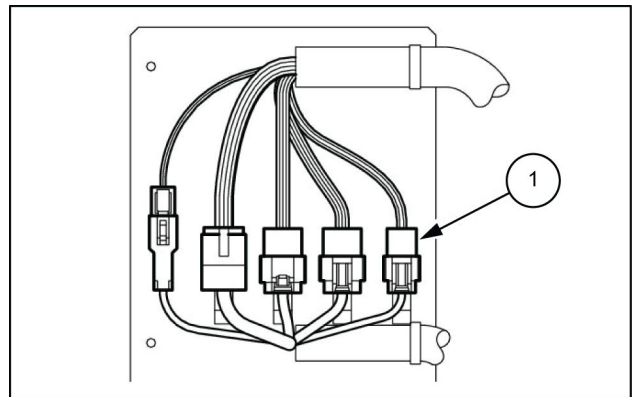
20. Use a wrench [ 13 mm] to remove the 2 bolts (1), and then remove the box cover (2).



SMIL13CEX3141AB 15

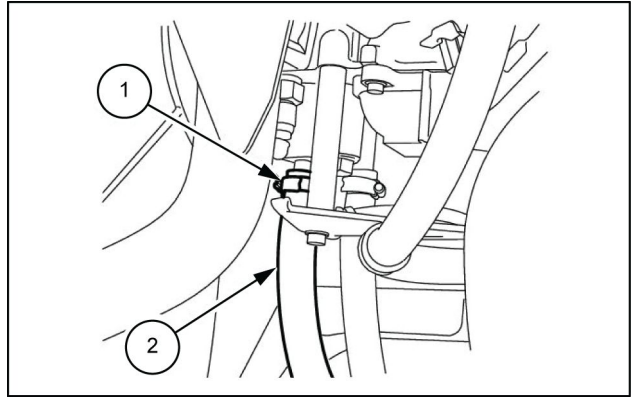
21. Disconnect the connectors (1) in the box.

- Wrap the removed connectors in plastic after tying them together to prevent any entry of water, dust or dirt.



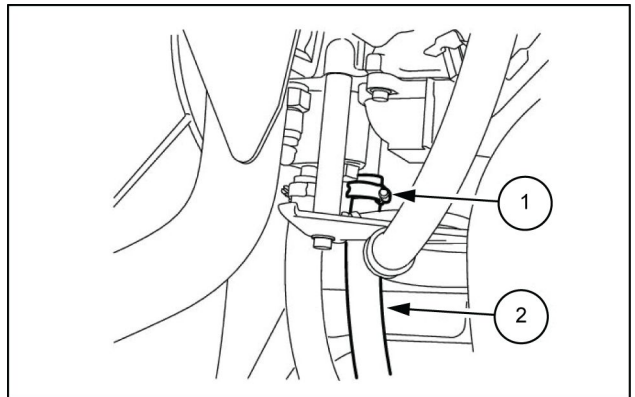
SMIL13CEX3142AB 16

22. Use a wrench [ **8 mm**] to loosen the hose band **(1)**, and then disconnect the heater hose **(2)**.
- Install caps or plugs to the engine and hoses to prevent any entry of water, dust or dirt.



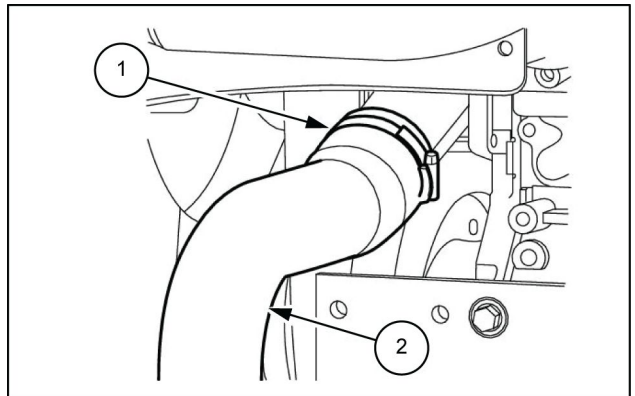
SMIL13CEX3143AB 17

23. Disconnect the heater hose **(2)**.
- Install caps or plugs to the engine and hoses to prevent any entry of water, dust or dirt.



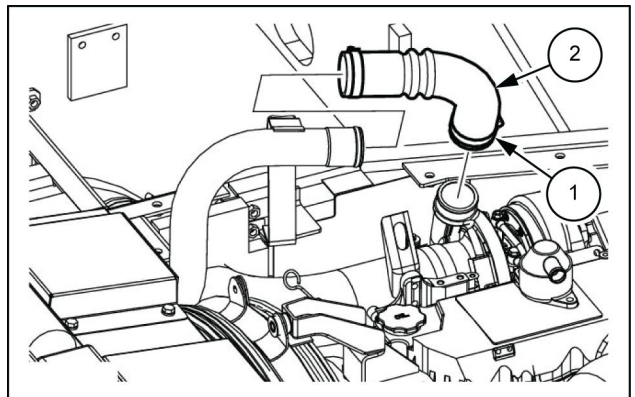
SMIL13CEX3144AB 18

24. Disconnect the radiator hose **(2)**.
- Use caps to cover the lines and hoses to prevent any entry of water, dust or dirt.



SMIL13CEX3145AB 19

25. Use a wrench [ **8 mm**] to loosen the hose band **(1)**, and then disconnect the air hose **(2)**.
- Use caps to cover the lines and hoses to prevent any entry of water, dust or dirt.

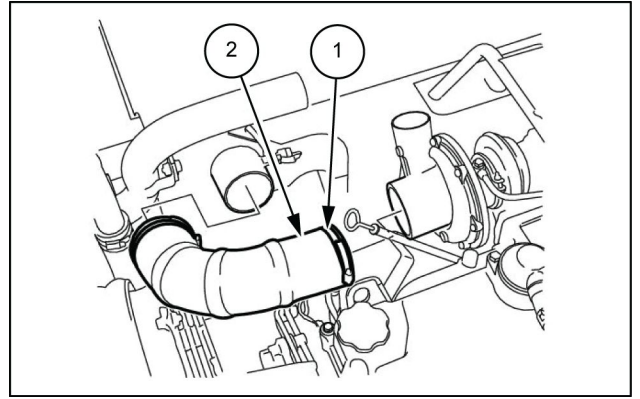


SMIL13CEX3146AB 20

26. Use a wrench [ **10 mm**] to loosen the hose band **(1)**, and then disconnect the air hose **(2)**.

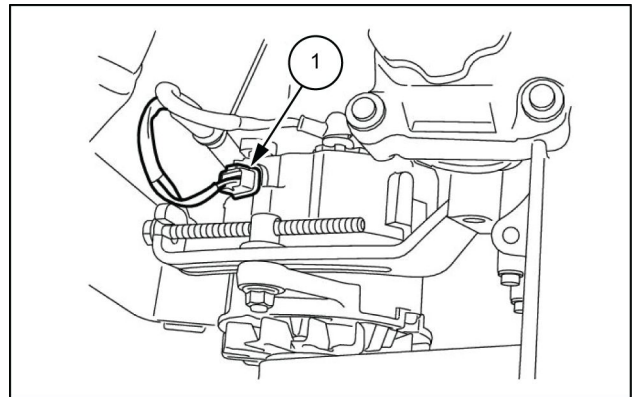
- Use caps to cover the lines and hoses to prevent any entry of water, dust or dirt.

Tightening torque for bolt installation: **8.8 - 9.8 N·m**  
(**6.5 - 7.2 lb ft**)



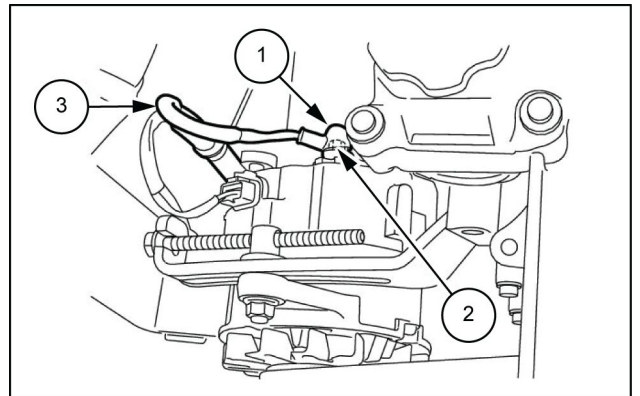
SMIL13CEX3147AB 21

27. Disconnect the connectors **(1)** from the alternator.



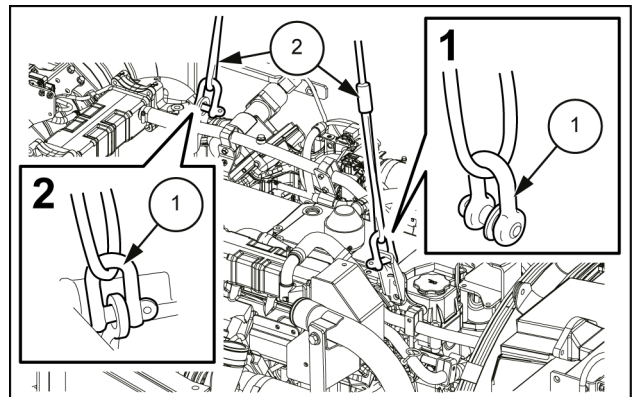
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28. Remove the cap **(1)**, use a wrench [ **10 mm**] to remove the nut **(2)**, and then remove the alternator wiring **(3)**.



LPIL12CX03565AB 23

29. Install the 2 shackles **(1)**, and then use the wire ropes **(2)** and a lifting equipment to secure the engine main unit.



SMIL15CEX3675AB 24



**Suggest:**

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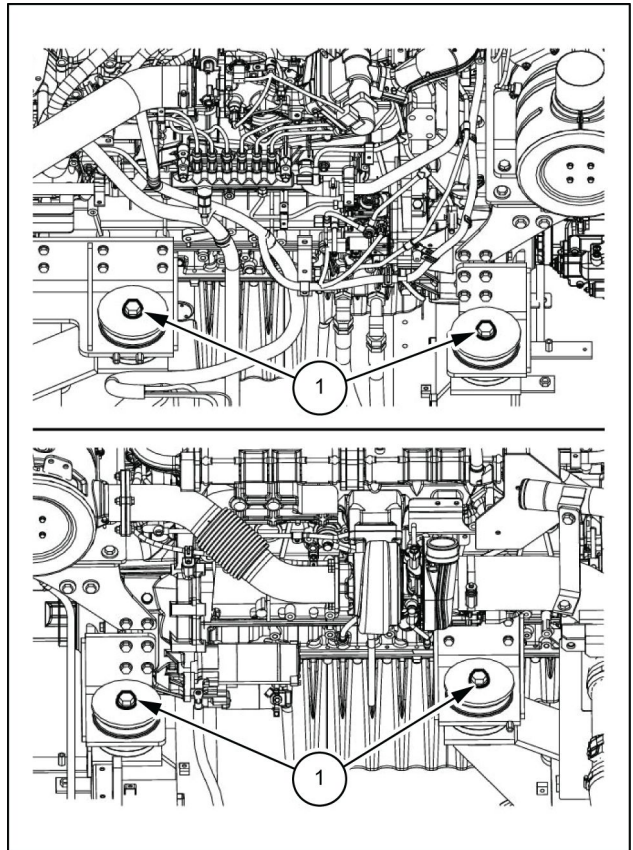
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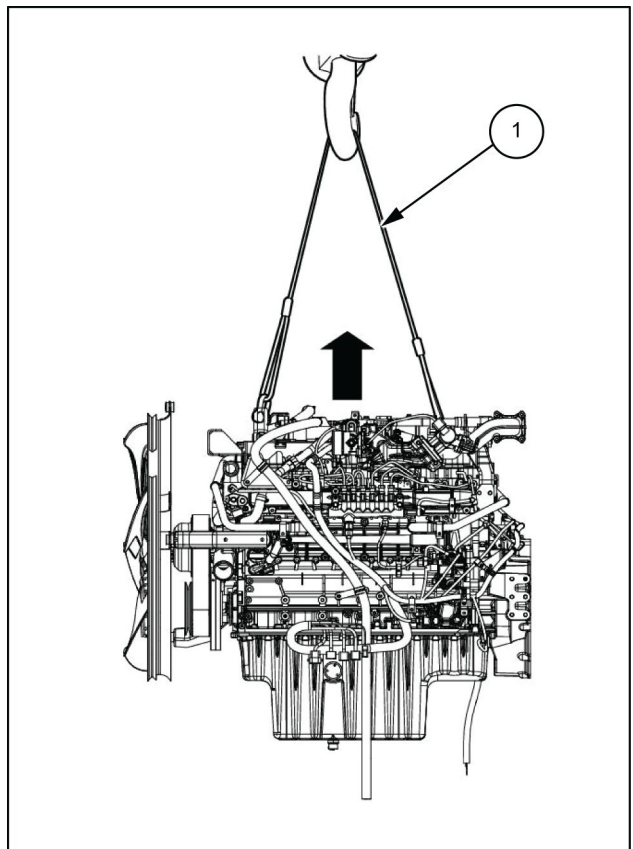
30. Use a box wrench [ **30 mm**] to remove the 4 bolts (1) from the mount.

Tightening torque for bolt installation: **324 - 337 N·m (238.97 - 248.56 lb ft)**



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31. Use the wire ropes (1) and a lifting equipment to lift the engine main unit.  
Thoroughly check that the location is safe before lowering the engine on wood planks, etc.



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