

# Shop Manual

ENGINE

**76E-6 SERIES**

**KOMATSU**

# **ENGINE**

## **76E-6 Series**

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## Composition of shop manual

The contents of this shop manual are shown together with Form No. in a list.

Note 1: Always keep the latest version of this manual in accordance with this list and utilize accordingly.

The marks shown to the right of Form No. denote the following:

○: New issue (to be filed additionally) ●: Revision (to be replaced for each Form No.)

Note 2: This shop manual can be supplied for each Form No.

Note 3: To file this shop manual in the special binder for management, handle it as follows:

- Place a divider on the top of each section in the file after matching the Tab No. with No. indicated next to each Section Name shown in the table below:
- File overview and other materials in sections in the order shown below and utilize them accordingly.

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KOMATSU 76E-6 Series engine

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# **ENGINE**

## **76E-6 Series**

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### **00 Index and foreword**

### **200 Foreword and general information**

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## Introduction

This manual describes the maintenance procedure for 76E-6 Series engines (swirl chamber type).

The contents of this manual shall be used as materials for correct, quick and safe maintenance of the above engines.

Since this manual explains the maintenance procedure for the standard engine, the specifications and component parts shown below are partly different from those of the engine mounted on each work equipment (generator, pump, compressor, etc.)

This shop manual consists of volumes.

Some volumes titled "Testing and adjusting" [Testing and adjusting, Part 1 – Part 8] contain descriptions related to disassembly and assembly.

For the contents of description, see the general contents or the contents of each volume.

## Applicable machine model and serial number


Engine	Applicable machine	Machine serial number	Remarks
3D76E-6	PC20MR-3	20001 and up	


## Safety Statements


Komatsu is concerned for your safety and your machine’s condition. Safety statements are one of the primary ways to call your attention to the potential hazards associated with Komatsu diesel engine operation. Follow the precautions listed throughout the manual before operation, during operation and during periodic maintenance procedures for your safety, the safety of others and to protect the performance of your engine. Keep the labels from becoming dirty or torn and replace them if they are lost or damaged. Also, if you need to replace a part that has a label attached to it, make sure you order the new part and label at the same time.



This safety alert symbol appears with most safety statements. It means attention, become alert, your safety is involved! Please read and abide by the message that follows the safety alert symbol.


 <b>DANGER</b>
<b>Danger (the word “DANGER” is in white letters with a red rectangle behind it) – indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. Danger is limited to the most extreme situations.</b>
<small>0000001en</small>


 <b>WARNING</b>
<b>Warning (the word “WARNING” is in black letters with an orange rectangle behind it) – indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.</b>
<small>0000001en</small>

 <b>CAUTION</b>
<b>Caution (the word “CAUTION” is in black letters with a yellow rectangle behind it) – indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.</b>
<small>0000001en</small>

<b>CAUTION</b>
<b>Caution without the safety alert symbol indicates a potentially hazardous situation that can cause damage to the machine, personal property and / or the environment or cause the machine to operate improperly.</b>
<small>0000001en</small>

## Safety Precautions


 **DANGER**




**SCALD HAZARD!**

- **NEVER** remove the radiator cap if the engine is hot. Steam and hot engine coolant will spurt out and seriously burn you. Allow the engine to cool down before you attempt to remove the radiator cap.
- Tighten the radiator cap securely after you check the radiator. Steam can spurt out during engine operation if the cap is loose.
- **ALWAYS** check the level of the engine coolant by observing the reserve tank.
- Failure to comply will result in death or serious injury.

000002en


 **DANGER**




**EXPLOSION HAZARD!**

- Keep the area around the battery well-ventilated. While the engine is running or the battery is charging, hydrogen gas is produced which can be easily ignited.
- Keep sparks, open flame and any other form of ignition away while the engine is running or battery is charging.
- Failure to comply will result in death or serious injury.

000003en


 **DANGER**




**FIRE AND EXPLOSION HAZARD!**

- Diesel fuel is flammable and explosive under certain conditions.
- When you remove any fuel system component to perform maintenance (such as changing the fuel filter) place an approved container under the opening to catch the fuel.
- **NEVER** use a shop rag to catch the fuel. Vapors from the rag are flammable and explosive.
- Wipe up any spills immediately.
- Wear eye protection. The fuel system is under pressure and fuel could spray out when you remove any fuel system component.
- Failure to comply will result in death or serious injury.

000009en

 **DANGER**



**FIRE AND EXPLOSION HAZARD!**

- Only use the key switch to start the engine.
- **NEVER** jump-start the engine. Sparks caused by shorting the battery to the starter terminals may cause a fire or explosion.
- Failure to comply will result in death or serious injury.

000004en

**! DANGER**



**FIRE AND EXPLOSION HAZARD!**

- Diesel fuel is flammable and explosive under certain conditions.
- **NEVER** remove the fuel cap with the engine running.
- Failure to comply will result in death or serious injury.

0000011en

**! DANGER**




**FIRE AND EXPLOSION HAZARD!**

- Diesel fuel is flammable and explosive under certain conditions.
- **NEVER** use diesel fuel as a cleaning agent.
- Failure to comply will result in death or serious injury.

0000012en

**! DANGER**



**FIRE AND EXPLOSION HAZARD!**

- Diesel fuel is flammable and explosive under certain conditions.
- **Only** fill the fuel tank with diesel fuel. Filling the fuel tank with gasoline may result in a fire and will damage the engine.
- **NEVER** refuel with the engine running.
- Wipe up all spills immediately.
- Keep sparks, open flames or any other form of ignition (match, cigarette, static electric source) well away when refueling.
- **NEVER** overfill the fuel tank.
- Fill the fuel tank. Store any containers containing fuel in a well-ventilated area, away from any combustibles or sources of ignition.
- Failure to comply will result in death or serious injury.

0000005en

 **DANGER**



**FIRE AND EXPLOSION HAZARD!**

- Diesel fuel is flammable and explosive under certain conditions.
- If the unit has an electric fuel pump, when you prime the fuel system, turn the key switch to the ON position for 10 to 15 seconds to allow the electric fuel pump to prime the system.
- If the unit has a mechanical fuel pump, when you prime the fuel system, operate the fuel priming lever of the mechanical fuel pump several times until the fuel filter cup is filled with fuel.
- Failure to comply will result in death or serious injury.

0000010en

 **DANGER**



**FIRE AND EXPLOSION HAZARD!**

- Diesel fuel is flammable and explosive under certain conditions.
- Be sure to place the diesel fuel container on the ground when transferring the diesel fuel from the pump to the container. Hold the hose nozzle firmly against the side of the container while filling it. This prevents static electricity buildup which could cause sparks and ignite fuel vapors.
- NEVER place diesel fuel or other flammable material such as oil, hay or dried grass close to the engine during engine operation or shortly after shutdown.
- Failure to comply will result in death or serious injury.

0000014en



**! DANGER**




**CRUSH HAZARD!**

- When you need to transport an engine for repair, have a helper assist you to attach it to a hoist and load it on a truck.
- NEVER stand under a hoisted engine. If the hoist mechanism fails, the engine will fall on you, causing death or serious injury.
- Failure to comply will result in death or serious injury.

000008en

**! DANGER**




**EXPLOSION HAZARD!**

- NEVER check the remaining battery charge by shorting out the terminals. This will result in a spark and may cause an explosion or fire. Use a hydrometer to check the remaining battery charge.
- If the electrolyte is frozen, slowly warm the battery before you recharge it.
- Failure to comply will result in death or serious injury.

000007en

**! WARNING**



**SEVER HAZARD!**

- Keep hands and other body parts away from moving / rotating parts such as the cooling fan, flywheel or PTO shaft.
- Wear tight-fitting clothing and keep your hair short or tie it back while the engine is running.
- Remove all jewelry before you operate or service the machine.
- NEVER start the engine in gear. Sudden movement of the engine and / or machine could cause death or serious personal injury.
- NEVER operate the engine without the guards in place.
- Before you start the engine make sure that all bystanders are clear of the area.
- Keep children and pets away while the engine is operating.
- Check before starting the engine that any tools or shop rags used during maintenance have been removed from the area.
- Failure to comply could result in death or serious injury.

000002en

 **WARNING**



**EXHAUST HAZARD!**

- NEVER operate the engine in an enclosed area such as a garage, tunnel, underground room, manhole or ship's hold without proper ventilation.
- NEVER block windows, vents, or other means of ventilation if the engine is operating in an enclosed area. All internal combustion engines create carbon monoxide gas during operation. Accumulation of this gas within an enclosure could cause illness or even death.
- Make sure that all connections are tightened to specifications after repair is made to the exhaust system.
- Failure to comply could result in death or serious injury.

000003en

 **WARNING**

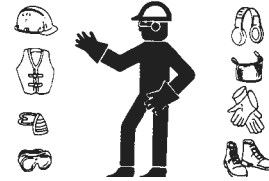


**ALCOHOL AND DRUG HAZARD!**

- NEVER operate the engine while you are under the influence of alcohol or drugs.
- NEVER operate the engine when you are feeling ill.
- Failure to comply could result in death or serious injury.

000004en

 **WARNING**



**EXPOSURE HAZARD!**

- Wear personal protective equipment such as gloves, work shoes, eye and hearing protection as required by the task at hand.
- NEVER wear jewelry, unbuttoned cuffs, ties or loose-fitting clothing when you are working near moving / rotating parts such as the cooling fan, flywheel or PTO shaft.
- ALWAYS tie back long hair when you are working near moving / rotating parts such as a cooling fan, flywheel, or PTO shaft.
- NEVER operate the engine while wearing a headset to listen to music or radio because it will be difficult to hear the alert signals.
- Failure to comply could result in death or serious injury.

000005en

**⚠ WARNING**



**BURN HAZARD!**

- If you must drain the engine oil while it is still hot, stay clear of the hot engine oil to avoid being burned.
- **ALWAYS** wear eye protection.
- Failure to comply could result in death or serious injury.

0000011en

**⚠ WARNING**




**BURN HAZARD!**

- Batteries contain sulfuric acid. **NEVER** allow battery fluid to come in contact with clothing, skin or eyes. Severe burns could result. **ALWAYS** wear safety goggles and protective clothing when servicing the battery. If battery fluid contacts the eyes and / or skin, immediately flush the affected area with a large amount of clean water and obtain prompt medical treatment.
- Failure to comply could result in death or serious injury.

0000007en

**⚠ WARNING**




**HIGH-PRESSURE HAZARD!**

- Avoid skin contact with the high-pressure diesel fuel spray caused by a fuel system leak such as a broken fuel injection line. High-pressure fuel can penetrate your skin and result in serious injury. If you are exposed to high-pressure fuel spray, obtain prompt medical treatment.
- **NEVER** check for a fuel leak with your hands. **ALWAYS** use a piece of wood or cardboard. Have your Komatsu distributor repair the damage.
- Failure to comply could result in death or serious injury.

0000008en

**⚠ WARNING**



**SHOCK HAZARD!**

- Turn off the battery switch (if equipped) or disconnect the negative battery cable before servicing the electrical system.
- Check the electrical harnesses for cracks, abrasions, and damaged or corroded connectors. **ALWAYS** keep the connectors and terminals clean.
- Failure to comply could result in death or serious injury.

0000009en

**⚠ WARNING****ENTANGLEMENT HAZARD!**

- Stop the engine before you begin to service it.
- **NEVER** leave the key in the key switch when you are servicing the engine. Someone may accidentally start the engine and not realize you are servicing it. This could result in a serious injury.
- If you must service the engine while it is operating, remove all jewelry, tie back long hair, and keep your hands, other body parts and clothing away from moving / rotating parts.
- Failure to comply could result in death or serious injury.

0000010en

**⚠ WARNING**

To prevent possible eye injury, always wear **SAFETY GLASSES** while servicing the engine.

0000013en

**⚠ WARNING****BURN HAZARD!**

- Keep your hands and other body parts away from hot engine surfaces such as the muffler, exhaust pipe, turbocharger (if equipped) and engine block during operation and shortly after you shut the engine down. These surfaces are extremely hot while the engine is operating and could seriously burn you.
- Failure to comply could result in death or serious injury.

0000015en

**⚠ WARNING****BURN HAZARD!**

- Wait until the engine cools before you drain the engine coolant. Hot engine coolant may splash and burn you.
- Failure to comply could result in death or serious injury.

0000016en