



Shop Manual

DX490LC-5/DX530LC-5

Excavator

Serial Number **10001 and Up**

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Track Excavator Maintenance Safety

Edition 1

SAFETY INSTRUCTIONS



WARNING

AVOID DEATH OR SERIOUS INJURY

Instructions are necessary before operating or servicing machine. Read and understand the Operation & Maintenance Manual and signs (decals) on machine. Follow warnings and instructions in the manuals when making repairs, adjustments or servicing. Check for correct function after adjustments repairs or service. Untrained operators and failure to follow instructions can cause death or serious injury.

SAFETY MESSAGES

Replace with Safety Messages Section on pages III and IV in the Doosan Operation & Maintenance Manual.

GENERAL

Safe Operation is Operator's Responsibility

Only trained and authorized personnel should operate and maintain the machine.

Follow all safety rules, regulations and instructions when operating or performing maintenance on machine.

- Do not operate machine if you are under the influence of drugs or alcohol. An operator who is taking prescription drugs must get medical advice to determine if he or she can safely operate a machine.
- When working with other personnel on a work site, be sure that all personnel know nature of work and understand all hand signals that are to be used.
- Be sure that all guards and shields are installed in their proper location. Have guards and shields repaired or replaced immediately if damaged.
- Be sure that you understand the use and maintenance of all safety features such as safety lever and seat belt. Use them properly.
- Never remove, modify or disable any safety features. Always keep them in good operating condition.
- Always check for and know the location of underground and overhead utility lines before excavating.
- Failure to use and maintain safety features according to instructions in this manual, Safety Manual and Shop Manual can result in death or serious injury.

Know Your Machine

Know how to operate your machine. Know the purpose of all controls, gauges, signals, indicators and monitor displays. Know the rated load capacity, speed range, braking and steering characteristics, turning radius and operating clearances. Keep in mind that rain, snow, ice, loose gravel, soft ground, slopes etc., can change operating capabilities of your machine.

Proper Work Tools and Attachments

Only use work tools and attachments that are recommended by DOOSAN for use on DOOSAN machines. When installing and using optional attachments, read instruction manual for attachment, and general information related to attachments in this manual. Because DOOSAN cannot anticipate, identify or test all attachments that owners may want to install on their machines, contact DOOSAN for written authorization and approval of attachments, and their compatibility with optional kits.

Attachments and attachment control systems that are compatible with the machine are required for safe and reliable machine operation. Do not exceed maximum operating weight (machine weight plus attachment) that is listed on ROPS certification plate.

Make sure that all guards and shields are in place on machine and on work tool. Depending on type or combination of work equipment, there is a potential that work equipment could interfere with the cabin or other parts of machine. Before using unfamiliar work equipment, check if there is any potential of interference, and operate with caution.

While you are performing any maintenance, testing, or adjustments to attachments, stay clear of the following areas: cutting edges, pinch points, and crushing surfaces.

Never use attachment as a work platform or manlift.

Contact your DOOSAN distributor about auxiliary hydraulic kits for attachments installation. If you are in doubt about compatibility of a particular attachment with a machine, consult your DOOSAN distributor.

Pressurized Fluids

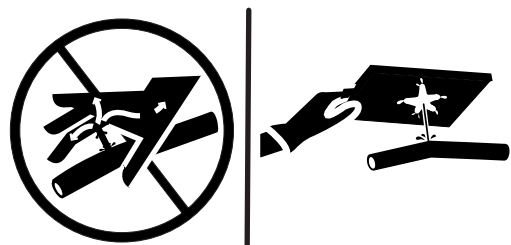
Pressurized air or fluids can cause debris and/or fluids to be blown out. This could result in death or serious injury.

Immediately after operations are stopped, coolant, engine oil, and hydraulic oil are at their highest temperatures and the radiator and hydraulic tank are still under pressure. Always wait for temperature to cool down. Follow specified procedures when attempting to remove caps, drain oil or coolant, or replacing filters. Always wait for temperature to cool down, and follow specified procedures when performing these operations. Failure to do so can result in death or serious injury.

When pressurized air and/or pressurized water is used for cleaning, wear protective clothing, protective shoes, and eye protection. Eye protection includes goggles or a protective face shield.

Pressure can be trapped in a hydraulic system and must be relieved before maintenance is started.

Releasing trapped pressure can cause sudden machine movement or attachment movement. Use caution if you disconnect hydraulic lines or fittings.



FG018457

Figure 1

High-pressure oil that is released can cause a hose to whip or oil to spray. Fluid penetration can result in death or serious injury. If fluid enters skin or eyes, get immediate medical attention from a physician familiar with this injury.

Obey all local laws and regulations for disposal of liquids.

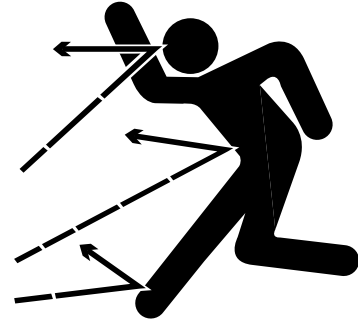
To prevent hot coolant from spraying out, stop engine and wait for coolant to cool. Using gloves, slowly loosen cap to relieve pressure.

Flying or Falling Objects

On work sites where there is a potential hazard that flying or falling objects can hit operator's cabin, select and use a guard to match operating conditions for additional operator protection.

Working in mines, tunnels, deep pits, and loose or wet surfaces, could produce hazard of falling rocks or flying objects. Additional protection for operator's cabin could be required such as an Operator Protection Guard (OPG) or window guards. Contact your DOOSAN distributor for information on available protective guards.

To prevent personnel from being struck by flying objects, keep personnel out of work area.



HAOA110L

Figure 2



HAOA100L

Figure 3

Engine

Edition 1

SAFETY INSTRUCTIONS



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OVERVIEW

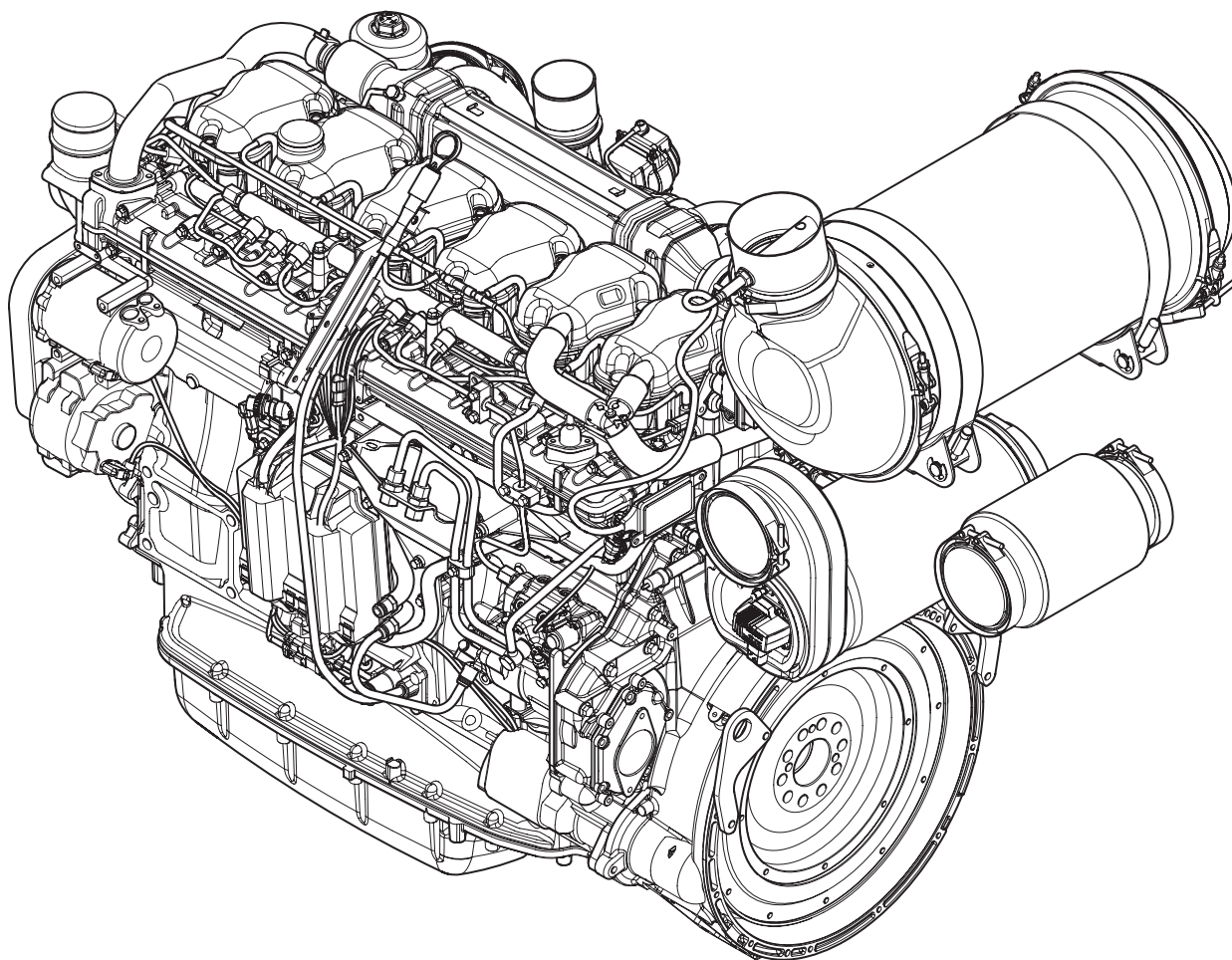


Figure 1

EX1401131

Removal Cylinder Head

1. Remove water-cooled EGR cooler as instructed in the work description for "Removing the EGR Cooler" on page 4-1-267.

Remove brackets for the water-cooled EGR cooler.

2. Remove bolts for the exhaust manifold on the relevant cylinder and slacken the bolts on the adjacent cylinders so the relevant part of the exhaust manifold comes loose.
3. Remove cooling system bleeder hose, separate the quick release coupling at the front lifting eye.
4. Remove cable duct from the intake.
5. Remove cable ties for the cable harness from the engine control unit.

IMPORTANT

The fuel system components are extremely sensitive to dirt. Clean thoroughly before dismantling and plug all connections with lint-free rags and tape.

6. Depressurize the fuel system and detach the fuel pipe (1, Figure 29) running between the accumulator and fuel manifold.
7. Detach the fuel manifold and remove bolts on the relevant cylinder.
8. Detach the intake manifold and remove bolts on the relevant cylinder. To remove fuel and intake manifold, see "Fuel Manifold" and "Intake Manifold".

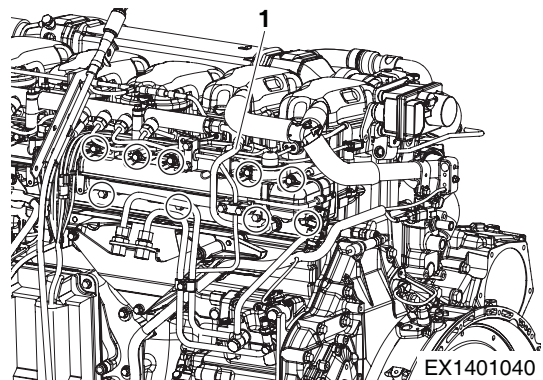


Figure 29

IMPORTANT

All parts in the fuel injection system and valve mechanism must be marked. Everything must be reinstalled in the same position.

9. Remove injectors as instructed in the work description for "Removing Injector" on page 4-1-311.

Also remove high-pressure pipes and connection on the cylinder head at the back viewed from the coolant pump.

IMPORTANT

If work is done on the 6th cylinder of an engine with an EGR system, the EGR valve control cylinder must be detached at the damper and removed.

10. Remove upper rocker cover and then the rocker arm housing, valve bridges and pushrods.

11. Pull the cable harness out of the lower rocker cover and remove it.

NOTE: *Take care when pulling the cable harness out of the rocker cover: the cable terminals can be damaged which can cause the nut securing the cable harness to the injector to come loose.*

12. Work on the adjacent cylinders. Remove upper rocker cover, release the cable harness and the lower rocker cover so it can be moved.

13. Remove relevant cylinder head. Be careful with the adjacent rocker covers.

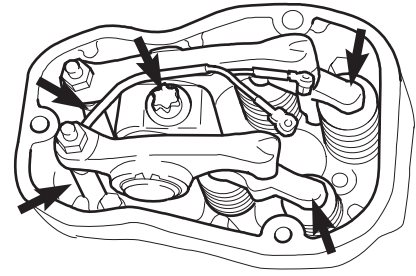
NOTE: *Mark the cylinder heads if more than one is being removed at the same time.*

NOTE: *If all cylinder heads are removed at the same time, the turbocharger must be removed or supported against the frame.*

Installing Cylinder Head

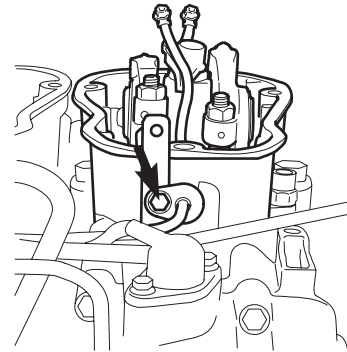
1. Check the liner height.
2. Clean the cylinder head and cylinder block. Lubricate the threads and below the heads of the cylinder head bolts.
3. Install a new cylinder head gasket.
4. Install the cylinder head.
5. Tighten the cylinder head as shown in the illustration and according to specification.

Cylinder head bolts can only be reused three times. Make a mark with a center punch on the head of the bolt. If any of the bolts already has three marks, it must be replaced.



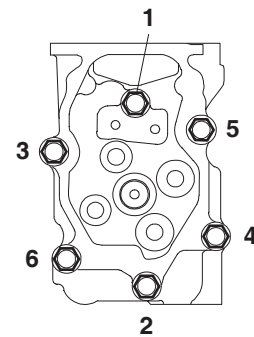
FG020251

Figure 30



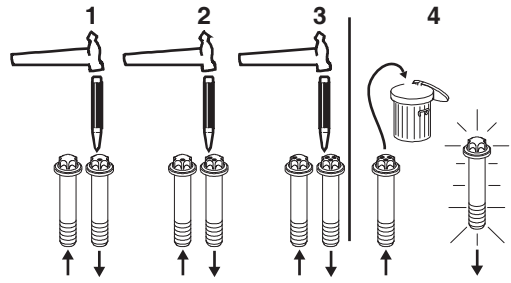
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Figure 31



FG020253

Figure 32



FG020254

Figure 33

6. Tighten the intake manifold. Use a new gasket. Tighten the bolts in the order 1 - 24 as illustrated. Tighten the bolts in the same order again.
7. Tighten the intake manifold and the exhaust manifold. Use new gaskets.
8. Install the cable bracket bolt in the lower rocker cover and install the following parts:
 - Lower rocker cover.
 - Pushrods.
 - Valve bridge.
 - Rocker arm housing.



EX1301878

Figure 34

IMPORTANT

Lubricate the valve bridge and rocker arm housing with engine oil.

9. Install the injector, high-pressure pipe connection and high-pressure pipe as instructed in the work description.
10. Reset adjacent cylinders.
11. Adjust the valve clearance.
12. Install the upper rocker covers.
13. Install the cooling system vent
Install the brackets for the water-cooled EGR cooler.
Install the water-cooled EGR cooler as described in the work description for "Installing the EGR Cooler" on page 4-1-268.

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